FINAL Decision
AusNet Services Contingent Project

Installation of Rapid Earth Fault Current Limiters (REFCLs) – tranche 1

August 2017

AUSTRALIAN ENERGY REGULATOR

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Contents

Shortened forms

Shortened form	Extended form
AER	Australian Energy Regulator
BMP	Bushfire Mitigation Plan
BMR	Electricity Safety (Bushfire Mitigation) Amendment Regulations, 2016
capex	Capital expenditure
DELWP	Department of Environment, Land, Water and Planning
[C-I-C]	Commercial In Confidence
DNSP	Distribution Network Service Provider
ESCV	Essential Services Commission (VIC)
ESV	Energy Safe Victoria
HV	High voltage
LTIC	Long term interests of consumers
Minister	Victorian Minister for Energy, Environment and Climate Change
opex	Operational expenditure
REFCL	Rapid Earth Fault Current Limiter
RIS	Regulatory Impact Statement
STPIS	Service Target Performance Incentive Scheme
VEDC	Victorian Electricity Distribution Code

Executive summary

On 31 March 2017 AusNet Services submitted an application to the Australian Energy Regulator (AER) for its revenue allowances to be adjusted for the installation of Rapid Earth Current Fault Limiters (REFCLs) in compliance with the Electricity Safety (Bushfire Mitigation) Amendment Regulations, 2016 (BMRs) introduced by the Victorian State Government. REFCLs are designed to reduce the risk of a bushfire caused by a fallen powerline.

AusNet Services' application seeks to recover projected capital expenditure of $104.5[1] million (real, $2016) [$107 million ($nominal)] for the first of three tranches of REFCL installation. The proposed expenditure for tranche 1 is for

- installation of REFCL devices at nine zone substations
- replacement of equipment in the 22kv distribution network that is incompatible with REFCL operation and
- installation of isolating transformers to protect high voltage (HV) customers' equipment from damage due to increased voltages as a result of REFCL operation.

Our determination is that AusNet Services' revenue allowance should be amended to allow for compliance with the amended BMRs. We do not accept the amount for which AusNet Services has applied. We have reduced the costs by $7.0 million (real, $2016) [$7.2 million ($nominal)]. This is mostly because we consider the costs proposed for works associated with HV customers exceed the prudent and efficient costs necessary to implement these projects. We consider the excess should be excluded from the increase in AusNet Services' annual revenue requirement.

However, we have provided some allowance for HV customer works. Our decision is that we accept the position of the Victorian distribution businesses that they are liable under the Victorian Electricity Distribution Code (VEDC) for adverse effects to HV customers as a consequence of REFCL operation.

We understand the Essential Services Commission Victoria (ESCV) intends to conduct a review of the VEDC. We expect that review will affect the incidence or scope of this liability for future installations. However, the decision we make here must be based on the legislated requirements as they currently stand. Any change to VEDC requirements will be considered in the future, when we consider AusNet Services' applications for tranches 2 and 3.

If the VEDC requirements change before tranche 1 of this project is completed, and the change results in lower costs, a negative pass through event may transpire. This would reduce the revenue allowance to be recovered from customers, provided the applicable materiality threshold is met or exceeded. Additionally, we have incentives in place for AusNet Services to outperform the benchmark allowances we set[2], including those allowed under this application. Under the Capital Expenditure Sharing Scheme, if capital savings are

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1 AusNet Electricity Services Pty Ltd, *Contingent Project Application, Bushfire Mitigation*, 31 March, 2017, p.36

2 In our Final Revenue Determination for AusNet Services' 2016-2020 regulatory control period

achieved for this project, 70% of the benefit is returned to customers through reduced prices in the years following the saving.

Our decision on works for HV customers applies only to the tranche 1 work program. It is not a precedent for the work proposed in tranches 2 and 3. We will examine future tranches having regard to the circumstances then applicable.

AusNet Services also sought to recover expected operating expenditure of $2.8 (real, $2016) between 2017 and 2022. Our decision is that this expenditure is efficient and should be allowed.

Our determination is that AusNet Services can recover the efficient cost of the tranche 1 REFCL installation project in charges during the remainder of the 2016–2020 period. The unsmoothed annual revenue requirement over the current regulatory control period will increase by $29.2million ($nominal) to $3 154.0 million ($nominal). This will increase distribution network prices on average by 1.18% in 2018 and by 1.68% in each of 2019 and 2020.

In making our decisions we consider the National Electricity Objective, which is to promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers (LTIC) of electricity with respect to price, quality, safety, reliability, and security of supply of electricity; and the reliability, safety and security of the national electricity system. We consider this decision will serve the LTIC because:

- it's in the LTIC that the REFCL program is properly funded to meet the bushfire mitigation objectives of the Victorian Government for a safe, secure and reliable network but one that also avoids fire starts from falling or damaged assets and
- it's in the LTIC that to the extent the operation of REFCLs has any adverse implications for particular customers, that these are effectively and efficiently addressed by the DNSP – an efficient allowance has been made for that based on existing regulatory obligations, but one which will also encourage more efficient practices should regulatory changes be made.

Contingent project trigger event

Our Final Revenue Determination for AusNet Services' 2016-2020 regulatory control period included a trigger for 'Bushfire Mitigation Contingent Project 1' (tranche 1 of REFCL deployment) once the amended Victorian Bushfire Mitigation Regulations came into effect. To be eligible to seek approval of the funding for the contingent project, AusNet Services is required to demonstrate the specified trigger event has occurred.

As set out in section 3.1, we consider that the requirements that comprise this trigger event have been satisfied.

Extension of time

AusNet Services submitted its application for this expenditure on 31 March 2017. We published the application for public comment on 4 April 2017. After review of the documentation provided with the application, we identified that the issues involved in assessing this application were difficult or complex and required further consideration.

Accordingly, we issued a notice to AusNet Services on 28 April 2017 advising that the AER would extend the time limit to make this decision to 21 August 2017.[3]

Assessment approach

We detail our assessment approach in section 2. In summary, in reaching our decision we relied on the following information:[4]

- AusNet Services' application
- a submission received from the Victorian State Government during public consultation
- AusNet Services' responses to our questions and related comments
- our own analysis and technical expertise
- the advice and assistance of Energy Safe Victoria (ESV) and the Essential Services Commission Victoria (ESCV)
- a letter received from ESCV[5]
- a report prepared for ESV by Marxsen Consulting and provided by ESV[6]
- two supplementary letters received from the Victorian Minister for Energy, Environment and Climate Change (the Minister)[7]
- a letter from the Department of Environment, Land, Water and Planning (DELWP)[8]
- our records of a roundtable meeting held on 3 August 2017 attended by AusNet Services, Powercor, the DELWP and ESV
- a letter from AusNet Services[9]
- two letters from Powercor[10]
- our records of a roundtable meeting held on 18 August 2017 attended by AusNet Services, Powercor, the DELWP, ESV and the ESCV.

We draw attention to a submission we received from the Victorian Minister for Energy, Environment and Climate Change supporting AusNet Services' application apart from funding distributors to install isolating transformers that would protect HV customer installations. The Minister also recommended the AER critically examine cost over-runs in number of areas and review the projects to ensure reliability benefits are taken into account,

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3 In accordance with the time limit extension provision of NEL clause 6.6A.2(j).

4 See: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/contingent-projects/ausnet-services-contingent-project-installation-of-rapid-earth-fault-current-limiters-tranche-1

5 ESCV letter, *Amendment of the Electricity Distribution Code – Bushfire mitigation regulations C/17/10921*, 28/6/2017

6 Marxsen Consulting: *Customer assets directly connected to REFCL networks: a preliminary risk survey*

7 As listed in Appendix - A

8 As listed in Appendix - A

9 As listed in Appendix - A

10 As listed in Appendix - A

advocated that the AER appoint independent expert technical advisers and asked that we conduct a detailed analysis of the proposals.

The Minister and the DELWP filed additional late submissions. AusNet Services filed a response to the late submissions. We took these submissions into account in making our decision.

AER determination

In accordance with clause 6.6A.2 of the NER, and taking into account stakeholder comments, our determination is that the bushfire mitigation tranche 1 contingent project should be approved, subject to adjustments to the capital and operating expenditure amounts sought. We consider that:

- the project as described is consistent with the contingent project approved in the 2016-20 revenue determination
- the trigger event specified for this project has occurred
- the capital amount sought exceeds the threshold specified in rule 6.6A.1(b)(2)(iii)
- an adjusted allowance for capital works intended to limit damage to HV customers through operation of the REFCL should be included in this project
- the operational expenditure reasonably required for the purpose of undertaking the project in each year of the regulatory period is $2.8 million (real, $2016) [$2.9 million ($nominal)]
- the total capital expenditure reasonably required to complete the project is $97.4 million (real, $2016) [$99.7 million ($nominal)]
- the smoothed annual revenue requirement should be adjusted to $3 152.3 million total ($nominal) based on an unsmoothed annual revenue requirement of $3 154.0 million ($nominal) - an increase of 1.18% on average distribution network prices in 2018 and 1.68% in each of 2019 and 2020
- the X-factors should be adjusted as set out in section 4 to maintain the difference in the final year revenue (2020) of not more than 3%, consistent with the AusNet Services revenue determination and
- the project has commenced and the likely completion date is 1 May 2019.

Structure of this document

This document sets out our determination on the timing and amount of capital and incremental operating expenditure reasonably required within the current regulatory period to undertake this contingent project.

The decision is structured as follows:

- section one provides background, introduces the application and sets out our consultation process
- section two sets out our assessment approach

- section three sets out our assessment of the application by AusNet Services
- section four sets out the AER's calculation of the annual revenue requirement
- section five sets out the AER's determination.

1 Introduction

This section sets out the relevant background information to our determination. This is whether the contingent project trigger has been met and how AusNet Services' revenue allowance should be amended to meet its legal and licence obligations. For this application we conducted significant additional consultation, and in making our decision took into account information that was provided in letters and meetings after our initial round of consultation.

1.1 Our role in this process

The Australian Energy Regulator (AER) is the economic regulator for electricity transmission and distribution services in the National Electricity Market (NEM) including in Victoria.[11] We are an independent authority, funded by the Australian Government. Our electricity-related powers and functions are set out in the National Electricity Law (NEL) and National Electricity Rules (NER).

When we receive a contingent project application we publish the application and seek public comment. We assess the application to determine whether it contains the information required by the NER.[12] We examine evidence provided to determine if the mandatory pre-defined trigger event has occurred. We also examine whether the project before us is consistent with the contingent project approved in the revenue determination. We also analyse the application to determine if the costs proposed represent a reasonable forecast of the capital and incremental operating expenditure required for the purpose of undertaking the contingent project both overall and in each year remaining in the regulatory control period. Where we have differed from the business' application we apply our adjustments to the post-tax revenue model to calculate the revenue the business may charge customers for the remainder of the regulatory period.

1.2 AusNet Services

AusNet Services is one of five distribution network service providers (DNSPs) in Victoria and is responsible for providing electricity distribution services in outer eastern suburbs of Melbourne and eastern Victoria. We regulate the revenues AusNet Services and other electricity distributors can recover from their customers through determinations that cover the span of a regulatory control period. AusNet Services' current distribution determination is for the 2016-2020 regulatory control period.

[11] In addition to regulating NEM transmission and distribution, we also monitor the wholesale electricity and gas markets to ensure suppliers comply with the legislation and rules, taking enforcement action where necessary, and regulated retail energy markets in the ACT, South Australia, Tasmania (electricity only) and New South Wales under the National Energy Retail Law.

[12] National Electricity Rules, clause 6.6A.2(b)(3)

1.3 Other regulators - Energy Safe Victoria and the Essential Services Commission (VIC)

Energy Safe Victoria (ESV) is the independent technical regulator responsible for electricity, gas and pipeline safety in Victoria. This includes administration of the *Electricity Safety Act 1998* (VIC) and the *Electricity Safety (Bushfire Mitigation) Regulations 2013* (VIC). Distribution and transmission network service providers are required to submit a bushfire mitigation plan to the ESV for approval before 1 July of each year regarding powerlines identified as 'at risk' of starting fires. Businesses required to upgrade their network to comply with the new bushfire mitigation provisions must also submit annual compliance reports to the ESV regarding their progress.

The Victorian Essential Services Commission is Victoria's independent regulator of the electricity, gas, water and sewerage, ports, taxis and rail freight industries. The Commission licenses energy retailers and distributors to operate in Victoria and administers the VEDC that all electricity distributors must abide by as a condition of their distribution licence. The VEDC includes provisions on quality and reliability of supply.

1.4 Bushfire mitigation reforms

In the wake of the tragic events of 2009's Black Saturday, the Victorian Bushfires Royal Commission published 67 recommendations[13] all of which were subsequently accepted by the Victorian State Government.

On 1 May 2016, the Victorian Parliament acted to carry out a number of the recommendations by passing amendments to the *Electrical Safety (Bushfire Mitigation) Regulations 2013*.[14] The amendments introduced new technical obligations on three Victorian DNSPs that operate in high risk bushfire areas. These obligations include:

- each polyphase electric line originating from a selected zone substation must have the "*required capacity*" specified in the BMR
- testing for the required capacity must be undertaken before the specified bushfire risk period each year and a report detailing the results of testing submitted to ESV
- each new or replaced line with a nominal voltage from 1 kV to 22 kV inclusive must be covered or undergrounded from 1 May 2016 in 33 prescribed electric line construction areas
- each Single Wire Earth Return (SWER) line must have an Automatic Circuit Recloser (ACR) installed by 1 May 2023

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13 Victorian Bushfires Royal Commission, *Final Report* (summary), July 2010, http://www.royalcommission.vic.gov.au/finaldocuments/summary/PF/VBRC_Summary_PF.pdf

14 *Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016* (VIC), http://www.legislation.vic.gov.au/Domino/Web_Notes/LDMS/PubStatbook.nsf/93eb987ebadd283dca256e92000e4069/9CC083A75311B617CA257FA100148082/$FILE/16-032sra%20authorised.pdf

Further, Schedule 2 of the legislation defines 45 *selected zone substations* and assigns a point value to each one based on the level of bushfire risk. Victorian DNSPs must meet the *required capacity* obligations for *selected zone substations* totalling:

- at least 30 points by 1 May 2019[15]
- at least 55 points by 1 May 2021[16] and
- any remaining *selected zone substations* by 1 May 2023.

The *required capacity* for a polyphase line originating from a *selected zone substation* is defined by the legislation as:

> *'…in the event of a phase-to-ground fault on a polyphase electric line, the ability—*
>
> *(a) to reduce the voltage on the faulted conductor in relation to the station earth when measured at the corresponding zone substation for high impedance faults to 250 volts within 2 seconds; and*
>
> *(b) to reduce the voltage on the faulted conductor in relation to the station earth when measured at the corresponding zone substation for low impedance faults to—*
>
> *(i) 1900 volts within 85 milliseconds; and*
>
> *(ii) 750 volts within 500 milliseconds; and*
>
> *(iii) 250 volts within 2 seconds; and*
>
> *(c) during diagnostic tests for high impedance faults, to limit—*
>
> *(i) fault current to 0.5 amps or less; and*
>
> *(ii) the thermal energy on the electric line to a maximum I^2t value of 0.10*[17]

In addition, increased compliance incentives were introduced on 11 May 2017 when the Victorian State Parliament passed the *Electricity Safety Amendment (Bushfire Mitigation Civil Penalties Scheme) Act 2017*. The Act introduces civil penalty provisions for the new requirements on DNSPs both as a single fine for a particular contravention and additional fines for each day the contravention remains unresolved.

