RIN Appendix 2: Supplementary information

Regulatory proposal for the ACT electricity distribution network 2019-24
January 2018

Disclaimer: On 1 January 2018, the part of ActewAGL that looks after the electricity network changed its name to Evoenergy. This change has been brought about from a decision by the Australian Energy Regulator. Unless otherwise stated, ActewAGL Distribution branded documents provided with this regulatory proposal are Evoenergy documents.

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4.3	Identify which items of *ActewAGL*'s *forecast capex* are:
(a)	derived directly from competitive tender processes;
(b)	based upon competitive tender processes for similar projects;
(c)	based upon estimates obtained from contractors or manufacturers;
(d)	based upon independent benchmarks;
(e)	based upon actual historical costs for similar projects; and
(f)	reflective of any amounts for risk, uncertainty or other unspecified contingency factors, and if so, how these amounts were calculated and deemed reasonable and prudent.

Response:

Capex projects	Basis of capex forecasts
Asset replacement	
Distribution Substation	(d) based upon independent benchmarks; (e) based upon actual historical costs for similar projects
Distribution Overhead	(d) based upon independent benchmarks; (e) based upon actual historical costs for similar projects
Distribution Underground	(d) based upon independent benchmarks; (e) based upon actual historical costs for similar projects
Meters	(d) based upon independent benchmarks;
Zone Substation	(e) based upon actual historical costs for similar projects
Sub Transmission	(e) based upon actual historical costs for similar projects
Secondary Systems	(e) based upon actual historical costs for similar projects
Distribution Earthing	(e) based upon actual historical costs for similar projects
Property	(e) based upon actual historical costs for similar projects
Reliability and quality improvements	
Distribution System	(e) based upon actual historical costs for similar projects
Zone Substations	(e) based upon actual historical costs for similar projects
Subtransmission	(e) based upon actual historical costs for similar projects
Asset augmentation	
Zone Substations	(b) based upon competitive tender processes for similar projects;
Distribution System	(e) based upon actual historical costs for similar projects
Subtransmission	(b) based upon competitive tender processes for similar projects;
Substations	(e) based upon actual historical costs for similar projects
Secondary Systems	(e) based upon actual historical costs for similar projects
Demand Response	(d) based upon independent benchmarks;
Customer initiated	

Commercial and Industrial Developments	(e) based upon actual historical costs for similar projects ($s); and (d) based upon independent benchmarks (Qty);
Community and Associated Developments	(e) based upon actual historical costs for similar projects
Meters	Not Applicable
New Urban Development	(e) based upon actual historical costs for similar projects ($s); and (d) based upon independent benchmarks (Qty);
Relocations & Replacements	(e) based upon actual historical costs for similar projects
Rural Developments	(e) based upon actual historical costs for similar projects
Services	(e) based upon actual historical costs for similar projects
Special Customer Requests	(e) based upon actual historical costs for similar projects
Urban Infill	(e) based upon actual historical costs for similar projects ($s); and (d) based upon independent benchmarks (Qty);
Electricity network IT systems	
IT Systems	(e) based upon actual historical costs for similar projects
Facilities	
ENF Facilities	(e) based upon actual historical costs for similar projects
Non-system assets	
Non System Assets	(e) based upon actual historical costs for similar projects
Finance Lease Assets	(e) based upon actual historical costs for similar projects

5.1	**In relation to information provided in *Workbook 1 – Regulatory determination, regulatory template* 2.2 and with respect to the *AER's repex model*, provide:**
(a)	For individual asset categories in each asset group set out in the *regulatory templates*, provide in a separate document:
(i)	a description of the *asset* category, including:
(A)	the *assets* included and any boundary issues (i.e. with other *asset* categories);
(B)	an explanation of how these matters have been accounted for in determining quantities in the age profile;
(C)	an explanation of the main drivers for replacement (e.g. condition); and
(D)	an explanation of whether the replacement unit cost provides for a complete replacement of the *asset*, or some other activity, including an extension of the *asset's* life (e.g. *pole* staking) and whether the costs of this extension or other activity are capitalised or not.
(ii)	an estimate of the proportion of *assets* replaced for each year of the *current regulatory control period*, due to:
(A)	aging of existing *assets* (e.g. condition, obsolesce, etc.) that should be largely captured by this form of replacement modelling;
(B)	replacements due to other factors (and a description of those factors);
(C)	additional *assets* due to the *augmentation*, extension, development of the *network*; and
(D)	additional *assets* due to other factors (and a description of those factors).

