ATTACHMENT 6.7

RESPONSE TO AER DRAFT DETERMINATION ON AUGMENTATION EXPENDITURE

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1. PURPOSE

The purpose of this paper is to present to the Australian Energy Regulator (AER) Essential Energy's response to the issues raised by the AER in its Draft Determination regarding Essential Energy's Augmentation Expenditure (AUGEX) submitted as part of the 2015 – 2019 substantive regulatory proposal.

2. SUMMARY

In our substantive regulatory proposal we forecast $744.6 million ($2013-14) of augex for the 2014-19 regulatory control period. This expenditure was designed to service spatial demand growth and compliance programs. The supporting attachments to our regulatory proposal provided further detail as to our growth servicing strategy and the key business cases related to our augex program.

In its assessment the AER has focused on the demand forecast, network utilisation and consultant advice. The AER has rejected our forecast and substituted an amount of $475.2 million (2013-14) excluding overheads, a reduction of 36.2 per cent according to the AER. In forming this view the AER's assessment approach utilised trend analysis, an engineering review and the augex model. Which culminate in the identification of a series of issues for recommending the change to Essential Energy's forecast.

Essential Energy has not revised its proposal to adopt the AER's draft decision on augex as we do not consider it will contribute to the achievement of the capital expenditure objectives. In light of the AER's decision we reviewed our augex forecast to ensure it reflected the efficient cost of servicing demand growth and to reflect the latest available information. As such, we have reduced our proposed program by $18.6 million, specifically in response to the new Value of Customer Reliability (VCR) value determined by AEMO and a risk based assessment of each project. This revision is discussed further in section 4.2 of this attachment.

However, this reduction has been offset by the Light Detection and Ranging (LiDAR) program of work, which has identified $77.4M of high risk low clearance mains defects. These revisions are discussed in more detail later in this attachment.

In our revised regulatory proposal our forecast total increase in direct augex due to the review of risk and the inclusion of the LiDAR is an increase of $58.8 million.

Issues raised by the AER regarding Essential Energy's augex expenditure and Essential Energy's response are highlighted in the table below. Essential Energy does not accept that the amount substituted by the AER and provides information in this report to support this position. A review by Jacobs Consulting also concludes that:

> *Our review of the Draft Determinations highlights a number of issues with respect to the AER's approach. Jacobs was able to observe apparent flaws in reasoning, poorly substantiated decisions, and an over reliance on speculative views in the AER's expenditure reduction decisions and the reasoning used to discount the NSW DNSP's Expenditure Proposals.* [1]

Table 2-1: AER Issues and Essential Energy's Response

AER issue	Summary of AERs reasons and findings	Essential Energy's response
Ratcheted Demand	The AER have calculated that ratcheted demand declined by 35 per cent from 2013 to 2014 (Error in AER Spreadsheet)	The AER have made an error when calculating Essential Energy's ratcheted demand. The AER excluded the forecast growth on several substations, due to an error in their spreadsheet. When these loads are included in the AER's spreadsheet the ratcheted demand changes from negative 35 per cent growth to positive 8 per cent growth.

[1] NNSW System Capex & Maintenance Prudency Assessment Report – Page 8 Jacobs Consulting

AER issue	Summary of AERs reasons and findings	Essential Energy's response
	The augex expenditure on HV feeders has a direct linear relationship between forecast demand and expenditure requirements.	46 per cent of Essential Energy's HV feeder augex expenditure is not related to demand. A further 42 per cent is reacting to voltage, fault and quality of supply issues, these issues are not directly related to the overall growth, but are driven by spatial growth and have a larger impact on a rural distributor than an urban based distributor. In a rural distributor if there is falling demand from existing customers in one part of the network and increasing load in another part of the network, the radial characteristic of the network does not enable the spare capacity to be utilised. As we have stated in our submission although the overall growth is low the spatial growth can be significant. Only 12 per cent of the total HV feeder augex is directly related to thermal constraints. But even a component of thermal constraints will be driven by spatial load growth.
	The HV feeder forecast model used by Ausgrid is general enough to apply to other HV distribution networks and that similar cost reductions are achievable.	Essential Energy has a predominantly radial rural network with limited capability to transfer load between feeders. The assumption that the Ausgrid model is applicable without consideration of this difference is not valid. Consequently the proposed reduction in the capex forecast through the application of this model is not accurate. A forecast based on past expenditure is considered by Essential Energy to be a more accurate forecast methodology.
	Essential Energy's HV feeder augex program is based on a conservative approach to asset and risk management.	Essential Energy distribution augex is reactive and is reacting to a known network constraint, it is not reasonable to suggest that the distribution expenditure can be reduced through a risk assessment. By taking a reactive approach to distribution planning (carrying out projects where and when required) and only carrying out projects that are mandatory means that we are taking the maximum risk allowed to maintain mandatory supply standards.

AER issue	Summary of AERs reasons and findings	Essential Energy's response
	Essential Energy did not consider trending of the HV Feeder augex	Essential Energy did not use the forecast demand to determine the future expenditure on HV feeder augex. The forecast was based on the average of the actual 2012/13 and forecast 2013/14 expenditures. These two years are the lowest historical level of growth on the Essential Energy network and hence represent the lowest likely HV Feeder augex expenditure. The reduction in growth expenditure in 2013/14 is as a direct result of the extremely low growth in this year. The actual growth that has been forecast for the 2015-19 period is higher than the growth during the 2012/13 - 2013/14 years, however the forecast expenditure has been held at this base level.
Risk Based Review of Essential Energy's augex	Essential Energy could achieve efficiency gains by applying a risk-based cost benefit analysis assessment techniques to new and ongoing programs of work	**Distribution augex:** Essential Energy distribution augex is reactive and is based on a network constraint, it is not reasonable to suggest that the distribution expenditure can be reduced through a risk assessment. By taking a reactive approach to distribution planning (carrying out projects where and when required) and only carrying out projects that are mandatory means that we are taking the maximum risk allowed to maintain mandatory supply standards. **Subtransmission augex:** All Projects in the subtransmission augex Program have been individually reviewed using the latest published AEMO VCR and a review is included in attachment A to this response
	We expect that Essential Energy will assess the changes to the VCR in the context of submitting a revised regulatory proposal	All subtransmission augex projects have been reviewed and a report on this review is included as appendix A. An internal review of all subtransmission augex has been carried out and approx. $18.6million worth of augex has been deferred, based on a risk based approach, using the latest AEMO VCR. Essential Energy is proposing deferring this work until it has a clear benefit to our customers.
	Essential Energy has not allowed for the changes to the NSW licence conditions design standards that took affect on the 1 July 2014.	**Distribution augex** All distribution augex expenditure to meet Schedule 1 of the NSW reliability licence condition was excluded from Essential Energy's proposal.

AER issue	Summary of AERs reasons and findings	Essential Energy's response
		Subtransmission augex Essential Energy did reduce the proposed expenditure on the Subtransmission network based on the expected outcome of the review of the licence conditions. This review resulted in a reduction of $45 million. In light of the published VCR a full review of all projects has now been carried out and an additional $18.6million has been identified for deferment
	In coming to our view we applied: - trend analysis, comparing the proposed augex with historic expenditure levels, taking into account changes in demand, network capacity and design and planning standards to assess whether the forecast is within a reasonable range to allow Essential Energy to meet expected demand, and comply with relevant regulatory obligations	Essential Energy has forecast augex over the 2014–2019 period of $744.6 million ($2013–14). This is 43.8 per cent less than the actual augex that it spent during the 2009–2014 regulatory control period. Essential Energy's augex for distribution expenditure is based on the lowest demand growth years historically and lower than the expected demand growth during the 2014-2019 regulatory control period. Essential Energy's augex for subtransmission level is itemised with every project being reviewed internally to ensure compliance with the latest VCR.
	The AER, based on the 10-20 per cent range provided by WorleyParsons to Endeavours network, reduced Essential Energy's total augex program by 20 per cent	In WorleyParsons review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019, WorleyParsons state: *"The application of risk based cost benefit analysis assessment techniques to projected programs of work would likely result in reductions to projected expenditure."*[2] The consultant report does not indicate that the reductions for Essential Energy would be in the order expected for Endeavour Energy. The AER provides no substantiation for a conclusion to apply a 20 per cent reduction which appears to be an arbitrarily determined result. This issue is further covered by Attachment 1.4 NNSW System Capex & Maintenance Prudency Assessment E1 – Jacobs[3].