1.4.1 Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016 - Regulatory Impact Statement

On 17 November 2015, a Regulatory Impact Statement (RIS) on the *Electricity Safety (Bushfire Mitigation) Amendment Regulations* was released by the Victorian Department of Economic Development, Jobs, Transport and Resources (DEDJTR).[18]

The RIS identified that the proposed regulations would impact AusNet Services and Powercor significantly (as the operators of the vast majority of rural powerlines in Victoria),

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15 Or all *selected zone substations* if less than 30 points of a DNSP's substations are defined in Schedule 2.

16 Or all *selected zone substations* if less than 55 points of a DNSP's substations are defined in Schedule 2.

17 *Electricity Safety (Bushfire Mitigation) Regulations 2013* (VIC), Regulation 5 'Definitions'.

18 http://www.acilallen.com.au/cms_files/ACILAllen_BushfireMitigationRIS_2015.pdf

with Jemena impacted to a much smaller degree. Its analysis was based on installation of a REFCL device at each of the 45 selected substations. The RIS analysis is based on REFCLs as this is the only technology currently available that can meet the specifications for dealing with a phase to ground fault in the BMR.

The RIS[19] estimated the complete cost required to carry out the necessary REFCL installation program (in 2015 dollars) for each DNSP was:

- AusNet Services (22 named zone substations) - $140.0 million [$146.6 million ($nominal)]
- Powercor (20 named zone substations) - $154.5 million [$161.8 million ($nominal)]
- Jemena (3 named zone substations) - $2.2 million [$2.30 million ($nominal)]

These estimates are for the total program of work across three tranches of contingent projects for each DNSP.

The RIS acknowledged that some equipment belonging to HV customers directly connected to the 22kV network may need to be replaced as a consequence of REFCL installation at the zone substation. From information provided by the DNSPs we understand that there are 92 HV customers connected directly to the 22kV network across the 45 named zone substations. The RIS estimated a cost of $100 000 (real, $2015) [$104 700 ($nominal)] for each of the 92 HV customers for replacement of surge arresters and voltage transformers. The RIS stated that these costs would be incurred by HV customers.

1.4.2 Previous AER decisions relating to this application

The AER approved a positive pass through amount of $20.2 million ($2012) to AusNet Services in October 2012. This included funding for REFCL trials at the Woori Yallock zone substation that had been approved by ESV.[20]

As part of the AER's 2016-2020 distribution determination decision for AusNet Services, trigger events were defined for three successive Bushfire Mitigation contingent projects during the 2016-2020 regulatory period.[21] These Bushfire Mitigation contingent projects relate specifically to expenditure required to comply with Victorian bushfire regulations that prescribe the installation of REFCLs and associated works.

1.5 AusNet Services' application

On 31 March 2017, AusNet Services submitted a contingent project application for funding to install REFCLs at 9 zone substations and for other associated works including the replacement of 122,117 surge arrestors. AusNet Services has split its programme of REFCL installations across their 22 named zone substations into three tranches. These tranches

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19 http://www.acilallen.com.au/cms_files/ACILAllen_BushfireMitigationRIS_2015.pdf

20 AER, *Final Decision - SP AusNet pass through application, 19 October 2012*: https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/cost-pass-throughs/sp-ausnet-cost-pass-through-victorian-bushfire-royal-commission-vbrc-31-july-2012

21 AER, *Final Decision – AusNet Services distribution determination 2016-20, Attachment 6 – Capital expenditure*: p. 126 https://www.aer.gov.au/networks-pipelines/determinations-access-arrangements/ausnet-services-sp-ausnet-determination-2016-20/final-decision

align with the three dates provided in the new bushfire legislation by which a certain proportion of the named zone substations must meet the required capacity for phase to ground faults (1 May 2019, 1 May 2021 and 1 May 2023). The first tranche, which is the subject of this contingent project application, is for works to be completed and operational by 1 May 2019.

We published the application for public comment on 4 April 2017. Consultation closed on 8 May 2017. We identified that the issues involved appeared difficult or complex. Accordingly, we issued a notice to AusNet Services on 28 April 2017 advising that the AER would extend the time limit to make this decision to be on or before 21 August 2017.

Table 1.1: Contingent project revenue requirement, 2016-20 ($m, nominal)

	2017	2018	2019	2020	Total
Return on capital	0.5	4.5	7.1	6.9	18.9
Regulatory depreciation	0.9	2.0	3.6	3.8	10.3
Operating expenditure	0.6	0.8	0.9	0.9	3.2
Revenue adjustments	-	-	-	-	-
Net tax allowance	0.1	0.2	0.4	0.5	1.3
Annual revenue requirement (unsmoothed)	2.2	7.6	12.0	12.0	33.7
Annual revenue requirement (smoothed)	-	6.7	13.4	14.1	34.2

Source: AusNet Services Contingent project application, REFCL program (tranche one), 31 March 2017, table 1, p.5.

The contingent project for tranche 1 relates to REFCL installation works at the following zone substations:

- Kinglake
- Barnawartha
- Rubicon A
- Wonthaggi
- Seymour
- Woori Yallock
- Kilmore South
- Myrtleford

Woori Yallock and Kilmore South zone substations each already have a REFCL installed. However, AusNet Services advise that a second REFCL is required at Woori Yallock in order

to achieve the performance standards set out in the BMR due to increased capacitance of the network. Kilmore South zone substation consists of two separate zone substations (north and south). AusNet Services proposes[22] to convert Kilmore South into a single zone substation to allow a single REFCL to serve the entire Kilmore South network.

The proposed total capital expense is $104.5 million (real, $2016), [$107 million ($nominal)] for the 9 projects. AusNet Services sought the following expenditure and revenue requirements to deliver the contingent project.

Consequently, AusNet Services sought an amended revenue requirement as set out in **Table 1.1**.

Table 1.1 Amended revenue requirement, 2016-20 ($m, nominal)

	2016	2017	2018	2019	2020	Total
Return on capital	217.3	230.8	252.5	270.8	287.0	1,258.4
Regulatory depreciation	103.8	88.7	94.1	96.0	102.9	485.5
Operating expenditure	230.3	240.0	251.5	262.3	273.9	1,258.0
Revenue adjustments	5.3	-6.4	-3.6	16.1	0.1	11.6
Net tax allowance	33.2	27.2	27.9	28.8	28.0	145.0
Annual revenue requirement (unsmoothed)	590.0	580.3	622.4	674.0	691.9	3,158.5
Annual expected revenue (smoothed)	586.0	597.9	623.5	657.1	692.5	3,157.0
X factor	8.27%	0.30%	-1.91%	-3.00%	-3.00%	n/a

Source: AusNet Services, *Contingent project application, REFCL program (tranche one), 31 March 2017*, table 2, p.6.

1.5.1 Points of difference between the RIS and AusNet Services' application

AusNet Services identified the differences in costing between the figure proposed in the contingent project application and the figure given in the RIS as due to some works being underestimated and others not being considered at all. The AER has found there is no material disparity between the RIS and the contingent project application for the costing of specific items. However, we have found that there are departures in the volumes of work associated with a number of items, which has significantly affected costs. In addition, there is a significant additional allowance sought for the installation of HV isolation transformers.

[22] We note that AusNet Services has sought funding to treat additional zone sub-stations beyond the minimum number required to fulfil their points obligations under the BMR and the civil penalties scheme. This additional sum is to ensure sufficient points are met. The effect of this is to bring forward some costs from a later tranche.

High Voltage isolation transformers

High Voltage (HV) customers connected directly to the 22kV network where REFCLs are installed risk damage to their equipment due to voltage spikes that occur when a REFCL is in operation. When a REFCL detects a fault due to a fallen powerline, it redirects the current flowing through the fallen phase to the remaining phases thereby reducing the chance of bushfire starts. However, this increases the voltage of the remaining phases, potentially beyond the limitations of a HV customer's connected equipment. Consequently, AusNet Services have included a cost for the installation of 12 isolation transformers of $14.2 million (real, $2016), [$14.5 million ($nominal)] to prevent HV customers being at risk of overvoltage in their installations when the REFCL operates.

The Minister and DEWLP do not support AusNet Services' proposal to address HV customers' risks.

Other costs

Compared to AusNet Services' contingent project application, we have found the RIS underestimated the cost of or did not include costs for:

- extensive line capacitive rebalancing works
- increased number of surge diverters to be replaced (due to REFCL operation increasing line voltage)
- conflict with existing distribution feeder automation systems
- project management
- procurement of land to house additional equipment
- zone substation rebuilding
- the need to install multiple REFCLs at certain zone substations (Woori Yallock, Seymour and Wangaratta)
- the installation or modification of switchboards
- HV customer isolation.

1.5.2 AER view of the RIS and regulatory framework

We note that the RIS was prepared in 2015 largely based on preliminary costing information provided by the DNSPs. We have investigated the reasons for the differences between the preliminary costing and the more detailed scope of works assessments which are now available. We are satisfied that the increased volumes of work are well substantiated and should be accepted.

In this decision we have also accepted that, under the current Victorian safety regulation framework, there is a requirement for HV customer isolation. However, we have not been satisfied the whole of the allowance claimed for this work has been wholly justified.

This decision is based on our assessment of the current Victorian regulatory framework as at the time of this decision. We anticipate changes will occur to that framework which will affect the future need for HV isolating transformers.

1.6 Why did AusNet Services request the AER to make a determination?

In its 2016–20 distribution determination proposal, submitted to the AER on 30 April 2015, AusNet Services sought to include a cost pass through event for the new bushfire regulatory obligations mandating a REFCL installation program, which were in development at that time.[23] We did not agree with AusNet Services' proposal. Instead, we considered the changed requirements for the installation of REFCLs should be treated as a contingent project. AusNet Services amended their approach accordingly and the contingent project (split into three separate tranches) was included in AusNet Services' 2016-20 distribution determination.

Contingent projects are significant network augmentation projects that may arise during the regulatory period but are not yet committed and associated costs are not sufficiently certain such that the expenditure should form a part of our assessment of the total forecast capital expenditure that we approve in a reset determination. Contingent projects are linked to unique investment drivers, which and are defined by a unique 'trigger events' that are set by the AER when it determines to accept a proposed contingent project in a revenue proposal.[24]

If the trigger for a contingent project, occurs the network service provider may apply to the AER to amend its revenue determination to include the capital and operating components required to undertake the project in the current regulatory period. The AER must determine if the proposed costs are prudent and efficient.[25] The AER must also determine the total cost of the project to be incurred in each remaining regulatory year of the current regulatory control period.[26] It is common ground amongst all the parties we consulted that the trigger event has occurred. In making this decision we have had regard to the requirements of clause 6.6A.2(e)(1), taking into account the factors in clauses 6.6A.2(f) and 6.6A.2(g) and the requirements of clause 6.6A.2(h).

1.7 Our initial consultation process

For the purpose of seeking public comment, the AER is required to publish an application for a contingent project as soon as practicable after it has been received. Any written submissions received must be considered by the AER before making a decision on the application.

Following the publication of the contingent project application, the AER received a submission from the Victorian Minister for Energy, Environment and Climate Change. The Minister supported the overall application but recommended the AER carefully examine cost

[23] AusNet Services, *Regulatory Proposal 2016-20*, 30 April 2015

[24] National Electricity Rules, clause 6.6A.1(c)

[25] National Electricity Rules, clause 6.6A.2(g)(4)

[26] National Electricity Rules, clause 6.6A.2(e)(1)

over-runs, review the projects to ensure reliability benefits are taken into account and asked that we conduct a detailed analysis of the proposals. We examine these aspects in detail in section 3.4 below, where we review specific project cost elements. The Minister also advocated that the AER appoint independent expert technical advisers.

The following items were identified as requiring specific examination on account of assumed excessive expenditure or being directly related to areas of costs where prior funding has been approved:

- zone substation works at Kinglake, Seymour, Wangaratta, Wonthaggi and Myrtleford in light of prior re-build project works for these zone substations
- zone substation works at Woori Yallock in light of funds granted by the AER for REFCL installation in a Pass Through Determination in 2012
- distribution feeder automation system modifications in light of funds allocated by the AER for similar works through AusNet Services' 2016-20 Distribution Determination
- surge arrestor replacement in light of funds allocated by the AER for surge arrestor replacement through AusNet Services' 2016-20 Distribution Determination and
- AusNet Services' use of standard unit costs of $1.18 million (real, $2016) [$1.21 million ($nominal)] for isolating transformers, compared to a variable cost structure developed by Powercor to reflect the differing demand capacities of its HV customers. [27]

Importantly, the Minister did not support the inclusion of additional funds in the contingent project for distributors to conduct work to isolate HV customer installations without technical due diligence. In particular, the Minister did not support the blanket installation of HV isolating transformers. This emerged as a significant issue in the further stages of our review and involved several stages of further consultation.

1.7.1 Further consultation

Significant issues were raised by both AusNet Services and Powercor regarding compliance with the VEDC, and as a result we conducted further consultation. We also received further written advice from stakeholders.

1.7.1.1 Essential Services Commission of Victoria

We wrote to the ESCV in mid–May to clarify their intentions to amend the VEDC in response to the new legislation. We requested the ESCV's advice on whether a review of the VEDC will incorporate amendments to account for the operation of REFCL devices on the Victorian electricity distribution system. The ESCV responded it plans to review relevant parts of the VEDC and expects to begin this review in the latter part of 2017. They stated that any changes to the VEDC would be consistent with the BMR. However, given its obligations under its legislative process to consult and to consider matters before making a decision, it

[27] Victorian Minister for Energy, Environment and Climate Change, Submission, 8 May 2017

could not provide guidance on specific VEDC changes it may make nor on how these changes may affect future financial liability.

1.7.1.2 AusNet Services

AusNet Services raised a number of issues about its ability to comply with the VEDC in relation to their HV customers:

- when a REFCL detects a fault, the REFCL drives the voltage on HV lines to a level greater than a limit specified in the VEDC and for a time period longer than permitted by the VEDC. The risk of potential voltage impacts from REFCL operation on HV customers was identified in the RIS and the costs estimated to HV customers therein were based on the presumption the DNSPs can easily access and upgrade the customer installation to counter the effect.

AusNet Services submitted[28] the presumption of working with HV customers to ensure their installations can safely accommodate the elevated voltage during REFCL operation is not a viable option for Tranche 1 because:

- there is no certainty that remediation of customers' works could be negotiated and completed in the timeframe required to meet the Government's service requirements, and arrangements made for on-going testing and treatment of equipment failures arising from testing. If some levels of equipment failure during testing are anticipated (as is known to be the case on the network) then there is high risk that AusNet Services would be required to manage new risks it is not in a position to manage.
- Operation of REFCL technology in accordance with the Bushfire Mitigation Regulations may cause it to be in breach periodically of the VEDC, and consequently clause 22 of its distribution licence.
- AusNet Services also argued that under clause 4.2.7 of the VEDC, they face financial liability for voltage variations that are outside the limits specified in the VEDC.

We consulted with the Essential Services Commission Victoria (ESCV, which has authority over the VEDC), the Department of Environment, Land, Water and Planning (DELWP), and Energy Safe Victoria (ESV) on different occasions in May and June to examine the matters raised by AusNet Services in relation to compliance with the VEDC.

1.7.1.3 Energy Safe Victoria

On 26 June 2017, ESV provided the AER with a report by Marxsen Consulting for ESV entitled "*Customer assets directly connected to REFCL networks: a preliminary risk survey*". This report examined twelve customers of AusNet Services and Powercor whose HV installations would require modification to allow operation if directly connected to a REFCL protected distribution network. ESV also provided this report to AusNet Services, Powercor and the Victorian Minister for Energy, Environment and Climate Change. ESV sought replies from those parties. The AER was not asked to respond to that consultation and we did not make a submission.

