ERGON ENERGY NETWORK

Part of Energy Queensland

Replacement capex modelling supporting information

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1 INTRODUCTION

1.1 Background

Ergon understands the AER uses the Repex Model as a threshold test to inform areas of repex for additional review. We also use Repex Modelling as a tool for top-down challenge and check of replacement capex bottom-up build forecast requirements. This is done both at an overall replacement capex level and at an asset category group level where applicable.

As optimal timing for asset replacement is not solely reliant on age, other factors such as safety, environment, changes in defect rates, and obsolescence issues must also be considered. We also have several proactive asset replacement programs driven by emerging issues unrelated to the age of the assets that will not be fully captured in the Repex models. Where differences are material, they are noted and discussed in the Energex and Ergon Energy Justification Statements for modelled asset classes.

1.2 Purpose

This document provides response to information requested by the AER in Reset Regulatory Information Notice (RIN) Schedule 1 Section 5, Replacement Capital Expenditure Modelling. It describes the methodologies, assumptions and sources of information required to populate the AER's Repex model.

2 ASSET CATEGORIES

We have followed guidance provided in the AER's Electricity network service providers - Replacement expenditure model handbook (November 2013) regarding asset groups and asset categories. Our assets have been mapped to the AER's Repex asset categories as set out in Table 1. Where the assets are adequately described by the Repex asset categories they are noted as described.

Table 1 – Mapping to AER repex categories

AER asset group	AER asset category	Energex asset category
"POLES BY: HIGHEST OPERATING VOLTAGE ; MATERIAL TYPE; STAKING (IF WOOD)"	< = 1 kV; WOOD	As described
	> 1 kV & < = 11 kV; WOOD	As described
	> 11 kV & < = 22 kV; WOOD	As described
	> 22 kV & < = 66 kV; WOOD	As described
	> 66 kV & < = 132 kV; WOOD	As described
	< = 1 kV; CONCRETE	As described
	> 1 kV & < = 11 kV; CONCRETE	As described
	> 22 kV & < = 66 kV; CONCRETE	As described
	> 66 kV & < = 132 kV; CONCRETE	As described
	< = 1 kV; STEEL	As described
	> 1 kV & < = 11 kV; STEEL	As described
	> 22 kV & < = 66 kV; STEEL	As described

AER asset group	AER asset category	Energex asset category
	> 66 kV & < = 132 kV; STEEL	As described
	Staked Poles	Nailed <= 1 kV; Wood
		Nailed > 1 kV & <= 11 kV; Wood
		Nailed > 22 kV & <= 66 kV; Wood
"POLE TOP STRUCTURES BY: HIGHEST OPERATING VOLTAGE"	< = 1 kV	As described
	> 1 KV & < = 11 KV	As described
	> 11 kV & < = 22 kV	As described
	> 22 KV & < = 66 KV	As described
	> 66 KV & < = 132 KV	As described
OVERHEAD CONDUCTORS BY: HIGHEST OPERATING VOLTAGE; NUMBER OF PHASES (AT HV)"	< = 1 kV	As described
	> 1 KV & < = 11 KV	As described
	> 11 kV & < = 22 kV ; SWER	As described
	> 11 kV & < = 22 kV ; Multiple Phase	As described
	> 22 KV & < = 66 KV	As described
	> 66 KV & < = 132 KV	As described
"UNDERGROUND CABLES BY: HIGHEST OPERATING VOLTAGE"	< = 1 kV	As described
	> 1 KV & < = 11 KV	As described
	> 11 kV & < = 22 kV	As described
	> 22 KV & < = 66 KV	As described
	> 66 KV & < = 132 KV	As described
"SERVICE LINES BY: CONNECTION VOLTAGE; CUSTOMER TYPE; CONNECTION COMPLEXITY "	< = 11 kV ; RESIDENTIAL; SIMPLE TYPE	As described
	< = 11 kV ; COMMERCIAL & INDUSTRIAL; SIMPLE TYPE	As described
	< = 11 kV ; RESIDENTIAL; COMPLEX TYPE	As described
"TRANSFORMERS BY: MOUNTING TYPE; HIGHEST OPERATING VOLTAGE ; AMPERE RATING; NUMBER OF PHASES (AT LV)"	POLE MOUNTED ; < = 22kV ; < = 60 kVA ; SINGLE PHASE	As described
	POLE MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; SINGLE PHASE	As described
	POLE MOUNTED ; < = 22kV ; > 600 kVA ; SINGLE PHASE	As described
	POLE MOUNTED ; < = 22kV ; < = 60 kVA ; MULTIPLE PHASE	As described
	KIOSK MOUNTED ; < = 22kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	As described
	KIOSK MOUNTED ; < = 22kV ; > 600 kVA ; MULTIPLE PHASE	As described
	KIOSK MOUNTED ; > 22 kV ; < = 60 kVA	As described
	KIOSK MOUNTED ; > 22 kV ; > 60 kVA AND < = 600 kVA	As described
	KIOSK MOUNTED ; > 22 kV ; > 600 kVA	As described