[2] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 22 WorleyParsons

[3] NNSW System Capex & Maintenance Prudency Assessment Report – Jacobs Consulting

AER issue	Summary of AERs reasons and findings	Essential Energy's response
Change in value customers place on electricity reliability	We expect that Essential Energy will assess the changes to the VCR in the context of submitting a revised regulatory proposal	All projects have been reviewed and a revised submission has been included in Essential Energy's revised submission.
Customer connections capex	We consider that capital contributions are mostly driven by connection and augmentation works, and in its revised proposal, we expect Essential Energy to clearly explain how capital contributions should be allocated to each capex driver.	Capital contributions are the value of the assets that are gifted to Essential Energy through the contestability framework in NSW. These assets are generally the connection assets required to connect the new customer to the existing network, however in rural areas and for dominant loads it may include some augmentation of existing assets. Essential Energy does not capture gifted assets into separate categories and capital contributions are allocated to connections.
Real cost escalators	We have not reduced Essential Energy's total forecast capex to reflect this reduction in labour rates as we require further information (i.e. labour costs as a proportion of total forecast capex). We expect Essential Energy to provide this information in its revised regulatory proposal.	A table detailing this information is incorporated in section 4.5.
Demand Management	We seek views on the appropriate capex/opex trade-off that should be included.	While useful tools, Essential Energy does not consider that the current RIT-D and Annual Planning Report alone provide the most appropriate approach in providing incentives for the optimal amount of Demand Management. A broad incentive scheme must be employed to ensure low cost options particularly those with broad, whole of market benefits are employed appropriately, whilst also ensuring that the scheme does not promote the use of non-cost effective outcomes. The appropriate capex/opex trade-off that should be included goes to the core of the AEMC task "Reform of the demand management and embedded generation connection incentive scheme" expected to commence consultation in early 2015, Essential Energy does not consider it appropriate to pre-empt the outcome of this reform suffice to say that Essential Energy supports a simplified D-factor type mechanism incorporating the deemed value of up-stream benefit resulting from DM projects; with additional mechanisms to ensure the benefits of the scheme and reduction of the issues involved, such as smoothing of any applicable compensation and ensuring no implicit capex/opex bias.

3. BACKGROUND

Under the *National Electricity Rules,* Essential Energy, as a Distribution Network Service Provider (DNSP), is required to submit a regulatory proposal to the AER every five years to set appropriate network tariffs. As part of the regulatory proposal Essential Energy has submitted a proposed augex to the AER in respect of regulatory period 1 July 2014 to 30 June 2019.

In our substantive regulatory proposal we forecast $744.6 million ($2013-14) of augex for the 2014-19 regulatory control period. This expenditure was designed to service spatial demand growth and compliance programs. The supporting attachments to our regulatory proposal provided further detail as to our growth servicing strategy and the key business cases related to our augex program.

In its assessment the AER has focused on the demand forecast, network utilisation and consultant advice. The AER has rejected our forecast and substituted an amount of $475.2 million ($2013-14) excluding overheads, a reduction of 36.2 per cent according to the AER. In forming this view the AER's assessment approach utilised trend analysis, an engineering review and the augex model. Which culminate in the identification of two reasons for recommending the change to Essential Energy's forecast. The breakdown and the key reasons provided by the AER in making this reduction are as follows:

- *56 per cent of Essential Energy's augex forecast was based on capacity requirements for their HV network. Essential Energy provided a draft of their 2014 demand forecasts that show a reduction in ratcheted demand of 35.67 per cent. We have used Essential Energy's draft 2014 spatial demand forecasts to reduce the expenditure required for its HV feeders by 35.67 per cent. This follows from analysis by Ausgrid which concluded a positive linear relationship exists between a change in forecast demand and expenditure requirements for HV feeders.*[4].
- *based on independent advice from WorleyParsons, it is evident that Essential Energy's augex forecast is biased because it has not sufficiently taken into account the impact of the changes to the NSW licence conditions design standards that took effect on 1 July 2014. WorleyParsons concluded that Essential Energy could achieve efficiency gains by applying a risk-based cost benefit analysis assessment techniques to new and ongoing programs of work. In light of this advice, and the observed trend in augex, we have applied a further 20 per cent reduction to account for the absence of Essential Energy applying a risk-based cost benefit analysis technique. In our view, this reduction will not put at risk Essential ability to recover at least its efficient costs.*[5]

In addition the AER has requested that several additional points be clarified

Customer connections capex

> *We also accept Essential Energy's proposed capital contributions forecast of $336.11 million ($2013/2014), as we consider it is consistent with Essential Energy's forecast level of connection works which we are also accepting. We consider that capital contributions are mostly driven by connection and augmentation works, We consider that capital contributions are mostly driven by connection and augmentation works, and in its revised proposal, we expect Essential Energy to clearly explain how capital contributions should be allocated to each capex driver.*[6]

Real cost escalators

> *We have also not accepted Essential Energy's proposed real escalation of labour prices on the basis of our reasoning in the opex rate of change appendix. In particular, we have forecast labour price change for the 2014–2019 period based on an average of the forecasts for the electricity, gas, water and waste services sectors from Deloitte and Independent Economics. Historically, an average has better reflected actual labour price changes for the electricity, gas, water and waste services sectors. We have not reduced Essential Energy's total forecast capex to reflect this reduction in labour rates*

[4] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-34.

[5] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-34.

[6] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-11.

as we require further information (i.e. labour costs as a proportion of total forecast capex). We expect Essential Energy to provide this information in its revised regulatory proposal.[7]

Change in value customers place on electricity reliability

We recognise that Essential Energy's augex forecasts were made in advance of the changes to the VCR. We expect that Essential Energy will assess the changes to the VCR in the context of submitting a revised regulatory proposal. For the purposes of making this draft decision, rather than make a specific adjustment for the significant reduction in VCR, we have used it to inform our judgement on the appropriate total augex forecast that we consider reasonably reflects the capex criteria, taking into account all the other evidence discussed in this section.[8]

A.6.3 Conclusion on demand management

Therefore, our draft decision is to not include an explicit reference in the capex or opex forecasts for demand management. Based on the available information, we are currently of the view that it is most appropriate to rely on the incentive framework, together with the new requirements around the RIT-D and the distribution Annual Planning Report, to drive the efficient use of demand management and share the benefits with consumers through the CESS.

However, we welcome views on whether this is the most appropriate approach in providing incentives for the optimal amount of demand management. To the extent that stakeholders consider that the long term interests of consumers may be better promoted through explicit recognition of demand management and consequential adjustments to capex and opex, we seek views on the appropriate capex/opex trade-off that should be included.[9]

This response seeks to discuss in more detail the approach and methodology used by Essential Energy to develop its proposed augex and address the specific issues outlined by the AER.

4. DISCUSSION

In this section, the specific issues raised by AER are discussed:

- Section 4.1 - Ratcheted Demand
- Section 4.2 - Risk Based Review of Essential Energy's augex
- Section 4.3 - VCR Review
- Section 4.4 - Capital Contributions
- Section 4.5 - Real Cost Escalators
- Section 4.6 - Demand Management
- Section 4.7 - LiDAR

The supporting attachments to our substantive regulatory proposal provided further detail as to our growth servicing strategy and the key business cases related to our augex program.

4.1 Ratcheted Demand

The first reason that the AER give for reducing Essential Energy's proposed augex is that:

56 per cent of Essential Energy's augex forecast was based on capacity requirements for their HV network. Essential Energy provided a draft of their 2014 demand forecasts that show a reduction in ratcheted demand of 35.67 per cent. We have used Essential Energy's draft 2014 spatial demand forecasts to reduce the expenditure required for its HV feeders by 35.67 per cent. This follows from

[7] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-12.

[8] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-44.

[9] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-79.

analysis by Ausgrid which concluded a positive linear relationship exists between a change in forecast demand and expenditure requirements for HV feeders.[10]

This results in an understated augex allowance because:

- The growth is actually 8 per cent, there is an error in the calculation of ratcheted demand,
- Not all HV feeder augex expenditure has a linear relationship with demand
- Essential Energy's HV feeder program is based on a reactive program
- Essential Energy's augex is based on the lowest period of growth
- The lower HV feeder utilisation has not resulted in spare capacity which can be used to defer HV feeder augex

4.1.1 Error in AER calculation

The AER have made an error when calculating Essential Energy's ratcheted Demand. The AER excluded the forecast growth on several substations, due to an error in their spreadsheet.

In the draft determination the AER reduced the expenditure on HV feeder augex by $150.6 million ($2013-14) based on their calculation of ratcheted demand. Essential Energy has identified that the AER have made an error when calculating Essential Energy's ratcheted Demand. The AER excluded the forecast growth on several substations, due to an error in their spreadsheet. When these loads are included in the AER's spreadsheet the ratcheted demand changes from negative 35 per cent growth to positive 8 per cent growth. Therefore, we consider the reduction made to the proposed augex is in error based on the AER's own decisions.

When corrected the percentage change in growth becomes positive, rather than negative (which using the AERs methodology would indicate an increase in expenditure over the original submission).The below tables show the original incorrect calculations and corrected calculations.

Table 4-1: The AER's original (incorrect) calculations

	2013 Forecast	2014 Forecast	% Difference ((2014 – 2013) / 2013)
No of +ve growth ZS	291	307	5.5%
Ratcheted Demand Growth	71.29	45.86	-35.67%

Errors were found in the AER's ratcheted maximum demand model where two Zone Substations had blank cells, rather than values of zero, once these values were corrected the outcome is shown as below.