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[28] AusNet Services *Response to AER information request #1 – second response- HV transformer questions* 17 May 2017 pp 3,4

The relevant findings of the Marxsen report are:[29]

This review of customer assets indicates that, recognising the small size of the sample:

1. *The primary bushfire ignition risk is a cross-country fault should a customer asset fail to withstand higher than normal voltages during REFCL response to an earth fault elsewhere on the network.*
2. *The consequences of a cross-country fault can include:*
    a. *In high fire risk conditions, a fire at the site of the original fault. However, this is unlikely if either the original fault is not of a type that would normally cause a fire, or it is not a sustained fault.*
    b. *Customer asset damage with*
        i. *Potential risk of interruption to normal site activity, lost production and potential loss of stock due to loss of supply.*
        ii. *Potential risk of injury or death of anyone exposed to the failed asset at the time.*
    c. *Network asset damage and consequential loss of supply to other customers.*
3. *Cross-country faults have proven to be rare in the only REFCL network operating in Victoria over the past five years (perhaps one per cent of all earth faults).*
4. *Risk from customer assets represents a small increment (perhaps three per cent) of Victoria's total risk from cross-country faults.*
5. *Safety risk from customer assets is of the same nature and likely no greater 'per asset' than that arising from the same assets deployed in distribution networks.*
6. *Risks from customer assets may in many cases be cost-efficiently mitigated without isolation transformers between the customer site and the distribution network.*
7. *Customers and network owners have a common interest in prevention of asset failures. Mitigation costs may be reduced by early technical information sharing and collaboration.*
8. *Clarity about the boundary between customer assets and network assets would strengthen accountability for safety risks.*

ESV received responses from AusNet Services[30] and Powercor[31] which are published on the ESV website. Although noting the Marxsen report was useful, both businesses maintained their view that HV isolating transformers were a preferable solution. For example, AusNet Services said the Marxsen report did not cover:

- liability and regulatory considerations

[29] Marxsen Consulting Pty Ltd, *Customer assets directly connected to REFCL networks: a preliminary risk survey*, June 2017, p3

[30] http://www.esv.vic.gov.au/pdfs/ausnet-services-response-hv-customers-and-refcl-protected-networks-report-june-2017/

[31] http://www.esv.vic.gov.au/pdfs/powercor-response-hv-customers-and-refcl-protected-networks-report-june-2017/

- economic and financial consequences of supply reliability factors
- compliance with the VEDC without any requirement for negotiation
- specialised technical requirements and
- alignment with REFCL rollout timelines.[32]

1.7.1.4 Minister for Energy, Environment and Climate Change

On 27 July 2017, the AER received a letter from the Minister for Energy, Environment and Climate Change, which supported the Marxsen view.[33] The Minister stated that the Marxsen report does not support the installation of isolating transformers at any of the twelve sites surveyed in the report. Rather, the Minister cited the preferred option being for the distributors to commence working with HV customers now to discover suitable network hardening mitigations.

The Minister also noted the VEDC is to be reviewed and asked that the AER to take this factor into account in assessing these applications. Finally, the Minister went on to note that fair and serious consideration would be given to timeline extensions[34] under the *Electricity Safety Amendment (Bushfire Mitigation Civil Penalties Scheme) Act 2017* should it emerge that any delay was due to factors outside the control of the businesses.

On 1 August 2017, Powercor replied to this letter. In their reply Powercor stated the need to comply with the VEDC and the regulatory framework remained a significant concern.[35]

1.7.1.5 Roundtable meeting on 3 August 2017

To provide the key stakeholders an opportunity to resolve these divergent views, on 3 August 2017 the AER convened a roundtable meeting. Attending were the CEO and senior staff of AusNet Services, Powercor and ESV. Also attending were senior staff of DELWP, representing the Minister and the Board and senior staff of the AER. The meeting was chaired by the Chair of the AER.

AER staff noted the following points during discussion.

Each business advised that although the HV isolating transformers were a costly option, they had arrived at this approach based on a number of factors including:

- a need to comply with the VEDC as it exists today
- no certainty as to the scope of changes planned for the VEDC
- under the VEDC, the DNSP bears a financial liability for damage if a customer is exposed to voltages outside the limits set by the VEDC

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[32] AusNet Services response, *HV customers and REFCL protected networks report June 2017.pdf*, pp.2-3

[33] Letter, Minister for Energy, Environment and Climate Change, Victoria, 27 July 2017

[34] Technical exemptions are available under section 120W. These can only be granted by Governor in Council. From 1 September 2017, these provisions sit under Part 10A of the Electricity Safety Act 1998.

[35] Powercor, letter, 1 August 2017 – as listed in attachment A.

- time pressure to complete the works to a mandated timetable
- uncertainty whether the Victorian penalty compliance regime would apply
- risk to their reputation if they fail to deliver on time
- lack of knowledge of, and access to, customer installations
- poor or no incentive for customers to cooperate
- legal risk of being joined to actions should a fire event occur and
- knowledge the HV isolating transformers were an effective solution.

Both DNSPs pointed out that if savings were made, the regulatory incentive regime would return the bulk of any savings to customers.[36]

DELWP presented the alternative case that:

- the Marxsen report confirmed lower cost options were possible at most sites
- HV isolating transformers was not the only technology that could achieve the desired outcome
- hardening works as detailed in the Marxsen report would enable REFCL protection to extend to HV customer network assets
- a key consideration should be to minimise the costs but the HV isolating transformers were unduly expensive as a blanket option
- the ESCV had stated the VEDC will be amended and those amendments would address the need to make the VEDC compatible with the operation of REFCLs
- the Victorian Minister has indicated in her letter that relief from the compliance regime is likely if the businesses were diligent in their efforts to meet the timetable and
- alternative technological solutions may be feasible.

The DNSPs did not agree the alternative technology suggested by DELWP was feasible because it would adversely impact customer reliability and was inconsistent with their obligation to maintain customer reliability.

ESV stated that from a safety perspective, either technology - network hardening or customer isolation - would be acceptable.

The meeting also discussed the purchase arrangements and costs proposed for isolating transformer purchases and installation. The DNSPs advised that:

- they need to engage with local suppliers only, on a limited basis

[36] The Capital Expenditure Sharing Scheme returns 70% of the benefit of a capital saving to customers.

- time pressure, and the unique nature of the HV isolating transformers, meant normal purchasing by competitive tender was not a feasible option
- a price premium was inevitable regardless of the supplier because this was not a mass produced item
- their suppliers were unlikely to price excessively because that would place them at risk of a loss of future business
- land purchase and easement costs were another significant expense.

AER staff asked about cost estimates that had been provided, giving the example of HV regulating transformers. They noted that:

- the approach taken to arrive at the transformer cost estimates appeared to be reasonable in the circumstances
- various of the DNSP estimates included duplicated strain poles, and that a single pole could suffice[37]
- land costs used were urban rates, but in many cases the locations were rural
- AusNet Services used "wet bund" transformer designs when "dry bund" as proposed by Powercor was significantly cheaper
- overall allowances for design, installation and commissioning were high relative to the HV regulator transformer costs and
- the secondary protection requirements were necessary.

A further issue was raised in relation to "cross country" faults.[38] AER staff noted that the DNSPs financial liability in the event a cross country fault triggered a fire event had not been resolved. AER staff further noted that Marxsen had estimated the risk of these faults at 3%.[39] The DNSPs both advised that until the VEDC was amended, they would not have a solid basis to discuss this matter with insurers.

The AER concluded the meeting with an offer to consider any final submissions from any stakeholder on a matter raised in this meeting, to be received by 7 August 2017.

We received a letter from DELWP on 16 August 2017, which reiterated the points they raised at the roundtable meeting on 3 August 2017.

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[37] A "strain pole" is a special pole construction. It is used where a line ends to counter the weight of a line which is on one side only. If a gap or space is created between two spans, two poles are required – one at each end, which adds significantly to costs. We consider the option of using a single pole with no gap is adequate for this project.

[38] A "cross country" fault is a second fault that can arise on a network, potentially triggered by the operation of a REFCL dealing with an initial fault. This fault can be more serious than a primary fault as the REFCL operating mode may raise the line voltage up to 90% over the normal operating voltage.

[39] Marxsen, op. cit., recommendation 4.

1.7.1.6 Meeting with ESCV

AER staff met with the ESCV on 16 August 2017. The ESCV explained the process they intend to follow to review the VEDC, to adapt it to recognise, and be consistent with, REFCL operation. In this context, ESCV advised their view was that AusNet Services would not face a compliance liability if a REFCL caused voltage excursions outside the current limits contained in the VEDC.

Based on this update and earlier meetings and correspondence with ESCV, we accept this advice.

1.7.1.7 Letter from the Victorian Minister for Energy, Environment and Climate Change

On 17 August 2017, we received a second letter from the Victorian Minister for Energy, Environment and Climate Change.[40] In this letter, the Minister announced the Victorian Government's plan to establish a $10m fund to assist HV customers mitigate risks to their equipment from the operation of REFCL. This fund is intended to support HV customers make changes to their installations to function safely in concert with the REFCL devices.

On the basis of this fund, the Minister suggested that works by AusNet Services and Powercor to isolate HV customers would not be necessary, and that the AER should not approve this expenditure for recovery under AusNet Services' application for this contingent project.

1.7.1.8 AusNet Services and Powercor letters

On 18 August 2017, we received letters from both AusNet Services and Powercor, which responded to the Minister's letter referred to in 1.7.1.7. The DNSPs expressed concern that the proposed fund did not adequately address compliance issues, that there remained significant delivery risk, and that the scope for financial liability to be incurred by the businesses remained. Powercor also raised a concern that the Minister's letter had arisen late in the process and they did not have a reasonable opportunity to respond to this new material.

1.7.1.9 Roundtable meeting on 18 August 2017

To consider the Minister's further advice, we reconvened the key stakeholders in a second meeting on 18 August 2017. In addition to the stakeholders listed in the earlier roundtable meeting, a senior officer of ESCV was in attendance.

The meeting discussed the government's plan for a fund to support HV customers. DELWP explained that the fund would operate in stages, firstly to identify potential works on customer sites and then a second funding stage, whereby grants would be made available to help fund works identified in stage 1 on a case–by–case basis. The meeting also discussed the provisions available under the BMR and Essential Services Act to manage compliance issues that may arise as the program evolves.

[40] See Appendix A – Late submissions.

The ESCV pointed to clause 16 (c) of the VEDC that requires customers to take reasonable precautions to minimise the risk of damage to any equipment which may result from poor quality or reliability of electrical supply. They also noted that while they could not pre-empt the outcome of a process to amend the VEDC, under the Essential Services Act, any amendments would need to be consistent with the BMR.

We observed that the DNSPs view was that the fund was a positive step which would support work to make REFCL installations effective although they expressed concern that the fund would not remove all financial liability, particularly the potential for legal liability.

The DNSPs advised that they must act on the basis of the obligations contained in the Victorian compliance framework and that they could not rely on the exercise of discretions in the event of any non-compliance.

The ESV advised that it would not approve the operation of the REFCLs until it was confident that they could be operated safely from a network and HV customer perspective.

1.7.1.10 AER assessment

The AER must make its funding decision within a legislated limited time period. Our decision must be made no later than 21 August 2017.[41] Our decision must be based on the obligations the DNSPs face currently, or are known will apply, at the time the expenditure will be required. Although our preference would be for the VEDC to be amended by the ESCV before we must decide this current application, this has not been possible. The earliest ESCV will consult on the matter is in late–2017 with a decision likely in 2018, well after this decision is required to be made.

We accept that any amendments of the VEDC would need to be consistent with the BMRs. However we cannot pre-empt the timing or the outcome of any amendments to the VEDC and we must consider the applications based on the VEDC as it is currently written.

We understand that it is within ESCV's control to issue "no action" for any potential breach of the voltage limits caused by the operation of REFCL.

We note that the timetable for completion of the tranche 1 is set out as obligations in AusNet Services' BMP.[42] ESV can issue "no action" for a breach of the obligations now contained in AusNet Services' BMP. However, we agree with the DNSPs that the issue of "no action" letters by ESCV and ESV may not relieve them of all liability should the operation of the REFCL cause damage to HV customer equipment or bushfires. Further, the DNSPs argued that these may not be insurable risks given that the operation of the REFCL would knowingly breach the VEDC.

Therefore, we have determined that some allowance for the installation of isolating transformers is appropriate.

We consider a prudent business would act on the basis that it must install and operate its network in accordance with the current Victorian regulatory framework, notwithstanding that the framework is subject to change. We consider it highly likely that the framework will

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41 NER clauses 6.6A.2 (j)

42 The AusNet Services' Bushfire Mitigation Plan as accepted by Energy Safe Victoria at 28 March 2017.

change in the foreseeable future and those changes will affect the approach to this issue in all future tranches of these works. We also note the Victorian Government's commitment to create a fund to support HV customers adapt their installations to operate safely with REFCLs. We consider this fund, when it is established, is likely to significantly assist in mitigating the financial risk the DNSPs face.

Under the current Victorian regulatory framework, operation of a REFCL will breach the VEDC requirements and carries with it the risk of financial liability if damage to customer installations were to occur. Although this liability may be reduced by the operation of clause 16(c) of the VEDC, this clause is currently linked to the current limits in table 1 of the VEDC. Until table 1 is amended, operating a REFCL will cause over-voltage events to occur which exceed the maximum permitted values and which currently, the customer installation should be capable of withstanding. Therefore, it is not clear that clause 16(c) will be effective in limiting financial liability for damage to a customer installation.

Further, the framework is supported by a civil penalty regime if the mandated completion date of 1 May 2019 is not achieved. A prudent business would operate on the basis that the financial liability may be significant and that the penalty regime will apply. This remains the position of both AusNet Services and Powercor, notwithstanding that Victorian officials gave a strong indication that if the cause of a delay were outside the control of the DNSPs it was unlikely any penalties would be applied.

AusNet Services and Powercor both argue they cannot be expected to speculate whether a future independent decision maker would accept the penalty regime might be waived, even if their reason for a delay in meeting the mandated operating date (1 May 2019) was because of factors outside their control. A relevant factor here may be that one or more customers had failed to upgrade their installations in time. Another relevant factor to each DNSP is that the delay would occur in circumstances where a reliable alternative was available (the HV isolating transformer) but not adopted.

Also, we note that AusNet Services (and Powercor in relation to its own circumstances) argue that even if VEDC compliance is achieved, there remains a risk at law of financial liability if equipment owned by AusNet Services were to trigger a failure in customer equipment and that failure led to a fire event. If an AusNet Services REFCL triggered a fault in a customer installation which could have been avoided, AusNet Services is likely to be sued directly or joined to any ensuing legal action. This may become an insurable risk in the future, but this cannot be ascertained until the VEDC is amended.

Although hardening of customer installations is a potentially viable approach in the longer term and could lead to lower project costs, further changes are required to the Victorian regulatory framework for this to be completely viable. We consider, therefore, that this decision is not a precedent for future tranches of, or other decisions about, similar work. Each tranche or decision must be considered on its merits based on the relevant obligations and requirements applicable at the time.

AusNet Services operates under an incentive regime which continuously encourages them to find better and cheaper ways to deliver its services. Our role is to set an efficient allowance for the completion of these works which forms a benchmark that they will seek to better. If they succeed, under the Capital Expenditure Sharing Scheme, customers will

receive 70% of the benefit of any savings whilst AusNet Services will retain 30%. Also, the benefit of these efficiency gains will inform future projects and result in long-term gains for customers.

