AusNet Electricity Services Pty Ltd

Advanced Metering Infrastructure

Transition Charges Application

Submitted: 31 May 2016

About AusNet Services

AusNet Services is a major energy network business that owns and operates key regulated electricity transmission and electricity and gas distribution assets located in Victoria, Australia. These assets include:

- A 6,574 kilometre electricity transmission network that services all electricity consumers across Victoria;
- An electricity distribution network delivering electricity to approximately 690,000 customer connection points in an area of more than 80,000 square kilometres of eastern Victoria; and
- A gas distribution network delivering gas to approximately 660,000 customer supply points in an area of more than 60,000 square kilometres in central and western Victoria.

AusNet Services' purpose is 'to provide our customers with superior network and energy solutions.'

For more information visit: www.ausnetservices.com.au

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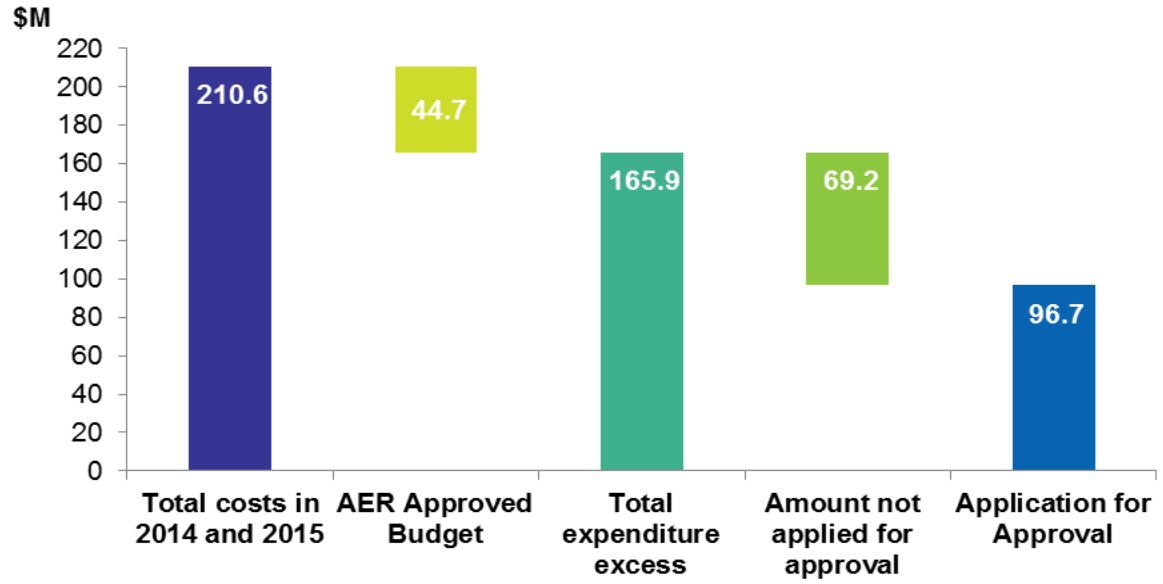
Executive Summary

AusNet Services is applying for approval of its 2014 and 2015 expenditure excess that, if approved, will result in a reduction to 2017 metering revenue of $13.1 million (real $2017) against the approved 2016-20 Electricity Distribution Price Review (EDPR). Customers' 2017 metering charges would be expected to decrease by an estimated average of $18[1] per customer.

During 2014 and 2015, AusNet Services spent $210.6M on the Victorian Government's mandated roll-out of advanced metering infrastructure (AMI). AusNet Services' combined actual expenditure in 2014 and 2015 exceeded the AER Approved Budget for the same period by $165.9M.

Based on its analysis of the expenditure excess, AusNet Services is applying for approval of $96.7M, of the efficient and prudent expenditure excess it incurred in excess of the AER Approved Budget in 2014 and 2015. This amount is based on an internal prudency analysis and is supported by an 'ex-post review' undertaken by Deloitte. The following chart summarises AusNet Services' combined costs for those years:

Figure 1: Analysis of expenditure excess



AusNet Services is not applying for approval of $69.2M of expenditure excess that is associated with past decisions relating to the choice of communications technology or may be considered inefficient.

The application for $96.7M represents just 58% of total expenditure excess and comprises the following categories of efficient and prudent expenditure:

- $23.8M for meter supply, being additional volumes of meters and communications modules required in line with the amended CROIC obligations to complete the roll-out obligations in 2014;
- $14.5M for meter installation, noting that the meter installation unit cost over the roll-out period is 9% below the efficient benchmark adopted by the AER in 2013;
- $31.5M for IT capex, being the incremental IT spend on systems, applications and hardware to provide reliable and secure data to market;
- $4.5M for meter data management, being the difference between the AER Approved Budget and the efficient base year determined by the AER in the 2016-20 EDPR;

[1] Preliminary analysis based on over recovery of costs in 2014 and 2015 which is inclusive of the total amount AusNet Services is applying for approval, divided by the 2017 forecast number of customers.

- $11.9M for communications infrastructure maintenance and IT opex reflecting the difference between the AER Approved Budget and the approved 2016 forecast efficient expenditure determined by the AER in the 2016-20 EDPR;
- $0.4M for additional meter maintenance as a result of higher rates of illegal usage;
- $1.6M for additional corporate overheads and customer service costs to manage the impact of customer concerns and government reviews;
- $3.2M for meter reading, reflecting the amended CROIC obligations to complete the roll-out obligations in 2014; and
- $5.3M for Project Management Office (PMO) resources to manage the continued compliance with the roll-out obligations imposed by the amended CROIC.

This expenditure excess was driven by various external factors that have impacted on AusNet Services' ability to deliver the AMI Program within the Approved Budget, combined with the inadequacy of the budgets approved for 2012 to 2015. External factors have included:

- Policy and safety reviews undertaken by the Victorian Government and various agencies; and
- Customer concerns about AMI, and issues associated with gaining access to customer sites for the purpose of installing AMI meters.

These external factors contributed to the requirement for the roll-out obligation to be extended into 2014. The Approved Budget for the 2012-15 regulatory period was set in 2011 based on a series of assumptions regarding the structure, schedule and timing of the AMI roll-out. These circumstances and assumptions did not eventuate as originally anticipated.

The argument that the original budget for 2014 and 2015 was set too low is clearly supported by the AER's determination in the 2016-20 EDPR that an efficient 2016 business-as-usual level of opex for AusNet Services is $29.9M compared to a budget of $19.0M and $17.9M for 2014 and 2015 respectively.

It is further noted that the inadequacy of the Approved Budget for 2014 and 2015 has also been the result of previous regulatory decisions which inappropriately benchmarked AusNet Services to other Victorian distribution networks where obvious environmental differences in customer density and difficulty of terrain were not adequately allowed for. Since the Approved Budget was determined, AusNet Services has gained a practical understanding of the impact of terrain on both the deployment and ongoing management of its communications network, compared to design modelling performed in 2011 by the AER's consultants.

These outcomes highlight the difficulties in accurately forecasting the costs associated with an innovative technology project which had limited precedent at the time. This has been recognised across the industry and by the Victorian Auditor-General[2]. In addition, a 2014 report by Deloitte found that on average, Australian infrastructure projects have experienced cost over-runs in seven of the previous eight years, and that for larger infrastructure projects cost over-runs averaged 12.7%[3]. It should be noted that AusNet Services is applying for approval of an expenditure excess which is within this level of expectation.

AusNet Services is not making an application for approval of $69.2M of its expenditure excess in 2014 and 2015. This expenditure comprises:

- $61.4m of costs which AusNet Services attributes to past decisions on the selection of the WiMAX communications technology; and

[2] Victorian Auditor-General, *Digital Dashboard: Status Review of ICT Projects and Initiatives – Phase 2*, p.1

[3] Deloitte Access Economics 2014, '*Major infrastructure projects: costs and productivity issues'*

- $7.8M of expenditure which is above the efficient 2016 business-as-usual costs determined by the AER in the 2016-20 EDPR.

AusNet Services considers that customers should not bear these additional costs and regrets the inconvenience to customers from the challenges experienced in its AMI Program. AusNet Services has taken accountability for this inconvenience by committing to the remediation program and continues to work towards fully delivering the benefits of smart metering to all customers. AusNet Services is spending $219M to stabilise the existing end-to-end metering systems and to improve the communications network coverage. AusNet Services is not making an application for approval of these remediation costs incurred during 2014 and 2015. It should be highlighted that by not applying for approval of these costs, AusNet Services ensures that customers only pay once for the AMI roll-out, the costs of which is commensurate with AusNet Services' network characteristics.

Taking into consideration this $219M of remediation expenditure, along with the $22M of 2013 expenditure excess not approved by the AER previously, AusNet Services will have incurred over $241M of direct costs on the AMI Program which it will not recover and on which it will not achieve a return.

AusNet Services is applying for the approval of efficient and prudent costs, being 58% of its actual program expenditure in 2014 and 2015. AusNet Services considers that approval of this application would achieve an appropriate balance between the financial impact of metering charges on customers, achieving compliance with regulatory obligations and ensuring customers have access to the benefits of smart meter technologies.

1 Introduction

In 2006, the Victorian Government mandated the roll-out of advanced metering infrastructure (AMI), or 'smart meters', to all Victorian residential and small business electricity customers. The regulatory arrangements relating to the roll-out are set out in the November 2008 Cost Recovery Order in Council (CROIC) made under the *Electricity Industry Act 2000* (Vic). The CROIC prescribes the regulatory framework that governs the regulation of metering charges.

On 31 October 2011, in accordance with the CROIC, the AER released its final determination on the 2012–15 budget and charges applications for the Victorian Distribution Network Service Providers (DNSPs).

At the end of 2013, the Victorian government noted that the roll-out may not be complete by 31 December 2013 because of access issues preventing meter installation and customer refusals. On 10 December 2013, the CROIC was amended to require a distributor, from 1 January 2014, to use its best endeavours to install AMI meters for customers for whom the distributor was the responsible person on 31 December 2013. This obligation ceased on 4 August 2014, whereupon the obligation upon a distributor to install an AMI meter for those customers, and for new premises for which the distributor becomes the responsible person on or after 1 January 2014, became absolute.

Distributors were required to make a rebate payment to customers whose premises did not have an AMI meter installed as at 30 June 2014 as well as make another rebate payment to customers who did not have a remotely communicating AMI meter as at 31 March 2015. Due to this requirement, AusNet Services made a total rebate payment to customers of approximately $32M in 2015.

From 1 January 2016, charges for regulated metering services are no longer governed by the CROIC but rather as an alternative control service with a revenue cap under the 2016-20 Electricity Distribution Price Review (EDPR). The CROIC permits a DNSP who incurs expenditure excess in 2014 and 2015 to submit to the AER a Transition Charges Application (TCA) to recover that expenditure through transition charges. The transition charges are intended to "true up" the total costs incurred and revenues received over the life of the CROIC, and apply as part of the metering revenue cap for the 2016-20 regulatory period from 1 January 2017 and (if the AER determines) thereafter in each regulatory year of that regulatory period. An application must be made no earlier than 30 April 2016 and no later than 31 May 2016.[4] The AER must make its determination by 31 October 2016, but may extend the timing of the determination until 31 December 2016.[5]

The CROIC requires AusNet Services to demonstrate that the additional expenditure (referred to in the CROIC as 'expenditure excess') has been incurred efficiently. The 'expenditure excess', or such portion of it determined to be prudent, is incorporated into the building blocks and recovered through the transition charges from 1 January 2017.

The remainder of this paper is structured as follows:

- Section 2 provides background information on the factors that have affected the delivery of the AMI roll-out program;
- Section 3 sets out AusNet Services' prudency assessment approach, having regard to the relevant CROIC provisions;
- Section 4 provides an overview of AusNet Services efficient expenditure during the roll-out period;
- Section 5 provides a breakdown of the base year metering opex in 2014 determined by the AER;
- Section 6 presents provisional analysis of expenditure by category, which provides the basis for assessing the prudency of AusNet Services' expenditure excess for 2014 and 2015; and
- Section 7 provides an analysis of the 2017 revenue adjustments.

[4] Clause 5L.1.
[5] Clauses 5L.2 and 2A.

2 Market conditions and risks

2.1 Introduction

The CROIC provides that the AER, in considering whether an expenditure excess is prudent, may consider (amongst other things):

- the risks inherent in a project of the type involving the provision, installation, maintenance and operation of AMI and associated services and systems;[6] and
- the market conditions relevant to the provision, installation, maintenance and operation of AMI and associated services and systems.[7]

The overall costs of any infrastructure project, such as the AMI roll-out, will be affected by its inherent risks and the prevailing market conditions. To a large extent these factors are beyond a company's direct control, but have the potential to materially affect project costs and delivery. AusNet Services' ability to respond to these kinds of external factors during the AMI roll-out was hindered by the last minute imposition of new regulatory obligations and the tight time constraints in which to achieve them. Consequently, it is appropriate that the AER take these external factors into account in assessing whether AusNet Services' expenditure excess is prudent.

It is also noted that the complex nature of the roll-out program, which includes extensive changes to the DNSP's systems and processes, involves technical risks that must be actively managed by the project team. To this point, the Victorian Auditor-General has recognised the "*inherent technical complexity and risks involved in the implementation of the AMI program*."[8]

This section examines two external factors that have had a direct and material impact on the costs and timing of the AMI roll-out program for all Victorian DNSPs. These factors are:

- Policy reviews and changes and safety reviews undertaken by the Victorian Government and various agencies; and
- Customer concerns about AMI, and issues associated with gaining access to customer sites for the purpose of installing AMI meters.

2.2 Policy reviews

Given the magnitude of the AMI roll-out program, in terms of its duration, cost and customer impact, it is understandable that the Victorian Government and Energy Safe Victoria (ESV) have commissioned a number of reviews. These reviews have addressed a wide range of issues, including whether the program should continue[9]; consumer protection arrangements and the introduction of Time of Use (TOU) network tariffs[10]; an enquiry into privacy protections[11]; and safety[12].

These reviews followed the Victorian Auditor-General's findings in 2009, which concluded that further review of the AMI roll-out was required.[13] AusNet Services considers that it is reasonable and proper

6 Clause 5I.8(b).
7 Clause 5I.8(f).
8 Victorian Auditor-General, *Realising the Benefits of Smart Meters*, September 2015, p.19
9 Deloitte, Department of Treasury and Finance, *Advanced metering infrastructure cost benefit analysis*, August 2011
10 Hon Michael O'Brien, MP, Minister for Energy and Resources, *Supplementary submission to AER's draft determination 2012-15 Budget and Charges Application*, 28 October 2011
11 Lockstep Consulting, *Privacy Impact Assessment, Advanced Metering Infrastructure (AMI),* August 2011
12 Energy Safe Victoria, *Safety of Advanced Metering Infrastructure in Victoria,* 31 July 2012
13 Victorian Auditor-General, *Towards a 'smart grid'—the roll-out of Advanced Metering Infrastructure*, November 2009, p.21

for the Victorian Government and regulatory agencies to conduct reviews in relation to the AMI roll-out program.

Notwithstanding that the CROIC provided some certainty to DNSPs regarding cost recovery, uncertainty regarding the future of the program has unavoidably increased demand for, and therefore the cost of, resources necessary to complete the roll-out.

While the impact of uncertainty on project costs and delivery is difficult to estimate precisely, the Government's review of the AMI roll-out had a direct and tangible impact. In this regard, the following Government announcements are worth noting in particular:

- In March 2010, the Victorian Government ordered a moratorium on the businesses' introduction of Time of Use pricing.[14]
- In November 2010, the incoming Coalition Government stated that the AMI Program would be reviewed and the Auditor-General's recommendations implemented, specifically commenting on program governance, customer data protection, and cost recovery. [15]
- In January 2011, the Energy Minister said he was not ruling out a suspension of the program.[16]
- In April 2011, it was announced that a cost-benefit review would be undertaken and the then Premier advised that distributors would skip houses of customers who did not want a meter. [17]
- The review of the AMI Program, delivered in December 2011, endorsed the continuation of the roll-out, with minor changes.[18]

The 2011 Government review of the mandated AMI roll-out caused over 13 months of uncertainty. Specifically, delays and increased costs arose because of difficulties in gaining appointments and scheduling the installation of AMI meters; the need to modify procurement and contracting arrangements; and requirements to modify IT systems to accommodate legacy tariffs. In 2014, the AER recognised that "*the economies of scale associated with the mass rollout process were partially lost*."[19] Furthermore, the AER acknowledged that "*distributors were faced with a number of unforeseeable changes in the circumstances in 2013, particularly arising from changes in government policy*."[20]

The timing of the numerous amendments to the CROIC during the roll-out period also impacted AusNet Services' ability (along with that of the other distributors) to manage the risks related to the roll-out effectively and efficiently. These changes were notably:

- Removing the 10% contingency in the 2012-15 Budget Period;[21]
- Extending the obligation to use best endeavours to install AMI meters to customers to 4 August 2014[22] as a result of the delays in the roll-out due to customer concerns and government reviews;

[14] http://www.smartmeters.vic.gov.au/about-smart-meters/reports-and-consultations/advanced-metering-infrastructure-customer-impacts-study-volume-1/2-background
[15] Victorian Auditor-General, *Realising the Benefits of Smart Meters*, September 2015, p.6
[16] http://www.abc.net.au/news/2011-01-04/smart-meters-could-be-abandoned/1893266?section=business
[17] 3AW radio interview on 19 April 2011
[18] http://www.theage.com.au/victoria/smart-meter-rollout-rolls-on-20111214-1otzf.html
[19] AER, *Determination Advanced Metering Infrastructure 2015 revised charges*, 12 December 2014, p.11
[20] AER, *Determination Advanced Metering Infrastructure 2015 revised charges*, 12 December 2014, p.17
[21] Clause 5I.4
[22] Clause 14AA.1

- Requiring a rebate to be paid to customers whose premises did not have an AMI meter installed as at 30 June 2014;[23]

- Expanding the prudency criteria in clause 5I to explicitly ensure the AER may make use of benchmarking analysis in assessing the prudency of excess costs;[24]

- Requiring the AER to consider whether an expenditure excess reasonably reflects the efficient costs of a business rolling out AMI over the entirety of the AMI initial regulatory period, rather than in a single year;[25]

- Requiring that the 2014 and 2015 Expenditure Excess applications be submitted concurrently after 30 April 2016 and before 30 May 2016, after the AER's Final Determination on the 2016-20 Victorian EDPR.[26]

Compounding the difficulty DNSPs faced in managing risks and costs associated with these changes was the fact that most of the amendments listed above were made merely weeks before they commenced, and some changes also had a retrospective application. Therefore, in some instances, this severely limited AusNet Services' ability to change past and/or current decisions given the timeframe required to achieve compliance.

2.3 Customer concerns and site access issues

The Energy and Water Ombudsman Victoria (EWOV) has articulated an important correlation between customer concerns regarding smart meters, and announcements by Government and media coverage:

> *"EWOV received a significant number of calls from customers - following the Council of Australian Governments (COAG) December 2012 meeting - querying whether the Victorian roll-out was still mandatory. […] Similarly, media coverage in December 2013 may have also contributed to an increase in Smart Meter cases in the current quarter. The Victorian Energy Minister's recent announcement that consumers may be charged a fee instead of having their electricity supply disconnected for not having a Smart Meter installed, has received significant coverage."* [27]

The EWOV's December 2013 Solar and Smart Meter Update also noted the occurrence of the following events:

- *"19 April 2011 – The Victorian Premier announces a cost-benefit review of the AMI roll-out and advised that distributors would skip houses of customers who did not want [a Smart Meter] installed.*

- *24 July 2011 – The Victorian Premier advises in the media that consumers could refuse to have a Smart Meter installed."* [28]

AusNet Services notes that these announcements have contributed to an increase in customer refusals and as such AMI meter installers skipping sites, and having to undertake repeated site visits.