Table 4-2: The AER's model with corrected zero values

	2013 Forecast	2014 Forecast	% Difference ((2014 – 2013) / 2013)
No of +ve growth ZS	291	307	5.5%
Ratcheted Demand Growth	71.29	77.11	8.17%

[10] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-34.

4.1.2 Relationship between HV feeder augex and forecast demand

Augex Drivers

The drivers for augex expenditure are not all impacted by growth and it is not correct to apply a linear relationship to the total HV feeder augex expenditure.

In light of the error made in calculating the ratcheted demand, Essential Energy would not expect that the total HV feeder augex would be increased by 8.17 per cent. Essential Energy would only expect that the AER will apply this increase to the component of HV feeder augex which is aligned with growth.

As stated in WorleyParsons report

> *Expenditure on HV feeders is the major component of augex and it covers growth, reliability and compliance (safety, environmental and legal) associated with HV overhead and underground lines and switchgear.*[11]

and

> *The four largest HV feeder growth programs (voltage constraints, fault level constraints, thermal constraints and customer connections) were examined.* [12]

Each of these different programs is covered in Essential Energy's submission and the relationship to demand is summarised in table 4.3 below.

Table 4-3: Total HV Feeder Augex

Total HV feeder Augex	**$422M**		
DRIVER	% of HV Feeder augex	Description	Relationship to demand
Reliability	27%	Licence compliance – Reactive program to maintain the number of poor performing feeders at 110.	Not driven by demand. Expenditure is unlikely to have any relationship to demand.
Compliance	13%	Compliance with Codes – Main program relates to river crossing and low clearance mains.	Not driven by demand. Expenditure is unlikely to have any relationship to demand.
Growth (Voltage)	18%	Compliance with standard – Reactive program based on voltage survey. Work is only carried out where it is demonstrated that the existing voltage is out of range and the new connecting customers voltage would be out of range.	Driven by confirmed voltage constraint and local spatial demand

[11] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 19 WorleyParsons

[12] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 19 WorleyParsons

Total HV feeder Augex	$422M		
Growth (Thermal)	12%	This program is associated with demand, however work is not based on forecasts but on actual load readings when the connection is requested.	May have a linear relationship with Demand, however there is still a significant component driven by local spatial demand
Growth (Fault level)	12%	Safety – Based on grading review study. Work only carried out if there is an existing mal-grade or the protection is unable to protect the asset.	Driven by confirmed protection constraint and local spatial demand
Growth (Customer)	6%	Driven by growth in customer numbers not demand. This work is reactive. Work associated with customers is identified at the time of connection application. A large proportion of this work is carried out by the contestable contractor.	Not driven by demand. Expenditure is unlikely to have any relationship to demand.
Quality of Supply	10%	Response to customer enquiries (generally voltage outside standard). This program is reactive. The corrective work is carried out based on an enquiry from a customer.	Driven by confirmed constraint and local spatial demand
Demand Management	2%	The demand management program as presented aims to reduce the level of general demand driven growth expenditure. This program is aimed at reducing the overall demand across the network to defer Growth (Thermal) work. To be effective the program needs to be carried out independent of the short term trends. Hence it will not be impacted by the 5 year growth forecast	Proactive program aimed at reducing the overall network demand. This expenditure is based on long term growth but is not impacted by short term trends. Expenditure is unlikely to have any relationship to regulatory period demand forecasts.

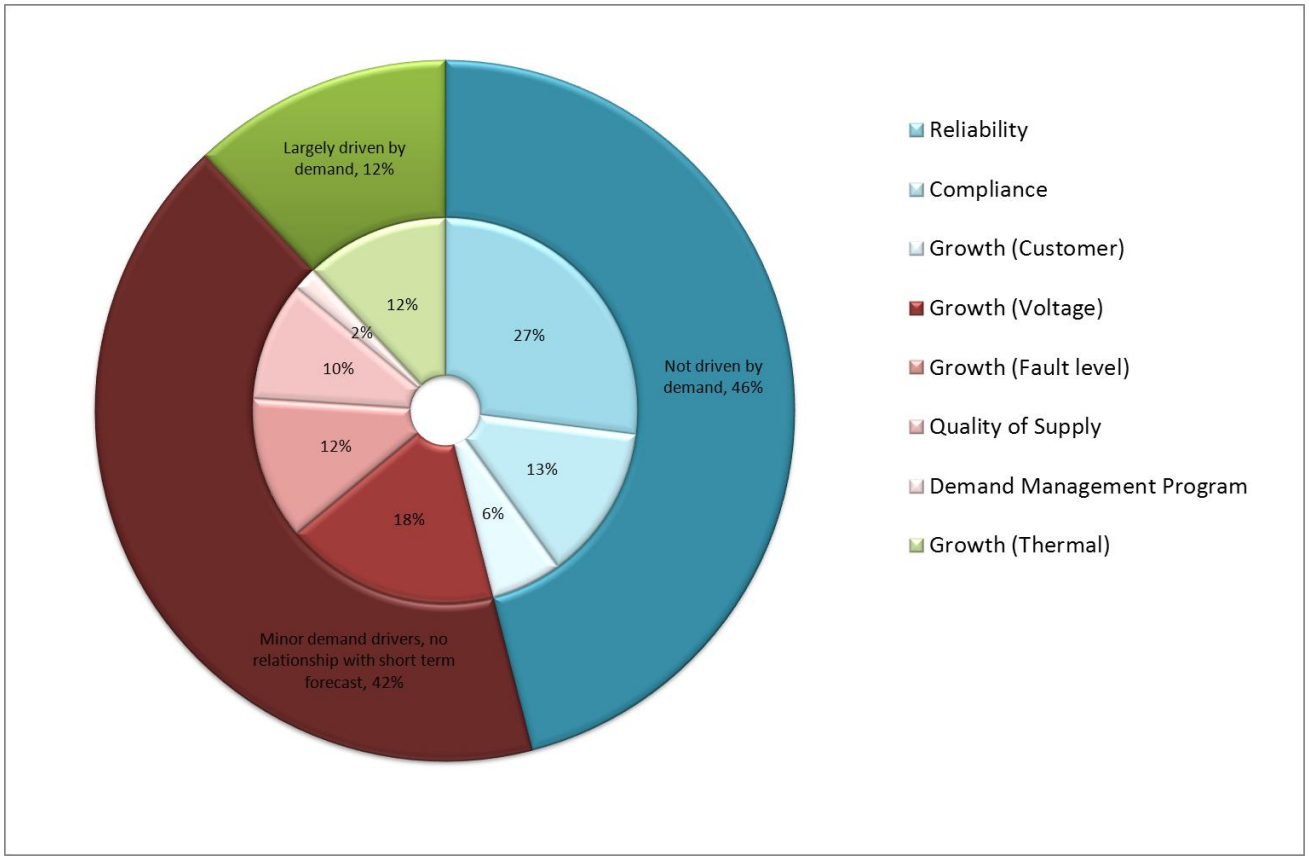

Figure 4.1 Augex expenditure by driver

Forty six per cent of Essential Energy's augex expenditure is not related to demand. Essential Energy's Reliability, Compliance, Growth (Customer) and Demand management programs have no relationship to the level of growth.

In addition 42 per cent is reacting to Growth (voltage), Growth (fault) and quality of supply issues, these issues are not directly related to the overall growth, but are driven by spatial growth and have a larger impact on a rural distributor than an urban based distributor. For a rural distributor if there is falling demand from existing customers in one part of the network and increasing load in another part of the network, the radial characteristic of the network does not enable the spare capacity to be utilised. As we have stated in our submission although the overall growth is low the spatial growth can be significant.

Only 12 per cent of the total augex is related to thermal constraints.

For a rural distributor there is only a small component of the HV feeder growth which would have a linear relationship with augex expenditure. Essential Energy did not use the forecast demand to determine the future expenditure on HV feeder augex. The forecast was based on the average of the actual 2012/13 and forecast 2013/14 expenditures. These two years are the lowest historical level of growth on the Essential Energy network and hence represent the lowest likely HV Feeder augex expenditure.

As such any adjustment to Essential Energy's distribution HV feeder augex should be based on the difference between the actual demand growth in 2013 and 2014 compared to the forecast growth. This would then only apply to the small component of growth that has a linear relationship with expenditure.

4.1.3 Risk management approach to Essential Energy's HV feeder augex program.

Essential Energy's forecast of HV feeder augex is based on a reactive program of work during a period of zero growth and as such cannot be reduced further.