1.7.1.11 AER HV customer works cost estimate approach

We agree with Marxsen that the hardening approach is preferable although this requires detailed cooperative work between the DNSP and the customer. We note that at some sites, particularly large load or generator sites, the most cost effective option may be to install a HV isolating transformer. However, without a detailed investigation of every affected customer site, the AER is unable to reliably cost this hardening work.

The cost of customer side work is estimated by Marxsen to be very variable, ranging from $20 000 to $3 million per customer. With such wide variability, a reasonable allowance based on a simple average of the Marxsen range could exceed the allowances claimed by AusNet Services. Even a weighted average is unlikely to be suitable. This is because there is no basis to establish if the sample of customers on which the Marxsen report is based is representative of all affected customers. In the absence of detailed information, we do not consider it reasonable for the AER to attempt to set an allowance based on an averaging approach. We note that at the second roundtable meeting, it was agreed the Marxsen sample was not statistically representative of all customers.

Accordingly, we determined an alternative forecast based on our consideration of similar distribution equipment with comparable design, location and installation requirements as the HV isolating transformers proposed by AusNet Services. In particular, we have used the HV regulating transformer as a point of reference in our decision.

Our decision on this cost element is discussed further in section 3.4.1.5 of this decision.

2 Assessment approach

In the first submission on AusNet Services' application by the Victorian Government Minister for Energy, Environment and Climate Change it was recommended that we commission an independent expert review of the costs proposed by AusNet Services.

We reviewed the project application to establish the types of technical expertise required. We determined we required distribution design expertise and advice on REFCL technology. REFCLs are a new technology and there is only a limited supply of specialist personnel available to provide support for its implementation. However, the available personnel have conflicts of interest. Some are employed by the applicants whilst the remainder were employed by the Victorian Government to develop the technology. Consequently, we concluded that an independent expert technical adviser on REFCL implementation would not be available to assist with this decision. Our internal technical advice team was used instead, with additional support from a contractor with specialist skills in distribution design engineering. We also relied on the advice of the Victorian regulatory bodies, Energy Safe Victoria and the Essential Services Commission Victoria.

We examined the material presented by AusNet Services in its application. We assessed the completeness of the information and identified a number or areas where we needed additional information to support the business' claims. However, we assessed the information provided in the application to be sufficient to be accepted as a compliant application for the purposes of clause 6.6A.2(b) of the NER.

We issued a number of sets of questions to AusNet Services. We examined AusNet Services' responses and prepared follow up questions and also assessed those responses. We also conducted our own analysis of the sub-projects as set out in the application.

2.1 National Electricity Rules requirement

The Electricity Rules state a contingent project application must contain the following information:[43]

(i) an explanation that substantiates the occurrence of the trigger event;

(ii) a forecast of the total capital expenditure for the contingent project;

(iii) a forecast of the capital and incremental operating expenditure, for each remaining regulatory year which the Distribution Network Service Provider considers is reasonably required for the purpose of undertaking the contingent project;

(iv) how the forecast of the total capital expenditure for the contingent project meets the threshold as referred to in clause 6.6A.1(b)(2)(iii);

(v) the intended date for commencing the contingent project (which must be during the regulatory control period);

[43] National Electricity Rules, clause 6.6A.2(b)(3)

(vi) the anticipated date for completing the contingent project (which may be after the end of the regulatory control period);

(vii) an estimate of the incremental revenue which the Distribution Network Service Provider considers is likely to be required to be earned in each remaining regulatory year of the regulatory control period as a result of the contingent project being undertaken as described in subparagraph (iii);

In assessing the application the AER must take into account:[44]

(1) the information included in or accompanying the application;

(2) submissions received in the course of consulting on the application;

(3) such analysis as is undertaken by or for the AER;

(4) the expenditure that would be incurred in respect of a contingent project by an efficient and prudent Distribution Network Service Provider in the circumstances of the Distribution Network Service Provider;

(5) the actual and expected capital expenditure of the Distribution Network Service Provider for contingent projects during any preceding regulatory control periods;

(6) the extent to which the forecast capital expenditure for the contingent project is referrable to arrangements with a person other than the Distribution Network Service Provider that, in the opinion of the AER, do not reflect arm's length terms;

(7) the relative prices of operating and capital inputs in relation to the contingent project;

(8) the substitution possibilities between operating and capital expenditure in relation to the contingent project; and

(9) whether the capital and operating expenditure forecasts for the contingent project are consistent with any incentive scheme or schemes that apply to the Distribution Network Service Provider under clauses 6.5.8, 6.5.8A or 6.6.2 to 6.6.4.

Further, in making this decision we have had regard to the requirements of clause 6.6A.2(e)(1), taking into account the factors in clauses 6.6A.2(f) and 6.6A.2(g) and the additional requirements of clause 6.6A.2(h).

2.2 AER approach

We followed the approach set out in the NER clause 6.6A.2.

We examined whether the project trigger event had been satisfied. We concluded that it had. We tested whether the amount sought exceeded the threshold for a contingent project and concluded that it had as set out in rule 6.6A 1 (b) (iii). The AER then reviewed the application and public submissions.

We identified a number of issues to investigate. These centred on:

[44] National Electricity Rules, clause 6.6A.2(g)

- differences between the RIS estimate and the application
- differences between the AusNet and Powercor contingent project applications
- the technical approach
- VEDC compliance and the HV customer isolation requirement
- levels of complexity required and discrimination between REFCL driven expenditure and reliability objectives already incentivised under the STPIS program
- discrimination between DNSP obligations and specific REFCL related statutory compliance obligations
- capex vs opex balance
- identification of any costs that have been included in the revenue determination, if any
- treatment of depreciation
- estimating techniques
- governance

Questions addressing these issues were issued to AusNet Services. Written responses were provided. AER asked further questions to clarify some aspects of the replies that remained unclear. Emails were used to respond to these questions.

We considered whether a prudent and efficient network business would have structured the project in similar or different form to that proposed by AusNet Services.

We concluded with some exceptions that they would.

In a number of instances AusNet Services asked that commercially sensitive information submitted to us as part of its application not be published. We accept that the project involves substantial new works that have yet to be put to tender. Publishing the AusNet Services information will make it easier for intending tenderers to anticipate the price expectations of AusNet Services. In turn, this will tend to lessen competitive pricing pressure. Although our general preference is to publish all relevant information, on balance, we consider that maintaining the confidentiality of the specific estimates involved in this project will better serve the long term interests of consumers than would publication. This approach is also consistent with our confidentiality guideline.

The AER's Technical Advisor Group (TAG) is an internal group of experts that provides the AER with insight and advice into electricity supply industry decision making, design and operating practices and costs. We sought the TAG's advice to assist us in making this determination. They examined how estimates were developed and identified weaknesses with the AusNet Services approach in some instances.

We considered the application of STPIS incentive schemes under the NER and performed analyses to ensure that there was not a conflict between REFCL driven modifications and those normally driven by reliability incentives.

Having determined the required capital and operating expenditure necessary to complete the project, we modified the proposed post tax revenue model (PTRM) to reflect the allowances we considered appropriate, but otherwise using the parameters as previously determined by the AER, including the year 2 return on debt update.

3 AER assessment

3.1 Trigger event

In its revised revenue proposal, submitted to the AER on 6 January 2016, AusNet Services proposed a three element trigger for the Bushfire Mitigation Contingent Project 1. In our final decision on AusNet Service's 2016 -2020 revenue determination published 26 May 2016 we approved the Bushfire Mitigation Contingent Project 1 as a contingent project.

We determined the trigger event for Bushfire Mitigation Contingent Project 1 to be:[45]

> *In circumstances where a new or changed regulatory obligation or requirement (within the meaning given to that term by section 2D of the National Electricity Law) ("relevant regulatory obligation or requirement") in respect of earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State is imposed on AusNet Services during the 2016–20 regulatory control period, the trigger event in respect of bushfire mitigation contingent project 1 occurs when all of the following occur:*
>
> > *(i) AusNet Services has identified the proposed capital works forming a part of the project, which must relate to earth fault standards and/or standards for asset construction and replacement in a prescribed area of the State and which are required for complying with the relevant regulatory obligation or requirement. The proposed capital works must be listed for commencement in the 2016–20 regulatory control period in regulations or legislation, or in a project plan or bushfire mitigation plan, accepted or provisionally accepted or determined by Energy Safe Victoria;*
> >
> > *(ii) For each of the proposed capital works forming a part of the project AusNet Services has completed a forecast of capital expenditure required for complying with the relevant regulatory obligation or requirement;*
> >
> > *(ii) for each of the proposed capital works forming a part of the project that relate to earth fault standards, AusNet Services has completed a project scope which identifies the scope of the work and proposed costing.*

We determined on 28 April 2017 the trigger event was satisfied as each of the above events had occurred and a compliant proposal had been lodged for consideration.

3.1.1 Extension of time limit

The AER published the application for public comment on 4 April 2017. We identified that the issues involved in assessing this application were difficult or complex and required further consideration. Accordingly, we issued a notice to AusNet Services on 28 April 2017 advising that the AER would extend the time limit to make this decision to 21 August 2017.[46]

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[45] AER, *Final decision, AusNet Services distribution determination 2016 to 2020, Attachment 6 – Capital expenditure, May 2016*, p. 6–120.

[46] AER Extension of time limit under NER clause 6.6A.2(j)

3.2 Expenditure threshold

The NER currently stipulates the capital expenditure threshold[47] for a contingent project is the proposed capital expenditure:[48]

> *exceeds either $30 million or 5% of the value of the maximum allowed revenue for the relevant Distribution Network Service Provider for the first year of the relevant regulatory control period whichever is the larger amount*

3.2.1 AER view

The AusNet Services application is for $104.5 million (real, $2016) [$107 million ($nominal)], which exceeds $30 million. Five per cent of AusNet Services' first year revenue is $29.3 million (real, $2016), which is $29.98 million ($nominal). As the capital expenditure threshold has been met under the first limb of the rule, we agree the threshold has been met.

3.3 Technical considerations

3.3.1 Technical standards in jurisdictional legislation

AusNet Services is required to comply with the VEDC and also, all applicable Victorian electrical safety regulations arising out of the BMR.[49] AusNet Services has also developed a revised BMP[50] which has been approved by the ESV. The BMP contains the timetable for completion of tranche 1. Under Victorian electrical safety regulations, this is a further obligation which AusNet Services must fulfil.

3.3.1.1 AER view

In 2015 the Victorian Government introduced the BMR. The BMR specify a performance regime for cutting power to a fault in a high voltage line in designated high fire risk zones of the State. A new device – a REFCL[51] device – is the only equipment currently capable of meeting the performance requirements specified by the BMR. Therefore, AusNet Services needs to operate the REFCLs on its distribution networks in order to comply with the BMR.

However, operation of the REFCLs without appropriate isolation measures may result in non-compliance with the VEDC. This is because when the REFCL operates the voltages on the AusNet Services' network will exceed the voltage limits currently specified in table 1 of clause 4.2.2 of the VEDC.[52] Operation of a distribution network outside the limits imposed by the VEDC is likely to cause damage to a high-voltage customer's installation.

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47 NER clause 6.6A1 (b) (iii)

48 NER clause 6.6A.2(e)

49 *Electricity Safety (Bushfire Mitigation) Amendment Regulations*, 2016

50 Bushfire Mitigation Plans (BMPs) are separate obligations regulated by Energy Safe Victoria.

51 REFCL stands for: Rapid Earth Fault Current Limiting

52 This is an intrinsic characteristic of the normal operation of a REFCL.

AusNet Services and Powercor have each applied for contingent project funding in accordance with their determinations.[53] They each have specific requirements included in the BMPs to install and operate REFCLs. In their applications both DNSPs cite the prospect that financial liability will arise for damage caused by operation of a REFCL as grounds for funding by the AER of additional works to mitigate the prospect of damage to their HV customer installations.

Table 1 of clause 4.2.2 of the VEDC specifies times and durations of the maximum overvoltage condition that must not be exceeded. For the purposes of this decision, we accept that without appropriate isolation measures when a REFCL operates it will exceed both the maximum overvoltage limit and/or the time duration specified in table 1 of clause 4.2.2 of the VEDC. Although the VEDC is likely to be amended to revise table 1, the AER was advised by ESCV that amendment is unlikely in the immediate future.

Compliance with the VEDC is a condition in AusNet Services' distribution licence. Also, clause 4.2.7 of the VEDC provides that a DNSP must compensate any person whose property is damaged due to voltage variations outside the limits prescribed by Table 1 of clause 4.2.2. However, clause 4.2.7 should be read in conjunction with clause 16 (c) of the VEDC and any applicable guideline. Clause 16(c) of the VEDC states that a customer must take reasonable precautions to minimise the risk of loss or damage to any equipment, premises or business of the customer which may result from poor quality or reliability of electricity supply.

Given that:

1. in order to comply with its obligations under the BMR, AusNet Services' must implement REFCL devices
2. the operation of a REFCL device without the use of isolation transformers will from time-to-time exceed the voltage limits set in the VEDC and therefore AusNet Services' will be in breach of its requirements under the VEDC and
3. operation of the REFCL outside the limits specified in the VEDC is likely to cause damage to a customer's installation and
4. clause 4.2.7 of the VEDC (as limited by clause 16(c) and the Electricity Industry Guideline) makes a DNSP liable for damage caused by operation outside those limits

we formed a view that under the VEDC as it currently applies, in order for AusNet Services to comply with its obligations under the VEDC and the BMRs, it is necessary that it implement REFCL devices and isolation transformers.

We note that there is an intention that the VEDC be reviewed in 2017/2018, which may be in time for Tranches 2 and 3. However, our consideration for this tranche must be in the terms of current statutory regulations and not in anticipation of potential but undefined, future revisions.

[53] AER, Final decision, AusNet Services distribution determination 2016 to 2020, Attachment 6 – Capital expenditure, May 2016, p. 6–144.

We communicated our view to the DELWP, ESV and the two DNSPs. This led to further submissions by AusNet Services, Powercor, the Minister and ESV, which submissions and our treatment of them were discussed in section1.7.1.

3.3.2 REFCL performance requirements

In the wake of the tragic events of 2009's Black Saturday, the Victorian Bushfires Royal Commission published 67 recommendations[54] that were all subsequently accepted by the Victorian State Government. On 1 May 2016, the Victorian Parliament acted to carry out a number of the recommendations by passing amendments to the *Electrical Safety (Bushfire Mitigation) Regulations 2013*.[55] The amendments introduced new obligations on Victorian distribution network service providers (DNSPs) that operate in high risk bushfire areas. These obligations include:[56]

- each polyphase electric line originating from a selected zone substation must have the required capacity (discussed below)
- testing for the required capacity must be undertaken before the specified bushfire risk period each year and a report detailing the results of testing submitted to ESV
- each new or replaced line with a nominal voltage between 1 kV and 22 kV must be covered or undergrounded from 1 May 2016
- each Single Wire Earth Return (SWER) line must have an Automatic Circuit Recloser (ACR) installed by 1 May 2023

Schedule 2 of the *Electrical Safety (Bushfire Mitigation) Regulations 2013* lists 45 selected zone substations and assigns a point value to each one based on the level of bushfire risk. Victorian DNSPs must meet the *required capacity* obligations for selected zone substations totalling:

- at least 30 points by 1 May 2019[57]
- at least 55 points by 1 May 2021[58] and
- any remaining *selected zone substations* by 1 May 2023.