As the best endeavours obligation continued until June 2014, EWOV continued to receive customer concerns on smart meters in 2014 and 2015:

[23] Clauses 14AAA.2 and 14AAA.3
[24] Clause 5I.8
[25] Clause 5I.7B
[26] Clause 5L.1
[27] EWOV, *Solar and Smart Meter Update – 1 October 2013 to 31 December 2013*, p.4
[28] Ibid, page 5

- In the first quarter of 2014, 10% of cases received by EWOV related to the installation of a Smart Meter.[29]

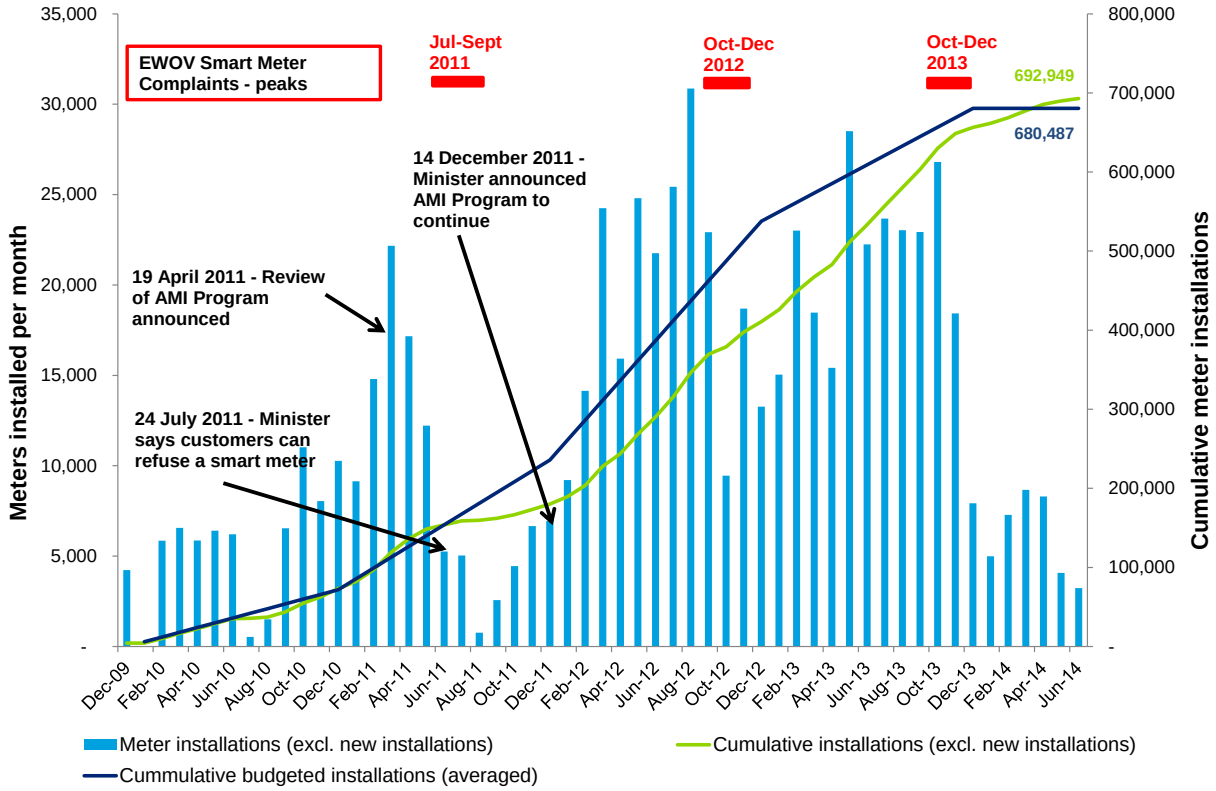
- From 1 April 2014 to 30 June 2014, EWOV received 209 cases regarding meter exchanges.[30] In the quarter ended 30 September 2014, 87 cases involving meter exchanges and 14 cases involving electromagnetic radiation were received by EWOV.[31]

- Meter exchanges continued to be an issue raised with EWOV in 2015[32], although the number of issues raised decreased in the quarter ended 30 September 2015.[33]

At the time the AMI budgets for the 2012–15 period were being considered and determined, stakeholders (including the Victorian Government, the DNSPs and the AER) under-estimated the extent, intensity and persistence of customer concerns regarding the AMI roll-out program. The impact of customer concerns resulted in AusNet Services expending significant effort to engage, influence and convince customers to accept AMI meters. This was a time consuming, complex and very costly process.

The following chart shows the peak periods of EWOV complaints and the impact to AusNet Services' overall roll-out.

Figure 2: AusNet Services' AMI deployment and peak periods of EWOV complaints



[29] EWOV, *Solar and Smart Meter Update – 1 January 2014 to 31 March 2014*, p.5
[30] EWOV, *Solar and Smart Meter Update – 1 April 2014 to 30 June 2014,* p.6
[31] EWOV, *Solar and Smart Meter Update – 1 July 2014 to 30 September 2014,* p.6
[32] EWOV, *Solar and Smart Meter Update – 1 April 2015 to 30 June 2015*, p.6
[33] EWOV, *Solar and Smart Meter Update – 1 July 2015 to 30 September 2015*, p.6

Customer concerns may be categorised as follows:

- Health related issues – concern that the meter will cause health issues because of perceived exposure to electromagnetic or radio frequency emissions;
- Installation and safety issues – concern that the meter is installed by unqualified installers, or the meter is unsafe;
- Privacy and security of data – concern that privacy of data revealing customers' personal electricity usage patterns will be breached, or on-sold to third parties; and
- Increased costs – concern that installing smart meters and the introduction of flexible pricing will lead to increased electricity tariffs, and concerns about increased service charges associated with recovery of roll-out costs.

In general, customers have been influenced by inaccurate reports or anecdotes in the media. For instance, ESV noted that some media reports have resulted in a great deal of largely misplaced community concern[34], while in its report on privacy matters for the Department of Primary Industries, Lockstep Consulting commented that there is a remarkably wide spectrum of consumer concerns.[35]

Unfortunately, while these concerns may be misplaced, they have a direct and material impact on the costs of the roll-out program. In particular, customer concerns ultimately translate into site access issues for AMI meter installers, resulting in skipped sites and repeated site visits.

As a consequence, meter installation productivity rates, the roll-out timetable, and total installation costs are all adversely affected. Additional resources are also required to agree and implement protocols to ensure that all customer concerns are addressed consistently and fairly. All of these factors increased AusNet Services' AMI roll-out costs in 2012 and 2013, and in 2014 and 2015. Even at the end of 2015 and at the date of this TCA, AusNet Services still had sites at which an AMI meter could not be installed due to customer refusals or access issues.

[34] Energy Safe Victoria, *Safety of Advanced Metering Infrastructure in Victoria,* 31 July 2012, section 1.3

[35] Lockstep Consulting, *Privacy Impact Assessment, Advanced Metering Infrastructure (AMI),* August 2011, p.16

3 AusNet Services' prudency assessment approach

AusNet Services has performed an analysis of the drivers of each category of the expenditure excess in both 2014 and 2015 to ascertain whether the expenditure excess in each of those years is prudent and reflects efficient costs as those terms are used in the CROIC. This analysis is detailed in Section 6.

It is further noted that during 2014 and 2015 (and for the entirety of the Project), AusNet Services has had in place substantive governance arrangements that have operated to ensure that costs incurred are prudent and efficient. Appendix B provides further details around the governance model and the program management arrangements in 2014 and 2015.

In addition, AusNet Services engaged Deloitte Access Economics (Deloitte) to undertake an ex-post review of the 2014 and 2015 expenditure excess. Deloitte reviewed AusNet Services' expenditure excess in 2014 and 2015 and considered the drivers of the overspend in the context of the broader AMI roll-out and the challenges faced by AusNet Services since 2012. Deloitte also considered the AER's previous decisions on AusNet Services' AMI expenditure, including metering costs in the 2016-20 EDPR Final Decision.

The key conclusions from Deloitte's review are contained within this document and the full report is included in Appendix C.

Appendix A of this TCA sets out certain key elements of the approach to assessing prudency under the CROIC, and the scope of the prudency analysis in accordance with clause 5I of the CROIC.

4 Efficient expenditure in the initial regulatory period

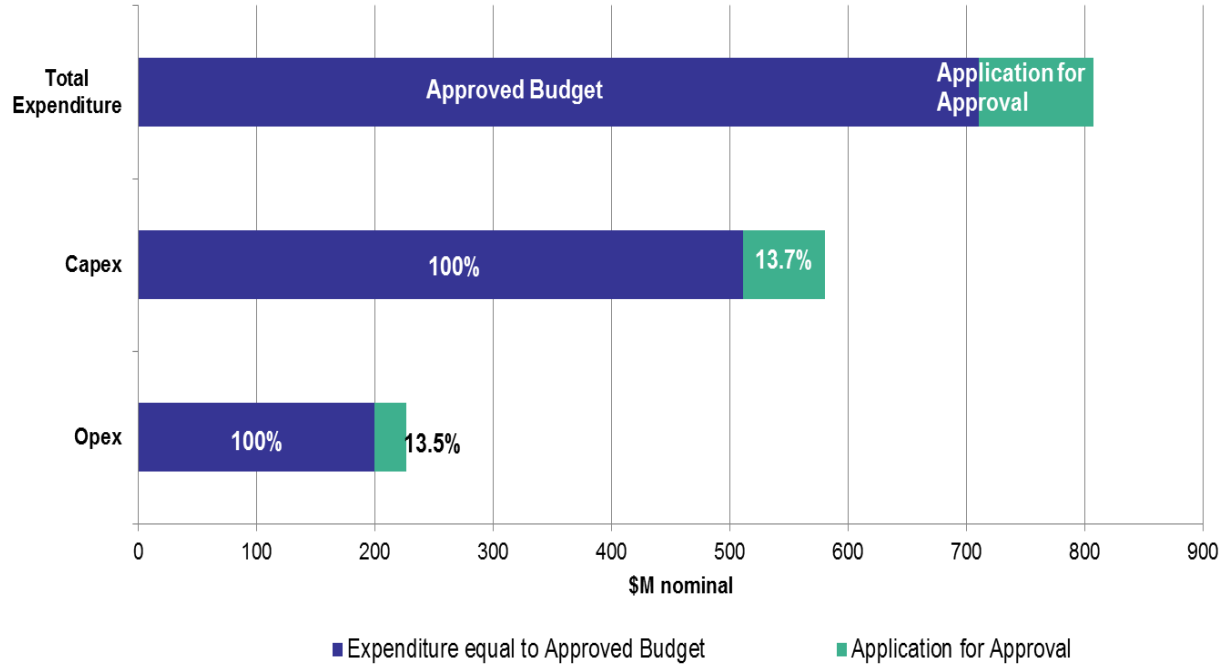
The following table summarises the costs incurred by AusNet Services during the roll-out period.[36]

Table 1: Total Expenditure 2009–2015 (nominal dollars)

	2009	2010	2011	2012	2013	2014	2015	Total
Approved Budget ($M)	69.5	113.5	143.6	183.2	155.0[37]	24.7	20.0	**709.5**
Actual Expenditure ($M)	65.7	128.7	155.5	181.0	177.7	107.2	103.4	**919.2**
Variance	(3.8)	15.2	11.9	(2.2)	22.7	82.5	83.4	**209.7**
Application for Approval						59.4	37.3	**96.7**

The expenditure excess for approval in this TCA amounts to an increase of 13.6% in the total expenditure approved by the AER for the AMI roll-out (inclusive of $47.5M approved in the 2013 Expenditure Excess Application). This is depicted in the following chart:

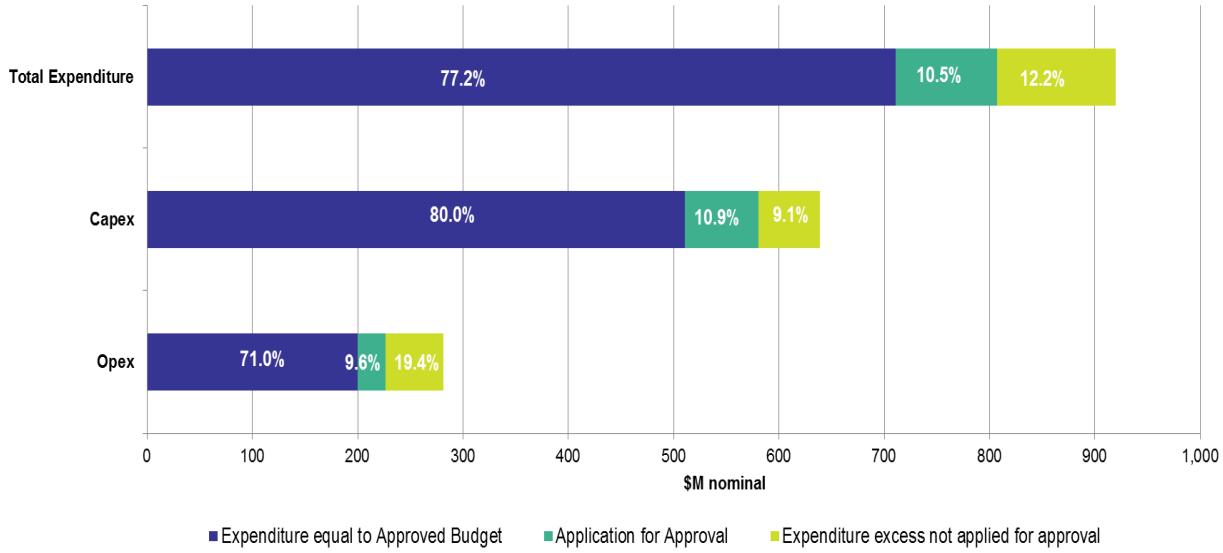
Figure 3: Expenditure excess applying for approval above the cumulative Approved Budgets



Comparing the efficient and prudent expenditure excess for 2014 and 2015 against total actual expenditure, the excess represents 10.5% of total program spend (inclusive of $47.5M approved in the 2013 Expenditure Excess Application). This is shown in Figure 4 below.

[36] This table includes a portion of the $219M of remediation related expenditure incurred in 2014 and 2015. This is discussed further below.
[37] The AER approved the recovery of $47.5M in addition to the initial approved budget of $107.2M.

Figure 4: 2014/15 expenditure excess application for approval as a proportion of total program expenditure



The CROIC originally made some allowance for the inherent risks in a unique program of such scale and magnitude. The initial CROIC contained contingency clauses which anticipated that distributors might spend (and would be allowed to recover) up to 120% of the Approved Budget in the Initial Budget period (2009 to 2011) and up to 110% of the Approved Budget in the Subsequent Budget period (2012 to 2015). Considering the nature and timing of such a large and complex program, there was no doubt that a level of contingency would be required. This is no different to the need for contingencies in the implementation of any other capital project. Furthermore, the Victorian Government did not manage the program as a single roll-out to allow for consistency and to achieve greater efficiencies amongst the distributors. As depicted in Figure 2 above, AusNet Services is applying for approval of 13.6% above the cumulative Approved Budgets. This amount is within an accepted level of contingency under the original CROIC.

For each year of the Initial Budget Period (2009 to 2011), AusNet Services' total actual expenditure was less than its Approved Budget or within 120% of it. In accordance with the CROIC as it was drafted at the time, the actual expenditure was approved by the AER and included in the annual building blocks revenue requirement. In 2012, AusNet Services did not exceed the Approved Budget. The expenditure in 2009 to 2012 was therefore determined to be prudent and reflected the efficient costs of AusNet Services providing the Regulated Services.

In 2013, AusNet Services incurred an expenditure excess of $70.2M and submitted an application for approval. The AER determined $47.5M (or 68%) of the $70.2M expenditure excess was prudent and reasonably reflected efficient costs. The proportion of the expenditure excess that was approved was accepted on the basis that the costs "*were outside the distributors' control but were incurred prudently and efficiently*"[38] and were not related to WiMAX expenditure that was previously rejected by the AER. The expenditure excess that was approved included non-WiMAX related meter supply cost, meter installation cost, IT capex, customer service cost, and corporate overheads and indirect costs.

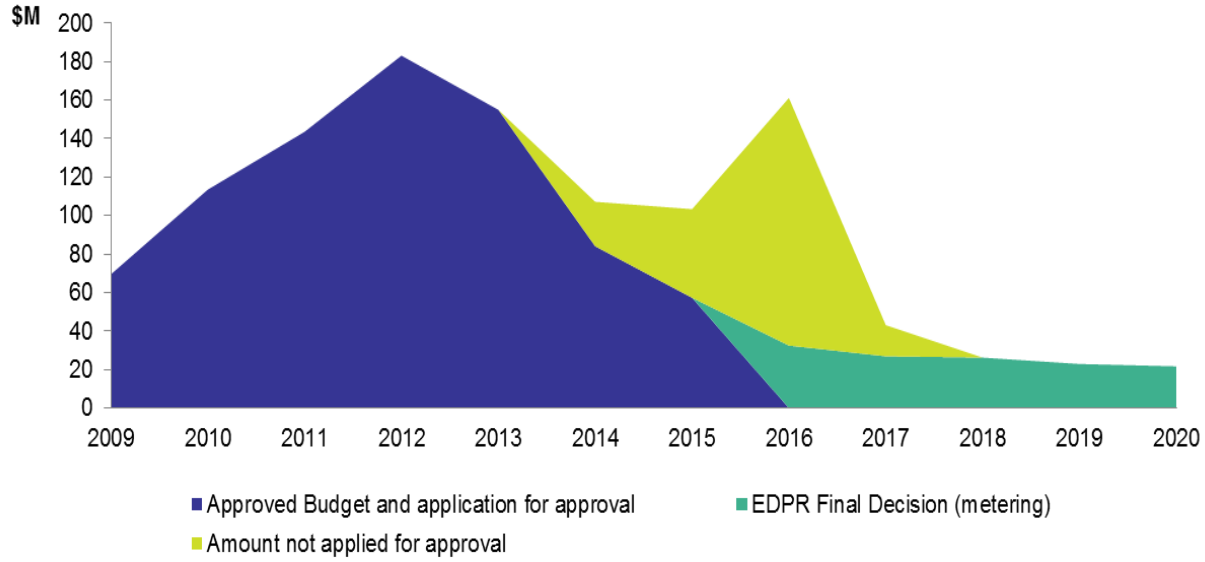
AusNet Services is spending $219M[39] to stabilise the existing end-to-end metering systems and to improve the communications network coverage. AusNet Services is not making an application for approval of these costs from customers, either through this TCA or the 2016-20 EDPR. It should be highlighted that by not applying for approval of these costs, AusNet Services ensures that customers only pay once for the AMI roll-out, the costs of which is commensurate with AusNet Services'

[38] AER, *Determination Advanced Metering Infrastructure 2015 revised charges*, December 2014, p.4

[39] The remediation expenditure comprises $69.2M incurred in 2014 and 2015. The balance is forecast to be incurred post 2015.

network characteristics. Figure 5 details total metering expenditure from 2009 to 2020, and depicts the extent and timing of AusNet Services' significant under-recovery of metering expenditure.