Essential Energy's HV augex expenditure is based on a reactive approach. This is identified in WorleyParsons review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 - 2019 which states;

> *Essential Energy has based its underlying expenditure level on all reactionary programs for HV feeders on the average of the expenditure over the past two years (i.e. the actual expenditure for 2012/13 and the estimated expenditure for 2013/14) and it has assumed that the allocation of this expenditure will follow the same breakdown as the average allocation over the past four years.*[13]

WorleyParsons further point out that we have made no additional expenditure forecast to account for forecast load increases. In fact Essential Energy based the forecast augex expenditure at the average of 2012/13 and 2013/14 level. This point is highlighted by WorleyParsons when they state;

> *The expenditure in most subcategories is reactionary and due primarily to the consequences of growth, e.g. power quality issues. Although overall growth projections are flat there will be local pockets of growth and Essential considers that the expenditure over the past two years under similar conditions is the best indicator of future requirements.*[14]

This approach to forecasting expenditure is supported in the WorleyParsons review which states:

> *Whilst the concept of using past expenditure for forecasting is supported, it is considered that this also needs to account for any underlying trends such as experienced from 2012. A further reinforcement of this been the understood $1.5M in $25M underspend for the last six months of 2013/14 for the growth related programs even though it was reforecast in February 2014.*[15]

WorleyParsons acknowledge that Essential Energy's augex program is reactive and that the forecast is based on the actual spend for the 2012/13 – 2013/14 period.

This average expenditure aligns with the lowest growth ever experienced on the Essential Energy network. This is reflected in the lower than forecast augex expenditure during 2013/2014.

As Essential Energy distribution network augex during the 2012/13 – 2013/14 period was reactive (only carrying out projects where and when required) and coincides with the lowest growth experienced on the network, it is not reasonable to suggest that the distribution expenditure can be reduced through a risk assessment. By using this period as our base for our forecasts we are taking the maximum risk allowed to maintain mandatory supply standards.

4.1.4 Trending of the HV feeder augex

Essential Energy has allowed for the trend in expenditure between 2012 and 2014 when determining the forecast HV feeder augex.

WorleyParsons highlighted the need to account for any underlying trend.[16]

Although Essential Energy has not built growth into the forecast expenditure, there is a component of the augmentation expenditure that is driven by the underlying trend in maximum demand, such as the reduction in augex expenditure experienced since 2012. This was further demonstrated by a $1.5 million reduction in expenditure in the later half of the 2013/14 year which aligned with a lower than expected growth.

Essential Energy is reactionary when carrying out distribution augex, expenditure is related to actual network demands rather than a forecast. Essential Energy has forecast expenditure during the next regulatory control period to remain at the same level as the average of the 2012/13- 2013/14 years. Based on the forecasts of positive growth for the period 2015 to 2019 it is reasonable to expect that Essential Energy's forecast augex for HV feeders is likely to be at the bottom end of the of prudent and efficient level of augex.

It is incorrect to suggest that Essential Energy did not account for the drop in expenditure from 2012. Essential Energy identified that the high augex expenditure in 2011/12 was due to a proactive program to improve voltage levels in sections of the network were the voltage was below the supply standard requirement. The 2012/13- 2013/14 years were selected because only reactive work was carried out and these years represent only spatial growth as the total network growth was zero in 2012/13 and total network

[13] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 20 WorleyParsons

[14] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 21 WorleyParsons

[15] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 21 WorleyParsons

[16] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 22 WorleyParsons

growth was actually negative in 2013/14. This average expenditure aligns with the lowest growth experienced on the Essential Energy network and lower than forecast for the present regulatory periods. The lower than forecast growth in 2013/14 resulted in expenditure below budget. This is reflected in the lower than expected augex expenditure during 2013/2014.

Although Essential Energy has not built growth into the forecast expenditure, there is a component of the augmentation expenditure that is responsible for the underlying trends such as experienced from 2012. Based on the forecasts of positive growth for the period 2015 to 2019 it is reasonable to expect that Essential Energy's forecast augex for HV feeders is likely to be at the lower end of the prudent and efficient level of augex.

4.1.5 Asset Utilisation

The lower HV feeder utilisation has not resulted in spare capacity which can be used to defer HV feeder augex

The AER's trend analysis appears to be a mixture of benchmarking and consideration of macro factors such as licence conditions and capacity utilisation. Essential Energy developed a forecast utilising a bottom up method which accounted for our operating environment and obligations at our subtransmission level and a top down approach based on historical data for distribution forecasts.

Whilst asset utilisation has declined we consider existing assets cannot adequately service the localised growth we are seeking to address. No technical review has been conducted by the AER to validate the legitimacy and practicality of their position.

The Distribution "N-1" Reliability Licence conditions required work in only 19 regional towns over the whole of rural NSW and then only on the front section of the feeder. Schedule 1 of the Reliability Licence Conditions required HV feeder work in only 19 regional towns over the whole of rural NSW and then only on the front section of the feeder. It is highly unlikely that this reduction in utilisation will constitute a reserve of capacity to allow future augmentation to be deferred. The intention of the N-1 security standard for distribution feeders was to allow faster response to outages in existing urban areas of the network. No technical review has been conducted by the AER to validate the legitimacy and practicality of their position that the lower utilisation will lead to reduced future augmentation capital expenditure.

The HV feeder utilisation as represented in the AER response uses feeder demands and the feeder capacity as defined by the AER in the RIN.

The relevant HV feeder information was provided to the AER with a number of qualifying statements so that reasonable care would be demonstrated in drawing conclusions as there are complexities and problems inherent with the data. These issues are summarised in the following points:

- The use of non-weather corrected demand data.
- The metric used to calculate HV feeder capacity
- The input data used to determine asset capacity
- Zone substation utilisation

- **The use of non-weather corrected demand data.**

Direct conclusions cannot be drawn from the components of Essential Energy's RIN data the AER has used; as explained in the documentation provided to the AER with the RIN. Essential Energy has not weather corrected the actual demands presented in the RIN, therefore any assumptions made on the utilisation of assets in a given year are relative to the weather in that particular region in that year. Given the AER's focus on requiring weather corrected data in future RINs it can be safely assumed that the AER understands the detrimental implications and error implied in using non-weather corrected data.

- **The metric used to calculate HV feeder capacity**

The HV feeder capacity as defined by the AER is; "The high voltage feeder rating should be based upon the main trunk segment exiting the substation". The use of this methodology to calculate HV feeder capacity has no relevance to the capacity of the HV feeder for the majority of Essential Energy's network due to the high

quantity of voltage constrained feeders.

In order to highlight the issue, the below diagram shows two physically identical feeders which having reached a voltage of 0.92p.u at the feeder ends are voltage constrained, it can be seen that both feeders have a thermal limitation of 150A, however the location of the load (or load growth) determines the true capacity of the feeder which in the first case is 45A before a voltage constraint is reached, in the second case 36A before voltage constraint is reached, neither of these values have any correlation to the RIN's metric of 150A (thermal limit).

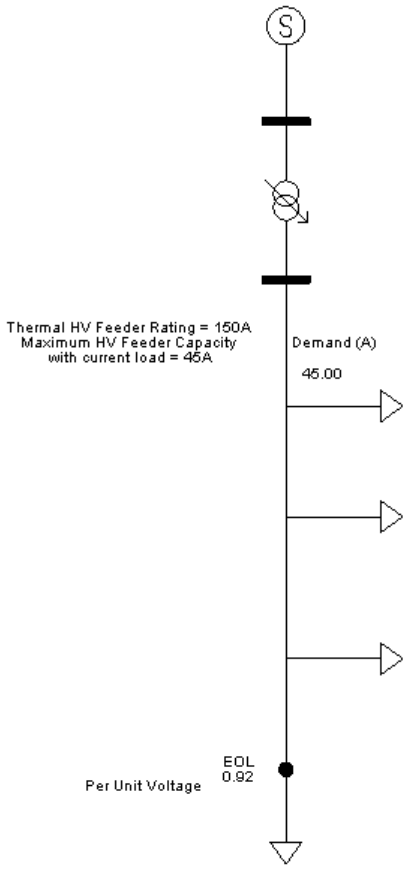

Figure 4-2: Voltage Constrained Feeder B loading 1

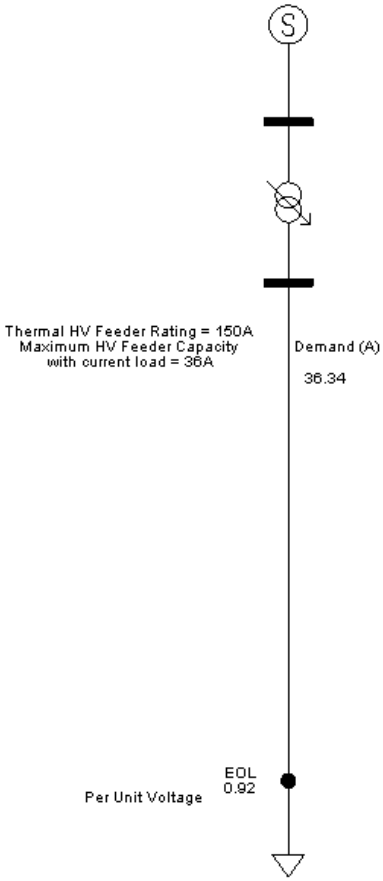

Figure 4-3: Voltage Constrained feeder B – loading 2

Now consider where Essential Energy prudently invests in an upgrade to the first trunk segment e.g. to permit back feeding, as minor works accompanying zone substation upgrades or as replacement of a currently non-standard asset with a standard conductor. In any of the fore mentioned cases, the investment is not required to cater for load growth, the true capacity of the feeder is unlikely to have changed, yet the AER's definition of utilisation would likely have changed dramatically.