Response:

5.1(a)(i)(A)

ASSET GROUP	ASSET CATEGORY	ASSET DESCRIPTION, BOUNDARY ISSUES ETC
POLES BY: HIGHEST OPERATING VOLTAGE ; MATERIAL TYPE; STAKING (IF WOOD)	STAKING OF A WOODEN POLE	Metal reinforcement of below ground section of a wood pole by means of a metal "stake" that is attached to the pole above3 ground to reinforce the pole.
	< = 1 kV; WOOD	Support structures for overhead lines, of the material specified. Voltage is nominal voltage of highest voltage circuit attached to the pole. Excludes pole tops and conductors. Includes stay poles Excludes privately owned poles (including street lighting poles owned by others).
	> 1 kV & < = 11 kV; WOOD	
	> 11 kV & < = 22 kV; WOOD	
	> 22 kV & < = 66 kV; WOOD	
	> 66 kV & < = 132 kV; WOOD	
	> 132 kV; WOOD	
	< = 1 kV; CONCRETE	
	> 1 kV & < = 11 kV; CONCRETE	
	> 11 kV & < = 22 kV; CONCRETE	
	> 22 kV & < = 66 kV; CONCRETE	

	> 66 kV & < = 132 kV; CONCRETE	
	> 132 kV; CONCRETE	
	< = 1 kV; STEEL	
	> 1 kV & < = 11 kV; STEEL	
	> 11 kV & < = 22 kV; STEEL	
	> 22 kV & < = 66 kV; STEEL	
	> 66 kV & < = 132 kV; STEEL	
	> 132 kV; STEEL	
	Other - Fibreglass etc	Fibreglass poles for all voltages.
POLE TOP STRUCTURES BY: HIGHEST OPERATING VOLTAGE	< = 1 kV	Poletop assets including crossarms, poletop assemblies, insulators and other equipment. Does NOT include pole or pole cap (primary support structure, conductors or switchgear.
	> 1 kV & < = 11 kV	
	> 11 kV & < = 22 kV	
	> 22 kV & < = 66 kV	
	> 66 kV & < = 132 kV	
	> 132 kV	
	OTHER - PLEASE ADD A ROW IF NECESSARY AND NOMINATE THE CATEGORY	No additional categories required – nominated categories were able to accommodate all assets of this class operated by Evoenergy
OVERHEAD CONDUCTORS BY: HIGHEST OPERATING VOLTAGE; NUMBER OF PHASES (AT HV)	< = 1 kV	Primary current carrying conductors, including overhead earthwires. Excludes insulators and poletop hardware.
	> 1 kV & < = 11 kV	
	> 11 kV & < = 22 kV ; SWER	
	> 11 kV & < = 22 kV ; SINGLE-PHASE	
	> 11 kV & < = 22 kV ; MULTIPLE-PHASE	
	> 22 kV & < = 66 kV	
	> 66 kV & < = 132 kV	
	> 132 kV	
	OTHER - PLEASE ADD A ROW IF NECESSARY AND NOMINATE THE CATEGORY	No additional categories required – nominated categories were able to accommodate all assets of this class operated by Evoenergy.
UNDERGROUND CABLES BY: HIGHEST OPERATING VOLTAGE	< = 1 kV	Single and multiple phase cables for transmission, subtransmission, HV and LV lines, reported by nominal operating voltage. Excludes pilot, communications and other cables.
	> 1 kV & < = 11 kV	
	> 11 kV & < = 22 kV	
	> 22 kV & < = 33 kV	
	> 33 kV & < = 66 kV	
	> 66 kV & < = 132 kV	
	> 132 kV	