AER asset group	AER asset category	Energex asset category
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; < = 60 kVA ; MULTIPLE PHASE	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 60 kVA AND < = 600 kVA ; MULTIPLE PHASE	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; < 22 kV ; > 600 kVA ; MULTIPLE PHASE	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; < = 15 MVA	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 15 MVA AND < = 40 MVA	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > = 22 kV & < = 33 kV ; > 40 MVA	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 33 kV & < = 66 kV ; > 15 MVA AND < = 40 MVA	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; < = 100 MVA	As described
	GROUND OUTDOOR / INDOOR CHAMBER MOUNTED ; > 66 kV & < = 132 kV ; > 100 MVA	As described
"SWITCHGEAR BY: HIGHEST OPERATING VOLTAGE ; SWITCH FUNCTION"	< = 11 kV ; FUSE	As described
	< = 11 kV ; SWITCH	The operational switch asset group has been defined as all other switches found within the Energex and Ergon Energy networks, which include the asset types: airbreak, disk link, link pillar, isolator, switch fuse, dropout, earth switch, fuse switch, sectionaliser, load transfer switch, ring main unit, link pillar and disconnect box
	> 11 kV & < = 22 kV ; SWITCH	
	> 22 kV & < = 33 kV ; SWITCH	
	> 33 kV & < = 66 kV ; SWITCH	
	> 66 kV & < = 132 kV ; SWITCH	
	< = 11 kV ; CIRCUIT BREAKER	The circuit breaker asset category has been defined as all circuit breakers and reclosers within the Energex and Ergon Energy networks, excluding circuit breakers that form part of a ring main unit.
	> 11 kV & < = 22 kV ; CIRCUIT BREAKER	
	> 22 kV & < = 33 kV ; CIRCUIT BREAKER	
	> 33 kV & < = 66 kV ; CIRCUIT BREAKER	
	> 66 kV & < = 132 kV ; CIRCUIT BREAKER	
SCADA, NETWORK CONTROL AND PROTECTION SYSTEMS BY: FUNCTION"	FIELD DEVICES	This includes protection relays, remote terminal units and intelligent electrical devices.
	LOCAL NETWORK WIRING ASSETS	As described
	COMMUNICATIONS NETWORK ASSETS	This includes microwave links (links installed), DSS Head ends, DSS

AER asset group	AER asset category	Energex asset category
		Radios (including repeaters) and Multiplex (including MPLS nodes) telecommunication equipment which includes: P25 network; cellular data network; CoreNet, corporate communications, multiplexing, routing and communication switching equipment, point-to-point and multipoint data systems, land mobile radio systems, communications sites, infrastructure assets.
OTHER ASSETS	CURRENT TRANSFORMERS	As described
	VOLTAGE TRANSFORMERS	As described
	OTHER	This includes return to service of assets following an in-service failure, control systems, DC supplies, civil assets associated with our primary electrical assets and operational technology assets.

2.1 Boundary Issues

There are no identified boundary issues between asset categories. An exception relates to overhead conductor age which is calculated based on pole age. However, this is more related to the ageing of the asset rather than a categorisation of the asset.

2.2 Main drivers of replacement

The main drivers of replacement for each of the asset groups are shown in Table 2.

Table 2 – Main replacement driver by asset category

Asset Group	Main replacement driver
Poles	Asset condition and quantified risk
Pole top structures	Asset condition and quantified risk
Overhead conductors	Asset condition and quantified risk
Underground cables	Asset condition and quantified risk
Service lines	Asset condition and quantified risk
Transformers	Asset condition and quantified risk
Switchgear	Asset condition and quantified risk
SCADA, network control	Obsolescence and asset condition and quantified risk

Asset condition considers metrics such as age, environmental factors, inception and test results and technical engineering risk assessments. The replacement of assets is undertaken in line with our Cost Benefit Framework and Principles (supporting document 5.08) to assess the consequence of an in-service failure of our assets assessed in poor condition. More information can be found in our Regulatory Proposal and associated Asset Management Plans and Replacement Expenditure Business Cases (supporting documents 5.2.01 to 5.2.26).

2.3 Replacement Unit Rates

In developing our repex forecast, we utilise our historic unit rates for our relatively low value, high volume replacement programs, such as our defective pole replacements, proactive conductor and service line replacements and defective distribution transformers replacements. In developing these programs, we have utilised a three-year average unit rate, derived from our revealed costs in our RIN submissions. These programs generally assume the complete replacement of the asset. An exception to this is where we stake a wooden pole to extend its life to avoid replacement.

For our substation and sub-transmission line assets, we typically have individual projects when replacing these assets. These estimates are built from an individual, site specific estimate. Being site specific, whether the costs associated with these projects are for an entire replacement or a life extension will also be site specific. However, these types of projects are also typically for the complete replacement of the asset.

3 COMPLIANCE CHECKLIST

RIN Response Requirement	Replacement capex modelling requirement	Energex asset category
4.4.7	In relation to information provided in *Workbook 1 – Forecast data, regulatory template 2.2* and with respect to the *AER's repex model*, provide:	-
4.4.7(a)	For individual *asset* categories in each *asset* group set out in the *regulatory templates*, provide in a separate document:	-
4.4.7(a) i	a description of the *asset* category, including:	Section 2
4.4.7(a) iA	the *assets* included and any boundary issues (i.e. with other *asset* categories);	Section 2.1
4.4.7(a) iB	an explanation of how these matters have been accounted for in determining quantities in the age profile;	Section 2.1
4.4.7(a) iC	an explanation of the main drivers for replacement (e.g. condition); and	• Section 2.2 provides a high-level overview of the main drivers for replacement. • Chapter 5 of our Regulatory Proposal for a description of the overarching drivers for replacement. • Energex's Asset Management Plans provide further detail on our main drivers of replacement by asset category (supporting documents 5.2.14 to 5.2.24)
4.4.7(a) iD	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.	Section 2.3