Even when considering an upgrade to the first trunk segment of a feeder in order to relieve a voltage constraint, the actual capacity increase is not commensurate with the increase in capacity in the first trunk segment. Therefore when using the first trunk segment as the feeder capacity, any augmentation to the first trunk segment on a voltage constrained feeder will result in decreased asset utilisation.

- **The input data used to determine asset capacity**

It was highlighted in the RIN documentation that data provided in the RIN for HV feeder capacity is not a true reflection of actual feeder ratings due to the voltage issues highlighted above, a lack of accurate data on feeder ratings and increasing accuracy of the data showing artificial growth in capacity.

- **Zone substation utilisation**

Essential Energy agrees that utilisation at Zone Substation level has likely decreased due to regulatory obligations imposed upon the DNSPs during the period in question. Essential Energy does not agree with the generalised statement accompanying the asset utilisation that there is “excess capacity in the network”. The AERs measurement of asset utilisation does not take into account what the prudent demand requirements are and therefore is unable to determine a level of excess capacity in the network.

As an example, the increase of assets to cater for N-1 conditions at the zone substation is likely to be prudent under VCR calculations, however the increase in assets increases capacity as measured by the AER, without a proportionate increase in demand and therefore will exhibit a strong reduction in the defined asset utilisation. However the increase in capacity as measured by the AER does not constitute any excess capacity for the prudent operator.

Therefore whilst asset utilisation as defined by the AER has decreased, much of the reduction is likely to be maintained by a prudent operator when considering the value of lost load to the customer.
That said, Essential Energy has taken into account the removal of the deterministic N-1 license condition, and incorporated the use of VCR and the expected growth rate and decreased its Zone Substation augmentation spend in line with these expectations.

It should also be noted that a rural distributor can never achieve similar asset utilisation to an efficient urban distributor. This is due to typically smaller zone substation size and consequently the number of transformers per zone substation, and the percentage step change between standard sizes increasing as transformer size decreases.

The following simple example shows the maximum utilisation versus number of transformers. As shown a greater number of transformers per zone substation allows for greater utilisation, therefore it can be expected that a rural distributor with fewer assets per zone substation would have a lower utilisation than an urban distributor.

Table 4-4 Zone transformer utilisation

No of Transformers	Maximum theoretical utilisation (assuming n-1 is prudent)
2	50%
3	66%
4	75%

The following simple example shows some common transformer sizes purchased over the last 10 years, as shown the smaller the transformer size the greater the step size in transformer. Note that at the lower levels of transformer sizing it is reasonable to expect that prudent investments in transformer upgrades may result in certain sized transformers being skipped. Therefore it can be expected that a rural distributor with smaller assets per zone substation would have a lower utilisation than an urban distributor

Table 4-5

Common Zone Substation Transformer sizes from the last 10 years (MVA)	% step change in size
1	
3	200%
4	33%
8	100%
10	25%
16	60%
20	25%
30	50%
45	50%
60	33%

4.2 Risk Based Review of Essential Energy's augex

The second reason that the AER give for reducing Essential Energy's augex is:

> *based on independent advice from WorleyParsons, it is evident that Essential Energy's augex forecast is biased because it has not sufficiently taken into account the impact of the changes to the NSW licence conditions design standards that took effect on 1 July 2014. WorleyParsons concluded that Essential Energy could achieve efficiency gains by applying a risk-based cost benefit analysis assessment techniques to new and ongoing programs of work. In light of this advice, and the observed trend in augex, we have applied a further 20 per cent reduction to account for the absence of Essential Energy applying a risk-based cost benefit analysis technique. In our view, this reduction will not put at risk Essential ability to recover at least its efficient costs.*[17]

This results in an understated augex allowance because:

- Essential Energy has used a risk based approach in developing the programs of work,
- The AEMO VCR has been used to assess our augex for the revised regulatory proposal
- The changes to the NSW reliability licence conditions have been allowed for.
- The observed trend was allowed for in Essential Energy's augex program.
- WorleyParsons report does not indicate that the reductions for Essential Energy would be in the order expected for Endeavour Energy.

[17] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-34.

4.2.1 Asset and risk management approach to programs of work

Distribution augex:

Essential Energy distribution augex is reactive and is based on a network constraint. Essential Energy's approach to forecasting distribution augex is summarised in our response to 4.1,

Subtransmission augex:

Where relevant, the Essential Energy Value of Customer Reliability (VCR) procedure is used to provide a probabilistic assessment of the augex project investments proposed for the 2014 – 19 regulatory period. Essential Energy's VCR procedure is based on the procedures promoted by AEMO and the consideration of the revised planning procedures proposed for adoption by the NNSW DNSP's in lieu of the previous licence compliance conditions.

This procedure generally involves comparing a derived value for the energy which would not be supplied (i.e. is at risk) as the result of a network contingency to an annualised value of the capital investment required to complete a nominated network augmentation.

The project costs are based on nominal design and unit rate costs with the annualised cost derived from this using the appropriate formula and a nominated WACC rate (e.g. 7 per cent) and asset life (e.g. 40 years) The Energy at Risk (EAR) is indicated by the area under the Load Duration Curve (LDC) which is derived from half hourly metering data and annotated with the related annual maximum demand (MW) and quantity of energy (MWh). This can be adjusted for load transfers to alternate supply/s if applicable.

Expected Unserved Energy (EUSE) assessment - is the product of the EAR and the assessed "unavailability" of the supply, it being the product of supply fault risk and time off supply (time to repair and/or transfer load to alternate supply)

The "fault risk" for subtransmission lines is assessed from industry accepted asset component failure rates (e.g. 0.75 pa/100km for fully shielded subtransmission lines; 2 pa/100km for unshielded lines) and "time off supply" based on the mean time to repair (MTTR). For rural zone substation transformers, a failure rate of 1 per 20years is allowed with a MTTR of 48-72 hours.

The VCR is the product of the EUSE (MWh) and the AEMO advised value of unserved energy (~$38k/MWh)

Essential Energy has reviewed all of the subtransmission augex programs using a risk based cost benefit analysis incorporating the latest AEMO VCR values.

4.2.2 Changes to the revised regulatory proposal resulting from the VCR.

Essential Energy did reduce the proposed expenditure on the Subtransmission network based on the expected outcome of the review of the licence conditions. This review resulted in a reduction of $45Million.

In light of the published VCR a full risk based review of all projects has now been carried out and an additional $18.6 million has been identified for deferment based on the adoption of the AEMO VCR values.

The summary report is attached as Appendix A to this report.

4.2.3 Changes to the NSW license that took affect on the 1 July 2014.

Essential Energy has made allowances for the changes to the NSW licence condition design standards and does not agree with the arbitrary reduction proposed by the AER as a a result of their finding. Details on the changes made by Essential Energy to the changes are detailed below for distribution and subtranbsmission assets.

A review by Jacobs Consulting has found that:

> *The AER's finding and subsequent reductions relating to the changed Design, Reliability and Performance Licence Conditions rely on a consultant report which identifies a reasonable range of potential augex reductions of between 10 to 20% - where the AER has then applied reductions of 15, 15 and 20% to the NSW DNSPs. However, in Jacobs' view the consultant's conclusions do not*

directly align with the AER's finding; in particular:

- *The AER's consultant's identified range of 10-20% is a speculation that is not robustly substantiated and is discussed only with respect to Endeavour Energy. Also, it seems to relate to a number of variable factors than specifically to the licence e condition changes. The AER has then applied the 10-20% speculation to all NSW DNSPs.*
- *It does not appear that specific augex program reductions made by the DNSPs to their baseline augex forecasts have been considered. These reductions occurred prior to the CASH/PIP process.* [18]

Distribution network

Our Proposal is based on adopting the maximum allowed risk by excluding all distribution expenditure which was not of a mandatory nature, This is recognised in the WorleyParsons review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 carried out for the AER, when WorleyParsons state:

> *The expenditure in most subcategories is reactionary and due primarily to the consequences of growth, e.g. power quality issues. Although overall growth projections are flat there will be local pockets of growth and Essential considers that the expenditure over the past two years under similar conditions is the best indicator of future requirements.*[19]

All distribution augex expenditure to meet Schedule 1 of the NSW reliability licence condition was excluded from Essential Energy's proposal.

Subtransmission network

Essential Energy did reduce the proposed expenditure on the Subtransmission network based on the expected outcome of the review of the licence conditions.