Figure 5: AusNet Services' metering expenditure 2009 – 2020



The following tables show AusNet Services' capital expenditure (capex) and operating expenditure (opex) in calendar years 2014 and 2015.

Table 2: AMI expenditure in 2014 ($M)

	Approved Budget	Actual Expenditure	Expenditure Excess
Capital Expenditure	5.7	60.4	54.7
Operating Expenditure	19.0	46.8	27.8
Total Expenditure	**24.7**	**107.2**	**82.5**

Table 3: AMI expenditure in 2015 ($M)

	Approved Budget	Actual Expenditure	Expenditure Excess
Capital Expenditure	2.1	60.4	58.3
Operating Expenditure	17.9	43.0	25.1
Total Expenditure	**20.0**	**103.4**	**83.4**

Table 2 shows that AusNet Services' actual total expenditure exceeded its Approved Budget in 2014 by $82.5M and Table 3 shows that AusNet Services' actual total expenditure exceeded the budget in 2015 by $83.4M.

In both years, AusNet Services incurred costs associated with remediation activities to stabilise the IT systems as well as costs associated with WiMAX. In 2015, AusNet Services also began rolling out mesh communications technology to complement the existing communications technology. Recognising that the AER's assessment of AusNet Services' 2013 expenditure excess means the AER is unlikely to be satisfied that some of the expenditure excess is to be approved (as they are likely to be associated with AusNet Services' choice of communications technology or may be considered inefficient), AusNet Services is not making an application for approval of $69.2M of the excess. This portion of the expenditure excess comprises:

- $27.5M of remediation costs relating primarily to IT capex and opex as a result of system instability issues as well as the 2015 Program Management Office costs;
- $7.3M of WiMAX related costs previously disallowed by the AER including the expenditure excess on communications infrastructure and meter reading costs post 30 June 2014 which is above the AER determined efficient opex;
- $26.6M of mesh costs associated with the procurement of mesh communications modules and the establishment of the mesh communications infrastructure and IT systems; and
- $7.8M of expenditure excess which is above the efficient base year determined by the AER in the 2016-20 EDPR.

Table 4 provides a breakdown of the 2014 and 2015 expenditure excess and the expenditure excess which AusNet Services is applying for approval in this TCA, split by opex and capex:

Table 4: Expenditure Excess 2014 and 2015 (nominal dollars)

$M	Expenditure excess not appliedfor approval	Expenditure excess application for approval	Total	% application for approval
2014 – capex	9.9	44.8	54.7	81.9%
2014 - opex	13.2	14.6	27.8	52.5%
2015 – capex	33.3	25.0	58.3	42.9%
2015 - opex	12.8	12.3	25.1	49.0%
Total	**69.2**	**96.7**	**165.9**	**58.3%**

This table reveals that AusNet Services is applying for the approval of efficient and prudent costs, being 58% of the expenditure excess across 2014 and 2015.

Benchmark Efficient Entity

Clause 5I.8A of the CROIC states that the AER must take into account the expenditure of a benchmark efficient entity over the entirety of, or any part of, the initial regulatory period. AusNet Services notes the considerable complexities and difficulties associated with benchmarking particularly when applied to cutting edge, new technology programs such as AMI. It is also noted that in the EDPR 2016-20 Final Decision, the AER decided against the use of benchmarking in assessing forecast opex.

In past AMI decisions, the AER has often utilised Powercor as a proxy benchmark for AusNet Services given its rural distribution network. AusNet Services considers that any assessment or benchmarking of AusNet Services' costs must fully consider the unique nature of AusNet Services' business.

Important factors which AusNet Services considers are relevant that the AER should have regard to in benchmarking AusNet Services' AMI expenditure include:

- Differences in network terrain between the Victorian DNSPs, which impacts both accessibility and the requirement for a greater proportion of infill communication technology (3G and mesh), depicted in Figures 5 to 7 in Section 6.1 below;
- Differences in cost allocation approaches and reporting, noting significant differences in the way that costs are allocated between AMI and other network charges, particularly for back office IT expenditure; and
- The ability (or inability) of distributors to share AMI-related fixed costs across multiple distribution networks.

Further, as acknowledged by the AER in its Final Decision for the 2013 Expenditure Excess, similar circumstances affect distributors differently. The AER recognised that "*changes in government policy that impacted rollout schedules had a proportionally greater effect on those distributors who had completed fewer meter installs at the time*."[40]

Victoria is the only Australian jurisdiction to mandate a distributor-led roll-out of smart meters. An infrastructure roll-out of such a magnitude and significant change was highly probable to incur cost overruns, and there is strong historical precedent for this in the implementation of large scale infrastructure projects. In a 2014 report, Deloitte found that on average, Australian infrastructure projects have seen cost over-runs in seven of the previous eight years, and that for larger infrastructure projects cost over-runs averaged 12.7%[41]. In line with this analysis, **it should be noted that AusNet Services is applying for approval of an expenditure excess which is within this industry standard**.

In 2015, the Victorian Auditor-General acknowledged that "*a high degree of uncertainty existed around the program."*[42] This uncertainty meant that it was very difficult for the AER to generate a reliable estimate of the budget required for the remainder of the roll-out at the point at which the 2014 and 2015 budgets were determined. Furthermore, there was no available benchmark for the costs that would be required to complete the program as such a roll-out had never been conducted in Australia. The challenges associated with implementing large scale technology projects was also highlighted by the Victorian Auditor-General which noted that nearly 35% of Victorian government IT projects were completed over budget and 50% were completed late[43]. In the same report, it was found that the total cost of the *Infringement Management and Enforcement System Project* by the Department of Justice was $60M against a budget of $25M, equating to 140% above budget. This project which was scheduled for completion by October 2009 was regrettably terminated in March 2015.[44]

[40] AER, *Determination Advanced Metering Infrastructure 2015 revised charges*, 12 December 2014, p.8
[41] Deloitte Access Economics 2014, '*Major infrastructure projects: costs and productivity issues'*
[42] Victorian Auditor-General, *Realising the Benefits of Smart Meters*, September 2015, p.8
[43] Victorian Auditor-General, *Digital Dashboard: Status Review of ICT Projects and Initiatives – Phase 2*, p.1
[44] Ibid, p.10

5 Efficient metering opex in 2014 and 2015

The EDPR 2016-20 Final Decision approved the metering opex for the 2016 to 2020 regulatory period using a 'base, step, trend' method with 2014 as the base year. In determining the base year opex, the AER noted that "*costs incurred in 2014 should best resemble business-as-usual opex for metering in the forthcoming 2016-20 regulatory control period*."[45] The AER applied the 'base-step-trend' method and made adjustments for any non-recurrent costs or material inefficiencies. The AER stated that "*any opex incurred in the base year which is strictly related to the roll-out of smart metering infrastructure should be regarded as non-recurrent, or "one-off", expenditure*."[46] The AER's approach therefore implies that costs during the roll-out period should undoubtedly be higher than during the business-as-usual (BAU) phase.

AusNet Services agrees that a distribution business would incur more opex during the roll-out period (when processes are still being refined and efficiencies being progressively gained), in anticipation of becoming BAU as compared to the post roll-out period. The AER's review of AusNet Services' 2014 actual opex also concluded that it "*does not contain material inefficiencies… on the basis that the Victorian distribution businesses are generally efficient.*"[47] As such, the AER did not adjust the base year opex for material inefficiencies. However, it did adjust for $20.7M (real $2015) of operating expenditure that it believes is related to the continued roll-out of the AMI Program and as such to be non-recurrent in nature.

The EDPR 2016-20 Final Decision approved forecast opex for the 2016 to 2020 regulatory period, which is unchanged from the Preliminary Decision. The AER reiterated that the opex fits into a BAU category. "*This is because it was forecast using a base level of opex that most closely resembles AusNet Services BAU smart meter operations*."[48] Therefore, the approved forecast opex for 2016 should reflect the minimum opex that AusNet Services would have required in 2014 and 2015.

The following table shows a comparison of the approved 2016 opex adjusted for inflation against the CROIC Approved Budget for 2014 and 2015.

Table 5: Comparison of expenditure under the EDPR and the CROIC – opex

	2014			2015		
$M (nominal)	**Per 2016 EDPR**[49]	**Per CROIC**	**Actual Costs**	**Per 2016 EDPR**[50]	**Per CROIC**	**Actual Costs**
Meter Maintenance	2.4	0.8	0.9	2.5	0.9	1.2
Meter Reading	1.3	0.5	4.9	1.3	0.5	4.8
Data Management	4.1	2.7	5.0	4.2	2.7	5.1
Communications Infrastructure Maintenance	7.0	5.1	8.4	7.2	5.3	9.2
IT Opex	12.5	7.5	15.8	13.0	6.6	13.9
Customer Services Cost	-[51]	0.6	0.5	-[52]	0.1	0.2
Overheads and indirect costs	2.6	1.8	2.8	2.7	1.8	2.3
Total	**29.9**[53]	**19.0**	**38.3**	**30.9**[54]	**17.9**	**36.7**

45 AER, *EDPR 2016-20 Preliminary Decision*, Attachment 16-43
46 Ibid.
47 AER, *EDPR 2016-20 Preliminary Decision,* Attachment 16-46
48 AER, *EDPR 2016-20 Final Decision,* Attachment 16-37
49 AER, *EDPR 2016-20 Final Decision, Metering Opex Model (Confidential)*
50 Being the efficient base year opex in 2014 escalated by CPI which is the same as the approved 2016 forecast in real $2015.
51 This cost is not included in forecast metering opex as AusNet Services will subsume this cost within the business.
52 Ibid.
53 The approved forecast opex for 2016 also includes metering management costs.
54 Ibid.

This table indicates that when determining the efficient and BAU metering operating costs for 2016-20, the AER has determined that the operating cost budget it originally determined in the CROIC Approved Budget were 57% and 73% too low for 2014 and 2015 respectively. This highlights the challenges faced in determining budgets or funding for large scale, innovative technology projects with limited precedents and should be kept in mind when reviewing performance against these budgets.

As the AER has determined AusNet Services' 2014 opex to be efficient and that the forecast opex for the 2016 to 2020 period "*most closely resembles AusNet Services BAU smart meter operations*"[55], AusNet Services should be permitted, at a minimum, to recover the difference between the CROIC Approved Budget for 2014 and 2015 and the approved 2016 forecast opex in the 2016-20 EDPR.

AusNet Services also incurred legitimate opex costs up to 30 June 2014 to complete the roll-out of AMI meters by that date (before a rebate is payable to customers), as mandated by the CROIC. AusNet Services is applying for approval of those costs as part of this TCA. It should be noted that AusNet Services had completed the roll-out of AMI meters by 30 June 2014.

[55] AER, *EDPR 2016-20 Final Decision*, Attachment 16-37

6 Analysis of expenditure excess by category

This section analyses the expenditure excess by category, including the cost drivers for the expenditure excess. Tables 6 and 7 present the actual and approved budget expenditure by category, and those items that will be subject to a prudency assessment under the CROIC.

Table 6: Actual and budget AMI expenditure for 2014 (nominal $M)

	Approved budget	Actual expenditure	'Expenditure excess'	'Expenditure excess' sought	Prudency assessment provided in
CAPITAL EXPENDITURE					
Meter Supply	2.2	25.6	**23.4**	**22.5**	Section 6.1
Meter Installation	-	13.3	**13.3**	**13.3**	Section 6.2
Communication Network Infrastructure and Installation	3.5	4.5	**1.0**	-	Assessment not required
IT Capex	-	17.0	**17.0**	**9.0**	Section 6.3
TOTAL CAPITAL EXPENDITURE	**5.7**	**60.4**	**54.7**	**44.8**	
OPERATING EXPENDITURE					
Meter Maintenance	0.8	0.9	**0.1**	**0.1**	Section 6.9
Meter Reading	0.5	4.9	**4.4**	**2.4**	Section 6.4
Data Management	2.7	5.0	**2.3**	**2.2**	Section 6.5
Communications Infrastructure Maintenance	5.1	8.4	**3.3**	**1.9**	Section 6.6
IT Opex	7.5	15.8	8.3	**1.7**	Section 6.7
AusNet Services PMO	-	8.5	**8.5**	**5.3**	Section 6.8
Customer Service Cost	0.6	0.5	**(0.1)**	**-**	Assessment not required
Overheads and Indirect Costs	1.8	2.8	**1.0**	**1.0**	Section 6.9
Debt Raising Costs	-	-	-	-	Assessment not required
TOTAL OPERATING EXPENDITURE	**19.0**	**46.8**	**27.8**	**14.6**	
TOTAL EXPENDITURE	**24.7**	**107.2**	**82.5**	**59.4**	

Table 7: Actual and budget AMI expenditure for 2015 (nominal $M)

	Approved budget	Actual expenditure	'Expenditure excess'	'Expenditure excess' sought	Prudency assessment provided in
CAPITAL EXPENDITURE					
Meter Supply	2.1	6.9	**4.8**	**1.3**	Section 6.1
Meter Installation	-	4.3	**4.3**	**1.2**	Section 6.2
Communication Network Infrastructure and Installation	-	4.5	**4.5**	**-**	Assessment not required
IT Capex	-	44.7	**44.7**	**22.5**	Section 6.3
TOTAL CAPITAL EXPENDITURE	**2.1**	**60.4**	**58.3**	**25.0**	
OPERATING EXPENDITURE					
Meter Maintenance	0.9	1.2	**0.3**	**0.3**	Section 6.9
Meter Reading	0.5	4.8	**4.3**	**0.8**	Section 6.4
Data Management	2.7	5.1	**2.4**	**2.3**	Section 6.5
Communications Infrastructure Maintenance	5.3	9.2	**3.9**	**1.9**	Section 6.6
IT Opex	6.6	13.9	**7.3**	**6.4**	Section 6.7
AusNet Services PMO	-	6.3	**6.3**	**-**	Assessment not required
Customer Service Cost	0.1	0.2	**0.1**	**0.1**	Section 6.8
Overheads and Indirect Costs	1.8	2.3	**0.5**	**0.5**	Section 6.9
Debt Raising Costs	-	-			Assessment not required
TOTAL OPERATING EXPENDITURE	**17.9**	**43.0**	**25.1**	**12.3**	
TOTAL EXPENDITURE	**20.0**	**103.4**	**83.4**	**37.3**	

6.1 Meter supply capital expenditure

Table 8: Meter supply in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter Supply Expenditure in 2014	$2.2M	$25.6M	**$23.4M**	**$22.5M**
Volume of Metering Units	10,112 metering units[56] purchased in 2014	122,579 3G communications modules and 33,389 WiMAX communication modules in 2014	122,579 additional 3G communications modules **[excess of $9.0M]** 23,277 additional WiMAX communications modules **[excess of $1.7M]**	AusNet Services is applying for approval of the expenditure excess caused by: • delay in the delivery of communication s modules due to the overall delay in the mass roll-out; and • greater requirement of 3G coverage. **[$22.5M]**
Metering Unit Cost Price (average cost)	$214 per metering unit, inclusive of $73.60[57] per communications module	$170 per 3G communications modules $103 per WiMAX communication modules	Unit cost difference of $96.40 per 3G communications modules **[excess of $11.8M]**	
			Unit cost difference of $29.40 per WiMAX communications modules **[excess of $0.9M]**	AusNet Services is not applying for approval of the expenditure excess associated with the unit cost of the WiMAX communication modules. **[$0.9M]**

The AER's budget for 2014 of $2.2M included an allowance of $214 for a complete metering unit (including metering hardware, communications card, Zigbee chip and antenna) and it was anticipated that AusNet Services would procure 10,112 metering units. The AER's budget was predicated on the assumption that the roll-out would be complete by the end of 2013. That proved not to be the case and, as explained above, amendments were gazetted to the CROIC on 10 December 2013 requiring each distributor to continue to use its best endeavours to install a complying remotely read interval meter for prescribed customers. If a complying remotely read interval meter was not installed by 30 June 2014, the distributor was required to make a rebate payment to the customer. The new regulatory obligations, which were a response to the delays in the roll-out due to customer concerns and government reviews, allowed AusNet Services to continue to roll-out smart meters throughout its distribution network. AusNet Services' compliance with these regulatory obligations underpins its application to apply for approval of the associated efficient and prudent expenditure excess.

In 2014, AusNet Services incurred $25.5M of expenditure associated with the supply of metering equipment.[58] Of this total, $20.8M was associated with the procurement of 122,579 3G

[56] Metering unit includes metering hardware, communications card, Zigbee chip and external antenna.
[57] Assumed to decrease in line with the decreasing cost per metering unit from 2013 to 2015.
[58] Metering unit includes metering hardware, communications card, Zigbee chip and external antenna.

communications modules at an average unit cost of $170. 3G communications modules were purchased to provide infill coverage where the communications technology coverage was not available or was insufficient. This approach was determined as the efficient and prudent alternative to installing additional WiMAX infrastructure in the area.

As a result of the delays due to government policy changes, AusNet Services ordered the 3G communications modules in 2013.

However, AusNet Services experienced a significant delay in taking delivery of the 3G communications modules. This occurred because the 3G communications module was a brand new product, and as such had to undergo proof of concept and prototype testing. Although the factory ramped up its production in 2013, delivery still took approximately 4 months, preventing AusNet Services from installing the communications modules at the same time as the meters in 2013.

The quantum of the expenditure excess associated with 3G communications modules arose largely as a result of the difference between the AER's infill coverage for the 2012 to 2015 budget, and the actual requirement for infill coverage that has been experienced over 2014 and 2015. Due to the terrain and nature of AusNet Services' network, it is not economical to have one communications technology as it will be extremely costly for the benefit of connecting a few customers to the communications network. As such, any communications solution will require an infill technology. Therefore, AusNet Services selected and installed 3G communications modules as its infill technology, which was assessed as a more economical and cost efficient option in the more difficult terrain areas. In rolling out the mesh communications technology in 2015, it should be noted that AusNet Services is also utilising 3G mesh communications modules.