	OTHER - PLEASE ADD A ROW IF NECESSARY AND NOMINATE THE CATEGORY	No additional categories required – nominated categories were able to accommodate all assets of this class operated by Evoenergy.
SERVICE LINES BY: CONNECTION VOLTAGE; CUSTOMER TYPE; CONNECTION COMPLEXITY	< = 11 kV ; RESIDENTIAL ; SIMPLE TYPE	Connections from the network to customers Point of Attachment. Simple (basic) connections are 16mm2 cables of <=100A connection capacity, otherwise considered complex. Subdivision assets are those classified as "new urban development" in Evoenergy's capital accounts, including new greenfield subdivisions. Redevelopment of previously developed sites is considered "urban infill" and classified as a simple or complex residential (or C/I) connection. Services classified by nominal connection voltage.
	< = 11 kV ; COMMERCIAL & INDUSTRIAL ; SIMPLE TYPE	
	< = 11 kV ; RESIDENTIAL ; COMPLEX TYPE	
	< = 11 kV ; COMMERCIAL & INDUSTRIAL ; COMPLEX TYPE	
	< = 11 kV ; SUBDIVISION ; COMPLEX TYPE	
	> 11 kV & < = 22 kV ; COMMERCIAL & INDUSTRIAL	
	> 11 kV & < = 22 kV ; SUBDIVISION	
	> 22 kV & < = 33 kV ; COMMERCIAL & INDUSTRIAL	
	> 22 kV & < = 33 kV ; SUBDIVISION	
	> 33 kV & < = 66 kV ; COMMERCIAL & INDUSTRIAL	
	> 33 kV & < = 66 kV ; SUBDIVISION	
	> 66 kV & < = 132 kV ; COMMERCIAL & INDUSTRIAL	
	> 66 kV & < = 132 kV ; SUBDIVISION	
	> 132 kV ; COMMERCIAL & INDUSTRIAL	
	> 132 kV ; SUBDIVISION	
	OTHER - PLEASE ADD A ROW IF NECESSARY AND NOMINATE THE CATEGORY	No additional categories required – nominated categories were able to accommodate all assets of this class operated by Evoenergy.
TRANSFORMERS BY: MOUNTING TYPE; HIGHEST OPERATING VOLTAGE ; AMPERE RATING; NUMBER OF PHASES (AT LV)	**POLE MOUNTED ;** < = 22kV ; < = 60 kVA ; SINGLE PHASE	Distribution and zone power transformers, reported by transformer type including: Installation type: type of substation Voltage: nominal voltage of HV side of transformer. Capacity: nameplate rating in MVA Number of phases: single or three phase transformer Excludes instrument, metering, protection (VT, CT) transformers. Includes only transformers, excludes other substation
	; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	
	; < = 22kV ; > 600 kVA ; SINGLE PHASE	
	; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	
	; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	
	; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	

	; > 22 kV ; < = 60 kVA	components (added as separate "other" category). Includes tap changers, bushings, end-boxes and other integral components.
	; > 22 kV ; > 60 kVA AND < = 600 kVA	
	; > 22 kV ; > 600 kVA	
	; > 22 kV ; < = 60 kVA	
	; > 22 kV ; > 60 kVA AND < = 600 kVA	
	; > 22 kV ; > 600 kVA	
	KIOSK MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	
	< = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	
	< = 22kV ; > 600 kVA ; SINGLE PHASE	
	< = 22kV ; < = 60 kVA ; MULTIPLE PHASE	
	< = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	
	< = 22kV ; > 600 kVA ; MULTIPLE PHASE	
	> 22 kV ; < = 60 kVA	
	> 22 kV ; > 60 kVA AND < = 600 kVA	
	> 22 kV ; > 600 kVA	
	> 22 kV ; < = 60 kVA	
	> 22 kV ; > 60 kVA AND < = 600 kVA	
	> 22 kV ; > 600 kVA	
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; SINGLE PHASE	
	< 22 kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	
	< 22 kV ; > 600 kVA ; SINGLE PHASE	
	< 22 kV ; < = 60 kVA ; MULTIPLE PHASE	
	< 22 kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	
	< 22 kV ; > 600 kVA ; MULTIPLE PHASE	
	> = 22 kV & < = 33 kV ; < = 15 MVA	
	> = 22 kV & < = 33 kV ; > 15 MVA AND < = 40 MVA	
	> = 22 kV & < = 33 kV ; > 40 MVA	