The 'required capacity' for a polyphase line originating from a selected zone substation is defined in the *Electrical Safety (Bushfire Mitigation) Regulations 2013*.as:

> *…in the event of a phase-to-ground fault on a polyphase electric line, the ability—*

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54 Victorian Bushfires Royal Commission, *Final Report* (summary), July 2010, http://www.royalcommission.vic.gov.au/finaldocuments/summary/PF/VBRC_Summary_PF.pdf

55 *Electricity Safety (Bushfire Mitigation) Amendment Regulations 2016* (VIC), http://www.legislation.vic.gov.au/Domino/Web_Notes/LDMS/PubStatbook.nsf/93eb987ebadd283dca256e92000e4069/9CC083A75311B617CA257FA100148082/$FILE/16-032sra%20authorised.pdf

56 E*lectricity Safety (Bushfire Mitigation) Regulations 2013* sections 7(ha) – (hd).

57 Or all *selected zone substations* if less than 30 points of a DNSP's substations are defined in Schedule 2.

58 Or all *selected zone substations* if less than 55 points of a DNSP's substations are defined in Schedule 2.

(a) to reduce the voltage on the faulted conductor in relation to the station earth when measured at the corresponding zone substation for high impedance faults to 250 volts within 2 seconds; and

(b) to reduce the voltage on the faulted conductor in relation to the station earth when measured at the corresponding zone substation for low impedance faults to—

(i) 1900 volts within 85 milliseconds; and

(ii) 750 volts within 500 milliseconds; and

(iii) 250 volts within 2 seconds; and

(c) during diagnostic tests for high impedance faults, to limit—

(i) fault current to 0.5 amps or less; and

(ii) the thermal energy on the electric line to a maximum I^2t value of 0.10[59]

In addition, increased compliance incentives were introduced on 11 May 2017 when the Victorian State Parliament passed the *Electricity Safety Amendment (Bushfire Mitigation Civil Penalties Scheme) Act 2017*. The Act introduces civil penalty provisions for the new requirements on DNSPs both as a single fine for a particular contravention and additional fines for each day the contravention remains unresolved.

3.3.2.1 AER view

Having reviewed the REFCL performance characteristics, we accept the concerns expressed by AusNet Services in terms of the technical challenges which must be addressed to meet REFCL performance requirements. We also accept that the BMR requires compliance to a standard of performance of the REFCL device that will exceed both the maximum overvoltage limit and/or the time duration specified in table 1 of clause 4.2.2 of the VEDC. In the absence of measures to isolate HV customer's over-voltage events, which are intrinsic to REFCL operation, damage may occur to customer networks unless the customer network is upgraded to tolerate these events.

As it is mandated by the BMR, we consider it reasonable that the performance standard be achieved, notwithstanding that the operation of the devices will require additional expenditure be incurred to address the concerns which result from operation outside the technical limits imposed by the VEDC. We and have taken this as our base position in reviewing the AusNet Services Contingent Project Application.

3.4 Capital expenditure

The following table is summarises the AusNet Services Contingent Project Application capital expenditure requirements.

[59] *Electricity Safety (Bushfire Mitigation) Regulations 2013* (VIC), Regulation 5 'Definitions'.

Table 3.1: Summary of contingent project capital expenditure requirements ($m, $2016)

	2016	2017	2018	2019	2020	Total
Zone substation works	6.9	56.2	32.4	0.1	-	95.5
Network reliability Improvements	-	2.3	5.6	-	-	7.9
Live Line Purchases	-	0.2	0.4	-	-	0.6
Program management office costs	-	0.5	-	-	-	0.5
Total	**6.9**	**59.2**	**38.4**	**0.1**	**-**	**104.5**

Source: AusNet Electricity Services Pty Ltd, Contingent Project Application, Bushfire Mitigation, 31 March, 2017 p36.

The following table from the AusNet Services Contingent Project application summarises the direct capital expenditure requirements forecast.[60]

Table 3.2: Summary of direct capital expenditure requirements costed in RIS, $m, $2016

	Zone substation	Network Balancing	Line Hardening	Compatible equipment	RIS total	Distribution Code (not costed in RIS)
Woori Yallock 2	3.9	1.0	1.5	0.7	**7.0**	1.2
Rubicon A	4.2	1.5	1.6	0.4	**7.7**	3.5
Barnawartha	3.8	0.9	0.4	0.1	**5.1**	2.4
Kinglake	7.1	0.8	0.4	0.4	**8.7**	-
Seymour	9.7	3.4.	2.1	0.6	**15.8**	2.4
Wangaratta	8.0	3.8	2.5	1.2	**15.6**	2.4
Wonthaggi	3.6	3.0	1.8	1.2	**9.6**	1.2
Myrtleford	3.4	1.2	1.0	0.4	**6.0**	-
Kilmore South	3.0	1.6	0.8	0.5	**5.8**	1.2

[60] AusNet Electricity Services Pty Ltd, *Contingent Project Application, Bushfire Mitigation, 31 March, 2017* p36

Total	**46.6**	**17.1**	**12.1**	**5.6**	**81.3**	**14.2**

Source: AusNet Electricity Services Pty Ltd, Contingent Project Application, Bushfire Mitigation, 31 March 2017, p36.

AusNet Services provide the following commentary on the above table in their submission.

> *The table shows that AusNet Services' total capital expenditure for the workstreams that were costed in the RIS is $81.3 million (real $2016). An additional $14.2 million (real $2016) is required to address the Victorian Electricity Distribution Code compliance issues, which were not costed in the RIS, producing a total cost of $95.5 million (real $2016).*

3.4.1 Detailed analysis

Each zone substation and associated feeders present a unique capex requirement. We have considered the individual circumstances of AusNet Services for each of the proposed zone substations. Also, where appropriate, we compared the unit rates and volumes against external sources by seeking prices from equipment suppliers, our own consideration of likely costs and volumes for similar works elsewhere and available benchmarks for unit costs and volumes derived from our recent work reviewing the costs of other regulated DNSPs.

3.4.1.1 Zone substation Works

The following codes are used by AusNet Services to identify zone substations and these codes will be used in this decision:

Table 3.3: Zone substation codes

Zone substation	Code
Woori Yallock 2	WYK2
Rubicon A	RUBA
Barnawartha	BWA
Kinglake	KLK
Seymour	SMR
Wangaratta	WN
Wonthaggi	WGI
Myrtleford	MYT
Kilmore South	KMS

AusNet Services has proposed $46.472[61] million (real, $2016) [$47.6 million ($nominal)] for zone substation works to integrate the REFCLs including:

- the REFCL components: Arc Suppression Coil, Residual Current Compensator/inverter and control panel
- additional power supplies including station service transformers
- modifications to 22kV system including neutral switching bus, ac switchboards and changeover boards
- capacitor bank upgrades
- spatial accommodation issues
- hardening within the zone substation
- civil and ground works
- associated protection and control and SCADA
- PMO and community engagement

The proposed works are considered below.

In this discussion, we note that the REFCL is a specific implementation by the Victorian Government of Ground Fault Neutraliser (GFN) technology, which is common in other parts of the world. The primary distinction is the addition of residual current compensation and advanced control technology to a GFN creates the very high performance REFCL. References to GFN technology in this discussion are generally interchangeable with REFCL technology, unless the context demands otherwise.

Station service transformers

Station service transformers provide power to the systems and machinery that operate within a zone substation. AusNet Services considers that the station service transformers in sizes between 500 kVA and 750 kVA are required to be upgraded in order to support the additional energy requirements of the new equipment. This is because when a REFCL operates, the associated inverter injects sizeable amounts of energy to counter the faulted phase.

Based on our review of the individual site requirements, we consider that at each site, AusNet Services has adequately scoped the increased energy requirement of the additional equipment. We have also reviewed the proposed equipment costs. We consider that these costs are consistent with recent cost benchmarks[62] for similar works carried out by AusNet Services and Powercor.

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[61] AusNet Services, *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

[62] Powercor and AusNet Services RIN submissions

Therefore, we consider that these costs reasonably reflect the capital expenditure criteria (capex criteria) having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of that DNSP under the NER, clause 6.6A.2 (g)(4).

Modifications to AC boards

AusNet Services has proposed additional works associated with the AC changeover board based on the additional load requirements of the new REFCL equipment. We note that the AusNet Services approach is broadly comparable with the Powercor approach, however, a slightly different design approach has been taken by AusNet Services. We conducted a review of the proposed design to satisfy ourselves of the need for this work.

The requirement for additional works including the AC changeover board was not identified in the RIS cost estimates, however we consider that there is a technical requirement for this work, which has only became apparent after more detailed site investigations. The works to the AC changeover board are required due to the increased alternating current (AC) supply requirement increases demanded by the REFCL installation. A number of the AC boards have increased cost requirements where there is a technical need for multiple GFNs at the one zone substation. We consider that the proposed unit rates and volumes of works associated with the AC changeover boards are reasonable. They are consistent with our benchmarks and our independent estimates of the likely scope and cost of similar works.

Therefore, we consider that these costs reasonably reflect expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Arc suppression coil

The arc suppression coil cost is based on quotation from the single supplier. The device is specialised item. We note that AusNet Services have made considerable efforts to identify alternative suppliers but none are currently available. Therefore, AusNet Services has endeavoured to negotiate an appropriate supply arrangement with the sole supplier to support the Contingent Project Application. We note AusNet Services has endeavoured to address the inherent risks associated with a single source provider of this equipment, which plays a central role in the required works.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Civil Works

AusNet Services has also identified civil works associated with the concrete footings for the ASC. These works are proposed at $[C-I-C] (real, $2016) [$[C-I-C] ($nominal)]. The works include bunding arrangement similar to other zone substation transformers. We have assessed this against the Powercor application, which presents a similar amount. We also consider that the works are required and, based on similar works conducted by other DNSPs, are within the reasonable cost expectations for this type of work.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Capacitor banks

Capacitive balancing is a critical technical issue is ensuring a REFCL can operate as intended. This cost item was set out in the RIS and included in the AER's initial assessment. The 22kV capacitor banks and cap bank footings have a unit cost of $[C-I-C] and $[C-I-C] (real, $2016) respectively [$[C-I-C] ($nominal)] and [$[C-I-C] ($nominal)], New capacitor bank footings are required for relocation and replacement situations. This compares favourably with the $320,013 ($nominal) amount estimated by Powercor and with the $0-500 000 (real, $2015) [$0-523 000 ($nominal)] cost range amount estimated in the RIS[63].We think it is unlikely that the standard would be significantly different between the two operators. The major reason for the difference is that the AusNet Services estimates are based on site specific data, whereas Powercor has adopted an average cost approach for this item.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Circuit breakers

The 22kV dead tank circuit breaker 3 at WN and 1 at KMS are required for hardening purposes and altered switching configurations. The estimates represent fair cost for a known upgrade and are consistent with costs for similar work elsewhere.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

The 22kV U/S isolator and the associated 22kV dead tank circuit breakers 6 at WN and 2 at KMS are required for hardening purposes and for the altered switching configurations. We consider these components are consistent with similar work elsewhere in the AusNet Services network. We acknowledge that this is a cost that a prudent operator would incur to achieve the capital expenditure objectives. We also consider that this unit cost is reasonable for an identified upgrade and is consistent with similar costs presented by Powercor.[64]

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Transformer neutral bus and switchboard

We queried the need for a transformer neutral isolator and neutral bus works. After discussion with AusNet Services staff, AER technical staff accept the requirement is justified by the changed current flows associated with REFCL operation.

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63 DELWP Regulatory Information Statement, *Bushfire Mitigation Regulations Amendment, Acil Allen; 2015* p69

64 Powercor REFCL *Contingent Project Submission 2017 REFCL_MOD.01 – Expenditure build-up model (Tranche 1)*

AusNet Services identified that additional switching capability beyond the scope of the RIS is required to ensure its protection system continues to operate in accordance with industry standards. The AusNet Services application includes a separate neutral bus and additional protection and interface control systems to address this. We consider that a neutral bus is required at all GFN zone substations. A second neutral bus is required at those substations requiring a second GFN. The technical reason for this assessment is that GFNs have a specific capacitive loading capacity. As load growth on a zone substation causes the capacitive loading to exceed this level, a second (and potentially a third) neutral bus is required.

We queried the requirement for neutral bus switchboard and additional circuit breakers at MYT, SMR and KLK. AusNet Services advised that the zone substations are built to a 1950's design standard (referred to as "banked"), meaning that the flexibility of operation is limited. A fault within the zone substation can cause protection to operate and require manual operation to restore. AusNet Services argued that inclusion of the REFCL devices increases the operational complexity and that manual operation would be required at KLK and SMR to change operating modes resulting in customer outages. AusNet Services made a case for providing fully switched capability at KLK and other zone substations on the basis that they are introducing a new standard for operation, the incremental cost of additional neutral earthing CBs is small and that the RMU approach enables modular expansion.

We note that GFNs can be paralleled and that they can be shared between transformers in a zone substation. However, an earth fault associated with a transformer needs to be cleared automatically. Otherwise, with a REFCL in operation, a cross country fault can result. Further, there is a requirement to fully switch the zone substations to enable segregation. This requires a level of flexibility not currently permitted by the "banked" configuration. We therefore accept that the Powercor design is justified.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Some zone substation works items that have been proposed by AusNet Services were not included in the RIS[65] estimate. These include items such as the neutral bus switchboard, the REFCL control room, REFCL backup protection and interface control systems, REFCL testing and a community engagement plan.

AusNet has identified that additional switching capability beyond the scope allowed for in the RIS is required. The AusNet Services application includes a separate neutral bus and additional protection and interface control systems to address this. We consider that a neutral bus is required at all REFCL zone substations and a second is required at substation SMR, WYK2 and WN due to these substations requiring a second GFN.

GFNs have a specific capacitive loading capacity per unit. As load growth occurs on a zone substation this causes the capacitive loading to exceed this capacity. A second (and potentially a third) GFN is required. Each neutral bus installation requires a neutral bus controller.

[65] Regulatory Information Statement, *Bushfire Mitigation Regulations Amendment, Acil Allen; 2015.*

Enclosures

On inspection of the trial site zone substations at Gisborne and Kilmore South, it was demonstrated that the GFN control system and inverter are sensitive power electronic systems. Consequently, these are items that need to be housed in an air-conditioned enclosure. Not all zone substations have the environment and space suitable for these devices. As such, we have allowed for these enclosure costs to be included where necessary.

AusNet Services proposes additional air-conditioned control room at six zone substations at a cost of 6x$[C-I-C] (real, $2016) [6x$[C-I-C] ($nominal)].

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Battery room upgrades

Battery room upgrades are required at four of the zone substations. We sought an explanation why the REFCL is a device that requires battery backup. AusNet Services argued that it is integrated into a control system that is battery backed and, as such, the system cannot be separated. Their secondary argument is that the REFCL needs to be battery backed so that service restoration following a zone substation 'Black' event is not jeopardised. Total cost of 3x2 battery room sets @$[C-I-C] (real, $2016) and 1x1 battery room set @$[C-I-C] [66] (real, $2016) = $[C-I-C] (real, $2016) [$[C-I-C] ($nominal)]. We have considered the AusNet Services' arguments and accept them on the basis of this argument. We also accept the arguments for segregation and that the additional DC load called for by REFCL systems cannot be separated from the associated equipment at a protection level.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Power quality meters

Power quality meters are specified at several zone substations: two each at RUBA BWA, WN, WGI $[C-I-C] and one at KMS at a cost of $[C-I-C], totalling $[C-I-C] (real, $2016) [$[C-I-C] ($nominal)]. These are identified as required for accurate data logging of REFCL response. As dual buses are being created to enable the flexible operation necessary to support REFCL function, duplication is required.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

[66] AusNet Service *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

Community engagement

The RIS does not identify community engagement as a project cost. AusNet Services has allocated funds for this purpose and capitalised them in each zone substation application. We consider this allocation reasonable on the basis that:

- it is consistent with AER's broader expectations for DNSPs to consult customers
- there may be customer impacts (outages) from the commissioning and insulation testing
- the Black Saturday fires caused considerable loss of life and property. There is an expectation in the community that active engagement will be maintained.