In WorleyParsons review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 - 2019 carried out for the AER, WorleyParsons have stated:

> *Essential has identified a further six sub transmission projects that were deferred until beyond the 2014-19 regulatory control period. The costs of these projects were not included in the augex forecasts. These projects are:*
>
> - *Boggy Creek-Nambucca Heads 66kV feeder*
> - *Temora-Thanowring 66kV feeder*
> - *Evans Lane-Batemans Bay 132kV feeder*
> - *Beryl-Mudgee (tee) 132kV feeder (a cheaper immediate alternative was identified with anauto-changeover scheme to be added to the existing arrangement by 2015/16)*
> - *Taree-Failford-Tuncurry-Forster-Bohnock 66kV feeders (a cheaper alternative was identified with the existing system by adding reactive support and revised line ratings)*
> - *TransGrid Tamworth TS-Quirindi 66kV feeder*
>
> *The basis for deferral of these augmentation projects has been stated as the repeal of the Schedule 1licence conditions (responses from Essential dated 17 September 2014).*[20]

This review resulted in a reduction of $45 million.

In light of the published VCR a full risk based review of all projects has now been carried out and an additional $ 8.2 million has been identified for deferment based on the adoption of the AEMO VCR values. In addition a further $10.4 million project has been deferred based on an assessment of the risk of the load

[18] NNSW System Capex & Maintenance Prudency Assessment Report – Page 28 Jacobs Consulting

[19] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 21 WorleyParsons

[20] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 19 WorleyParsons

connecting. The total reduction in major project augex is forecast to be $18.6 million. This has resulted in a reduction in our subtransmission augex from $168 million to $149.4 million a reduction of 11%.

In regard to the reductions made to the forecast to account for changed licence conditions, it was found by Jacobs Consulting that:

> *In any case, given the $214 M reduction made by the NSW DNSPs was the outcome of a detailed assessment process, in our opinion, it would be prudent to apply further detailed analysis to determine the potential for any additional reductions rather than simply speculating on a percentage reduction based on arguable reasonableness.*[21]

Detailed analysis has been undertaken and updated with the latest VCR values and any other current information. The outcome of this analysis as described above is included in the revised proposal.

4.2.4 Observed trend in augex.

Essential Energy forecast augex over the 2014–2019 period is $744.6 million ($2013–14). This is 43.8 per cent less than the actual augex that it spent during the 2009–2014 regulatory control period.

In Worley Parson's review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 - 2019 WorleyParsons state that:

> *There has been a downward trend since 2012 in the costs associated with HV feeder works and this trend has only been partly recognised.*[22]

This statement does not recognize the fact that the two years 2012/13 and 2013/14 saw zero growth and in fact negative growth for 2013/14 which resulted in expenditure below forecast.

It is incorrect to suggest that Essential Energy did not account for the drop in expenditure from 2012. Essential Energy identified that the high augex expenditure in 2011/12 was due to a proactive program to improve voltage levels in sections of the network were the voltage was below the supply standard requirement. The 2012/13- 2013/14 years were selected because only reactive work was carried out and these years represent only spatial growth as the total network growth was zero in 2012/13 and was actually negative in 2013/14. This average expenditure aligns with the lowest growth experienced on the Essential Energy network and lower than forecast for the present regulatory period. The lower than forecast growth in 2013/14 resulted in expenditure below budget; and is reflected in the lower than expected augex expenditure during 2013/2014.

Essential Energy's augex for distribution expenditure is based on the lowest growth years historically and lower than the expected growth during the 2014-2019 regulatory control period.

Although Essential Energy has not built growth into the forecast expenditure, there is a component of the augmentation expenditure that is responsible for the underlying trends such as experienced from 2012. Based on the forecasts of positive growth for the period 2015 to 2019 it is reasonable to expect that Essential Energy's forecast augex for HV feeders is likely to be at the bottom end of the of prudent and efficient level of augex.

Essential Energy's augex for subtransmission level is itemised with every project being reviewed internally to ensure compliance with the latest VCR.

The AER have also identified[23] that Essential Energy's 43.8 percent reduction in augex is significantly less than the reductions seen by Ausgrid and Endeavour. Based on this comparison the AER then draw the conclusion that Essential Energy could reduce its augex program. As stated above and throughout this attachment Essential Energy has identified the augex program by a combination of bottom up and top down forecasts which reflect the prudent expenditure on the network. The use of such a untested and unproven

[21] NNSW System Capex & Maintenance Prudency Assessment Report – Page 30 Jacobs Consulting

[22] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 22 WorleyParsons

[23] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-38.

benchmark appears to have no substantiation as there are many factors which are not considered in such a high level comparison.

The AER also states[24] that Essential Energy has not identified constraints. The distribution augex is forecast based on the expenditure in the lowest growth years and represents the lowest prudent expenditure required to meet our supply standards. The subtransmission augex is based on a bottom up build of all projects that are required. A full list of these projects and the constraints they are addressing was included within the planning reports which were attached to Essential Energy's substantive regulatory proposal.

4.2.5 Reduction of Essential Energy's total augex program by 20 per cent based on comments made about Endeavour Energy.

This issue is highlighted in Essential Energy's attachment 1.4 JACOB's Review NNSW System Capex and Maintenance Prudency Assessment Jacobs and is summarised here.

The AER's finding and subsequent reductions relating to the changed Design, Reliability and Performance Licence Conditions rely on a consultant report which identifies a reasonable range of potential augex reductions of between 10 to 20 per cent - for Endeavour Energy.

For Essential Energy the consultant report does not speculate on the likely level of reduction and instead states:

> *The application of risk based cost benefit analysis assessment techniques to projected programs of work would likely result in reductions to projected expenditure.*[25]

In Jacob's view the conclusions do not align with the AER's finding; in particular:

- **The identified range of 10-20 per cent is a speculation that is not robustly substantiated and is discussed only with respect to Endeavour Energy. The AER has then applied this speculation to Essential Energy.**
- **It does not appear that specific augex program reductions made by Essential Energy to its baseline augex forecasts have been considered. These reductions were not part of the CASH/PIP process and are shown in table 4-7.**

Table 4-6 below identifies $45.2 M of project expenditure that was removed from Essential Energy's baseline augex programs based on engineering reviews that considered cost-benefit factors in light of the changes to the Design, Reliability and Performance Licence Conditions.

This demonstrates that Essential Energy:

- **Did carry out a cost-benefits review in relation to the changes to the Licence Conditions; and**
- **Through this review achieved a reduction of $45.2M to the augex forecast.**

[24] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-38.

[25] Review of Proposed Augmentation Capex in NSW DNSP Regulatory Proposals 2014 -2019 – page 22 WorleyParsons

Table 4-6: Summary of Reductions in Capex Due to Removal of NSW Design Reliability and Performance Licence Conditions - Schedule 1

Project Name	$ Million
Essential Energy	
TG Port Macquarie to Rocks Ferry - reconductor 33kV conductor	$ 2.4
Tamworth to Quirindi (Werris Ck) - construct 132kV feeder and 132/66kV substation	$ 23.0
Orange Industrial ZS - upgrade 66/11 kV transformer	$ 1.1
Griffith West - new dual 132kV feeder (operate 33kV)	$ 7.3
Bourkelands ZS - upgrade 2 x 66/11 kV transformers	$ 2.9
Bourkelands to Uranqunity - construct new 66kV feeder	$ 5.0
Reduction in overloaded 11kV distribution feeder reinforcement	$ 3.4
Essential Energy Total	**$ 45.2**

(Source: Networks NSW – Attachment 2 – NNSW Licence Conditions Adjustments.xlsx – Worksheet: Schedule 1 Impacted Projects)

It is noted that there is a lack of analysis from which the initial 10 to 20 per cent value has been determined, other than "*it would be reasonable to expect*". Additionally, the identified range is only discussed with respect to Endeavour Energy whereas the comments in the report relating to Essential only indicate reductions "*may be possible*". The consultant report does not indicate that the reductions for Essential Energy would be in the order expected for Endeavour Energy.

It is also noted that while the consultant's report acknowledges that further augex reductions would have been achieved through the CASH/PIP process, it does not appear that the magnitude of these reductions have been taken into account in establishing the speculated "*reasonable range*".

Finally, given the $45.2 M reduction made by Essential Energy was the outcome of a detailed assessment process. Essential Energy believes it would be prudent to apply further detailed analysis to determine the potential for any additional reductions as opposed to the method adopted by the AER.

A report of Essential Energy augex projects is attached to this response in Appendix A and all augex major projects have been reviewed in light of the AEMO VCR findings. From a detailed risk based review Essential Energy has identified $8.2M of projects that may be deferred based on a probalistic review. In addition Essential Energy has reviewed all greenfield development projects which would generally not be subject to a VCR risk approach and has identified that an additional project may be deferred to beyond this regulatory control period. The reduction to Essential Energy's augex program is an additional $10.4 million. The total reduction in major project augex is forecast to be $18.6 million.