	> 33 kV & < = 66 kV ; < = 15 MVA	
	> 33 kV & < = 66 kV ; > 15 MVA AND < = 40 MVA	
	> 33 kV & < = 66 kV ; > 40 MVA	
	> 66 kV & < = 132 kV ; < = 100 MVA	
	> 66 kV & < = 132 kV ; > 100 MVA	
	> 132 kV ; < = 100 MVA	
	> 132 kV ; > 100 MVA	
	OTHER - PLEASE ADD A ROW IF NECESSARY AND NOMINATE THE CATEGORY	No additional categories required – nominated categories were able to accommodate all assets of this class operated by Evoenergy.
SWITCHGEAR BY: HIGHEST OPERATING VOLTAGE ; SWITCH FUNCTION	< = 11 kV ; FUSE	Circuit interrupting devices including fuses, switches and circuit breakers reported by device type and nominal operating voltage. Excludes associated protection and control equipment.
	< = 11 kV ; SWITCH	
	< = 11 kV ; CIRCUIT BREAKER	
	> 11 kV & < = 22 kV ; SWITCH	
	> 11 kV & < = 22 kV ; CIRCUIT BREAKER	
	> 22 kV & < = 33 kV ; SWITCH	
	> 22 kV & < = 33 kV ; CIRCUIT BREAKER	
	> 33 kV & < = 66 kV ; SWITCH	
	> 33 kV & < = 66 kV ; CIRCUIT BREAKER	
	> 66 kV & < = 132 kV ; SWITCH	
	> 66 kV & < = 132 kV ; CIRCUIT BREAKER	
	> 132 kV ; SWITCH	
	> 132 kV ; CIRCUIT BREAKER	
	OTHER - PLEASE ADD A ROW IF NECESSARY AND NOMINATE THE CATEGORY	No additional categories required – nominated categories were able to accommodate all assets of this class operated by Evoenergy.
PUBLIC LIGHTING BY: ASSET TYPE ; LIGHTING OBLIGATION	LUMINAIRES ; MAJOR ROAD	Evoenergy does not own and operate streetlighting assets
	LUMINAIRES ; MINOR ROAD	
	BRACKETS ; MAJOR ROAD	
	BRACKETS ; MINOR ROAD	
	LAMPS ; MAJOR ROAD	
	LAMPS ; MINOR ROAD	
	POLES / COLUMNS ; MAJOR ROAD	
	POLES / COLUMNS ; MINOR ROAD	

	OTHER - PLEASE ADD A ROW IF NECESSARY AND NOMINATE THE CATEGORY	No additional categories required – nominated categories were able to accommodate all assets of this class operated by Evoenergy.
SCADA, NETWORK CONTROL AND PROTECTION SYSTEMS BY: FUNCTION	FIELD DEVICES	SCADA, protection and control system assets.
	LOCAL NETWORK WIRING ASSETS	
	COMMUNICATIONS NETWORK ASSETS	
	MASTER STATION ASSETS	
	SCADA Radio System Assets	Added category: Radio system assets for SCADA communications
	other protection and secondary systems	Added category: Other protection and secondary systems assets, including batteries and chargers, protection relays and systems, etc
OTHER BY: DNSP DEFINED	Other substations and equipment	Added category: Substation assets excluding transformers, switchgear and protection systems. Includes housings, LV boards, fences, doors and locks, etc.

5.1(a)(i)(B)

The asset category definitions above have been applied in allocating all Evoenergy assets to one of the nominated regulatory template categories. Asset ages have been determined according to installation, manufacture or estimated dates (as described in basis of preparation).

5.1(a)(i)(C)

Asset condition and risk is the primary driver for planned replacements. Certain low risk assets are “run to failure” where failure is the primary driver for unplanned replacements.

High risk assets including poles, zone and switching substation assets are subject to routine inspection and condition assessment or monitoring, along with some distribution switchgear and other assets. As equipment ages, its condition deteriorates and probability of failure and risk increases.

Low risk assets including underground LV service cables are generally operated under “run to failure” asset maintenance strategies. As equipment ages and its condition deteriorates the asset remains in service until failure and, and replaced as unplanned replacements upon failure.

In some instances, assets are replaced based on limited functionality, obsolesce, available spares, safety risks, etc.

5.1(a)(i)(D)

All costs are complete replacement costs, except pole reinforcement which is a cost for asset life extension and is capitalised.

5.1(a)(ii)(A)

The majority of assets replaced due to effects of aging and their risk.

5.1(a)(ii)(B)

A small number of assets are replaced by other factors include safety and environmental risk and failure caused by 3rd party damage.

5.1(a)(ii)(C)

Few assets are replaced due to asset augmentation drivers.