However, it needs to be emphasised that DNSPs already have community engagement programs that they can leverage off. This means that the costs should be incremental to existing activities, not a new/standalone activity.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

3.4.1.2 Feeder works

Network balancing

AusNet Services has proposed $16.863[67] million (real, $2016) [$17.25 million ($nominal)] for network balancing works to integrate the REFCLs including:

- design
- third conductor installation
- unbonding cable
- phase rotation
- balancing capacitors
- inherent works

Network balancing is a major component of feeder works. We have reviewed the network balancing unit rates and also compared these with the RIS and Powercor application.

AusNet average $1.87 million (real, $2016) [$1.92 million ($nominal)] and Powercor average $1.95 million ($nominal). The RIS estimated network balancing at $0–340 000[68] (real, $2015) [$0–356 000 ($nominal)] per zone substation based on 0–85 phase rotations at $4 000 (real, $2015) [$4 187 ($nominal)] per rotation per zone substation.

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[67] AusNet Service *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

[68] DELWP *Regulatory Impact Statement, Bushfire Mitigation Regulations Amendment, ACIL ALLEN Consulting,* Table 14, Page 69

The AusNet Application Network Balancing Strategy[69] presents arguments for the increased costs of this activity in comparison to the RIS. The Strategy identifies:

- new learning out of the WYK REFCL commissioning
- the RIS was tabled in 2015 before detailed design and site considerations were taken into account. The contingent project application was lodged in 2017.
- the RIS detailed phase rotations alone as a means of achieving balance. It was found that the level of leakage mitigation required to meet the Bushfire Mitigation Regulations is far higher than is possible under that strategy.[70]
- AusNet Services has identified as necessary a combination of approaches including:
    - performing single-phase spur and distribution substation phase transpositions (e.g. Where a network section may have more connections to the Red phase in comparison to the Blue phase a transposition can be made converting a Red and White connected spur or asset to the White and Blue phases)
    - installing balancing capacitor banks at the beginning of single phase spur sections
    - installing LV balancing capacitor banks on the three-phase back bone and
    - in a small number of cases adding a third conductor to the beginning of a single-phase spur section (practical for cable) and converting that cabled section to three-phase.

AER technical staff conducted site inspections at trial sites operated by AusNet Services and Powercor. We reviewed the arguments advanced for these additional activities against the field experience of operational staff at those locations. We consider the field experience justifies the combined approach as detailed above. We therefore consider the approach taken by AusNet Services is reasonable.

The application outlines a detailed risk and governance strategy.[71] The AusNet Services approach is similar to the Powercor approach.[72] We consider the AusNet Services approach is in accordance with industry norms for complex capital works and is reasonable.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

3.4.1.3 Line hardening

Line hardening works include the major activity of replacing surge arrestors and other items of incompatible equipment (but labelled as ‘compatible equipment‘).

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69 AusNet Services *REFCL Program Network Balancing Strategy 2017* p11 to 13

70 AusNet Services *REFCL Program Network Balancing Strategy 2017*

71 AusNet Services *REFCL Program Network Balancing Strategy 2017* p11 and 13

72 AusNet Services REFCL *Program Network Balancing Strategy 2017* p11 and 13

Surge arrestors

AusNet Services has proposed $12.1 million (real, $2016)[73] [$12.4 million ($nominal)] for line hardening works to integrate the REFCLs including:

- surge arrestor replacement

AusNet Services has proposed the replacement of 40% of surge arrestors[74] for Tranche 1 of the REFCL program. This equates to a unit cost of $2 460 per site or $940 (real, $2016) [$962 ($nominal)] per unit. Powercor estimates in most zone substations a cost of $1 523 and $1 175 ($nominal) respectively.

The RIS presented an estimated cost of $1 000 (real, $2015) [$1 047 ($nominal)] per surge arrestor.

The RIS[75] proposed that replacement of one in three Surge Arrestors would reflect an appropriate cost/risk benefit profile. This analysis was based on preliminary data for age and specification of the surge arrestor population, taking into consideration statistical failure rates. Subsequent work by the an independent testing laboratory, commissioned by AusNet Services, identified specific makes and models of existing installed surge diverters which would require replacement.

AusNet Service and Powercor agree closely with the RIS assessment of the percentage of the surge diverter population that requires replacement. The higher percentage is based on a detailed study of GIS data augmented by line inspections in many cases. As such, we consider the process of estimating replacement volumes is to an acceptable standard. We accept the AusNet Services estimate of replacement volumes.

The following historical references were compared:

Table 3.4: Surge arrestor benchmarks

AusNet Services from 2009 Bushfire review[76]	"Planned replacement costs ranging from $1500 for surge diverters on a SWER distribution or single-phase transformer and $2000 for surge diverters on a SWER isolating or three-phase transformer" (AMS 20-67 $2009)
Powercor and CitiPower RINs (see RINs)[77]	CitiPower - $3,763 weighted unit cost ($2014). Note included HV switchgear replacement, so may not be representative. Powercor - $1,896 weighted unit cost

[73] AusNet Service, *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

[74] AusNet Services, *REFCL Program Line Hardening Strategy 2017*

[75] *Regulatory Impact Statement, Bushfire Mitigation Regulations Amendment, ACIL ALLEN Consulting, DELWP 2015,* p69

[76] AusNet Services, from 2009 Bushfire review

[77] Powercor and CitiPower RINs

	($2014). Note included HV switchgear replacement, so may not be representative.
AusNet Service Vic EDPR 2015[78]	$1600 per surge arrester. (Ref: Appendix 7C: Unit Rates) SAPN Bushfire mitigation program (2015) "Estimated cost to replace 19kV RAGs or CLAHs with surge arrestors =about $2,007 each". "Estimated cost to replace 11kV RAGs or CLAHs with surge arrestors = about $3,755 per set of 3".

These references reflect surge arrestor costs previously accepted by the AER in the determination for AusNet Services and in an earlier pass through application. On this basis, the AER accepts the additional cost per surge arrestor as proposed by AusNet Services in the contingent project application.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

3.4.1.4 Compatible equipment

AusNet Services has proposed $5 583 000 (real, $2016)[79] [$5 713 000 ($nominal)] for Compatible Equipment works to integrate the REFCLs including:

- ACR replacements and upgrades
- voltage regulator replacements and upgrades

Compatible equipment in the AusNet Services network comprises the replacement or upgrade of Automatic Circuit Reclosers (ACRs) and voltage regulators. AusNet Services has produced a REFCL Program Automatic Circuit Recloser Strategy.[80] The approach was to produce an options analysis from which the preferred option was to modify ACRs where possible and replace where necessary. We consider the AusNet Services options to be reasonable and the assessment to be robust, leading to a lower cost than the RIS estimate. Overall the average cost per upgrade was $[C-I-C] (real, $2016) [$[C-I-C] ($nominal)] compared with the RIS $70 000 (real, $2016).[81] [$73 000 ($nominal)]

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

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78 AusNet Services, *Victorian Electricity Distribution Pricing Review,* 2015

79 AusNet Services, *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Mode, CONFIDENTIAL*

80 AusNet Services, *REFCL Program Automatic Circuit Recloser Strategy 2017*

81 AusNet Services, *REFCL Program Automatic Circuit Recloser Strategy 2017*, p9

AusNet Services has taken a similar approach with voltage regulators. The following is from the REFCL Voltage Regulator Strategy 2017[82] chapter "Program costs and benchmarking":

> *To demonstrate the efficiency and prudency of our proposed expenditure, we must have regard to available benchmark information. We note that the Regulatory Impact Statement (RIS) prepared by ACIL ALLEN for the Victorian Government in 2015 provided the variation in costing for line voltage regulators (referred to as 'Three phase regulators').*
>
> *The RIS estimate forecast $0 - $375 000 per zone substation.*
>
> *AusNet Services program, as detailed above, is 0-3 line voltage regulator units per zone substation requiring upgrade or replacement at a range of $0 - 386 916 per zone substation, which is in line with the RIS estimates. This outcome provides further assurance that AusNet Services' cost forecasts are prudent and efficient.*

We have considered the expenditure proposed by AusNet Services in relation to the voltage regulators. We consider that the volume and unit rates proposed by AusNet Services to be reasonable and consistent with previous estimates for this work.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

3.4.1.5 Victorian Electricity Distribution Code - HV customers

AusNet Services has proposed $14.2 million (real, $2016)[83] [$14.5 million ($nominal)] for VEDC works to integrate the REFCLs including:

- provision of isolation transformers for each customer installation

Significant costs for the treatment of their HV customer installations were provided for in the application. Staff raised a series of information requests on the business, seeking an expanded explanation of the basis of the claimed costs and detailed breakdowns of how the estimates were derived. These explanations and detailed costs were subsequently discussed in detail with the business. They were also reviewed by AER staff and the TAG, having regard to industry norms for similar expenditure where relevant.

AusNet Services proposes to address the matter by installing isolation transformers near the customer location at a cost of $1.18[84] million (real, $2016) [$1.21 million ($nominal)] per customer. This effectively isolates each HV customer so that the VEDC can be complied with at the customer connection point.

AusNet Services argues that this is the best alternative based on the following:

- there is insufficient time to resolve the matter by alternative means

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82 AusNet Services, *REFCL Program Voltage Regulator Strategy 2017*, pp.7-8

83 AusNet Services, *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

84 AusNet Services, *Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, _CONFIDENTIAL*

- there is an insufficient relationship with the customer to identify more cost effective alternatives
- the isolation transformer is a simple and effective solution with low risk

For the reasons set out in sections 1.7.1.10 and 1.7.1.11 and in this section, we have determined an alternative allowance for HV isolating transformers.

Benchmark cost comparisons

We note that HV isolating transformers are not a standard piece of distribution equipment. In our analysis, we consider AusNet Services estimate for the purchase cost of each HV isolating transformer to be similar to Powercor's estimate for HV isolation transformers up to 10MVA. Their respective estimates are based on quotes from local suppliers.

We are satisfied that this is not an item that can be readily sourced through a normal tender process, especially where overseas suppliers may become involved. The supply chain lead times and coordination requirements limit AusNet Services' options to local suppliers, with whom they have a strong relationship.

AusNet Services and Powercor have obtained independent prices from two independent suppliers that are comparable. This increases our comfort that the quoted prices are competitive. We also note the premium associated with the estimated prices does not appear to be large relative to standard equipment, taking into account the unique requirements of these non-standard devices. However, AusNet Services have not chosen the lowest cost option available from local suppliers. This has been a factor in our decision.

Although the numbers quoted by AusNet Services are consistent with similar quotes obtained by Powercor from another supplier, we are concerned that the associated design installation, land acquisition and testing and commissioning cost estimates of AusNet Services (and Powercor) were large and possibly excessive, having regard to the nature of the equipment and the matters expected to be addressed in their installation. We found the material cost for the transformer itself to fall within the acceptable range for comparable equipment but we were not satisfied that the extensive design, project management, site acquisition and preparation, installation and commissioning costs as claimed by AusNet Services were justified.

Accordingly, we considered two alternative arrangements involving standard distribution components which offered comparable (albeit not identical) functionality to obtain a better guide to the likely cost of support activities necessary to install a HV isolating transformer. The two configurations we considered as cost benchmarks were:

- the kiosk style isolating transformer configuration proposed by Powercor and,
- a HV regulating transformer

We then used these configurations to inform an alternative estimate of the cost of design, project management, site acquisition and preparation, installation and commissioning costs.

We consider the HV regulating transformer has similar connection arrangements to a HV isolating transformer. We note, however, that its internal function, secondary configuration

and associated protection requirements are different. Accordingly, as we discuss in the following sections, although we have adopted an alternative forecast, we have adopted AusNet Services' estimates for the protection requirements in our alternative forecast.

Assessment of cost and feasibility

The estimate provided in the AusNet Services application is $1.18 million (real, $2016) [$1.21 million ($nominal)] for the transformer, regardless of the size of the customer.

We have compared the Powercor application and the AusNet Services application on isolation transformers. We consider the indicative prices for HV isolating transformers to be comparable and reasonably consistent between the two distributors. As this is custom made equipment and is required within a mandated timeframe, we accept that the opportunity for competitive tendering is more restrictive than regular equipment purchases.

We note that Powercor proposes an ISO kiosk style 22/22kV isolation transformer that does not require bunding, extensive security and external services. Powercor advise the 2, 5 and 10 MVA 22/22 isolation transformers are $110 446,[85] $194 446 and $249 446 ($nominal) respectively. We consider these costs to be reasonable, having regard to their unique design and procurement requirements.

We have also considered the installed cost of Powercor voltage regulators at $339 940[86] ($nominal). Although functionally different to the isolation transformer, HV regulators exhibit similar design, installation, commissioning, testing and protection requirements.

We focus on the HV regulator transformer as the chief point of comparison. A HV regulator is a 22kv in / 22kv out device. The HV isolating transformer is also a 22kv in / 22kv out device but is costed in excess of $1.18 million (real, $2016) [$1.21 million ($nominal)] per unit by AusNet Services. Functionally, what is different is the internal construction of the device and its mode of operation.

The installation cost of a voltage regulator replacement is estimated in the contingent project application to be $[C-I-C] [87] (real, $2016) [$[C-I-C] ($nominal)] for labour and contracts. If an ACR is added at $[C-I-C] [88] [$[C-I-C] ($nominal)] the installation costs are $[C-I-C] (real, $2016) [$[C-I-C] ($nominal)].

We consider that AusNet Services proposal can be benchmarked against the Powercor proposal of a kiosk style 22/22kV isolation transformer for sizes up to 10MVA. Unlike the AusNet Services approach, the transformers proposed by Powercor do not require bunding, oil water separation, oil storage and connection to site drainage, extensive security and external services. We have reduced the AusNet Services allocation accordingly.

We consider that given the large number of sites at which these devices are proposed to be installed, a high degree of standardisation can be achieved during the design, procurement

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85 Powercor, *Contingent Project Application 2017 REFCL_MOD06 comp HV Cmer*

86 REFCL_MOD.01 Powercor, *Expenditure build-up model (tranche one), March 2017*

87 AusNet Services, *Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, _CONFIDENTIAL*

88 AusNet Services, *Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, _CONFIDENTIAL*

and implementation stages. Although the initial design of the first installation may require a greater number of labour hours, we do not agree that this degree of effort will be required for every site. We note that the pad mounted transformer example demonstrates that design activities become standardised when similar works are planned and repeatedly implemented.

We consider that extensive design allocation by AusNet Services could be reduced from 590 to 100 hours per site for these reasons. We have allowed for an additional 590 design hours to develop a design standard to be applied to all HV customer sites and divided these across 11 sites. We consider when the kiosk arrangement is benchmarked against the proposed cost, that the transformer installation costs item can be reduced to a simple foundation.

As the transformer installation will require an isolation capability and protection, we accept the costs as proposed by AusNet Services for ACR and protection works. The proposed costs are in line with our expectations for similar works undertaken by other DNSPs.

Live-line work, fitter and sub-tester costs included in the Contingent Project application are mitigated significantly when benchmarked as these costs are inclusive in the kiosk style, option and the Voltage Regulator replacement costs comparisons. A kiosk or option is self-contained and requires only minimal setup and connection work. We have allowed live-line work in the amount of 40 hours on the basis that a strainer pole can be installed at a cost of $30 000 (real, $2016) and a straightforward cutover be performed on commissioning. Sub-tester costs of 348 hours and fitter costs of 196 hours proposed by Powercor in their application have been allowed for AusNet Services. We consider that as this type of equipment is yet to be standardised, an allowance must be made for comprehensive protection and setup costs.