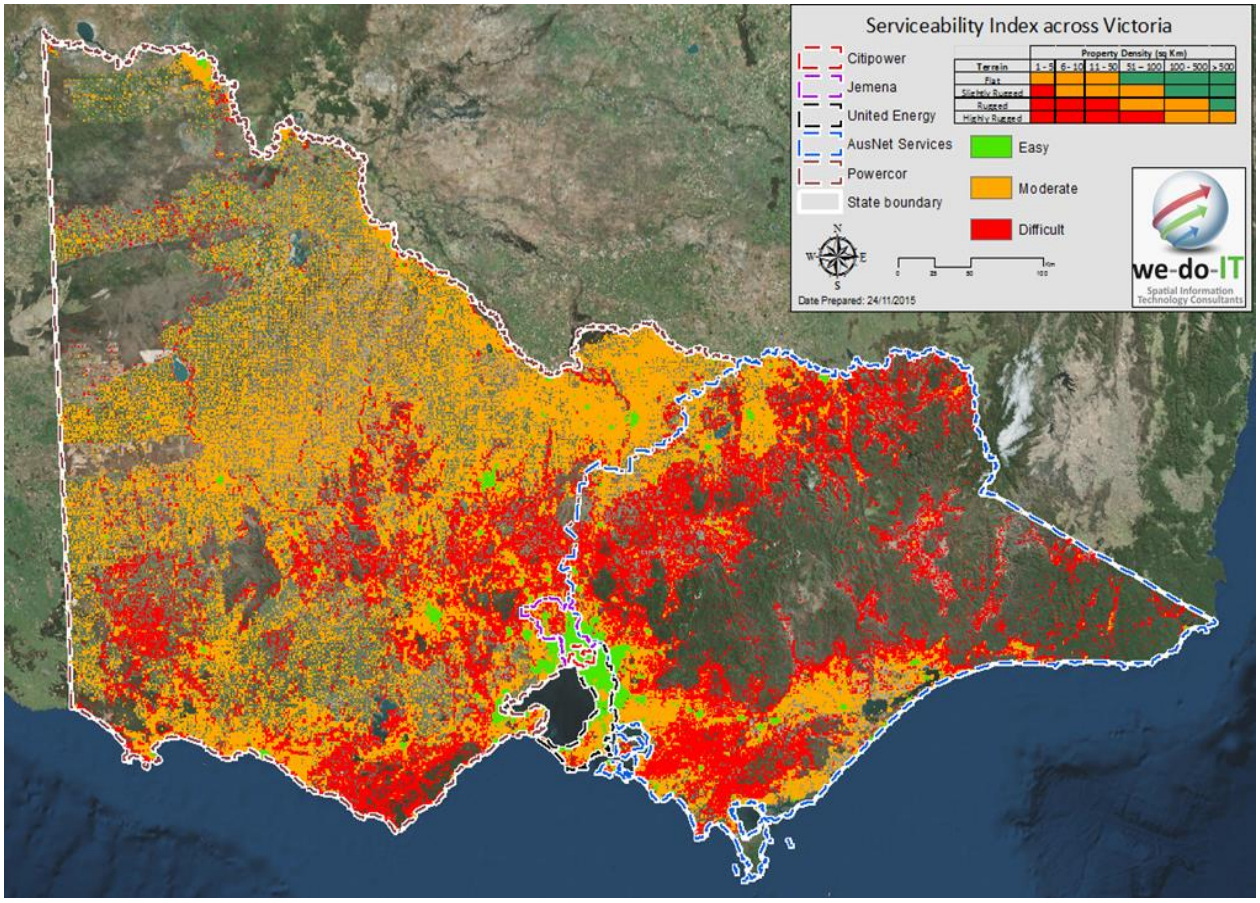
In its 2012-15 budget application, AusNet Services sought funding to provide infill coverage for up to 15% of meters, with the existing communications technology expected to provide the remaining 85% coverage[59]. The AER, via its consultants, used Powercor as a benchmark for the level of infill coverage determined that AusNet Services should only require infill coverage for 3% of its distribution network as the remaining 97% should be able to be serviced by the existing communications technology.

AusNet Services maintains that it is not appropriate to use Powercor as a benchmark for its infill coverage requirements as there are clear environmental differences between their respective distribution networks with respect to customer density and difficulty of terrain.

Figures 6 to 8 below taken from a report by We-do-IT Spatial Information Technology Consultants entitled "*Electricity Distributors Terrain Comparison*" undertaken in 2015 demonstrates that AusNet Services' network presents the most difficult environment for a communications network out of all Victorian distributors. This report is an extension of the previous analysis in 2013 undertaken by We-do-IT Spatial Information Technology Consultants in the report entitled "*SP AusNet Powercor Region Terrain Comparison Project*".

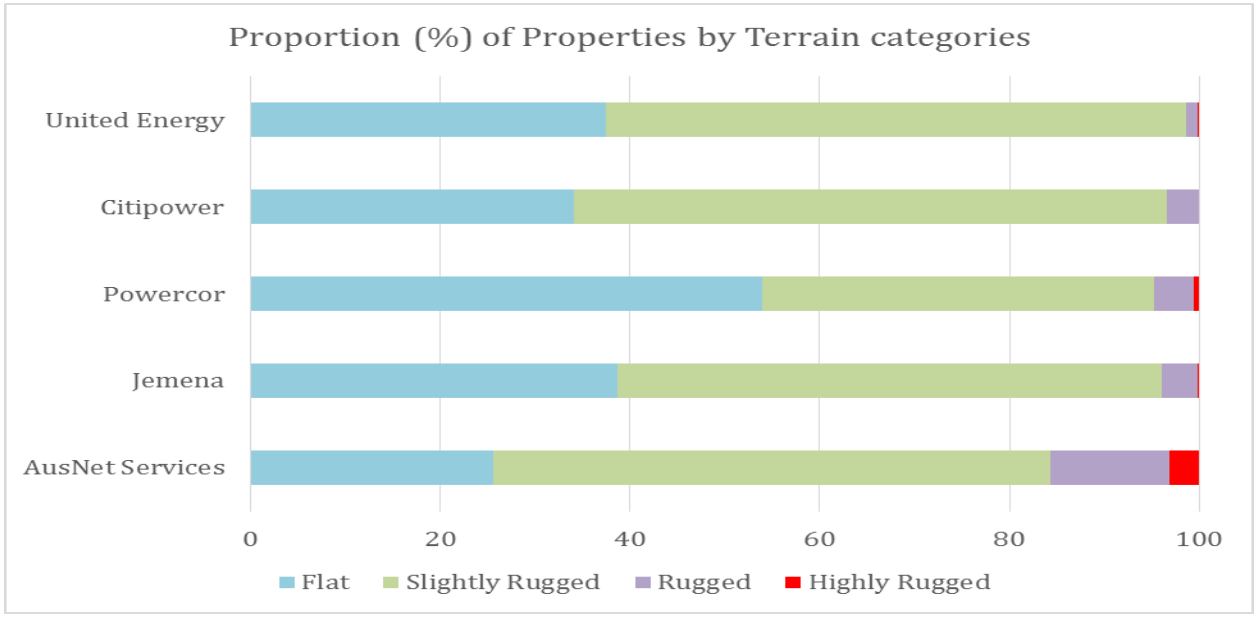
[59] AusNet Services, *2012-15 AMI Budget Application*, 28 February 2011, p.27, 56

Figure 6: Serviceability



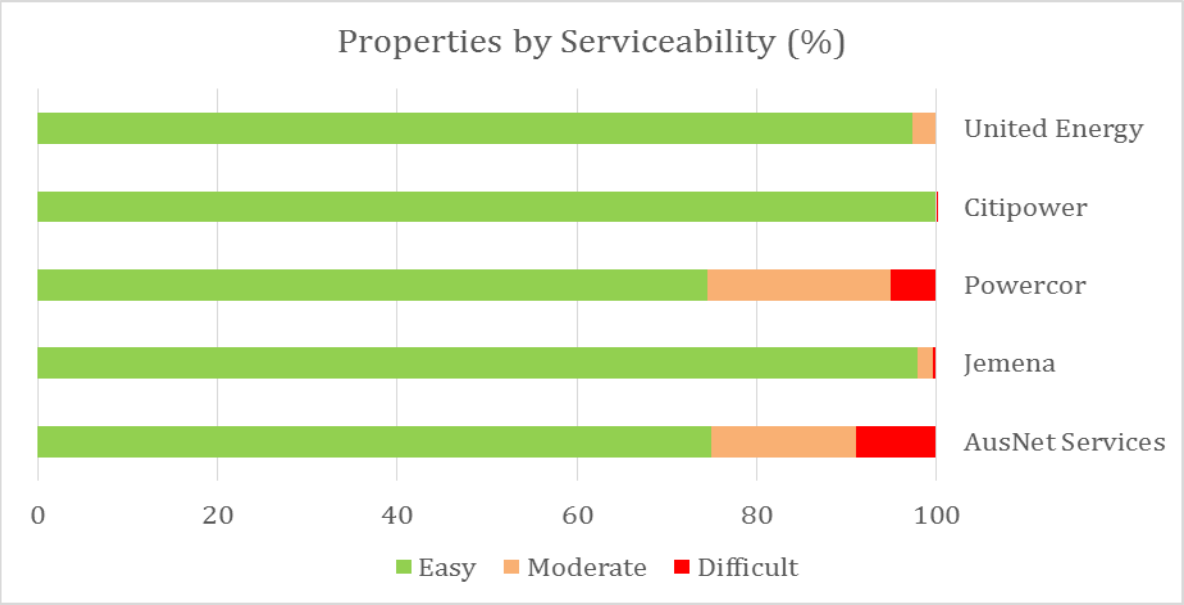
Source: We-do-IT

Figure 7: Percentage of properties by terrain



Source: We-do-IT

Figure 8: Percentage of properties by serviceability



Source: We-do-IT

Subsequent work undertaken during the mesh roll-out in 2015 resulted in a design infill percentage of 16.3% of 3G enabled communications modules. As part of the ongoing optimisation during the mesh roll-out, AusNet Services is currently targeting an infill percentage of 9% as an absolute minimum. The achievement of this outcome will not be known until the mesh roll-out is fully completed. Nevertheless, it is evident that the percentage of infill required will be significantly higher than the 3% the AER has previously determined.

It is further noted that AusNet Services is not applying for approval of the costs associated with the roll-out of mesh communications, either through this TCA or the 2016-20 EDPR. As such, the cost included in this TCA associated with purchasing and installing the 3G communications modules, represents the total cost to customers of providing infill coverage for AusNet Services' unique distribution area.

Table 9: Meter supply in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter Supply Expenditure in 2015	$2.1M	$6.9M	**$4.8M**	**$1.3M**
Volume of Metering Units	9,852 metering units purchased in 2015[60]	22,422 complete metering units in 2015	12,570 additional metering units **[increase of $2.7M]**	AusNet Services is only applying for approval of the expenditure excess caused by the higher number of meters and communications modules than forecast. **[$1.3M]**
Metering Unit Cost Price (average cost)	$216 per metering unit, inclusive of $74.30[61] per communications module	$153 per metering unit	Unit cost difference of $63 **[decrease of $1.4M]**	
Increase in mesh communications module not sought	-	AusNet Services purchased mesh communications modules	AusNet Services purchased mesh communications module ($3.5M) **[excess of $3.5M]**	AusNet Services is not applying for approval of the expenditure excess associated with the mesh communications modules. **[$3.5M]**

The AER's budget for 2015 included an allowance of $216 for a complete metering unit (including metering hardware, communications card, Zigbee chip and antenna) and it was anticipated that AusNet Services would procure 9,852 metering units for new connections.

In 2015, AusNet Services incurred $6.9M of expenditure associated with the supply of metering equipment.[62] This was attributable to the procurement of 22,422 metering units for new connections and meter faults at an average unit cost of $153. The Approved Budget (set in 2011) had forecast 9,852 new connections but in actual fact, AusNet Services had 14,925 new connections in 2015, an increase of 51% above the Approved Budget.

The expenditure excess associated with the extra meters purchased was offset by a $1.4M saving achieved by using refurbished meters during 2015.

In 2015, AusNet Services also purchased mesh communications modules but is not applying for approval of the expenditure excess associated with this purchase of $3.5M.

6.1.1 Volume of equipment purchased

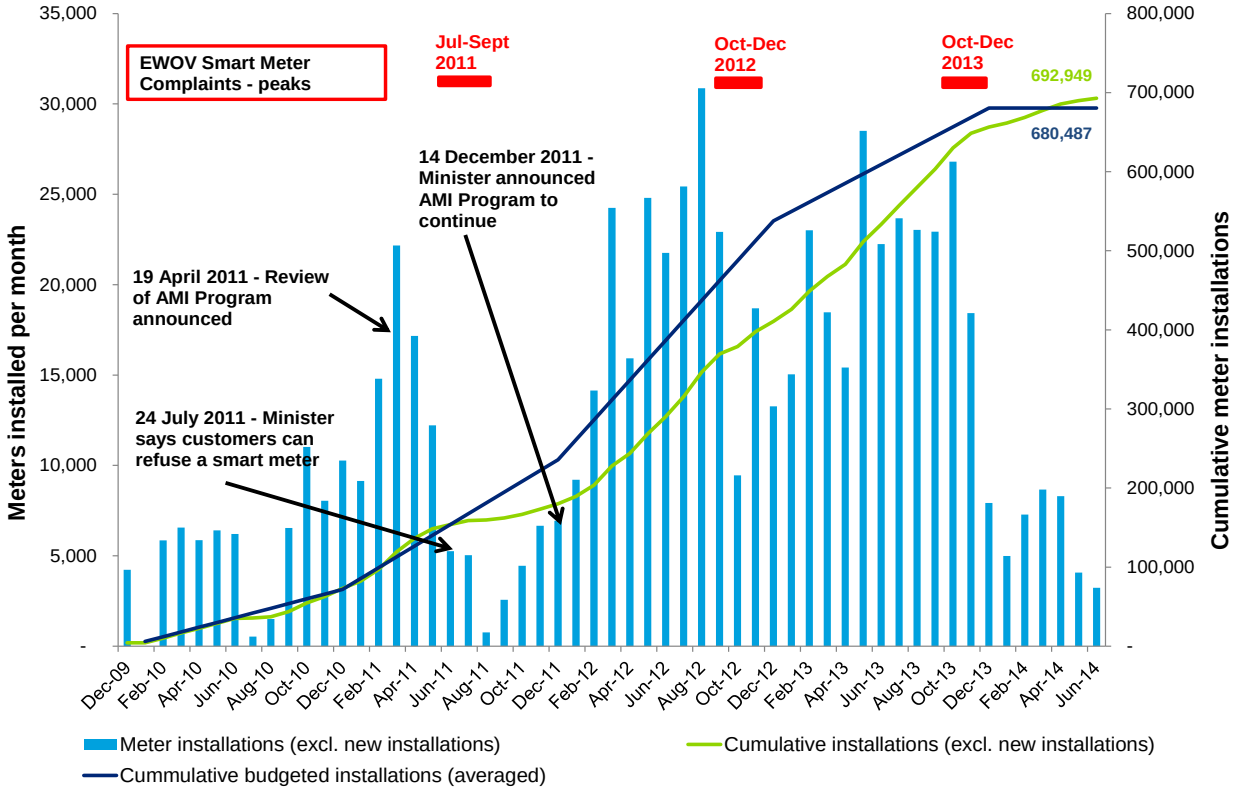
As detailed above, a number of external factors contributed to the extension of the AMI roll-out beyond the original completion date of December 2013 and resulted in the amendment of the CROIC to extend the obligation to use best endeavours to install AMI meters to customers.

Figure 9 (being a replication of Figure 2 above) illustrates AusNet Services' AMI meter deployment schedule since the commencement of the roll-out period until June 2014 (before a rebate is payable

[60] Metering unit includes metering hardware, communications card, Zigbee chip and external antenna.
[61] Assumed to decrease in line with the decreasing cost per metering unit from 2013 to 2015.
[62] Metering unit includes metering hardware, communications card, Zigbee chip and external antenna.

to customers) and contrasts it with the initial budgeted number of installations. It also highlights the timing of the key external factors that have contributed to the delay in completion of the AMI Program.

Figure 9: AusNet Services' AMI deployment and peak periods of EWOV complaints



Due to the 2011 Government review of the AMI roll-out, AusNet Services experienced delays to its meter deployment schedule. The 13 months of uncertainty between November 2010 and December 2011, led to increased customer opposition, increased refusals and no access sites. This delay has been highlighted in section 2 of this paper. The delays and uncertainties also led to a delay in the delivery of the 3G communications modules as detailed earlier.

As illustrated in Figure 9 above, AusNet Services experienced a significant decline in the number of meter installations during mid-late 2011 due to the uncertainty noted. This led to a 'catch up' post 2012.

As noted above, amendments to the CROIC were gazetted on 10 December 2013 requiring each distributor to use its best endeavours to install a complying remotely read interval meter from 1 January 2014. The changes made to the CROIC to extend the best endeavours obligation to install AMI meters to customers required AusNet Services to continue to roll-out smart meters throughout its distribution network. To achieve compliance with this regulatory obligation required AusNet Services to develop processes for AusNet Services' call centre to follow up on every job that could not be completed due to refusals, appointment requirements and access issues. AusNet Services also focused on sites which required a truck visit, customers who requested particular processes to be followed or required traffic management, as well as closing out the sites that required external asbestos removalists.

6.1.2 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' meter supply capex concluded as follows:

"Almost all of the excess expenditure being sought by AusNet Services in this category relates to the need to purchase more 3G communications than originally forecast. 3G is more expensive than either mesh or WiMAX. As noted above, the AER budget for AusNet Services' meter supply capex appears to be based on a benchmark of infill technology required by Powercor. In our view, and supported by the analysis carried out by WeDoIT Consulting, the AER's benchmark for infill technology was insufficient for AusNet Services' network area.

AusNet Services' need for a greater proportion of 3G infill technology than Powercor is associated with two factors:

- *The relative terrain roughness and property density of its network area compared to Powercor, as reported by WeDoIT Consulting, which is relevant to the identification of an appropriate benchmark efficient entity (consistent with clause 51.8A of the OIC).*
- *The performance of the WiMAX technology, which required a greater infill technology support than expected at the time AusNet Services' AMI budget was forecast and determined by the AER. This relates to the state of the AMI technology (consistent with clause 5I.8(d) of the OIC)."*

6.2 Meter installation capital expenditure

Table 10: Meter installation expenditure in 2014

<table>
<tr><th></th><th>Approved Budget</th><th>Actual Expenditure</th><th>'Expenditure Excess'</th><th>'Expenditure Excess' sought</th></tr>
<tr><td>Meter Installation Expenditure in 2014</td><td>-</td><td>$13.3M</td><td>$13.3M</td><td>$13.3M</td></tr>
<tr><td>Volume of Metering Units</td><td>Nil</td><td>37,022 meters installed
69,862 stand-alone communications modules installed
4,060 faulty meters replaced</td><td rowspan="2">Installed a total of 41,082 additional meters and 69,862 stand-alone communications modules at a per installation rate that is well below the 2013 AER benchmark [excess of $13.3M]</td><td rowspan="2">AusNet Services is applying for approval of the full expenditure excess as the installation rate over the roll-out period is well below the 2013 AER benchmark. [$13.3M]</td></tr>
<tr><td>Average Price Per Installation</td><td>2013 – benchmarked at $151 (nominal $2013)</td><td>$138.15 over the life of the roll-out period</td></tr>
</table>

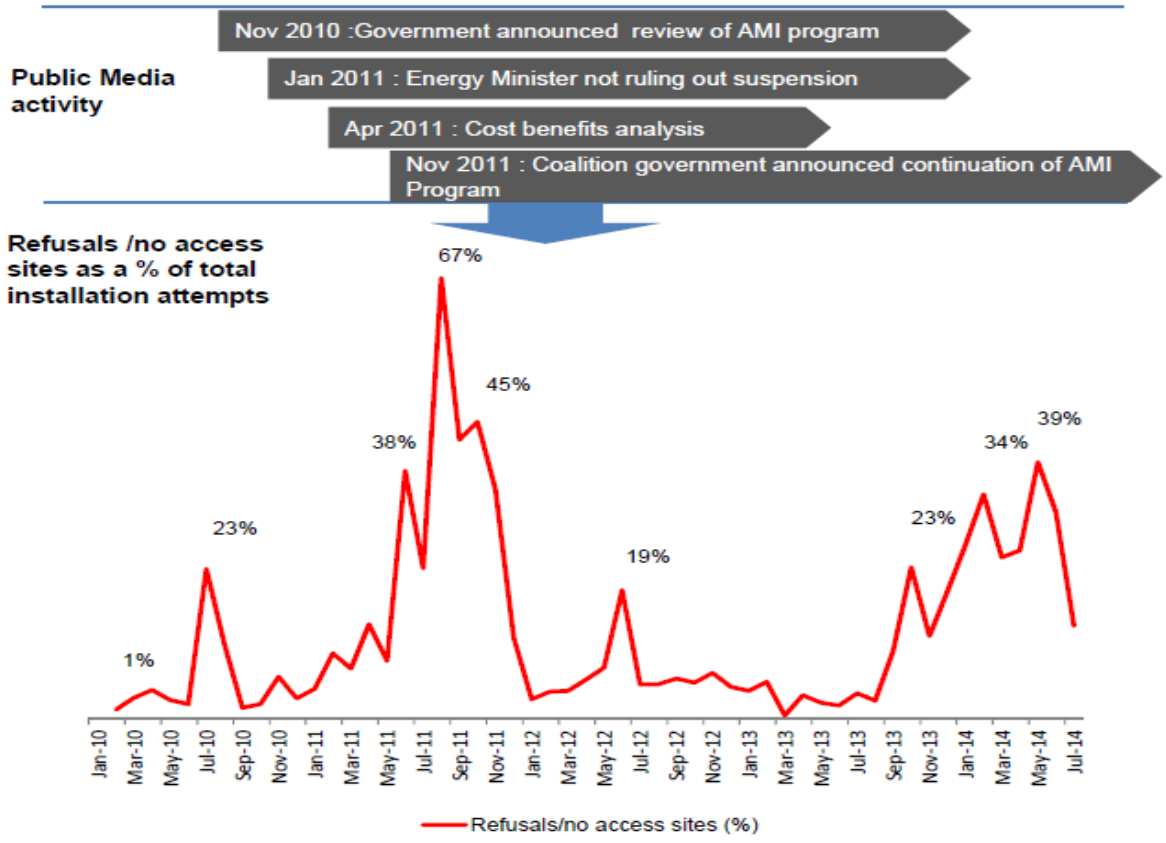
When the AER Approved Budget for 2014 was determined, it was envisaged that the roll-out obligation would cease in December 2013. Therefore, there was no Approved Budget for 2014 in relation to meter installation.