4.3 VCR review

On PAGE 6-44 of the AER Draft Decision the AER have requested that:

> *We recognise that Essential Energy's augex forecasts were made in advance of the changes to the VCR. We expect that Essential Energy will assess the changes to the VCR in the context of submitting a revised regulatory proposal. For the purposes of making this draft decision, rather than make a specific adjustment for the significant reduction in VCR, we have used it to inform our judgement on the appropriate total augex forecast that we consider reasonably reflects the capex criteria, taking into account all the other evidence discussed in this section.*[26]

As discussed in section 4.2.5 Essential Energy has now carried out a full risk based assessment of all of the augex projects and the results of this review are attached to this response as Appendix A.

[26] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-44.

4.4 Customer Connection Capex

On PAGE 6-11 of the AER Draft Decision the AER have requested that:

> *We also accept Essential Energy's proposed capital contributions forecast of $336.11 million ($2013/2014), as we consider it is consistent with Essential Energy's forecast level of connection works which we are also accepting. We consider that capital contributions are mostly driven by connection and augmentation works, We consider that capital contributions are mostly driven by connection and augmentation works, and in its revised proposal, we expect Essential Energy to clearly explain how capital contributions should be allocated to each capex driver.*[27]

Capital contributions are the value of the assets that are gifted to Essential Energy through the contestability framework in NSW. These assets are generally the connection assets required to connect the new customer to the existing network, however in rural areas and for dominant loads it may include some augmentation of existing assets. Essential Energy does not capture gifted assets into separate categories and capital contributions have been reported within connections.

4.5 Real Cost Escalators

On PAGE 6-12 of the AER Draft Decision the AER have requested that:

> *We have also not accepted Essential Energy's proposed real escalation of labour prices on the basis of our reasoning in the Opex rate of change Appendix. In particular, we have forecast labour price change for the 2014–2019 period based on an average of the forecasts for the electricity, gas, water and waste services sectors from Deloitte and Independent Economics. Historically, an average has better reflected actual labour price changes for the electricity, gas, water and waste services sectors. We have not reduced Essential Energy's total forecast capex to reflect this reduction in labour rates as we require further information (i.e. labour costs as a proportion of total forecast capex). We expect Essential Energy to provide this information in its revised regulatory proposal.*[28]

As illustrated in Table 4-7 the impact of labour escalators on capital expenditure is $32 million over the 2014-19 regulatory control period.

Table 4-7: Impact of labour escalators on forecast capital expenditure ($2013-14, millions)

	Forecast year ending 30 June					
	2015	2016	2017	2018	2019	Total
Revised EGW wages real labour escalation rate	0.71%	1.00%	1.55%	1.56%	1.44%	n/a
Revised general wages real labour escalation rate	0.68%	1.33%	1.27%	1.17%	1.20%	n/a
Revised capital expenditure – pre real escalation						
Growth (demand related)	176	153	140	136	127	733
Asset Renewal or Replacement	208	248	249	238	229	1,172
Reliability & Quality of Service Enhancements	27	31	31	31	31	151
Environmental, Safety, Statutory Obligations	33	40	40	35	36	185
Non-system*	73	51	51	43	37	255

[27] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-11.

[28] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-12.

	Forecast year ending 30 June					
	2015	2016	2017	2018	2019	Total
Capital expenditure excluding labour escalators	**519**	**523**	**511**	**484**	**459**	**2,496**
Revised capital expenditure – post real escalation						
Growth (demand related)	177	154	142	139	130	742
Asset Renewal or Replacement	209	249	253	243	235	1,189
Reliability & Quality of Service Enhancements	27	31	31	31	32	154
Environmental, Safety, Statutory Obligations	33	41	40	36	37	187
Non-system*	73	51	52	44	38	257
Revised capital expenditure – post real escalation	520	527	518	493	471	2,529
Impact of labour escalation included in RRP	**1**	**3**	**7**	**9**	**12**	**32**

4.6 Demand Management

On PAGE 6-79 of the AER Draft Decision the AER have requested that:

> *Therefore, our draft decision is to not include an explicit reference in the capex or opex forecasts for demand management. Based on the available information, we are currently of the view that it is most appropriate to rely on the incentive framework, together with the new requirements around the RIT-D and the distribution Annual Planning Report, to drive the efficient use of demand management and share the benefits with consumers through the CESS.*
>
> *However, we welcome views on whether this is the most appropriate approach in providing incentives for the optimal amount of demand management. To the extent that stakeholders consider that the long term interests of consumers may be better promoted through explicit recognition of demand management and consequential adjustments to capex and opex, we seek views on the appropriate capex/opex trade-off that should be included.*[29]

While useful tools, Essential Energy does not consider that the current RIT-D and Annual Planning Report alone provide the most appropriate approach in providing incentives for the optimal amount of Demand Management. A broad incentive scheme must be employed to ensure low cost options particularly those with broad, whole of market benefits are employed appropriately, whilst also ensuring that the scheme does not promote the use of non-cost effective outcomes.

The appropriate capex/opex trade-off that should be included goes to the core of the AEMC task "Reform of the demand management and embedded generation connection incentive scheme" expected to commence consultation in early 2015, Essential Energy does not consider it appropriate to pre-empt the outcome of this reform. Essential Energy supports a simplified D-factor type mechanism incorporating the deemed value of up-stream benefit resulting from DM projects.

[29] Draft decision Essential Energy distribution determination 2015-16 to 2018-19 Attachment 6 : Capital expenditure – page 6-79.

Many of these issues where discussed in Ausgrids issue paper submitted to the AEMC on the 16th September 2011 as part of the Power of Choice review .

4.7 LiDAR

In the NSW DNSPs' Response to the AER's Issues Paper it was foreshadowed that Essential Energy had commenced a program of inspecting the network using Light Detection and Ranging technology:

> *Essential Energy's approach to asset renewal is becoming increasingly strategic and sophisticated; for example, LIDR technology is currently being rolled out over the distribution network. Early results indicate significantly more defects have been found than originally estimated meaning the replacement expenditure proposed by Essential Energy may be underestimated.* [30]

In 2014 Essential Energy initiated a new contracted inspection methodology on state-wide contracts with other NSW DNSP's utilising Hi Definition photography of pole top assemblies and LiDAR technology to establish conductor clearances to vegetation, ground and other circuits by aircraft. This is referred to as Aerial Patrol and Analysis (AP&A) including LiDAR survey and is now an industry accepted practice for better understanding of pole top condition monitoring, line design profiling and vegetation clearance status.

The 2014 inspections identified relatively higher volumes of Opex and compliance augex related maintenance tasks of an urgent risk, risk, and general maintenance severity, which typically require actioning within 14 days, six months, and two to four years respectively. The costs for this work were not included in the 2015 – 2019 investment submissions to the AER as inspections were still in progress and the results unknown at the time of submission.

The risk exposure varies across the tasks identified and it is Essential Energy's intention to prudently focus on a limited number of higher public risk tasks.Essential Energy has identified a high risk program aimed at ensuring that low distribution lines are raised. As this work is based on a compliance design requirement rather than the condition of the asset it has been classified as a compliance program and the program has been included under the AER classification augex.

Essential Energy has developed a strategy to address the defects that are identified on the network and this strategy is attached as Attachment 6.8 Network Aerial patrol and Anlaysis (AP&A) – Step Change Analysis to Essential Energy's revised proposal. The proposed augex expenditure over the regulatory control period is $77.4 million.

[30] NSW DNSPs' Response to the AER's Issues Paper – Attachment 1 page 9

5. CONCLUSION

In developing the Essential Energy Regulatory Proposal (2014-2019), Essential Energy has developed a forecast capex program using the NNSW Capital Governance Framework, and within this framework, has undertaken a range of governance processes and activities to robustly develop the program:

- Use of both a bottom-up, and top-down assessment in the forecasting methodology
- A thorough internal management challenge process to assess the prudency of repex and augex work
- An internal review process at sub-portfolio and portfolio level
- Testing of project plans during the approval process
- Evaluation of a range of options, including a 'do-nothing' option as part of the investment case development
- Adopted a reactive distribution augex program. Removing all distribution augex that is discretionary.
- The application of risk based cost benefit analysis assessment techniques to projected programs of work.
- There has been a downward trend since 2012 in the costs associated with HV feeder works. To account for this trend Essential Energy's augex for distribution expenditure is based on the expenditure during the lowest growth years historically and lower than the expected growth during the 2014-2019 regulatory control period.
- our proposed program has been reduced by $18.6million, specifically in response to the new VCR value determined by AEMO and a risk based assessment of each project.
- However, this reduction has been offset by the LiDAR program of work, which has identified $77.4 million of high risk low clearance mains defects.
- The total increase in direct augex due to the review of risk and the inclusion of the LiDAR is an increase of $58.8 million.

APPENDIX A MAJOR PROJECT RISK BASED REVIEW

1 PURPOSE

The purpose of this paper is to present to the Australian Energy Regulator (AER) Essential Energy's response to the issues raised by the AER in the Draft decision Essential Energy distribution determination (2015-16 to 2018-19) – *Attachment 6: Capital Expenditure*, in particular, those issues related to a requirement for a risk based cost benefit analysis assessment in the context of revision to the Reliability and Performance Licence Conditions.