We consider that these costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

For customer sites rated up to 10MVA and fitted with a factory built, self-contained equipment we consider construction, delivery and site control to be minor cost elements. We have reduced this allocation accordingly. We also consider that civil works can be reduced when installing a kiosk style arrangement as the necessary works would be limited to benching and surfacing, inclusion of an earth grid and security. We consider the more extensive works associated with a ‘wet bund’ type transformer will not be needed. We have allowed a total of $[C-I-C] (real, $2016) for this requirement.

We note the extra information provided by AusNet Services on 4 August 2017[89] in relation to larger size customers. For the 15MVA rated installations we accept the costs associated with foundations, oil/water bund, site drainage and transformer installation will be greater. For 15MVA rated installations we also accept costs for oil/water separation facility, oil storage and connection to site drainage, which total $[C-I-C] (real, $2016).

We consider that the costs reasonably reflect the capex criteria having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

[89] Email: *Transformer bunding - HV customers,* 4 August 2017

Table 3.5: This Table is based on Unit costs for HV customer isolation provided by AusNet Services[90]

AusNet Services HV Isolation Substations *($'000, real 2016)*		Proposed in application			AER Allowance				AER Allowance Comment
Category		2MVA	5MVA	10-15 MVA	2MVA	5MVA	10MVA	*15MVA	
Design	Design		[C-I-C]			23		23	Allow 100 hours design and add full 593 hrs divided across 11 = 54 hrs to develop standard
Feeder Works	Transformer Installation		[C-I-C]			8		189	Powercor kiosk $8K foundation *Allow proposed for 15MVA
	Entry and Exit Poles and Switch		[C-I-C]			159		159	Single Strainer plus Live Line 40 hours Allow ACR and allow 550 hours sub-tester/fitter Acceptance testing, settings and protection
	Benching and Surfacing		[C-I-C]			[C-I-C]		[C-I-C]	Accept

[90] Unit costs for HV customer isolation. AusNet Services: *Email response to verbal information request - Cost of HV isolating transformers*, 20/6/2017

	Station Road (Unsealed)	[C-I-C]			Not required
	Oil Containment/Water Management	[C-I-C]		104	Use Powercor ISO kiosk - Fully Integrated Package Solution *Allow Proposed for 15MVA
	Perimeter Security Fence	[C-I-C]	[C-I-C]	[C-I-C]	Accept
	Lighting	[C-I-C]			Not required
	SCADA, Cabling, Outages, EarthGrid	[C-I-C]	[C-I-C]	[C-I-C]	Accept
Contracts	AusNet Internal Costs	[C-I-C]			PMO cost in Application No negotiation customer does not apply
	Survey, Cultural & Vegetation Report and Management Plans	[C-I-C]	[C-I-C]	[C-I-C]	Accept
	Land/Easement negotiation, planning permits and purchase	[C-I-C]	23	23	AusNet $450/m^2 is well above rural industrial land value Valuer General DELWP based on 15x15m allow 50m^2
	Sub-contractor indirects	[C-I-C]	[C-I-C]	[C-I-C]	Accept

	Risk Allowance		[C-I-C]						Risk Allowance not allowed
	Spare ISO					27		27	Add Spare transformer $299K across 11 sites
	Installation cost	**$1,004**	**$1,004**	**$1,004**	**$419**	**$419**	**$419**	**$704**	
HV ISO	2 MVA ISO	[C-I-C]			108				Use Powercor ISO Kiosk - Fully Integrated Package Solution
	5 MVA ISO		[C-I-C]			190			Use Powercor ISO Kiosk - Fully Integrated Package Solution
	10 MVA ISO			[C-I-C]			244		Use Powercor ISO Kiosk - Fully Integrated Package Solution
	*15 MVA ISO [C-I-C]							[C-I-C]	Accept
	Total	**$1,180**	**$1,180**	**$1,180**	**$527**	**$609**	**$663**	**$880**	

* Kiosk type ISO not available in 15MVA size so AER accept additional costs for wet bund system

We accept the earth grid costs as well as benching and surfacing. We consider the cost of a station access road to be unnecessary with a kiosk arrangement.

For smaller transformer sizes, the benchmark of a kiosk arrangement obviates the need to allow costs for external services, oil and water separation and processing, as these elements are intrinsic to the design. However, we have accepted allocations for SCADA, cabling, outages and earth-grid as these are likely to be site specific costs not included in the benchmark. Although we note security arrangements are intrinsic to a kiosk design, we accept these devices may warrant some additional security, given their novel nature. We do not consider lighting is required.

In previous discussions with AusNet Services, it has been identified that the affected customers are rural, industrial customers. We understand that available land is abundant, including within the customer boundary and that the need for site remediation work is minimal. We accept land purchase and site remediation are applicable costs, however, as the sites are generally rural, we have reduced the allowance for land purchase in line with the costs for rural land set out in the publication: Valuer-General - DELWP *A Guide to Property Values 2016.* We accept the proposed costs to satisfy planning requirements and maintain delivery plans that protect the environment and cultural heritage are necessary and normal project costs.

We consider that AusNet internal costs are not required as Project Management Office (PMO) cost is included in the application and the estimates are based on an intention not to require negotiation with customer.

We consider the proposed allowance for subcontractor indirect costs to be reasonable.

We do not consider a risk allowance to be necessary.

It is noted that AusNet Services (and Powercor) have not identified a need for long HV underground runs in their estimates at any of their HV customer locations.

If the VEDC compliance issue were to be resolved, and in the absence of financial liability for the impact of a REFCL device on a HV customer installation, we note in many situations the most cost effective solution is likely to be the hardening of the HV customers' installation to an identical standard as the distribution network. This view is strongly supported by the Victorian Minister for Energy. The Victorian RIS and other work undertaken for Energy Safe Victoria also support this view. However, in this current application, no legal basis has been identified for the DNSPs to undertake work on the customer installations. Consequently, neither we nor AusNet Services have access to direct cost information on this option.

Accordingly, we have based our alternative estimate on the cost of the functional equivalent to the isolating transformer. We expect if the regulatory framework is amended the DNSPs will pursue the customer hardening option at some locations, if it is more cost effective and can be addressed in the available timeframe (noting that the installations must be operational by 1 May 2019). If so, any savings in capital outlay will be substantially returned to customers in future periods through the operation of the Capital Efficiency Sharing Scheme. If material, any savings may also be passed back to customers through a negative pass-through event process in the current period.

We have used as a benchmark the results as proposed by Powercor for smaller units. Incrementing for 22/22 isolation transformer kiosks of 2MVA, 5MVA and 10 MVA size, based on $110 446 ($nominal) (2MVA), $194 446 ($nominal) (5MVA) and $249 446 ($nominal) (10MVA), we calculate the total benchmarked cost to be $527 000 for the 2MVA, $609 000 for the 5MVA and $663 000 for the 10MVA size.

As noted earlier, we have costed the 15MVA transformers separately. We have reduced the allowance for these units by $300 000 (real, $2016) to $880 000 (real, $2016).

Dual feeder customers

AusNet Services has two customers that have two feeders. AusNet Services proposes to provide a separate isolation transformer for each feeder. This is because they are of the view that the customer has paid for a second feeder and is entitled to a fully redundant supply.[91]

The AER sought details of the affected dual feeder customers. AusNet Services informed us that one of the customers has a large separation between its HV feeder entry points. We accept separate transformers are needed for that customer. Accordingly, we have reduced the number of dual feeder sites for consideration of a single isolation transformer to one.

We asked AusNet Services to consider the option of installing a single Isolation Transformer instead of two separate transformers at that dual feeder customer site.[92] AusNet Services responded:[93]

> *…[their] connection agreements include terms and conditions of supply which must be negotiated. Any change to the customer supply must be consistent with the objectives set out in the NER that require forecasts to include expenditure to maintain the quality, reliability and security of supply.*

We understand their argument to be that:

- where there are two feeders these must be fully segregated and
- if an isolation transformer is to be added then there must be one for each feeder to maintain segregation.

We have considered these arguments but we are not convinced that providing two transformers on separate feeders is prudent and efficient. We consider the following points to be relevant to this issue:

- distribution system power transformers including the isolation transformer that is being proposed have one failure in 200[94] transformers in any year of operation which is an extremely low failure rate.

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91 EMAIL, *Questions arising from meeting on 10 July 2017 - Response 2*, 18/07/2017

92 EMAIL, *Questions arising from meeting on 10 July 2017 - Response 2*, 18/07/2017

93 EMAIL, *Questions arising from meeting on 10 July 2017 - Response 2*, 18/07/2017

94 Roos, Fredrik, and Sture Lindahl, *Distribution system component failure rates and repair times–an overview*, *Nordic distribution and asset management conference*. 2004

- maintenance of the isolation transformers is of a low frequency and can be carried out in winter, outside of the bushfire season.
- the REFCL implementation introduces new capabilities for the existing supplies which have been justified by AusNet Services and Powercor. The zone substations from which the dual supplies are sourced will be upgraded to full switchability to enable bus segregation and automatic reconfiguration to enable full REFCL capability. The zone substations themselves are presently subject to a reliability level for faults within their perimeter which will be enhanced with full switchability.
    - Customers with dual supplies will benefit from these reliability improvements as the reserve feeders are sourced from a separate bus/transformer combination within the zone substation which will have fully automatic remote configurability.
- installing a single isolation transformer simplifies the installation as well as saves cost. This, by definition reduces the completion risk of the project.
- the obligation on a DNSP is to maintain reliability. As automation and REFCL operation will enhance reliability on each feeder, we consider these factors offset any diminution of reliability associated with a single isolating transformer.
- to minimise service outages should a HV isolating transformer fail, a spare 10MVA transformer should be held in store. We consider that this spare would be beneficial to support all HV customers, including single feeder customers across the three tranches.
- a modern distribution transformer is highly reliable but the provision of a spare enables rotation for maintenance and works in the unlikely event of a HV isolating transformer failure. The cost of a spare 10MVA unit has been allocated across 11 sites.

We do not accept that the customer installation has been compromised. A customer can have a switching arrangement that provides the flexibility of a reserve feeder with both feeders able to switch through a single isolation transformer. The ACRs or circuit breakers can be coordinated to provide rapid changeover. A bypass arrangement can be installed to enable operation while a spare isolation transformer is swapped over. We have allowed for an ACR to be installed on each affected reserve feeder to enable changeover.

The occurrence of an isolation transformer failure event or an unplanned or planned maintenance requirement is unlikely to coincide with a Total Fire Ban Day. If the transformer fails on a Total Fire Ban day, for the DNSP safety obligation to be met, the HV isolation transformer can be switched out and, if necessary, the site can be supported by diesel generator.

In the event of an isolation transformer fault or when maintenance is required:

- the REFCL can be disabled for the duration of the works.
- the isolation transformer can be isolated and bypassed by a switch.

- a single isolation transformer spare of, nominally, 10MVA size can be purchased in advance and held in store to provide a spare for all of the HV customers.
    - The spare can be taken to site and replaced in a short period of time using the existing foundations and connections.
    - Allocation will be made for a spare in the amount of $292K (real, $2016) and can be shared between all affected Powercor HV customers
- installing a single isolation transformer simplifies the installation as well as saves cost. This, by definition reduces the completion risk of the project.

AER view - HV isolation transformer cost

We consider the proposed HV isolation transformer costs do not satisfy the capex criteria as we are not satisfied that the costs reasonably reflect prudent and efficient costs. We consider that the comparative analysis, benchmarking and technical alternatives discussed above present significant cost savings. Therefore, after careful consideration of the information provided by AusNet Services in support of a capital expenditure allocation of $14.1million ($real 2016)[95] for VEDC works to integrate the REFCLs 12 transformers we consider that a more reasonable allocation is $7.1 million (real, $2016) across 11 transformers.

Based on reduction of one isolation transformer on reserve feeders and a benchmarked cost of each to be to be $527 000 for the 2MVA, $609 000 for the 5MVA, $663 000 for the 10MVA size and $880 000 for the 15MVA size (real, $2016), we calculate the allowance as set out in the table below.

Table 3.6: AER review of HV isolation costs after benchmarking and reduction

AusNet Services HV isolation transformers application				**Benchmark Allowance**		**Allowance after reduction of dual transformers**			
($'000, real 2016)									
Size	Application Estimated Unit Price	Number of ISO proposed	Application Estimate	AER Allowance unit price	AER Allowance	Eliminate second HV ISO	Number of ISO allowed	Add ACR	AER Allowance
2 MVA	1 180	4	4 720	527	2 107	0	4		2 107
5 MVA	1 180	2	2 360	609	1 218	0	2		1 218
10MVA	1 180	3	3 540	663	1 988	0	3		1 988
15 MVA	1 180	3	3 540	880	2 640	-1	2	51	1 811
Total		**12**	**14 160**		**7 954**		**11**		**7 124**

[95] AusNet Services, *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

3.4.2 Other capital expenditure

AusNet Services has proposed $9.18 million (real, $2016) [$9.39 million ($nominal)] for Other works to integrate the REFCLs including:

- Distribution Feeder Automation schemes compatibility
- live line equipment purchases
- phase identification tools and training
- Program Management Office costs

We visited sites at GSB and KMS to discuss the other capital expenditure items associated with REFCL works. We note there are proportionally more extensive works at KLK, SMR and WN zone substations. These require modifications that are dealt with in section 3.4.1.1 of this document.

3.4.3 Feeder automation

AusNet Services has allocated $7.9 million (real, $2016) [$8.08 million ($nominal)] for Distribution Feeder Automation (DFA). AusNet Services has developed the DFA as a network self-healing system which detects faults and automatically isolates short sections so that larger groups of customers are not affected.

The integration of the REFCL into the network reduces the effectiveness of the DFA system and will cause a significant loss of reliability in some operating modes. When in operation, REFCLs reduce fault currents to a level below the DFA sensing resolution capability. This means that the DFA cannot operate in the manner for which it was designed. AusNet Services have modelled the impact on the Service Target Performances Incentive Scheme (STPIS) and estimate the annual penalty impact at approx. $5.5 million (real, $2016) [$5.63 million ($nominal)]. This totals more than $20 million (real, $2016) in the next regulatory control period.

We note the submission of the Victorian Energy Minister queries whether modification of the DFA system is a valid project cost to be included in this application. As the DNSP is under an obligation to maintain reliability, it follows that where a requirement to install equipment which reduces a current service level is imposed on a DNSP, it is a valid project cost to take corrective action to counter that effect. We also believe AusNet Services would suffer a substantial penalty cost under the STPIS if corrective action were not taken to address this issue.

The cost of DFA modifications proposed by AusNet Services to restore lost functionality includes a small amount for logic upgrades and a much larger amount for replacement of protection devices that sense faults. We discussed this proposal with AusNet Services.

AusNet Services advise that the more sensitive current sensing arrangements are under development and are estimated to cost approximately $[C-I-C] (real, $2016) [$[C-I-C] ($nominal)] per switch. However, we are concerned that this estimate is subject to significant uncertainty. This is because detection issue is a novel problem that will only be resolved

through trial and error. Under the National Electricity Rules,[96] AusNet Services is required to maintain reliability. The mechanism providing an incentive for improving reliability is through the STPIS. However, AusNet Services must also comply with its obligations under the BMR to operate a REFCL which we consider is a greater obligation in the high fire danger periods, although it necessarily entails a reduction of reliability on the relevant days, especially so where the DFA system is no longer effective.