In 2014, AusNet Services installed 41,082 meters and a further 69,862 stand-alone communications modules, incurring $13.3M. Delays in the roll-out due to customer concerns and government reviews impacted the rate of meter installation as described below. These delays led to the extension of the AMI roll-out. As mentioned in section 6.1, there was a delay in the delivery of the 3G communications modules in 2013 as a result of the impact of policy changes. This prevented AusNet Services from installing the communications modules at the same time as the meters in 2013.

Impact of government policy changes

The various government policy reviews and changes contributed strongly to the level of customer refusals and site access issues encountered in AusNet Services' network as shown in Figure 10 below.

Figure 10: Impact of government announcements on customer refusals and site access issues



The significant volume of customer refusals and site access issues encountered by AusNet Services since 2011 when the refusals and no access rate peaked at 67% (as a proportion of the total installation attempts) continued to impact the rate of meter installation in 2014 and 2015.

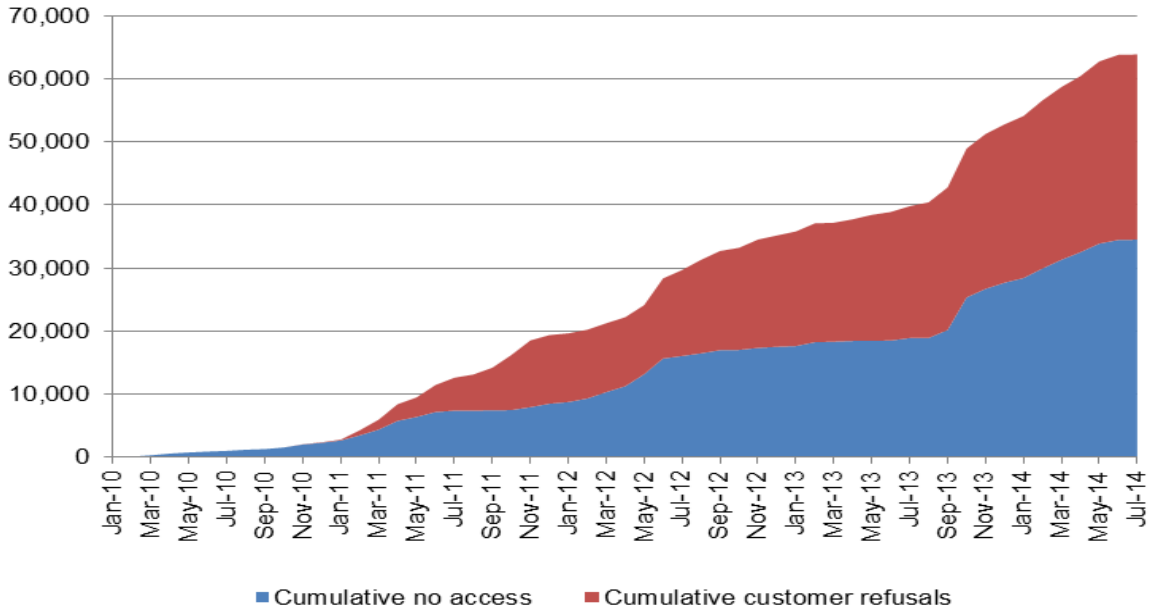
The Victorian Auditor-General also noted that there were still sites in which an AMI meter could not be installed at the end of 2013 because:

- "*the customer at the premises had actively refused the installation of a smart meter for health, privacy or other concerns,*
- *access issues, such as locked gate or an aggressive dog prevented installation*
- *other issues, such as defects or technical issues*."[63]

It should be noted that AusNet Services encountered more than 60,000 no access issues and customer refusals during the roll-out period as depicted in Figure 11 below. This amount represents nearly 10% of AusNet Services' total meters. The Victorian Auditor-General noted that "*significant challenges to consumers' understanding of the benefit of smart meters remain*".[64] This lack of understanding meant that there are still customers who continue to refuse the installation of an AMI meter.

[63] Victorian Auditor-General, *Realising the Benefits of Smart Meters*, September 2015, p.18
[64] Victorian Auditor-General, *Realising the Benefits of Smart Meters*, September 2015, p.16

Figure 11: AusNet Services' cumulative no access and customer refusals



Due to the government policy changes, Energeia, the AER's consultant, also found that installation labour costs increased as a result of the Victorian Government's policy changes. For example, the AER noted that "*Energeia found that new government safety rules resulted in additional spending on truck support required for metering installations*."[65]

Change in regulatory compliance requirements

In October 2012 ESV provided guidance to AusNet Services in relation to compliance with the minimum requirements of AS/NZS3000. This related specially to holes in meter boards found during the AMI roll-out. ESV identified a risk regarding fire and electrocution from holes in the meter boards. Due to these risks, ESV required that all holes greater than 12mm must be covered with a patch to prevent contact with single insulated cables behind the meter board.

This advice from the safety regulator impacted the costs and timing of meter installations. In order to comply with the Australian Standard, AusNet Services decided that regardless of whether a hole was pre-existing or newly created during the AMI roll-out, it was to be assessed and covered if necessary.

[65] AER, *Determination Advanced Metering Infrastructure 2015 revised charges*, 12 December 2014, p.21

Table 11: Meter installation expenditure in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter Installation Expenditure in 2015	-	$4.3M	**$4.3M**	**$1.2M**
Volume of Metering Units	Nil	3,319 meters due to faults 8,833 mesh communications modules	3,319 meters at an installation rate that is well below the 2013 AER benchmark **[excess of $1.2M]**	AusNet Services is applying for approval of the expenditure excess associated with the replacement of faulty meters. **[$1.2M]** AusNet Services' installation rate over the roll-out period is well below the 2013 AER benchmark.
Average Price Per Installation	2013 - benchmarked at $151 (nominal $2013)	$138.15 per installation over the life of the roll-out period		
Mesh installation expenditure not sought	-	AusNet Services installed mesh communications modules	8,833 mesh communications modules **[excess of $3.1M]**	AusNet Services is not applying for approval of the expenditure excess associated with the installation of the mesh communications modules. **[$3.1M]**

In 2015, AusNet Services incurred $4.3M of expenditure associated with the installation of metering equipment.[66] This was associated with:

- the installation costs to replace 3,319 faulty meters which was not factored in the Approved Budget; and
- the installation of 8,833 mesh communications modules.

AusNet Services is not applying for approval of the cost to install mesh communications modules of $3.1M.

An analysis of AusNet Services' meter installation of complete metering units (excluding the installation of mesh communications module in 2015) over the roll-out period is shown below.

Table 12: Meter installation unit cost comparison

	2009 – 2014			2009 – 2015		
	$M	Quantity	Unit cost ($)	$M	Quantity	Unit cost ($)
Approved Budget	76.7	680,487	112.77	76.7	680,487	112.77
Benchmark unit cost ($2013)			151.00			151.00
Actual	92.5	697,486	132.66	96.8	700,805	138.15

[66] Metering equipment includes meter hardware, communications card, zigbee chip and antenna.

The AER, via its consultant Energeia, had previously found in the 2013 Expenditure Excess determination AusNet Services' efficient meter installation unit cost to be $151[67] ($2013). Energeia accepted AusNet Services' meter installation capex in 2013 "*because actual expenditure did not exceed Energeia calculation of efficient costs for this expenditure category" and "did not take AusNet Services' later than planned meter installation as a sign of inefficiency*."[68]

AusNet Services' installation cost per meter was $132.66 for the roll-out period up to 2014, and $138.15 per meter for the entirety of the roll-out period. This unit cost is 9% below the efficient benchmark determined by the AER in the 2013 Expenditure Excess Application and therefore, reflects prudent and efficient costs.

The AER also acknowledged that in 2013, "*installation costs increased partly due to higher installation rates negotiated by a limited pool of available, trained and skilled technicians*". In addition, the "*higher installation volume and costs*" was "*also due to having more installers returning to sites where customers had refused installations*" and "*the media covered the smart meter rollout in a negative light and this increased the number of customers refusing installations*."[69] These issues continued in 2014 and 2015.

6.2.1 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' meter installation capex concluded:

"Delays in the AMI Program in 2011 and 2012 impacted the rate at which AusNet Services' AMI installation costs were incurred, with a significant number of meter installations being required in the later years beyond the budgeted allowance. While the challenges faced by AusNet Services in its communications technology and in the timely supply of 3G infill comms cards led to it revisiting some premises in 2014, despite the additional travel and installation time per site that this required, the total cost per completed installation is 9% below the AER's accepted benchmark cost of $151 per installation. This consideration is relevant to the prudency criteria in clause 5I.8A of the OIC, being 'the expenditure of a benchmark efficient entity over the entirety of, or any part of, the initial regulatory period.'

The nature of the rollout obligation (clause 5I.8(c)) is also relevant to this cost category, as significant delays were caused by the policy uncertainty and the customer issues surrounding the AMI Program. Delays caused by the delivery of 3G cards are also associated with the nature of the rollout obligation under the OIC timetable. In addition, the inherent risks in the AMI project (clause 5I.8(e)) are important considerations as the issues relating to meter procurement are inherent risks of projects such as the AMI rollout, particularly given the mandatory nature of the project timeline."

[67] Energeia, *Review of Victorian Distribution Network Service Provider's Advanced Metering Infrastructure 2015 Charges Revision Applications*, December 2014, p.25

[68] AER, *Determination Advanced Metering Infrastructure 2015 revised charges,* 12 December 2014, p.32

[69] AER, *Determination Advanced Metering Infrastructure 2015 revised charges*, 12 December 2014, p.11

6.3 IT capital expenditure

Table 13: IT capital expenditure in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
IT Capital Expenditure in 2014	-	$17.0M	**$17.0M**	**$9.0M**
	• Continuation of 2 activities that commenced in 2013 that were not anticipated when the Approved Budget was determined ($5.4M). These activities were approved by the AER in the 2013 Expenditure Excess Application. • Additional 2 activities required in 2014 that were not anticipated when the Approved Budget was determined ($3.6M)			AusNet Services is only applying for approval of the expenditure excess caused by additional activities not anticipated when the Approved Budget was determined. **[$9.0M]**
	• $8.0M to remediate the AMI IT systems			AusNet Services is not applying for approval of WiMAX related remediation costs. **[$8.0M]**

Table 14: IT capital expenditure in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
IT Capital Expenditure in 2015	-	$44.7M	**$44.7M**	**$22.5M**
	• Additional 6 activities required in 2015 that were not anticipated when the Approved Budget was determined			AusNet Services is only applying for approval of the expenditure excess caused by additional activities not anticipated when the Approved Budget was determined. **[$22.5M]**
	• $22.2M to remediate the AMI IT systems as well as to implement IT systems for the mesh communications technology			AusNet Services is not applying for approval of WiMAX related remediation costs. **[$22.2M]**

The AER did not approve a budget for IT capital expenditure in 2014 and 2015. Over 2014 and 2015, AusNet Services incurred a total of $61.7M, however, it is only applying for approval of $31.5M of efficient and prudent expenditure, or approximately 51% through this TCA. In determining expenditure to be applying for approval, AusNet Services has excluded all expenditure associated with remediating the AMI IT systems and the WiMAX communications technology.

The expenditure excess being sought under this TCA has arisen mainly as a result of the complexity of the systems implementation, migration and integration task being greater than that originally anticipated when the Approved Budget was set in place. This was driven by the 'cutting edge' nature of the AMI Program (technology and scale) coupled with the requirement to deliver the AMI Program within a defined timeframe. The scope of the requirements relating to the overall hardening of the solution to deal with the large data volumes as well as providing appropriate security and disaster recovery capabilities, were underestimated. Additionally the externally caused delays to the AMI Program and the uncertainties associated with the AMI Program have also added to the complexity of the task undertaken and contributed to IT capex being incurred in 2014 and 2015.

The implementation of the AMI Program has required new and augmented IT systems particularly the Network Management System (NMS) and core Business Systems:

- The NMS (comprising the Communications Network Management and Meter Management Systems) provides an interface between different environments which constitute the overall information systems; and
- The business systems deliver the required functionality and service level performance to meet ongoing business needs (including Meter Data Management System, Customer Information System and Enterprise Application Integration).

The implementation of AMI with increased meter data volumes and functional complexity has a direct impact on a distributor's IT back office systems.

In 2013, AusNet Services experienced an expenditure excess as a result of undertaking six additional activities that were not anticipated when the Approved Budget was determined. The expenditure excess in 2013 was approved by the AER. As highlighted in the 2013 Expenditure Excess Application, some of these activities would continue to be developed and implemented in 2014. AusNet Services continued to implement two of the activities that commenced in 2013 as they provided a net benefit to the overall provision of metering services. These activities are shown in table 15 below.

Table 15: Additional IT capital expenditure activities required in 2014 (continuation from 2013)

Activity	Scope of works in 2014	$M
Amendments to the Customer Information System (CIS)	This included application development and test planning and execution. The requirement surrounding this activity was greater than originally anticipated.	0.1
Amendments to the Network Management System (NMS)	This activity was required to implement critical requirements and new end-to-end process required to execute the AMI services. This included: • the implementation of event management, performance management, fault management and correlation management of the NMS; • the implementation of High Availability and Disaster Recovery (HADR) requirements; • application design and design validation of existing market services applications; • alignment of build outcomes to AMI solution architecture and operational support; and • Enhance security protocols, firewalls and processes. Given the technical worldwide inexperience with large scale AMI systems, this work was not fully appreciated in AusNet Services' approved budget.	5.3
Total		**5.4**

In 2014, AusNet Services also carried out additional activities on its IT systems and infrastructure to meet the higher than expected demands and capability of the AMI interval data. These activities were not anticipated when the Approved Budget was determined and are described in Table 16 below.

A thorough review of the AMI solution was conducted in 2014, identifying a number of material activities required to remediate the end-to-end AMI solution. These remediation activities amount to $8.0M in 2014 and AusNet Services is not applying for approval of this cost.

Table 16: Additional IT capital expenditure activities required in 2014

Activity	Scope of works in 2014	$M
Infrastructure Upgrade	This included upgrades to the IT infrastructure to address the high computing and system availability requirements of the AMI solution and other enterprise applications. Due to the AMI volume and processing requirements, the complexity and size of this effort was greater than originally anticipated.	2.8
Quality assurance	This activity involved an independent review of the AMI solution to ensure significant optimisation of AMI meters and associated data to meet the Meter Data Provider (MDP) and the CROIC specifications. This activity also involved developing a greater understanding of IT system and infrastructure behavior and underlying solution redundancy and fault tolerance.	0.8
Sub-total		**3.6**
Remediation activities not sought	This included activities to remediate the AMI systems. AusNet Services is not applying for approval of this amount.	**8.0**

In 2015, AusNet Services continued to remediate its AMI systems, however, there were also a number of activities undertaken that were not remediation in nature. These activities were related to the migration of applications to the new converged infrastructure platform.

The primary driver for this migration was that the existing hardware platform was approaching end-of-life after having been implemented over 5 years earlier.

The new infrastructure platform is more robust, provides improved performance as well as more reliable backup and recovery systems.

Furthermore, this new infrastructure platform ensures that AusNet Services is able to deal with the large volume of data required for metering services as well as power quality data collection required to derive significant network safety and operational benefits for AusNet Services and its customers. It is noted that the other distribution businesses faced similar challenges in terms of managing the large volume of data.

It is important to recognise that in the hardware provision space, technology developments advance very fast. This new infrastructure platform represents the next generation of converged infrastructure solution. It provides unmatched reliability, flexibility, automation and performance to support the most demanding workloads. In this context, this new type of technology was not envisaged at the time when the original solution was designed and therefore, not included in the initial budget.

Further, the migration of applications to the new infrastructure is not remediation or WiMAX related. Rather, it was required to transition the end of life infrastructure that was unable to cope with the huge volume demands.

The majority of the IT capex cost for which AusNet Services is applying for approval relates to the migration, integration, testing, and hardening of key application to this new hardware infrastructure. These migrations were very complex due to a number of factors:

- total redesign, rebuild, and testing of all the systems' integrations;
- many complex operational support and maintenance processes changes due to migration of systems; and

- the migration had to occur whilst ensuring no disruption to or impact on the performance of the existing AMI logically converted meters in the market. This required significant planning, testing and release management.

Table 17 lists the activities in 2015 for which AusNet Services is applying for approval.