5.1(a)(ii)(D)

Nil

6.2	**In relation to information provided in *Workbook 1 – Regulatory determination, regulatory template* 2.4 and with respect to the *AER's augex model*:**
(a)	Separately for *sub-transmission lines*, *sub-transmission* and *zone substations*, *HV feeders* and *distribution substations*, *ActewAGL* must explain how it:
(i)	Prepared the *maximum demand* data (weather corrected at 50 per cent *probability of exceedance*) provided in the *asset* status tables 2.4.1 to 2.4.4, including where relevant, explanations of each of:
(A)	how this value relates to the maximum demand that would be used for normal planning purposes;
(B)	whether it is based upon a measured value, and if so, where the measurement point is and how abnormal operating conditions are allowed for;
(C)	whether it is based on estimated (rather than actual measured) demand, and if so, the basis of this estimation process and how it is validated; and
(D)	the relationship of the values provided to raw unadjusted maximum demand; and the relationship of the values provided to the values that could be expected from weather corrected maximum demand measures that reflect a 10 per cent probability of exceedance year.
(ii)	Determined the rating data provided in the *asset* status tables 2.4.1 to 2.4.4, including where relevant:
(A)	the basis of the calculation of the ratings in that segment, including asset data measured and assumptions made; and
(B)	the relationship of these ratings with *ActewAGL's* approach to operating and planning the network. For example, if alternative ratings are used to determine the augmentation timing, these should be defined and explained.

(iii)	Determined the growth rate data provided in the *asset* status tables 2.4.1 to 2.4.4. This should clearly indicate how these rates have been derived from *maximum demand* forecasts or other load forecasts available to *ActewAGL*.

Response:

6.2(a)(i)

Segment	Information
Subtransmission lines	Demand data taken from SCADA and/or bulk supply point metering data. All historical raw unadjusted maximum demands are weather corrected for normal planning purposes. It is based on measured MVA values (with MW estimated based on typical PF where MW are not measured), at substation circuit breakers. There is no adjustment for abnormal operating conditions. Evoenergy is using AEMO's Monash Electricity Forecasting Model (MEFM) for its system and zone substation level load forecast. The methodology and forecasts are included in the Annual Planning report (APR).
Zone substations	Demand data taken from SCADA and/or bulk supply point metering data. All historical raw unadjusted maximum demands are weather corrected for normal planning purposes. It is based on measured MVA values (with MW estimated based on typical PF where MW are not measured), at substation circuit breakers. There is no adjustment for abnormal operating conditions. Evoenergy is using AEMO's Monash Electricity Forecasting Model (MEFM) for its system and zone substation level load forecast. The methodology and POE forecasts are included in the attached *Evoenergy Demand Forecast Report*, which is also reviewed by independent consultant, Jacobs.
HV feeders	Demand data taken from SCADA data. All historical raw unadjusted maximum demands are weather corrected for normal planning purposes. It is based on measured MVA values (with MW estimated based on typical PF where MW are not measured), at substation circuit breakers. There is no adjustment for abnormal operating conditions. Feeder load analysis examines each feeder's percentage of loading by comparing its weather corrected maximum demand against its seasonal firm rating. The augmentation or network solution is required when the percentage of loading approaches 100%.
Distribution substations	Evoenergy does not regularly measure distribution substation demand, and hence does not have actual demand data for distribution substations. For table 2.4.4 in the regulatory templates, Evoenergy has estimated average substation utilisation by dividing peak demand by installed transformer capacity. A modified normal distribution was used around this average figure to estimate the proportion of substations in each of the Regulatory Information Notice loading bands (see Basis of Preparation for more detail). Organic growth within the Evoenergy area is low, and generally substation planning is triggered by new connections rather than organic growth. Hence these values are not used as the basis for normal planning decisions. These are not based on measured values (other than system maximum demand, measured at transmission bulk supply points). There is no adjustment for abnormal operating conditions. It is based on aggregate demand, with engineering experience and judgement used to estimate the distribution of individual substation loadings.

6.2(a)(ii)

Ratings are taken from the Evoenergy Electrical Data Manual which contains the operational ratings for major equipment items. Evoenergy generally uses nameplate

ratings for major items such as transformers and circuit breakers. Emergency ratings have been calculated for some zone transformers based on allowable hotspot temperatures. Cables and overhead lines are rated according to data provided by manufacturers, using industry standard assumptions. These ratings are the ones used by Evoenergy to plan augmentation on the network.