2 SUMMARY

Issues raised by the AER regarding Essential Energy's risk based cost benefit analysis assessment and Essential Energy's response are highlighted in the table below:

AER issue	Summary of AERs reasons and findings	Essential Energy's response
Cost benefit analysis	Augex forecast did not take account of risk based cost benefit analysis	Essential Energy has undertaken a risk based review of major projects as part of its regulatory submission and a number of projects have been deferred to a later regulatory period or where commenced projects have been halted at an economically practical stop point This report presents an updated cost benefit analysis of major projects where a VCR analysis is applicable using latest forecasts of load, VCR and costs
Current VCR value	The proposed Augex forecast does not take account of the most recent changes to the value of VCR	This report presents an updated cost benefit analysis of major projects where a VCR analysis is applicable using latest forecasts of load, VCR and costs
Licence conditions	- The proposed Augex forecast does not take account of the most recent changes to the Reliability and Performance Licence Conditions	Essential Energy has taken account of changed licence conditions as part of its regulatory submission and a number of projects have been deferred to a later regulatory period or where commenced, projects have been halted at an economically practical stop point This report presents an updated cost benefit analysis of major projects where a VCR analysis is applicable using latest forecasts of load, VCR and costs

3 BACKGROUND

In its regulatory submission, Essential Energy put forward its forecast expenditures for the next regulatory control period. This forecast expenditure was supported by information about the justification for each major project.

The AER in its draft determination stated that it is not satisfied that Essential Energy's proposed total forecast capex reasonably reflects the capex criteria and raised issues about Essential Energy's project justification, including:

- augex forecast did not take account of risk based cost benefit analysis
- the proposed augex forecast does not take account of the most recent changes to the value of VCR
- the proposed augex forecast does not take account of the most recent changes to the Reliability and Performance Licence Conditions

4 DISCUSSION

The drivers of major projects for augex are generally to provide an n capacity to supply load, provide n-1 capacity for supply reliability and for new major customer connections.

The revised licence conditions removed the deterministic criteria that were previously in Schedule 1 with the expectation that Distributors would utilise alternate justification for the need for n-1 elements in the network.

Essential Energy's approach has been to use the former licence conditions to identify potential candidate projects for n-1 supply security investment however a further risk based assessment was undertaken and several projects were deferred till a later regulatory period as noted in the AER's consultant WorleyParsons report and as advised to the AER by NNSW. The use of the revised licence conditions in this way may have caused confusion and the incorrect finding that no allowance had been made for the revised licence conditions. The application of the former licence conditions without the additional risk based analysis step would have resulted in additional projects being included in the augex forecast.

It is accepted however that the VCR analysis for relevant project needs to be updated for each project which takes in to account the new VCR value, current load forecasts and project costs. This has been done utilising the approach included in the proposed NNSW probabilistic planning criteria.

This report provides information on a review of the proposed major projects generally and more specifically for those projects where a VCR analysis is applicable as a risk based cost benefit tool for project justification.

4.1 Major Project Summary

Of the proposed total Essential Energy augex for 2014 – 19, the major subtransmission line and substation projects totalled $168M. Of this, $21.5M is works in association with TransGrid augmentation committed through Joint Planning. Of the remaining $146.5M of the total, $9.5M is augmentation associated with refurbishment, and $61M committed to "carry-over" projects which are already under way which are not subject to added load or probabilistic planning assessment. The remaining $76M represents "new" projects which can be further considered to have three (3) driver categories these being:

- Major new (spot & urban expansion) load connection: $33.3M. The listed projects include the Orange-Blayney 66kV line reconstruction, Cobaki zone substation, Tralee supply extension, the Gloucester bulk supply substation and the Toongi mine connection.
- Power Quality/Protection ("other") needs: $12.7M. The listed projects include Cobar Town supply augmentation, the Hillston zone substation & capacitor compensation (voltage regulation) and the Kooringal and Cartwrights Hill zone substation projects (Wagga 66kV network reconfiguration/protection)
- VCR related projects: $30M. Individual projects and investment/VCR assessment comparison information is detailed in Section 4.3 below.

4.2 VCR methodology

Where relevant, the Essential Energy Value of Customer Reliability (VCR) procedure is used to provide a probabilistic assessment of the augex project investments proposed for the 2014 – 19 regulatory period. It is based on the procedures promoted by AEMO and the consideration of the revised planning procedures proposed for adoption by the NNSW DNSP's in lieu of the previous licence compliance conditions.
This procedure generally involves comparing a derived value for the energy which would not be supplied (i.e. is at risk) as the result of a network contingency to an annualised value of the capital investment required to

complete a nominated network augmentation.

The project costs are based on nominal design and unit rate costs with the annualised cost derived from this using the appropriate formula and a nominated WACC rate (e.g. 7%) and asset life (e.g. 40 years).

The Energy at Risk (EAR) is indicated by the area under the Load Duration Curve (LDC) which is derived from half hourly metering data and annotated with the related annual maximum demand (MW) and quantity of energy (MWh). This can be adjusted for load transfers to alternate supply/s if applicable.

Expected Unserved Energy (EUSE) assessment - is the product of the EAR and the assessed "unavailability" of the supply, it being the product of supply fault risk and time off supply (time to repair and/or transfer load to alternate supply).
The "fault risk" for subtransmission lines is assessed from industry accepted asset component failure rates (e.g. 0.75 pa/100km for fully shielded subtransmission lines; 2 pa/100km for unshielded lines) and "time off supply" based on the mean time to repair (MTTR). For rural zone substation transformers, a failure rate of 1 per 20 years is allowed with a MTTR of 48-72 hours.

The VCR is the product of the EUSE (MWh) and the AEMO advised value of unserved energy (~$38k/MWh)

For each project assessment, a summary is prepared which indicates:

- the project purpose; a network & project description and a (simplified) network diagram
- the project cost and annualised investment value
- the associated LDC diagram and EAR
- the supply unavailability, EUSE and VCR.

Dot point references to "other considerations" are also included if applicable.

4.3 VCR Analysis Results

The VCR related project assessment revision results are summarised below with more specific information re the project description, indicative investment costs and unserved energy evaluations available in a "VCR summary" for each project.

The revised assessments indicate that the annualised investment costs are generally less than or equivalent to the assessed Value of Unserved Energy for all but three of the identified VCR related projects, the three exceptions being:

- Evans Lane to Batemans Bay 132kV feeder augmentation ($4.9)
- Pambula ZS 66kV CB and dynamic compensation ($1.1M)
- Deniliquin to Moulamein tee 66kV reconnection ($2.2M)

Of these, the Evans Lane to Batemans Bay and Pambula dynamic compensation projects were required to address excessive voltage swings which could result from critical faults on primary supply rings with the immediate needs having been removed as a result of measured and forecast load demand reductions. The Pambula 66kV CB component of the Pambula project provides a significant benefit and should be completed. The VCR assessment for the Deniliquin project indicates that the creation of a 66kV ring supply to service the Deniliquin ZS load is not justified with a project to amend the Moulamein line protection to be implemented as an alternative. These adjustments result in an investment reduction of $8.2M.

4.4 Impact of Analysis of Proposed Project List

The breakdown of the augex project list indicate that the VCR related projects comprise <18% of the total initial amount - ie: being $30M of $168M. Of this amount, a revised VCR assessment, in combination with recorded and forecast load demand reductions, indicates that the investment requirement for this group of projects could be reduced by an amount of $8.2M, this being some 27% of the component total and < 5% of the total indicated overall augex project amount.

The review also indicated that some $33.3M of the listed investment requirement is related to new

spot/urban expansion load connections which is subject to potential variations in terms of the commitment to the project completions and the actual project development timing. A full review of project commitment and timing has been completed. The only change been that associated with the connection option available to one project (Toongi mine), meaning that this $33.3M can be reduced by $10.4M to $22.9M.

5 CONCLUSION

In summary, the review of the expected augex project investment requirements indicates that there is limited scope and need for adjustment to the amount of $168M nominated in the initial submission with 55% ($92M) of this amount allocated to the completion of commenced projects, refurbishment projects and jointly planned TransGrid augmentation with “new” investment being 45% ($76M) of the total.

Of the new project investment amount, < 40% ($30M) is associated with VCR related projects with all but $8.2M of this amount being substantiated by a review based on revised probabilistic planning criteria and the AEMO report on VCR methodology and unserved energy values.

It is also noted that >15% ($33.3M) of the identified augex investment amount is related to projects which depend on the commitment of major new load connection requirements. After review, this total can be reduced to $22.9M based on the adoption of the Toongi mine alternative connection option.

Overall it could be reasonable to reduce the nominated augex requirement by $18.6M, the reduction being $8.2M from the review of VCR related projects and $10.4M as a new spot load project consideration.