Table 17: Additional IT capital expenditure activities required in 2015

Activity	Scope of works in 2015	$M
SAP Customer Information System (CIS) Application migration	Migrate the SAP Customer Information System (CIS) applications to the converged infrastructure platform, delivering operational resilience through the introduction of virtualised environment and providing a stable platform for the AMI applications. This activity provides reliable backup and recovery features as well as improves reliability to ensure systems are available and operating to enable daily operations. This activity also addresses end of life issues with operating system components.	3.4
Migration of the Enterprise Application Integration (EAI)	Migrate, redesign and reinstate AusNet Services' key integration application, Enterprise Application Integration (EAI). This activity was particularly challenging due to the integral role this application plays and in particular the dependency on keeping the existing logically converted meters operational in the market on a daily basis. This migration improved business processes, enabled improved processing of data, improved communications card fault processes and enable remote services capability. This activity is required to provide sustainable and compliant AMI systems. The migration increased the application's processing time, improved its messaging capabilities and removed single point of failure.	3.6
Migration of, and minor Business As Usual (BAU) upgrades to the Meter Data Management System (MDMS)	Migrate the Meter Data Management System (MDMS) application to the new infrastructure platform as well as implementing Business As Usual (BAU) releases to improve business processes, in particular relating to new standing data synchronization which improves the data quality and reduces exceptions and manual intervention overtime. There was also a requirement to reinstate the integration to AusNet Services' network billing system, Kinetiq. This IT capex cost was significant due to the central role the MDMS plays in AusNet Services' metering systems. The MDMS system and its operations play a central role in metering data processing activities. This means the MDMS is one of the most connected systems within AusNet Services. On top of the challenges and complexities brought about by this central role, AusNet Services' MDMS system has been historically designed not to be flexible and as a result, changes are difficult, require custom codes and a tremendous amount of testing governance to ensure this critical system does not fail.	8.2
Migration of the Meter Management System (MMS)	Migrate the Meter Management System (MMS) to the new infrastructure platform as well as making minor BAU changes to improve communications card fault processes and enable remote services capability. This activity is required to provide sustainable and compliant AMI systems. The activity ensures that the solution is more efficient and facilitates the lifecycle replacement of ageing servers and infrastructure.	2.3
Reporting and monitoring upgrades	Improvements and additions to reporting and monitoring of AMI systems, including an upgrade of current operational dashboards, additional minimum compliance reporting and a dashboard for the Communications Network Monitoring System (CNMS). This activity improves the ability and capability to monitor AMI systems. Due to the complexity of the AusNet Services' AMI infrastructure and the requirement to have comprehensive reporting that enabled fast and effective identification of issues, the cost of the reporting tool were significant.	4.2
Establishment of a stress and volume testing environment	This activity creates a dedicated stress and volume testing environment for AMI systems, instead of having to perform stress and volume testing in the respective IT application or system. This environment can be utilised by other AMI systems, providing cost efficiencies. The requirement surrounding this activity was greater than originally anticipated.	0.8
Total		**22.5**

As mentioned, AusNet Services continued to remediate its AMI systems in 2015. AusNet Services incurred $22.3M of IT capex which is related to the WiMAX remediation as well as being required for the implementation of the mesh communications network. However, given the relationship between the expenditure and WiMAX remediation, AusNet Services is not applying for approval of this expenditure.

6.3.1 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' IT capex concluded as follows:

"We consider that the $9.0 million in 2014 and $22.5 million in 2015 which AusNet Services is seeking to recover are not associated with either remediation activities or the WiMAX communications technology. Instead they are largely associated with the fact that systems were delayed in line with the meter installation schedule, and are costs that had been anticipated earlier. As for other categories of capex discussed above, we consider this delay in expenditure to be a result of a range of factors largely outside of AusNet Services' control, as discussed in Chapter 4. As described in Table 5, a major driver of the 2015 excess expenditure was the need for AusNet Services to migrate its various applications to a new infrastructure platform, to transition its existing hardware platform that had reached the end of its life. The need to implement a new infrastructure platform and migrate existing applications to it was not anticipated at the time the AMI budgets were determined, as the technology had not yet evolved. AusNet Services has described the new infrastructure platform as providing unmatched reliability, flexibility, automation and performance, which is needed to cope with the volume of data that AMI produces.

Considering the factors in Clause 5I.8 of the OIC, in our view the excess expenditure was driven by:

- *Nature of the rollout obligation (5I.8(c)): AusNet Services was required to install new systems to support the AMI meter data, requiring substantial investments in IT capex over the rollout period. Delays in the program and unanticipated technical problems have led to excess expenditure, which was exacerbated by the mandatory nature of the rollout obligation and the timeframes in the OIC.*
- *State of the technology (5I.8(d)): the considerable technical challenges faced by AusNet Services in the AMI Program relate to the fact that the technology being employed was cutting edge and implemented at a large scale within a defined timeframe. In addition, the technology for infrastructure platforms evolved during the 2012-15 budget period, and important hardware improvements emerged that had been previously unforeseen. In our view, under such circumstances and in the timeframe for the AMI rollout, cost overruns are not unexpected.*
- *Inherent risks in the AMI project (5I.8(e)): There are inevitably cost risks associated with a cutting edge technology project, the implications of which are difficult to forecast. Delays in the rollout caused by the review of the program and customer backlash also impacted on the IT capex program, resulting in more costs being incurred in 2014 and 2015 than anticipated.*
- *Regulatory obligation (5I.8(g)): The requirement for AusNet Services to continue to operate its existing meter data systems at the same time as shifting customers onto the new AMI systems within a defined timeframe has contributed to the problems faced and the cost overruns."*

6.4 Meter reading expenditure

Table 18: Meter Reading Expenditure in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter Reading Expenditure in 2014	$0.5M	$4.9M	**$4.4M**	**$2.4M**
	Assumed all meters would be installed and logically converted by 30 June 2014	Meters were manually read due to the inability to close routes, as well as meter not being logically converted	Higher than anticipated number of meters requiring manual reading	AusNet Services is only applying for approval of the expenditure excess associated with the continued roll-out of AMI meters mandated by the CROIC. **[$2.4M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$2.0M]**

The AER's Approved Budget in 2014 and 2015 assumed minimal meter reading expenditure on the basis that the AMI Program would be complete. This assumption has since proven itself to be incorrect.

In 2014, AusNet Services incurred $4.9M for meter reading activities, an excess of $4.4M compared to the AER Approved Budget. This additional expenditure resulted from the inability to close out meter reading routes in 2014 due to the following:

- **Refusals/no access issues**: Initially it was planned that customers who refused the installation of a smart meter would be disconnected. This approach was replaced with a 15-step customer issues management plan that was agreed with the Victorian Government in 2013. The new approach prevented AusNet Services from closing off meter reading routes and it still has an obligation to manually read a customer's meter on a quarterly basis.
- **Delays in meter deployment schedule and logical conversion**: The uncertainties in 2011 about the future of the AMI Program led to delays in AusNet Services' meter deployment schedule.

As noted earlier, AusNet Services continued to roll-out AMI meters until 30 June 2014 as mandated by the CROIC, before a rebate is payable to customers. Due to the inability to close out meter reading routes because of the reasons noted above, manual meter reading was still required during this period as there is a time lag between the time when an AMI meter is installed and the time when the meter can be logically converted and thereafter, remotely read.

AusNet Services incurred meter reading costs from January to June 2014 of $2.4M and this expenditure excess is sought as a part of this TCA. AusNet Services is not applying for approval any expenditure excess associated with meter reading costs for the period July 2014 to December 2014.

Table 19: Meter Reading Expenditure in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter Reading Expenditure in 2015	$0.5M	$4.8M	**$4.3M**	**$0.8M**
	Assumed all meters would be installed and logically converted by 30 June 2014	Meters were manually read due to the inability to close routes, as well as meter not being logically converted	Higher than anticipated number of meters requiring manual reading	AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast meter reading expenditure in the 2016-20 EDPR. **[$0.8M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$3.5M]**

AusNet Services continued to incur material meter reading expenditure during 2015 because it was still prevented from closing out meter reading routes, noting that only 33 out of 2,743 routes were closed over the period 2013 to 2015 (representing approx. 1% of routes) as shown in the following table.

Table 20: Meter reading routes

Region	2013	2014	2015
Bairnsdale	291	291	291
Beaconsfield	358	361	363
Benalla	190	190	190
Leongatha	278	244	239
Lilydale	613	613	613
Seymour	137	137	137
South Morang	381	382	382
Traralgon	287	287	287
Others	2	2	2
Wodonga	206	206	206
Total	**2,743**	**2,713**	**2,710**

As can be seen from the above table the only reduction in the number of routes to date has been in the Leongatha region where 39 routes were successfully closed. Although AusNet Services has always attempted to focus on route closure during the course of the roll-out period, this was not possible due to the significant number of exceptions faced by AusNet Services including customer refusals, open defects and access issues. The need to keep so many routes open has, in turn increased the average cost per meter read due to the dispersed location of the manually read meters which impacted the total travel time between locations and the productivity of each meter reader.

The above factors have resulted in AusNet Services incurring meter reading expenditure of $4.8M in 2015. This reflects an excess of $4.3M versus the Approved Budget. Of this expenditure excess,

Transition Charges Application

AusNet Services is applying for approval of $0.8M which, together with the approved budget, provides total funding for meter reading in 2015 of $1.3M. This ($1.3M) is equivalent to the approved 2016 forecast meter reading expenditure in the 2016-20 EDPR. It is noted that the efficient BAU cost determined in the 2016-20 EDPR is $1.3M which indicates that the original CROIC Approved Budget of $0.5M was insufficient.

AusNet Services is applying for approval of only 33% of the combined expenditure excess in 2014 and 2015. The excess expenditure sought under this TCA results in AusNet Services significantly under recovering actual expenditure and provides recovery of approximately 49% and 17% of costs incurred in 2014 and 2015 respectively.

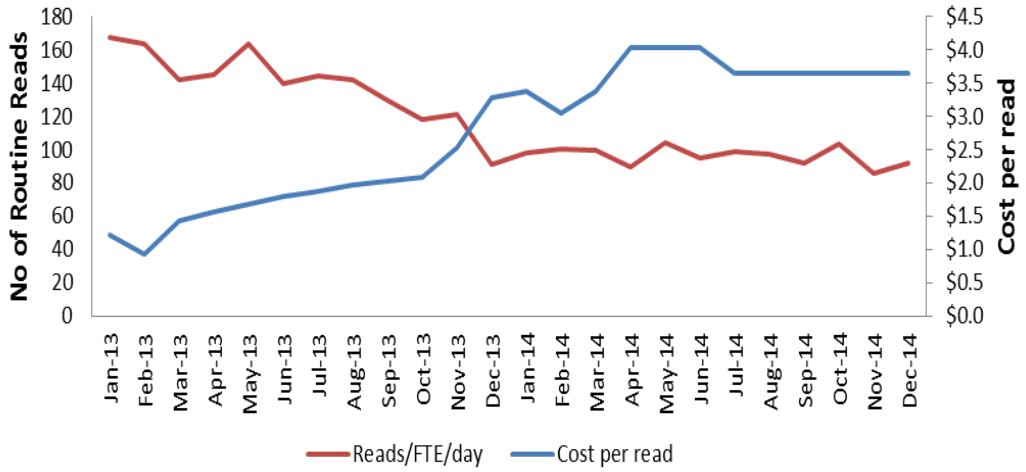
The following table shows the comparison of meter reading costs since 2011.

Table 21: Meter reading costs per read

Actual	2011	2012	2013	2014	2015
Number of reads per year	3,131,439	3,079,424	2,151,175	1,297,265	1,224,152
Total meter reading cost ($M)	$6.2	$5.6	$6.8	$4.9	$4.8
Cost per read	**$1.96**	**$1.80**	**$3.16**	**$3.78**	**$3.90**

As illustrated in Figure 12 below, the number of reads performed by each meter reader on a given day has decreased as compared to 2013 as more customers have an AMI meter. However, this has led to an increase in the average cost per meter read due to the dispersed location of the manually read meters which impacted the total travel time between locations and the productivity of each meter reader.

Figure 12: Meter reading productivity



The approved 2016 forecast meter reading expenditure in the 2016-20 EDPR suggests that the CROIC Approved Budget was insufficient, as shown below.

Table 22: Comparison of Meter Reading Expenditure in 2015

$M nominal	2015
Approved Budget	$0.5
EDPR Approved Cost	$1.3
Expenditure excess sought	**$0.8**
Actual Expenditure	$4.8

AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast meter reading expenditure in the 2016-20 EDPR.

6.4.1 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' meter reading opex concluded:

"The excess expenditure relating to meter reading opex has been primarily driven by the following factors:

1. *Insufficient budget originally forecast for meter reading, demonstrated by consistent excess expenditure even in the early years of the rollout, as well as the AER's recent determination on efficient base year metering costs which significantly exceeds the AMI budget.*
2. *Delays due to fewer than expected logical conversions of installed meters, which related both to delayed meter capex, installation labour market pressures in the earlier years of the AMI rollout and technical issues including management of the IT program*
3. *Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout*
4. *Declining productivity (and rising costs per meter) resulting from lower manually read meter density, to the extent this wasn't already provided for in the AER budget.*

As we have noted in the previous section in relation to IT capex, the information we have reviewed suggests that there were a range of challenges faced by AusNet Services in the AMI Program, some of which related to project management of the IT capital program, which have played a part in the fewer than expected logical conversions of installed meters.

Based on the information we have reviewed, we understand that the technical systems integration problems relating to logical conversions were caused by a range of factors, and we note that such technical problems are common in projects of the size and scope of the AMI Program. However, on balance we also consider that it is likely that some aspects of the IT capital program could have been better managed by AusNet Services, and that this has in part contributed to the excess expenditure in this category.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

- *Nature of the rollout obligation (clause 5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program decreased the density of meter reading routes and contributed to logical conversion delays.*
- *State of the technology (clause 5I.8(d)): the technical problems with logical conversions.*
- *Inherent risks in the AMI project (clause 5I.8(e)): The issues relating to meter procurement, installation and technical issues are an inherent risk in projects such as the AMI Program."*

6.5 Meter data management expenditure

Table 23: Meter Data Management Expenditure in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter Data Management Expenditure in 2014	$2.7M	$5.0M	**$2.3M**	**$2.2M**
	Anticipated that logically converted meters require minimal manual validation and substitution to be performed	Delay in the roll-out resulted in the continued management of exceptions	Approved Budget underestimated cost of meter data management	AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the efficient base year cost determined in the 2016-20 EDPR. **[$2.2M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$0.1M]**

Table 24: Meter Data Management Expenditure in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter Data Management Expenditure in 2015	$2.7M	$5.1M	**$2.4M**	**$2.3M**
	Anticipated that logically converted meters require minimal manual validation and substitution to be performed	Delay in the roll-out resulted in the continued management of exceptions	Approved Budget underestimated cost of meter data management	AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the efficient base year cost determined in the 2016-20 EDPR. **[$2.3M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$0.1M]**

The AER Approved Budget per the CROIC was $2.7M per annum, for 2014 and 2015 in relation to meter data management.

In 2014, the AER allowed AusNet Services an allowance for meter data management of $2.7M based on the following assumptions[70]:

- 70% of meters logically converted by March 12;
- 80% of meters logically converted by March 13;
- 90% of meters logically converted by March 14; and
- Full remote functionality activated by 2012.

[70] AER, *Victorian Advanced Metering Infrastructure Review 2012–15 budget and charges applications*, October 2011

It should be noted that the above targets were not realistic and could not be achieved as the AER had assumed that by June 2012, AusNet Services would have installed 57% AMI meters. Therefore, even if AusNet Services had installed the budgeted number of AMI meters by June 2012, AusNet Services would not have been able to logically convert these 57% AMI meters by June 2012 as meters cannot be exchanged and logically converted on the same day.

AusNet Services has not assessed its Approved Budget against the approved 2016 forecast meter data management expenditure in the 2016-2020 EDPR. This is because the approved 2016 forecast reflects a BAU phase, and during 2014 and 2015, additional meter data management expenditure was required as part of the roll-out. Furthermore, as noted above, the timeframe for meters to be logically converted was not realistic. Therefore, AusNet Services has assessed its 2014 and 2015 meter data management expenditure against the 2016-20 EDPR determination of the base year efficient cost, of $4.9M for 2014 and $5.0M for 2015. This comparison indicates that the CROIC Approved Budget was insufficient. This is detailed in Table 25:

Table 25: Comparison of Meter Data Management Expenditure in 2014 and 2015

$M nominal	2014	2015
Approved Budget	$2.7	$2.7
EDPR Benchmark	$4.9	$5.0
Expenditure excess sought	**$2.2**	**$2.3**
Actual Expenditure	$5.0	$5.1

AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the efficient base year cost determined in the 2016-20 EDPR, which represents $2.2M in 2014 and $2.3M in 2015.

6.5.1 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services meter data management opex concluded:

"The excess expenditure relating to meter data management opex has been primarily driven by the following factors:

1. *Insufficient budget originally forecast for meter data management, demonstrated by the AER's recent determination using 2014 costs as an efficient base year*
2. *Delays in meter capex, and technical issues including management of the IT program*
3. *Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout.*

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

- *Nature of the rollout obligation (5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program*
- *State of the technology (5I.8(d)): the technical problems faced by AusNet Services*
- *Inherent risks in the AMI project (5I.8(e)): Technical challenges are an inherent risk in projects such as the AMI Program."*

6.6 Communications infrastructure maintenance

Table 26: Communications infrastructure maintenance in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Communications infrastructure maintenance in 2014	$5.1M	$8.4M	**$3.3M**	**$1.9M**
				AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast communications infrastructure maintenance expenditure in the 2016-2020 EDPR. **[$1.9M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$1.4M]**

Table 27: Communications infrastructure maintenance in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Communications infrastructure maintenance in 2015	$5.3M	$9.2M	**$3.9M**	**$1.9M**
				AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast communications infrastructure maintenance expenditure in the 2016-2020 EDPR. **[$1.9M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$2.0M]**

AusNet Services' communications infrastructure maintenance costs are an essential component of the ongoing management and operation of the communications technology network.

AusNet Services has incurred expenditure excess of $3.3M and $3.9M in 2014 and 2015 respectively. This expenditure excess has been driven by a combination of the delays experienced in delivery, coupled with the technical challenges involved in delivering a program of the scale and complexity of the AMI Program.

Additionally the expenditure excess also arises as a consequence of the inadequacy of the Approved Budget. The approved 2016 forecast communications infrastructure maintenance expenditure in the 2016-20 EDPR accepted that the efficient BAU cost should be $1.9M higher for both 2014 and 2015 than the CROIC Approved Budget.

Table 28: Comparison of Communications Infrastructure Maintenance Expenditure in 2014 and 2015

$M nominal	2014	2015
Approved Budget	$5.1	$5.3
EDPR Approved Cost	$7.0	$7.2
Expenditure excess sought	**$1.9**	**$1.9**
Actual Expenditure	$8.4	$9.2

AusNet Services is only applying for approval of costs equivalent to the AER approved 2016 forecast communications infrastructure maintenance expenditure in the 2016-2020 EDPR, namely $7.0M in 2014 and $7.2M in 2015. This represents expenditure in excess of the CROIC Approved Budget of approximately $1.9M in both 2014 and 2015. AusNet Services is not applying for approval beyond this level and as such will not recover costs incurred in 2014 and 2015 of $1.4M and $2.0M respectively.

6.6.1 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' communications infrastructure maintenance opex concluded:

"The excess expenditure relating to communications opex has been primarily driven by the following factors:

1. *Insufficient budget originally forecast for communications opex, demonstrated by the AER's recent determination using higher actual 2014 costs as an efficient basis for forecasts, and Powercor's original AMI budget exceeding the AusNet Services AMI budget*
2. *Delays in meter capex, and technical issues including management of the IT program, pushing opex out to the later years of the rollout*
3. *Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout.*

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

- *Nature of the rollout obligation (5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program*
- *State of the technology (5I.8(d)): the technical problems faced by AusNet Services.*
- *Inherent risks in the AMI project (5I.8(e)): Technical challenges are an inherent risk in projects such as the AMI Program."*

6.7 IT operating expenditure

Table 29: IT Operating Expenditure in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
IT Operating Expenditure in 2014	$7.5M	$15.8M	**$8.3M**	**$1.7M**
	$12.5M to maintain and support IT systems and applications			AusNet Services is only applying for approval of $1.7M of the difference between the CROIC Approved Budget and the approved 2016 forecast IT operating expenditure in the 2016-20 EDPR. **[$1.7M]**
	WiMAX remediation costs of $3.3M			AusNet Services is not applying for approval of WiMAX remediation costs. **[$3.3M]**

Table 30: IT Operating Expenditure in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
IT Operating Expenditure in 2015	$6.6M	$13.9M	**$7.3M**	**$6.4M**
				AusNet Services is only applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast IT operating expenditure in the 2016-20 EDPR. **[$6.4M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$0.9M]**

Excess IT opex has been driven predominantly by the delays associated with the completion of key IT systems and interfaces required for the AMI Program and are reflected in the deferral of IT capex (refer Section 6.3). Delays to the completion of IT capex have an offsetting impact on IT opex and require greater levels of maintenance opex while systems are completed. These delays have been caused by a combination of the external factors impacting on the AMI roll-out, coupled with technical challenges experienced by AusNet Services.