6.2(a)(iii)

Growth rates have been taken from the Evoenergy demand forecast, with total growth over the periods specified and annualised to derive the growth rate figures in the regulatory templates.

6.2	**In relation to information provided in *Workbook 1 – Regulatory determination, regulatory template* 2.4 and with respect to the *AER's augex model*:**
(b)	In relation to the capex-capacity table 2.4.6, *ActewAGL* must explain:
(i)	the types of cost and activities covered. Clearly indicate what non-field analysis and management costs (i.e. direct *overheads*) are included in the *capex* and what proportion of *capex* these cost types represent;
(ii)	how it determined and allocated actual *capex* and capacity to each of the segment groups, covering:
(A)	the process used, including assumptions, to estimate and allocate expenditure where this has been required; and
(B)	the relationship of internal financial and/or project recording categories to the segment groups and process used.
(iii)	how it determined and allocated estimated/*forecast capex* and capacity to each of the segment groups, covering:
(A)	the relationship of this process to the current *project* and *program* plans; and
(B)	any other higher-level analysis and assumptions applied.

Response:

As described in the basis of preparation, each customer initiated and network service provider (NSP) initiated augex[1] project was categorised to show:

- initiator (customer, NSP);
- whether it was capacity related (yes/no). All customer projects assumed to be capacity related. NSP initiated projects categorised according to their nature.
- asset type / network segment
- The MVA added (transformer or feeder capacity added (assumed zero for feeder extensions))

This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods. Non-capacity related projects were separately added.

Costs exclude network and corporate overheads, and only include directly attributable field costs and capitalised engineering / design costs as per Evoenergy's approved CAM.

[1] Taken from an Oracle data extract showing all capex projects over the period 08/09 to 18/19

Internal financial categories were used to determine whether projects were customer or NSP initiated.

6.2	**In relation to information provided in *Workbook 1 – Regulatory determination, regulatory template* 2.4 and with respect to the *AER's augex model*:**
(c)	Describe the projects and programs ActewAGL has allocated to the unmodelled augmentation categories in table 2.4.6, covering:
(i)	the proportion of unmodelled *augmentation capex* due to this *project* or *program* type;
(ii)	the *primary drivers* of this *capex*, and whether in *ActewAGL*'s view, there is any secondary relationship to *maximum demand* and/or utilisation of the *ActewAGL network*; and

Response:

"Unmodelled" augmentation projects include drivers such as reliability, earthing and SCADA improvements. The bulk of these expenses relate to earthing projects at substations.

These projects do not generally add capacity, and hence there is little or no secondary relationship to maximum demand or utilisation.

These projects can be considered to improve service levels, through improving either the safety, reliability, flexibility and operability of the network, enhancing Evoenergy's ability to provide network services to customers.

6.2	**In relation to information provided in *Workbook 1 – Regulatory determination, regulatory template* 2.4 and with respect to the *AER's augex model*:**
(d)	Separately for each network segment that *ActewAGL* defined in the model segment data table 2.4.5, whether the outcome of such a project or program, whether intended or not, should be an increase in the capability of the *ActewAGL* network to supply customer demand at similar service levels, or the improvement in service levels for a similar customer demand level:
(i)	Describe the *network* segment, including:
(A)	the boundary with other connecting *network* segments; and
(B)	the main reasoning for the individual segment (e.g. as opposed to forming a more aggregate segment).
(ii)	Explain the utilisation threshold statistics provided (i.e. the mean and standard deviation), including:
(A)	the methodology, data sources and assumptions used to derive the parameters;
(B)	the relationship to internal or external planning criteria that define when an augmentation is required;
(C)	the relationship to actual historical utilisation at the time that augmentations occurred for that asset category;

(D)	ActewAGL's views on the most appropriate probability distribution to simulate the augmentation needs of that network segment; and
(E)	the process applied to verify that the parameters are a reasonable estimate of utilisation limit for the network segment.
(iii)	Regarding the *augmentation* unit cost and capacity factor provided, provide an explanation of each of:
(A)	the methodology, data sources and assumptions used to derive the parameters;
(B)	the relationship of the parameters to actual historical augmentation projects, including the capacity added through those projects and the cost of those projects;
(C)	the possibility of double-counting in the estimates, and processes applied to ensure that this is appropriately accounted for (e.g. where an individual project may add capacity to various segments); and
(D)	the process applied to verify that the parameters are a reasonable estimate for the network segment.