Where events that impact reliability are a result of externally imposed requirements, the STPIS includes a mechanism through exclusions to discount those effects. That mechanism is available and might be applied in relation to REFCL operation on fire danger days. Another mechanism available to offset the penalty under the STPIS would be to amend the scheme applicable to AusNet Services to adjust the rates imposed for non-performance due to REFCL installation. This is not considered an acceptable alternative. It would permanently burden customers on REFCL served feeders with a decline in reliability from the service they currently receive. In periods outside declared fire danger days, AusNet Services would expect to operate their network at a level consistent with maintaining reliability. As the installation and operation of a REFCL will render some elements of the DFA system ineffective, we accept that AusNet Services should receive an allowance to address this impact.

We note that the forecast STPIS impact is considerably greater than the cost of the proposed modifications. As such, we consider it would be cost-effective to accept the $7.0 million (real, $2016) [$7.2 million ($nominal)] capital allowance that AusNet Services has identified. We believe this approach is consistent with the incentives on AusNet Services under the STPIS. Further, AusNet Services will face incentives to develop a more efficient solution. If so, we expect this benefit will be accounted for in the expected future application(s) for tranches two and three of the REFCL program. We also note that operation of a REFCL is expected to result in increased longer term reliability benefits for all customers on a protected line. We note that the application does not attempt to account for these benefits as the current application has not finalised the operating mode of the REFCL outside the peak fire danger period. We therefore consider that a prudent operator will conduct a careful appraisal of the available operating modes and the potential for reward under the STPIS. In the longer-term, we consider the increased reliability benefit attainable under the STPIS will be realised through this mechanism.

We further note the commissioning date for these devices is set for 1 May 2019. The current STPIS targets are fixed for the period of the regulatory control period which ends on 31 December 2020. As the STPIS targets must be reviewed in the determination to apply from 1 January 2021, we consider that will provide a timely opportunity to further assess the reliability benefits of REFCL operation and take them into account in setting future STPIS targets.

3.4.4 Other Items

We note that other items including Live Line Equipment purchases, phase identification tools and training and PMO costs totalling $1.26 million (real, $2016) [$1.29 million ($nominal)]

[96] National Electricity Rules; clauses 6.5.6 and 6.5.7

are included in the application. As the technology is new, specialised tools and training are a necessary expense. We consider the AusNet Services application falls within a reasonable range, given the unusual nature of the technology and having regard to all the circumstances.

We consider that these costs reasonably reflect the capex criteria, having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

3.5 Operating expenditure (Opex)

3.5.1 Forecast

Table 3.7: AusNet Services REFCL Contingent Project Application; Operating Expenditure cost summary for Tranche 1 REFCL Installations

	Expenditure Year			
Activity	**2017**	**2018**	**2019**	**2020**
Incremental operations and maintenance				
Annual testing				
Primary earth fault tests	$17,899	$69,596	$191,389	$208,788
Insulation tests	$10,343	$41,372	$113,773	$124,116
Network balancing activities				
Capacitance forecasting	$11,400	$14,250	$17,100	$22,800
Initiation of remedial works	$5,700	$17,100	$45,600	$51,300
Day-to-day capacitance analysis	$19,305	$57,915	$154,440	$173,745
Fault response				
Fault response & analysis	$27,000	$72,000	$81,000	$81,000
Establish documentation				
Operating, maintenance and testing instructions	$30,000	$0	$0	$4,500
Equipment maintenance				
Routine maintenance of zone substation assets	$0	$9,462	$37,848	$37,848
Line equipment purchases				
Purchase of hard covers	$71,980	$62,776	$0	$0
Alternative technologies and vendors				
Liaison with suppliers	$123,750	$247,500	$123,750	$0
Training and change management				
Technical training and familiarisation	$107,813	$107,813	$0	$0
Change management	$148,200	$0	$0	$0
Update policy documents & reporting				
Update policy & strategy documents	$22,800	$0	$0	$0
Modified ESV reporting	$11,172	$5,472	$5,472	$5,472
Annual Totals	**$606,862**	**$705,256**	**$770,372**	**$709,569**
Grand Total				**$2,792,058**

Source: AusNet Services REFCL Contingent Project Application, Bushfire Mitigation – Operational Requirements 2017 p7.

3.5.2 Analysis

Annual testing and network balancing costs rise to provide a small team reflecting AusNet Services' strategy to test each feeder each year and address the ongoing balancing requirement. The activities are at an early experience stage. The costs are consistent with

the capex components of the application. These costs can be reviewed at the next regulatory reset. We consider that the costs reasonably reflect expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of that DNSP under the NER, clause 6.6A.2 (g)(4).

Fault response and analysis costs rise as the tranche 1 projects are commissioned to a reasonable level in terms of industry standards and based on fault response experience. We consider that the costs reasonably reflect expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of that DNSP under the NER, clause 6.6A.2 (g)(4).

Operating maintenance and testing instructions costs are reasonable in terms of industry standards. We consider that these costs reasonably reflect the operating expenditure (opex) criteria, having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of that DNSP under the NER, clause 6.6A.2 (g)(4).

Routine maintenance of zone substation assets is reasonable in consideration of the increased complexity and maintenance requirement associated with REFCL implementation. We consider that these costs reasonably reflect the opex criteria, having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of that DNSP under the NER, clause 6.6A.2 (g)(4).

Live-line equipment purchases were discussed with AusNet Services in relation to code changes and other aspects of introduction of REFCL. This was considered reasonable. A reasonable level of expenditure on Training & Change Management has been included as are Update Policy documents and reporting.

We note that these costs are finite and consider that these costs reasonably reflect the opex criteria, having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER, clause 6.6A.2 (g)(4).

Costs associated with sole supplier risk mitigation are $495 000 (real, $2016) [$506 000 ($nominal)], it would be expected that AusNet Services optimise procurement and continuously improve all technologies and processes. However we accept that there needs to be a significant investment in understanding the technology and mitigating risk.

We consider that these costs reasonably reflect the opex criteria, having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of the DNSP under the NER clause 6.6A.2 (g)(4).

3.5.3 Comparison of Powercor and AusNet Services Project Management Office cost treatment

Analysis was performed on PMO costs. The comparison between Powercor and AusNet Services reveals a different Cost Allocation Methodology[97] [98] approach is taken by each. The

[97] Cost Allocation Methodology AusNet Services

total operational expenditure for AusNet Services is $2.79 million (real, $2016) and does not include PMO costs as an expense. For Powercor it is $5.21million ($nominal) [$5.09 million ($nominal)] including PMO costs as an expense.

AusNet Services proposes to capitalise $4.93 million (real, $2016) for the project. Thus, the respective total PMO costs of AusNet Services are $7.72 million (real, $2016) and Powercor $5.21 million ($nominal) [$5.09 million (real, $2016)].

On an average total per zone substation, the result is AusNet Services $858 000 (real, $2016) [$877 900 ($nominal)] and Powercor $868 000 ($nominal) respectively. The AusNet Services figure is within 1% of Powercor. We conclude the respective accounting treatments are reasonable, having regard to the approved Cost Allocation Methodologies. The outcomes for each business are similar over the project implementation phase.

We consider that these costs reasonably reflect the opex criteria, having regard to the expenditure that would be incurred in respect of a contingent project by an efficient and prudent DNSP in the circumstances of that DNSP under the NER, clause 6.6A.2 (g)(4).

Table 3.8 opex benchmarks

Comparison	AusNet Services ($'000 real 2016)	Powercor ($'000 nominal)/($'000 real 2016)
Opex	2 792	5 209/5 091
Capex	4 926	-
5 year total	7 718	5 209/5 091
Total per Zone substation	858	868/848

Source: AusNet Services Contingent project application, REFCL program (tranche one), 31 March 2017, Total Cost Model; Powercor Contingent project application, REFCL program (tranche one), 28 March 2017, Expenditure build-up model.

[98] Cost Allocation Methodology Powercor

4 AER's calculation of the annual revenue requirement

4.1 Capital expenditure

AusNet Services proposed $104.5 million (real, $2016) capital expenditure to provide for REFCL installation and supporting works for six zone substations in Tranche 1 of the REFCL program.[99] AusNet Services provided supporting evidence and detailed cost estimates to make the Contingent Project Application.[100] These costs have not been included in the 2016-2020 Distribution Determination given that these assets were not part of the planned replacement program for that period.

We have reduced the allocation for HV customer isolation transformers by $7.1million (real, $2016) as set out in section 3.4.1.5.

Our allocation is determined to be $97.4 million (real, $2016) for capital expenditure.

As set out in the next section, to adjust the capex amounts sought by AusNet Services we calculated the adjustment to the inputs into the post-tax revenue model in real, 2015 dollars.

4.2 Operating expenditure

AusNet Services proposed $2.8 million (real, $2016) operating expenditure to provide for REFCL installation and supporting works for nine zone substations in Tranche 1 of the REFCL program.[101] AusNet Services provided supporting evidence and detailed cost estimates to make the Contingent Project Application.[102] These costs have not been included in the 2015-20 Distribution Determination given that these assets were not part of the planned replacement program for that period.

As set out in the next section, to adjust the opex amounts sought by AusNet Services we calculated the adjustment to the inputs into the post-tax revenue model in real, 2015 dollars.

4.3 Time cost of money

Clause 6.6A.2(b)(4)(iii) of the NER requires us to take into account the time cost of money based on the rate of return for the provider. In calculating the total allocated amount, we have made an allowance for this. The time cost of money has been based on the most recent rate of return for AusNet Services, as set out in our 2016–20 Final Decision.[103] The exception is that we update the values for x factor and return on debt in year 2, under the trailing average methodology, which now applies. The smoothed revenue is then calculated by adjusting the X factors to maintain final year revenue within 3.0% of the target value.

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99 AusNet Electricity Services Pty Ltd, *Contingent Project Application, Bushfire Mitigation, 31 March, 2017,* p36

100 AusNet Services, *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

101 AusNet Services, *REFCL Contingent Project Application – Operational Requirements 2017,* p7

102 AusNet Services, *REFCL Contingent Project Submission 2017 AST Distribution Contingent Project 1 Cost Model, CONFIDENTIAL*

103 AER, *Final decision AusNet Services distribution determination 2016-20*

4.4 Calculation of revenue requirement

Table 4.1: AER Allowance: AusNet Services Contingent Project Revenue Requirement, 2016-2020 ($m, nominal)

	2016	2017	2018	2019	2020
Return on Capital	0.0	0.5	4.0	6.6	6.5
Return on Capital (regulatory depreciation)	0.0	0.7	1.8	2.4	2.6
Operating Expenditure	0.0	0.6	0.8	0.9	0.9
Revenue Adjustments	0.0	0.0	0.0	0.0	0.0
Net Tax Allowance	0.0	0.1	0.2	0.3	0.3
Annual Revenue Requirement (unsmoothed)	0.0	2.0	6.8	10.2	10.2
Annual Revenue Requirement (smoothed)	0.0	0.0	7.3	10.8	11.4
% change	0.00%	0.00%	1.18%	1.68%	1.68%
X Factors	8.27%	0.30%	-2.01%	-2.50%	-3.00%

For this contingent project, revenue is determined by allocating the incremental opex to opex and the incremental capex amount to distribution services in the post-tax revenue model. The PTRM is updated applying the same WACC parameters as were used in the determination, including the return on debt adjustment noted above.

5 AER determination

5.1 AER determination

On 21 August 2017, the AER Board determined that the AusNet Services application for contingent project funding was approved but with modifications to the amounts sought in the proposal as lodged on 31 March 2017. AusNet Services submitted their application in real, $2016. We have used “real, $2015” as the basis for presenting the calculations of incremental capital and operating expenditure in each remaining year of the regulatory control period. This is because the Post-Tax Revenue Model calculation is expressed in real, $2015.

In accordance with clause 6.6A.2(e)(1) of the National Electricity Rules (NER) we have determined:

- the amount of capital and incremental operating expenditure, for each remaining year of the regulatory control period that we consider is reasonably required for the purpose of undertaking the contingent project is:[104]

Table 5.1 - Capital and incremental operating expenditure (real, $2015)

	2016	2017	2018	2019	2020
Incremental capital expenditure	6.94	53.24	39.50	0.12	0.0
Incremental operating expenditure	0.0	0.61	0.71	0.78	0.73

- The total capital expenditure we consider is reasonably required for the purpose of undertaking the contingent project is $99.8m (real, $2015).[105]
- The contingent project has commenced and the likely completion date is 30 April 2019.[106]
- On the basis of the capital and incremental operating expenditure stated in Table 5.1 above, and otherwise in accordance with clause 6.6A.2(b)(4),[107] we have calculated the incremental revenue which is likely to be required by AusNet Services for each remaining regulatory year as a result of the contingent project being undertaken to be:[108]

Table 5.2 – Incremental revenue calculation and x-factors ($nominal)

	2016	2017	2018	2019	2020
Return on capital	0.0	0.5	4.0	6.6	6.5
Return of capital (regulatory depreciation)	0.0	0.7	1.8	2.4	2.6

[104] NER clause 6.6A.2(e)(1)(i).

[105] NER clause 6.6A.2(e)(1)(ii).

[106] NER clause 6.6A.2(e)(1)(iii).

[107] NER clause 6.6A.2(e)(2).

[108] NER clause 6.6A.2(e)(1)(iv).

Operating expenditure	0.0	0.6	0.8	0.9	0.9
Revenue adjustments	0.0	0.0	0.0	0.0	0.0
Net tax allowance	0.0	0.1	0.2	0.3	0.3
Incremental Annual Revenue Requirement (unsmoothed)	**0.0**	**2.0**	**6.8**	**10.2**	**10.2**
Incremental Annual Revenue Requirement (smoothed)	**0.0**	**0.0**	**7.3**	**10.8**	**11.4**
% change	0.00%	0.00%	1.18%	1.68%	1.68%

In accordance with clause 6.6A.2(h), we have used the capital expenditure and incremental operating expenditure determined in accordance with clause 6.6A.2(e)(1)(i) to amend the post-tax revenue model to determine the effect of any resultant increase in forecast capital and operating expenditure on:

(i) the annual revenue requirement for each regulatory year in the remainder of the regulatory control period and

(ii) the X factor for each regulatory year in the remainder of the regulatory control period.[109]

We determine the effect to be:

Table 5.3 – Annual revenue requirement and x-factors ($nominal)

	2016	2017	2018	2019	2020
Annual Revenue Requirement (unsmoothed)	**589.98**	**580.14**	**621.58**	**672.20**	**690.10**
Annual Revenue Requirement (smoothed)	**586.05**	**597.87**	**624.06**	**654.53**	**689.82**
X Factors	8.27%	0.30%	-2.01%	-2.50%	-3.00%

We have determined the approved incremental contingent project unsmoothed revenue amount to be $29.2 million ($nominal). This is the amount that AusNet Services will recover from customers over the three years commencing 1 January 2018. This is different from the building block amount of $33.7 million ($nominal) proposed by AusNet Services.

We further determine the total smoothed annual revenue requirement should be adjusted to $3 152.3 million ($nominal), based on the revenue requirements and X factors set out in Table 5.3. This corresponds to a total unsmoothed annual revenue requirement of $3 154.0 million ($nominal).

We have not amended the roll-forward model.

[109] NER clause 6.6A.2(h)(3).

This corresponds to an increase of 1.18% on average distribution network prices in 2018 and 1.68% in each of 2019 and 2020.

Appendix A - List of stakeholder submissions

Submission from	Date
Victorian Minister for Energy, Environment and Climate Change	8 May 2017
Late submissions:	
Victorian Minister for Energy, Environment and Climate Change	27 July 2017
Powercor	1 August 2017
Department of Environment, Land Water and Planning	15 August 2017
Victorian Minister for Energy, Environment and Climate Change	17 August 2017
AusNet Services	18 August 2017
Powercor	18 August 2017