In 2014, AusNet Services incurred expenditure of $15.8M, spending $8.3M (including $3.3M related to remediation activities which cannot be capitalised) over its Approved Budget. AusNet Services is not applying for approval of the WiMAX remediation related expenditure of $3.3M.

In 2015, IT opex decreased, however, AusNet Services still incurred $7.3M over its Approved Budget. AusNet Services' expenditure excess is exacerbated by the inadequacy of the Approved Budget for this expenditure category of $7.5M and $6.6M for 2014 and 2015 respectively. In comparison, the approved 2016 forecast IT operating expenditure in the 2016-20 EDPR was based on expenditure of $12.5M and $13.0M for 2014 and 2015 respectively. That the EDPR forecast were broadly double those approved under the CROIC underscores their inadequacy.

In 2014, acknowledging that multiple factors contributed to its expenditure excess on IT opex, AusNet Services is only applying for approval of $1.7M. Even if this is recovered in full, AusNet Services will recover less than the approved 2016 forecast IT operating expenditure in the 2016-20 EDPR. It is noted that as such, under this TCA, AusNet Services will not recover $6.6M in 2014 (including $3.3M of WiMAX remediation expenditure) and $0.9M in 2015 of IT opex costs that it has incurred.

For 2015, AusNet Services is therefore applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast IT operating expenditure in the 2016-20 EDPR, that is, $6.4M.

Table 31: Comparison of IT Operating Expenditure 2014–2015

$M nominal	2014	2015
Approved Budget	$7.5	$6.6
EDPR Approved Cost	$12.5	$13.0
Expenditure excess sought	**$1.7**	**$6.4**
Remediation expenditure not sought	$3.3	-
Actual Expenditure	$15.8	$13.9

6.7.1 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' IT opex concluded:

"As per the discussion above on IT capex, the excess expenditure relating to IT opex has been primarily driven by the following factors:

1. *Insufficient budget originally forecast for IT opex, demonstrated by the AER's recent determination*
2. *Delays in meter capex, and technical issues including management of the IT program, pushing opex out to the later years of the rollout*
3. *Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout.*

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

- *Nature of the rollout obligation (5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program*
- *State of the technology (5I.8(d)): the technical problems faced by AusNet Services.*
- *Inherent risks in the AMI project (5I.8(e)): Technical challenges are an inherent risk in projects such as the AMI Program."*

6.8 Customer service and AMI PMO operating expenditure

Table 32: Customer service and Project Management Office Expenditure in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Customer service and Project Management Office Expenditure in 2014	$0.6M	$9.0M	**$8.4M**	**$5.3M**
	Assumed the roll-out would be completed by 31 December 2013	Resources were still required to manage the continuation of the roll-out	Delays and uncertainties in the earlier years of the roll-out required the need for resources to continue to manage the roll-out in 2014	
Customer service	$0.6M	$0.5M	($0.1M)	-
Project Management Office	-	$8.5M	$8.5M	AusNet Services is only applying for approval of the expenditure excess associated with the continued roll-out of AMI meters based on the mandated CROIC. **[$5.3M]**
				AusNet Services is not applying for approval of the remaining expenditure excess. **[$3.2M]**

Table 33: Project Management Office Expenditure in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Customer service and Project Management Office Expenditure in 2014	$0.1M	$6.5M	**$6.4M**	**$0.1M**
	Assumed the roll-out would be completed by 31 December 2013	Resources were still required to manage the continuation of the roll-out	Delays and uncertainties in the earlier years of the roll-out required the need for resources to continue to manage the roll-out in 2014	
Customer service	$0.1M	$0.2M	$0.1M	AusNet Services is only applying for approval of $0.1M of the difference between the CROIC Approved Budget and the efficient base year cost determined in the 2016-2020 EDPR. **[$0.1M]**
Project Management Office	-	$6.3M	$6.3M	AusNet Services is not applying for approval of Project Management Office costs. **[$6.3M]**

6.8.1 Customer service

The introduction of the 'Customer Issues Management Protocol' (Protocol) in November 2012 placed additional regulatory burden on all Victorian distribution businesses tasked with installing smart metering technology. The Protocol consists of a three-stage process under which the distribution businesses:

- provide standard information to all customers prior to installation;
- allocate a customer service specialist to those customers who continue to raise concerns or prevent access; and
- provide targeted case management for those customers who do not accept the actions taken to address their concerns.

The introduction of this process continued to increase AusNet Services' customer service costs in 2014 and 2015 by changing the level and nature of customer engagement, particularly for customers who had imminent concerns with the roll-out of AMI at these premises. The introduction of the Protocol was a substantial contributing factor to the expenditure excess AusNet Services incurred.

The incremental costs due to the increase in customer refusals and access issues (which is often correlated) are difficult to identify separately. Nevertheless, the costs are real and material. Some of the incremental activities relate to:

- Increased inbound and outbound calls;
- Increased Average Handling Time (AHT) of calls due to the complexity and predisposition or negative perceptions of customers;
- Increased training and education of front line staff to deal with more complex queries;
- Increased coordination with other third parties were required by the new process;
- Increased process work due to the increase in work steps as well as the increased effort to follow up on customers and to ensure the end-to-end process was fully adhered; and
- Increased effort with regards to customer data gathering to facilitate effective outbound call activities.

No customer service expenditure was specifically forecast by AusNet Services in the 2016 to 2020 regulatory control period as this cost would be subsumed within the business as the level of activity required in the BAU phase is minimal compared to the effort required during the roll-out period. Therefore, AusNet Services has assessed the CROIC Approved Budget against the 2016-20 EDPR determination of the base year efficient cost. This assessment suggests that the CROIC Approved Budget was insufficient, as shown below.

Table 34: Comparison of Customer Service Expenditure in 2015

$M nominal	**2015**
Approved Budget	$0.1
EDPR Benchmark	$0.5
Expenditure excess sought	**$0.1**
Actual Expenditure	$0.2

AusNet Services is only applying for approval of $0.1M of the difference between the CROIC Approved Budget and the efficient base year cost determined in the 2016-20 EDPR.

6.8.2 Project Management Office

AMI Project Management Office (PMO) is responsible for the management of risks, issues, changes and resources across AusNet Services' AMI Program.

As highlighted in the previous sections of this paper, the AMI Program is significantly more complex than originally anticipated. As the complexity became apparent, the management of the program required ongoing changes to the structure and resourcing of the PMO to ensure objectives continued to be achieved.

In 2013, AusNet Services submitted an application for an expenditure excess of $3.6M that was rejected by the AER on the basis that the PMO function should have ended by the end of 2013, and that CitiPower and Powercor had completed their roll-outs and did not incur expenditure excess for PMO.

The CROIC was amended in December 2013 to require all DNSPs to continue to use best endeavours to complete the roll-out until mid-2014. It therefore became necessary for AusNet Services to maintain its PMO function in 2014 to ensure adequate staff with historical knowledge and experience were available to manage AusNet Services' continued compliance with the roll-out obligations. The consequence of extending the obligation was that AusNet Services required its PMO function in 2014 to enable it to meet its regulatory obligations.

Due to the delays and uncertainties faced in the earlier years of the roll-out, AusNet Services incurred $5.3M to continue to manage the roll-out up to 30 June 2014. This cost is not related to the communications technology.

AusNet Services is not applying for approval of $3.2M associated with operating the PMO from 1 July 2014 to 31 December 2014, or the PMO expenditure excess of $6.3M in 2015.

6.8.3 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' customer service and Project Management Office opex concluded:

"The excess expenditure in this category relates to the need to maintain PMO staff after the AMI rollout was expected to have been completed, to complete the rollout and rectify technical challenges faced by AusNet Services.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

- *Nature of the rollout obligation (5I.8(c)): The AMI PMO had to manage the delays which were caused by the policy uncertainty and customer issues. Costs associated with these delays were exacerbated by the mandatory nature of the rollout obligation to make best endeavours to complete AMI installations by the end of 2013.*
- *State of the technology (5I.8(d)): the AMI PMO required additional resources to manage the technical issues relating to the AMI Program.*
- *Inherent risks in the AMI project (5I.8(e)): The issues relating to meter procurement, customer resistance, regulatory obligations and tight labour market conditions are inherent risks of projects such as the AMI rollout, particularly given the mandatory nature of the project timeline. Consequently, excess PMO costs are also an inherent risk in a project of this type."*

6.9 Meter maintenance, and corporate overheads indirect costs

Table 35: Meter maintenance, and corporate overheads and indirect costs in 2014

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter maintenance, and corporate overheads and indirect costs in 2014	$2.6M	$3.7M	**$1.1M**	**$1.1M**
				AusNet Services is applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast meter maintenance, and corporate overheads and indirect costs in the 2016-20 EDPR. **[$1.1M]**

In both 2014 and 2015, three types of AMI associated expenditure are included in this category as outlined in Table 36 and Table 38.

Table 36: Breakdown of meter maintenance, and corporate overheads and indirect costs in 2014 ($M)

	Approved Budget	Actual Expenditure	Expenditure Excess
Meter maintenance	$0.8	$0.9	$0.1
Corporate Overheads	$1.7	$2.5	$0.8
Indirect Costs	$0.1	$0.3	$0.2
Total ($M)	**$2.6**	**$3.7**	**$1.1**

Table 37: Meter maintenance, and corporate overheads and indirect costs in 2015

	Approved Budget	Actual Expenditure	'Expenditure Excess'	'Expenditure Excess' sought
Meter maintenance, and corporate overheads and indirect costs in 2015	$2.7M	$3.5M	**$0.8M**	**$0.8M**
				AusNet Services is applying for approval of the difference between the CROIC Approved Budget and the approved 2016 forecast meter maintenance, and corporate overheads and indirect costs in the 2016-20 EDPR. **[$0.8M]**

Table 38: Breakdown of Meter Maintenance, and Corporate Overheads and Indirect Costs in 2015 ($M)

	Approved Budget	Actual Expenditure	Expenditure Excess
Meter maintenance	$0.9	$1.2	$0.3
Corporate Overheads	$1.4	$2.2	$0.8
Indirect Costs	$0.4	$0.1	($0.3)
Total ($M)	**$2.7**	**$3.5**	**$0.8**

Each of these cost items is discussed below.

6.9.1 Meter maintenance

The following table shows the volume of meter maintenance and investigations from 2013 to 2015.

Table 39: Meter maintenance volume

Volume	2013	2014	2015
Maintenance	610	664	674
Investigation	376	491	588
Total	**986**	**1,155**	**1,262**

AusNet Services has been using new tools to interrogate metering data, resulting in higher find rates of illegal usage such as power theft and bypassing the meter. This benefits customers as it detects fire and electrocution risk to occupants and visitors, as well as improving public safety. As a result, the volume of investigations in 2014 and 2015 were higher than expected, leading to greater time and effort being required to investigate, escalate and resolve the highlighted cases. In particular this contributed to the increase in actual metering maintenance of $0.3M in 2015.

The approved 2016 forecast meter maintenance expenditure in the 2016-20 EDPR indicates that the CROIC Approved Budget was insufficient, as shown below.

Table 40: Comparison of Meter Maintenance in 2014 and 2015

$M nominal	2014	2015
Approved Budget	$0.8	$0.9
EDPR Approved Cost	$2.4	$2.5
Expenditure excess sought	**$0.1**	**$0.3**
Actual Expenditure	$0.9	$1.2

In 2014 and 2015, AusNet Services is only applying for approval of $0.1M and $0.3M respectively of the difference between the CROIC Approved Budget and the approved 2016 forecast meter maintenance expenditure in the 2016-20 EDPR.

6.9.2 Corporate overheads

Corporate overheads and indirect costs are allocated to the AMI Program via the Cost Allocation Methodology approved by the AER in 2010. These costs include corporate relations, market operations and general overheads.

When the Approved Budget was put in place, it was anticipated that the effort and time associated with the AMI Program would reduce in 2014. This has not been the case, as the AMI roll-out continued post 31 December 2013 due to delays and uncertainties experienced in 2011. Therefore, the effort and time required to manage and continually minimise the customer refusals and no access issues encountered persisted in 2014 and 2015. Furthermore, meter procurement (such as the inability to obtain the 3G communications modules within the required timeframe) and changes in regulatory obligations also required management effort.

6.9.3 Other indirect costs

This cost category includes finance and administration charges, sundry costs and regulatory and government relations resources.

These costs have been higher than the budget due to various policy and regulatory changes not anticipated in 2011. This includes, but is not limited to:

- multiple amendments to the CROIC, including the continuation of the roll-out obligation in 2014;
- introduction of the AMI Ministerial Advisory Council (MAC) in 2011;
- the introduction of flexible pricing tariffs in 2013;
- the extension of the Victorian Derogation from the National Electricity Law in 2013; and
- two electro-magnetic field (EMF) studies relating to AMI meters conducted by the Victorian Government.

The approved 2016 forecast overheads in the 2016-20 EDPR indicates that the CROIC Approved Budget was insufficient, as shown below.

Table 41: Comparison of Corporate Overheads and Indirect Costs in 2014 and 2015

$M nominal	2014	2015
Approved Budget	$1.8	$1.8
EDPR Approved Cost	$2.6	$2.7
Expenditure excess sought	**$1.0**	**$0.5**
Actual Expenditure	$2.8	$2.3

Due to the impact of exogenous factors in 2014, AusNet Services is therefore applying for approval of $1.0M, being $0.2M higher than the difference between the CROIC Approved Budget and the approved 2016 forecast overheads expenditure in the 2016-20 EDPR. In 2015, AusNet Services is only applying for approval of $0.5M of the difference between the CROIC Approved Budget and the approved 2016 forecast overheads expenditure in the 2016-20 EDPR.

6.9.4 Deloitte ex-post review

Deloitte's ex-post review of AusNet Services' meter maintenance, and corporate overheads and indirect costs concluded:

"We consider it reasonable that time taken to manage the political, regulatory and technical issues that arose during the AMI rollout, as well as the higher than anticipated number of comms card installations during 2014, be allocated to the project.

However, in our view there is likely to be some element of the overhead costs driven by management of the AMI Program that could have been more efficient.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

- *Nature of the rollout obligation (Clause 5I.8(c)): delays caused by policy uncertainty and customer responses necessitated increased management time to ensure that best endeavours were made to meet the extended rollout timeline.*
- *State of the technology (Clause 5I.8(d)): The technical issues relating to the AMI program needed to be addressed at a management level, requiring more time than anticipated at the time of the AER budget.*
- *Inherent risks in the AMI project (Clause 5I.8(e)): The issues relating to meter procurement, customer management, regulatory obligations, technology and tight labour market conditions are inherent risks of projects such as the AMI rollout, particularly given the mandatory nature of the project timeline. All require management attention."*

7 Revenue requirement

7.1 Introduction

Clause 5L.3 of the CROIC specifies that a transition charge as part of the revenue cap for metering services will apply from 1 January 2017 to recover the difference between:

- the AER approved building block costs for the years 2009 to 2015 in 2017 dollars; and
- actual revenue for the years 2009 to 2015 in 2017 dollars.

Clauses 5L.7 and 5L.9 of the CROIC set out that the amount to be recovered via the transition charge will need to be reduced or increased when it results in a reduction or increase of the metering asset base as at 1 January 2016.

7.2 Form of control for annual metering charges

In the EDPR 2016-20 Final Decision, the AER stated that it will apply a revenue cap form of control to annual metering charges where annual metering charges revenues are capped for each year of the 2016–20 regulatory control period[71]. AusNet Services' annual metering charges revenue will therefore be adjusted annually to clear (or true-up) any under or over recovery of actual revenue collected.

The formula for the annual metering charges revenue cap is:

(1) $$TARM_t \geq \sum_{i=1}^{n} \sum_{j=1}^{m} p_t^{ij} q_t^{ij}$$ i=1,...,n and j=1,...,m and t=1,...,5

(2) $$TARM_t = AR_t + T_t + B_t$$ t=1,2,...,5

(3) $$AR_t = AR_{t-1}(1+\Delta CPI_t)(1-X_t)$$ t=1,2,...,5

where:

$TARM_t$ is the total annual revenue for annual metering charges in year t.

p_t^{ij} is the price of component 'j' of metering service 'i' in year t.

q_t^{ij} is the forecast quantity of component 'j' of metering service 'i' in year t.

AR_t is the annual revenue requirement for year t. When year t is the first year of the 2016–20 regulatory control period, AR_t is the annual revenue requirement in the annual metering charges Post Tax Revenue Model (PTRM) for year t.

T_t is equal to zero for all years except 2017 and is a once off adjustment to 2017 charges for the unders and overs recoveries relating to Advanced Metering Infrastructure actual revenues and actual costs incurred in 2014 and 2015.

B_t is the sum of annual adjustment factors in year t as calculated in the unders and overs account.

AR_{t-1} is the annual revenue requirement for year t–1.

[71] AER, *EDPR 2016-20 Final Decision*, Attachment 16-20

ΔCPI_t is the annual percentage change in the ABS CPI All Groups, Weighted Average of Eight Capital Cities from the June quarter in year t–2 to the June quarter in year t–1, calculated using the following method:

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the June quarter in regulatory year t–1

divided by

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the June quarter in regulatory year t–2

minus one.

X_t is the X-factor for each year of the 2016–20 regulatory control period as determined in the annual metering charges PTRM.

From 2017 to 2020, side constraints will apply, and the permissible percentage increase will be the greater of CPI-X plus 2 per cent or CPI plus 2 per cent. The side constraint formula is:

$$p_t^i \leq p_{t-1}^i(1+\Delta CPI_t)(1-X_t^i)(1+2\%)+T_t^{'}+B_t^{'}$$

where:

p_t^i is the price of annual metering charges service 'I' in year t.

p_{t-1}^i is the price of annual metering charges service 'I' in year t-1.

ΔCPI_t is the annual percentage change in the ABS CPI All Groups, Weighted Average of Eight Capital Cities from the June quarter in year t–2 to the June quarter in year t–1, calculated using the following method:

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the June quarter in regulatory year t–1

divided by

The ABS CPI All Groups, Weighted Average of Eight Capital Cities for the June quarter in regulatory year t–2

minus one.

X_t is the X-factor for each year of the 2016–20 regulatory control period as determined in the annual metering charges PTRM.

$T_t^{'}$ is the annual percentage change from the unders and overs recoveries relating to Advanced Metering Infrastructure actual revenues and actual costs incurred in 2014 and 2015. It is equal to zero for all years except 2017 and is a once off adjustment to 2017 charges.

$B_t^{'}$ is the annual percentage change from the sum of annual adjustment factors in year t as calculated in the unders and overs account.

7.3 2017 forecast revenue adjustment

Based on AusNet Services' TCA, the forecast revenue for 2017 is expected to reduce by $13.1 million (real $2017), being the difference between actual revenue received and the building block costs for the years 2009 to 2015. This is calculated using the AMI Charges Model updated for actual expenditure and revenue in 2014 and 2015, and converted to $2017 using the CPI as per the Metering PTRM Model from the approved 2016-20 EDPR Final Decision.