Response:

6.2(d)

(i) Segment description	(ii) Utilisation threshold stats	(iii) augex unit cost and capacity factor
Subtransmission lines		
Lines and cables operating at voltages specified as subtransmission in the regulatory templates. A single segment for this class is appropriate for a small distributor such as Evoenergy. No boundary issues.	Utilisation thresholds were estimated based on N-1 (or specified planning criteria) requirements for typical Evoenergy network configurations, and typical project lead-times. The mean represents the average or typical utilisation of individual elements at the point they require augmentation. SD was estimated based on the range of thresholds for individual asset configurations, or assuming a reasonably narrow band of around ±10% around the mean.	As described in the basis of preparation, each customer initiated and NSP initiated augex project was categorised to show: • initiator (cust, NSP) • whether capacity related. • Asset type / network segment • MVA added This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods, and these figures used to derive average $/MVA. NSP initiated project costs have been used, or cust initiated used where NSP initiated cost not available. Double counting is avoided by counting each project once, and allocating cost and capacity increase to the primary segment for that project. Capacity factors could not be calculated from recent projects. CF of 1.5 (HV feeders) assumed as typical of large, lumpy investments with limited capacity options.

		Engineering experience and judgement has been used to verify the parameters are reasonable.
Subtransmission substations and subtransmission switching stations		
Substations operating at voltages specified as subtransmission in the regulatory templates. A single segment for this class is appropriate for a small distributor such as Evoenergy. No boundary issues.	Utilisation thresholds were estimated based on N-1 (or specified planning criteria) requirements for typical Evoenergy network configurations, and typical project lead-times. The mean represents the average or typical utilisation of individual elements at the point they require augmentation. SD was estimated based on the range of thresholds for individual asset configurations, or assuming a reasonably narrow band of around ±10% around the mean.	As described in the basis of preparation, each customer initiated and NSP initiated augex project was categorised to show: • initiator (cust, NSP) • whether capacity related. • Asset type / network segment • MVA added This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods, and these figures used to derive average $/MVA. NSP initiated project costs have been used, or cust initiated used where NSP initiated cost not available. Double counting is avoided by counting each project once, and allocating cost and capacity increase to the primary segment for that project. Capacity factors could not be calculated from recent projects. CF of 1.5 (HV feeders) assumed as typical of large, lumpy investments with limited capacity options. Engineering experience and judgement has been used to verify the parameters are reasonable.
Zone substations		
Substations operating at voltages specified as zones in the regulatory templates. A single segment for this class is appropriate for a small distributor such as Evoenergy. No boundary issues.	Utilisation thresholds were estimated based on N-1 (or specified planning criteria) requirements for typical Evoenergy Distribution network configurations, and typical project lead-times. The mean represents the average or typical utilisation of individual elements at the point they require augmentation. SD was estimated based on the range of thresholds for individual asset configurations, or	As described in the basis of preparation, each customer initiated and NSP initiated augex project was categorised to show: • initiator (cust, NSP) • whether capacity related. • Asset type / network segment • MVA added This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods, and these figures used to derive average $/MVA. NSP initiated project costs have been used, or cust initiated used where NSP initiated cost not available. Double counting is avoided by counting each project once, and allocating cost and capacity

	assuming a reasonably narrow band of around ±10% around the mean.	increase to the primary segment for that project. Capacity factors could not be calculated from recent projects. CF of 1.5 (HV feeders) assumed as typical of large, lumpy investments with limited capacity options. Engineering experience and judgement has been used to verify the parameters are reasonable.
High voltage feeders - urban		
Lines and cables operating at voltages specified as HV in the regulatory templates, and classified as urban[2] according to STPIS definition. A single segment for this class is appropriate for a small distributor such as Evoenergy. No boundary issues.	Utilisation thresholds were estimated based on N-1 (or specified planning criteria) requirements for typical Evoenergy network configurations, and typical project lead-times. The mean represents the average or typical utilisation of individual elements at the point they require augmentation. SD was estimated based on the range of thresholds for individual asset configurations, or assuming a reasonably narrow band of around ±10% around the mean.	As described in the basis of preparation, each customer initiated and NSP initiated augex project was categorised to show: • initiator (cust, NSP) • whether capacity related. • Asset type / network segment • MVA added This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods, and these figures used to derive average $/MVA. NSP initiated project costs have been used, or cust initiated used where NSP initiated cost not available. Double counting is avoided by counting each project once, and allocating cost and capacity increase to the primary segment for that project. Capacity factor has been estimated based on utilisation of feeders installed in current regulatory period. Engineering experience and judgement has been used to verify the parameters are reasonable.
High voltage feeders - short rural		
Lines and cables operating at voltages specified as HV in the regulatory templates, and classified as short rural according to	Utilisation thresholds were estimated based on N-1 (or specified planning criteria) requirements for typical Evoenergy network configurations, and typical project lead-times. The mean represents the	As described in the basis of preparation, each customer initiated and NSP initiated augex project was categorised to show: • initiator (cust, NSP) • whether capacity related. • Asset type / network segment • MVA added

[2] Note - Evoenergy only has urban and short rural feeders

STPIS definition. A single segment for this class is appropriate for a small distributor such as Evoenergy. No boundary issues.	average or typical utilisation of individual elements at the point they require augmentation. SD was estimated based on the range of thresholds for individual asset configurations, or assuming a reasonably narrow band of around ±10% around the mean.	This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods, and these figures used to derive average $/MVA. NSP initiated project costs have been used, or cust initiated used where NSP initiated cost not available. Double counting is avoided by counting each project once, and allocating cost and capacity increase to the primary segment for that project. Capacity factor based on urban feeders as no new short rural feeders installed in current regulatory period. Engineering experience and judgement has been used to verify the parameters are reasonable.
Distribution substations - urban (including downstream LV network)		
Substations defined as distribution in the regulatory templates, connected to urban feeders. A single segment for this class is appropriate for a small distributor such as Evoenergy. No boundary issues.	Utilisation thresholds were estimated based on N-1 (or specified planning criteria) requirements for typical Evoenergy network configurations, and typical project lead-times. The mean represents the average or typical utilisation of individual elements at the point they require augmentation. SD was estimated based on the range of thresholds for individual asset configurations, or assuming a reasonably narrow band of around ±10% around the mean.	As described in the basis of preparation, each customer initiated and NSP initiated augex project was categorised to show: • initiator (cust, NSP) • whether capacity related. • Asset type / network segment • MVA added This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods, and these figures used to derive average $/MVA. NSP initiated project costs have been used, or cust initiated used where NSP initiated cost not available. Double counting is avoided by counting each project once, and allocating cost and capacity increase to the primary segment for that project. Capacity factors have been estimated based on standard capacities for new ground transformers currently used by Evoenergy, and averaging the increment between these standard sizes. Engineering experience and judgement has been used to verify the parameters are reasonable.
Distribution substations - short rural (including downstream LV network)		

Substations defined as distribution in the regulatory templates, connected to short rural feeders. A single segment for this class is appropriate for a small distributor such as Evoenergy. No boundary issues.	Utilisation thresholds were estimated based on N-1 (or specified planning criteria) requirements for typical Evoenergy network configurations, and typical project lead-times. The mean represents the average or typical utilisation of individual elements at the point they require augmentation. SD was estimated based on the range of thresholds for individual asset configurations, or assuming a reasonably narrow band of around ±10% around the mean.	As described in the basis of preparation, each customer initiated and NSP initiated augex project was categorised to show: • initiator (cust, NSP) • whether capacity related. • Asset type / network segment • MVA added This data was then analysed to determine the total $ and MVA for each network segment for the specified time periods, and these figures used to derive average $/MVA. NSP initiated project costs have been used, or cust initiated used where NSP initiated cost not available. Double counting is avoided by counting each project once, and allocating cost and capacity increase to the primary segment for that project. Capacity factors have been estimated based on standard capacities for new pole transformers currently used by Evoenergy, and averaging the increment between these standard sizes. Engineering experience and judgement has been used to verify the parameters are reasonable.

29	**Corporate structure**
29.1	Provide charts that set out:
(a)	the group corporate structure of which *ActewAGL* is a part; and
(b)	the organisational structure of *ActewAGL.*

(a) Provided in the Overview to this regulatory proposal

(b) Provided below