The AER has stated that "*any difference between the forecast AMI capex and the actual AMI capex that we approve will be rolled into the metering RAB at the 2021-25 regulatory control period.*"[72] As such, this adjustment has not been made in the calculation of the forecast revenue adjustment.

7.4 Total revenue requirement

Table 42 summarises the Total Revenue Requirement for the period 2009 to 2015.

Table 42: Total Revenue Requirement ($M, nominal)[73]

	Actual					Proposed		
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Total**
Return on Capital	5.9	8.1	17.1	28.2	31.9	28.9	28.9	149.0
Return of Capital (Depreciation)	7.8	18.3	26.2	34.4	49.6	45.0	48.4	229.7
Operating & Maintenance	27.1	39.8	42.8	40.2	32.5	33.9	30.6	246.9
Offset of costs and revenue 2006-08	-6.1							**-6.1**
Building Blocks Revenue Requirement	**34.7**	**66.2**	**86.1**	**102.8**	**114.0**	**107.8**	**107.9**	**619.5**
Actual Tariff Revenue	**37.9**	**65.6**	**73.5**	**83.6**	**101.3**	**125.4**	**162.8**	**650.1**

[72] AER, *EDPR 2016-20 Final Decision*, Attachment 16-29

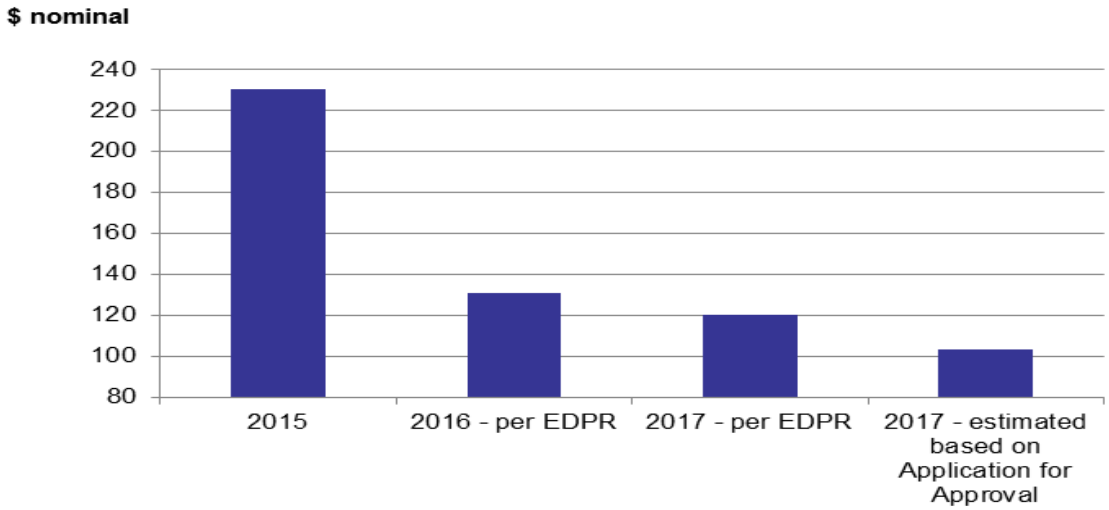
[73] AusNet Services, *AMI Charges Model – TCA*

7.5 Impact to customers

The approval of AusNet Services' TCA would be expected to result in an estimated average reduction of $18[74] to a customer's metering charge in 2017.

The following chart shows the average metering charge per customer[75] from 2015:

Figure 13: Comparison of the average metering charge per customer (2015 – 2017)



7.6 Models

The following models are attached to this TCA:

- AMI Charges Model – Total Costs (this model shows the actual costs incurred by AusNet Services in 2014 and 2015)
- AMI Charges Model – TCA (this model shows the total costs based on the Approved Budget plus the amount AusNet Services is applying for approval)
- Metering PTRM – TCA (this model shows the impact of the TCA to 2017 revenue)

[74] AusNet Services, *AMI Charges Model – TCA*, divided by the 2017 forecast number of customers

[75] Being total revenue approved for the respective year divided by the total forecast number of customers

Appendix A – Definition of prudency

As noted in section 1, the CROIC allows the AER to include an expenditure excess in the building blocks if the DNSP satisfies the AER that the expenditure is prudent. [76] If the application seeks a determination to recover an expenditure excess through transition charges under clause 5L clause 5I.7AA states that the expenditure excess is prudent "*where the expenditure of the distributor over the entirety of the initial regulatory period reasonably reflects the efficient costs of a business providing the Regulated Services*[77] *over the entirety of that period*." The initial regulatory period means the period commencing on 1 January 2009 and ending on 31 December 2015.

The CROIC provides a non-exhaustive list of the matters that the AER may take into account when determining whether an 'expenditure excess' reasonably reflects the efficient costs of a business providing the Regulated Services over the entirety of the initial regulatory period. In particular, clause 5I.8 lists the following matters that the AER may take into account:

- The information available to the DNSP at the relevant time.
- The nature of the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems.
- The nature of the roll-out obligation.
- The state of the technology relevant to the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems.
- The risks inherent in a project of the type involving the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems.
- The market conditions relevant to the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems.
- Any metering regulatory obligation or requirement.
- Any other relevant matter.

Were the 'expenditure excess' is a contract cost, the AER may also consider whether the contract was let in accordance with a competitive tender process. In considering this matter, clause 5I.9 requires that the AER must have regard to:

- the tender process for that contract;
- whether there has been compliance with that process; and
- whether the request for tender unreasonably imposed conditions or requirements that prevented or discouraged the submission of any tender that is consistent with the selection criteria.

If a transition charges application is submitted, the AER must also take into account the expenditure of a benchmark efficient entity over the entirety of, or any part of, the initial regulatory period. [78] Clause 5I.8B states the following:

> "*For the purposes of clause 5I.8A:*
>
> *(a) Benchmark efficient entity:*
>
> *In determining what may be or is a benchmark efficient entity the Commission may have regard to (but is not limited to):*
> *(i) meter density; and*
> *(ii) number of meters subject to regulation under this Order.*

[76] Clauses 5I.5 and 5I.7
[77] As defined in the CROIC.
[78] Clause 5I.8A

(b) Benchmarking methods:

(i) The Commission may make use of either or both category level benchmarking and aggregated category benchmarking;

Note: See section 2.4.1 of the AER's Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013.

(ii) The Commission may have regard to (but is not limited to), both for the benchmark efficient entity and the distributor:

(A) capitalisation policies; and

(B) any allocation of costs between distribution services that are metering services and distribution services that are not metering services.

(c) Benchmarking:

(i) That a distributor is the only distributor that incurs particular expenditure or engages in a particular activity is not a matter, and is not to be taken as a matter, that prevents or limits the use of benchmarking;

(ii) That a benchmark efficient entity might not have incurred particular expenditure or engaged in a particular activity is not a matter, and is not to be taken as a matter, that prevents or limits benchmarking of that entity against a distributor and vice versa;

(iii) The Commission is not bound to proceed on the basis that the starting point for benchmarking is what a distributor has in fact done but may instead proceed from the starting point of what a hypothetical benchmark efficient entity would have done;

(iv) Without limiting clause 5I.8B(c)(iii), the Commission may proceed on the basis that a benchmark efficient entity's remotely read interval meters become logically converted remotely read interval meters at either or both different rates and different times from the rates and times at which the distributor's remotely read interval meters become logically converted remotely read interval meters; and

(v) The Commission may disregard (in whole or in part):

(A) expenditure with respect to Distribution IT Systems where such systems are required for all customers of a distributor and not just for distribution services that are metering services; and

(B) expenditure with respect to Distribution IT Systems where that expenditure has been or is sought to be brought into account as expenditure for the purposes of standard control services.

Note: For Distribution IT Systems, see also the scope of a distributor.

(vi) Clauses 5I.8B(c)(i)–(v) do not limit the matters that the Commission may have regard to when benchmarking."

AusNet Services' prudency assessment considered all of the matters set out above to the extent they are relevant to particular expenditure categories.

A.1 Proposed scope of the prudency analysis

The CROIC requires the AER to include in the building blocks actual expenditure incurred in a particular year if the expenditure does not exceed the approved budget for that year.[79] As explained above, an 'expenditure excess' exists if the total capex and opex for the provision of Regulated Services for a particular year exceeds the budgeted expenditure approved by the AER for that year. An 'expenditure excess' is defined in relation to total expenditure in a particular year, as set out in clause 5I.5 below:

[79] Clause 5I.2(a)(iii). The conditions specified in sub-paragraphs (i) and (ii) must also be met.

Transition Charges Application

"Where pursuant to clause 5I.2 or 5I.4 the Commission determines that actual Total Opex and Capex or the balance actual Total Opex and Capex for year t-1 exceeds: …
(b) the Approved Budget for that year in the case of the subsequent AMI budget period,
the Commission may, in accordance with clauses 5I.6 to 5I.9 and despite anything to the contrary in clause 5I.2 or 5I.4 include in the building blocks the amount of that excess in expenditure (the 'expenditure excess')."

In terms of assessing whether the 'expenditure excess' should be included in the building blocks, clauses 5I.7 5I.7A and 5.I7AA state that:

- The Commission may include in the building blocks an 'expenditure excess' if the DNSP satisfies the Commission that the 'expenditure excess' is prudent;
- The 'expenditure excess' is prudent where that 'expenditure excess' reasonably reflects the efficient costs of a business providing the Regulated Services; and
- Where a transition charges application is made, the 'expenditure excess' is prudent where the expenditure of the distributor over the entirety of the initial regulatory period reasonably reflects the efficient costs of a business providing the Regulated Services over the entirety of that period.

In effect, the CROIC requires that the prudency assessment for 2014 and 2015 follow a three-step process:

1. The approved budget is automatically included as a building block cost;
2. The expenditure above the approved budget (the 'expenditure excess') is subject to a prudency review; and
3. The efficient component of the 'expenditure excess' is added to the approved budget and included as a building block cost.

Appendix B – AMI Program Governance model

AusNet Services' AMI Program governance model has been established to deliver an overarching management support mechanism to govern and guide each of the AMI project streams, and support clear and transparent decision-making across the program. It facilitates the resolution of program-wide issues and effective risk mitigation. Figure B.1 depicts AusNet Services' outcome-driven governance model.

Figure B.1: AMI Program Governance Model (2014)

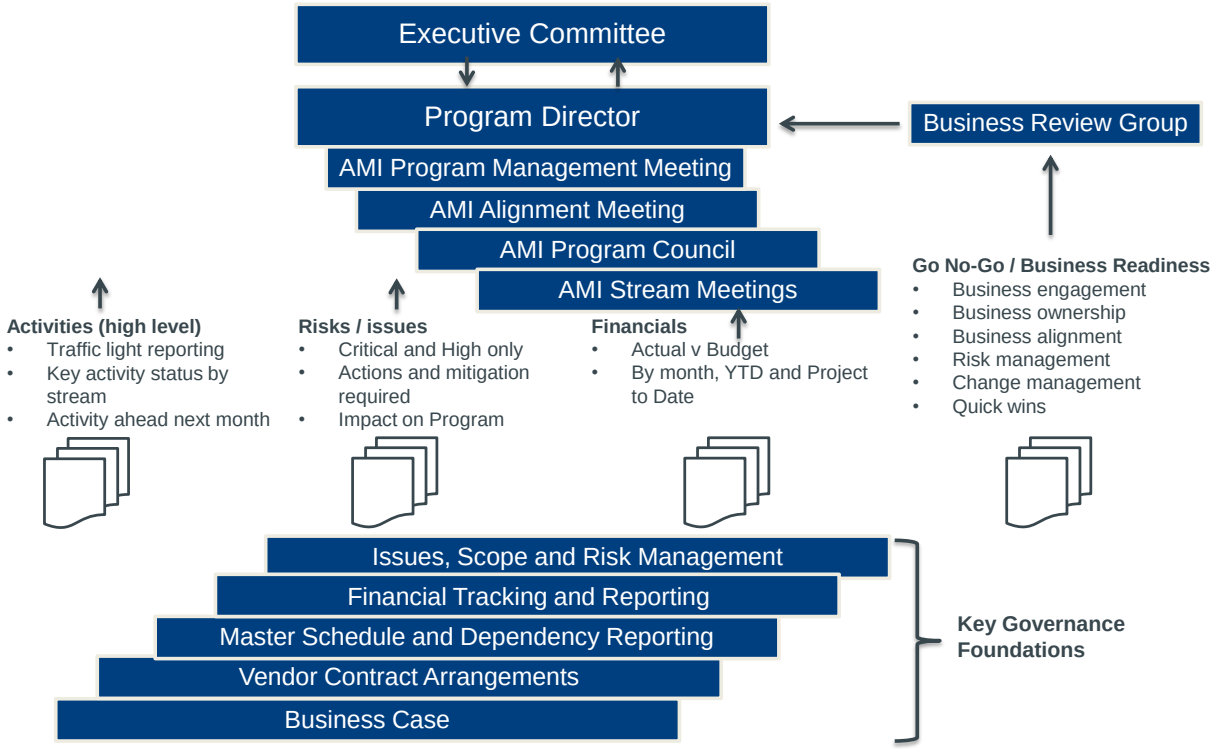


Table B.1 outlines the terms of reference for each governance body shown in the figure above.

Table B.1: Terms of reference for 2014 governance bodies

Role	Terms of Reference
Executive Committee	▸ Provide Program oversight and governance including costs, risks and issues ▸ Ensure Program alignment with corporate strategy ▸ Endorsement of strategic solution direction and major program changes ▸ Approve decisions with regard to scope, funding and government relations
AMI Program Management Meeting	▸ Raise issues with Executive Leadership Team ▸ Initial point of escalation to the Executive Leadership Team ▸ Information sharing to Executive Leadership Team level
AMI Alignment Meeting	▸ Escalation point for Program issues related to Enterprise; this includes issues related to policies, procedures, resource constraints ▸ Provide guidance regarding Program risks and issues
AMI Program Council (AMI stream lead meeting)	▸ Actively manage program scope, timelines and budget as emergent issues arise ▸ Actively manage issues to ensure timely resolution and support provided ▸ Actively manage risks

Role	Terms of Reference
	▸ Provide overall direction and management for the Program ▸ Represent the broader business context in project definition and planning, ensuring alignment with organisational and stakeholder goals ▸ Endorse and approve scope, deliverables, plans and budget ▸ Ensure dependencies are addressed ▸ Facilitate the resolution of disputes
AMI Stream Meetings	▸ Manage stream of work activities ▸ Responsible for day to day execution/delivery of stream of work and associated projects ▸ Manage, resolve and escalate issues and risks

In 2015, AusNet Services set up its Metering Business division which plays a strong role as the business owner of the AMI roll-out. As a result of this establishment, AusNet Services' AMI Program governance model was altered to the following.

Figure B.2: AMI Program Governance Model (2015)

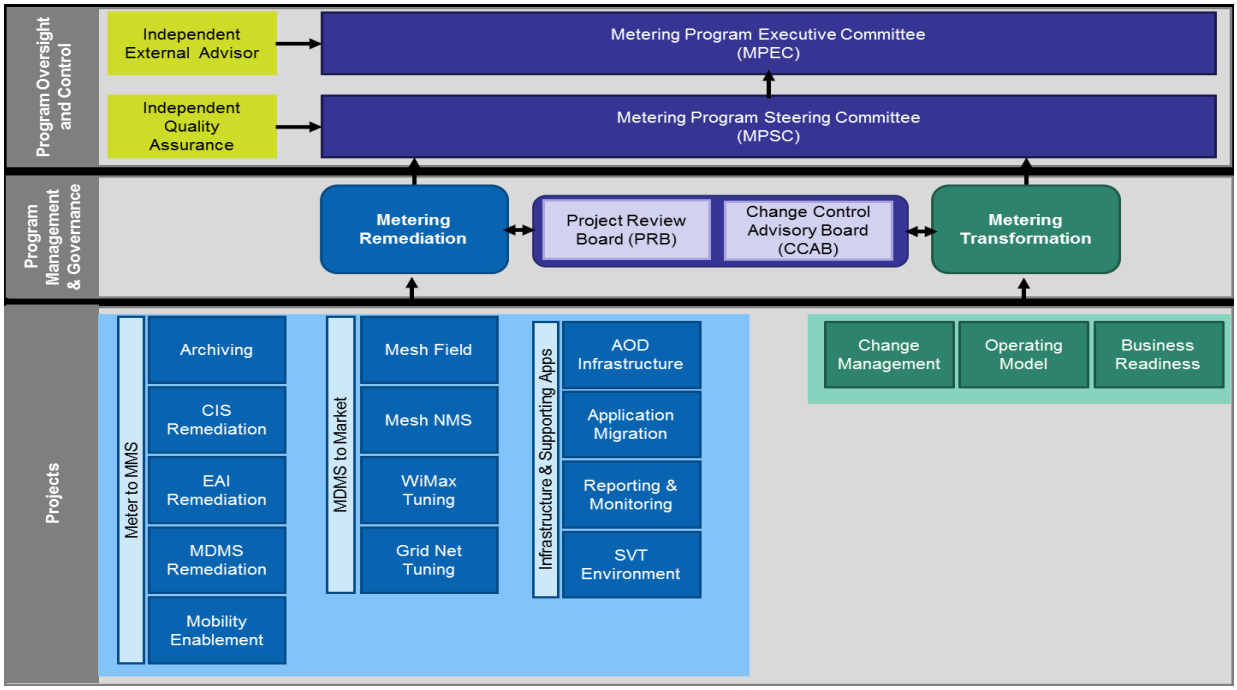


Table B.2 outlines the terms of reference for each governance body shown in the figure above.

Table B.2: Terms of reference for 2015 governance bodies

Role	Terms of Reference
Metering Executive Committee	▸ Ultimate governing body of program ▸ Provide program oversight and control including costs, issues and risks and independently review performance of program ▸ Ensure program alignment with corporate strategy ▸ Endorsement of strategic solution direction and major program changes ▸ Approve decisions with regards to scope, funding and government relations
Steering Committee	▸ Decision making forum ▸ Responsible for overall steering of the program ▸ Accountable for issue resolution and risks management ▸ Review of program performance against budget and timelines

Role	Terms of Reference
	► Approve changes to scope, cost and delivery timeline within authority levels or provide recommendation to Metering Executive Committee for final approval/endorsement
Advisors	► Provide independent advice to Metering Executive Committee, Program Steering Committee and Program Sponsor
Program Management	► Manage overall program activities and review program progress ► Responsible for day-to-day execution/delivery of program ► Review program level progress against schedule and budget ► Manage, resolve and escalate issues and risks ► Manage project dependencies and critical milestones ► Project level decision making and resource allocation
Change Control Advisory Board (CCAB)	► Review change requests ► Ensure impact assessment are complete based on milestones, scope, schedule, cost and risk implications ► Endorse change requests within authority levels and recommend to Metering Steering Committee for approval ► Escalate major change requests for approval to Metering Executive Committee
Project Review Board	► Responsible for evaluating and endorsing project progress through project gating in line with the corporate strategy and governance

B.1 AMI Program Management

Although AusNet Services' AMI Program management arrangements have slightly altered over the years (as seen from the slight changes in the governance models), AusNet Services is focused on delivering efficient outcomes. The project management activities in 2014 and 2015 included:

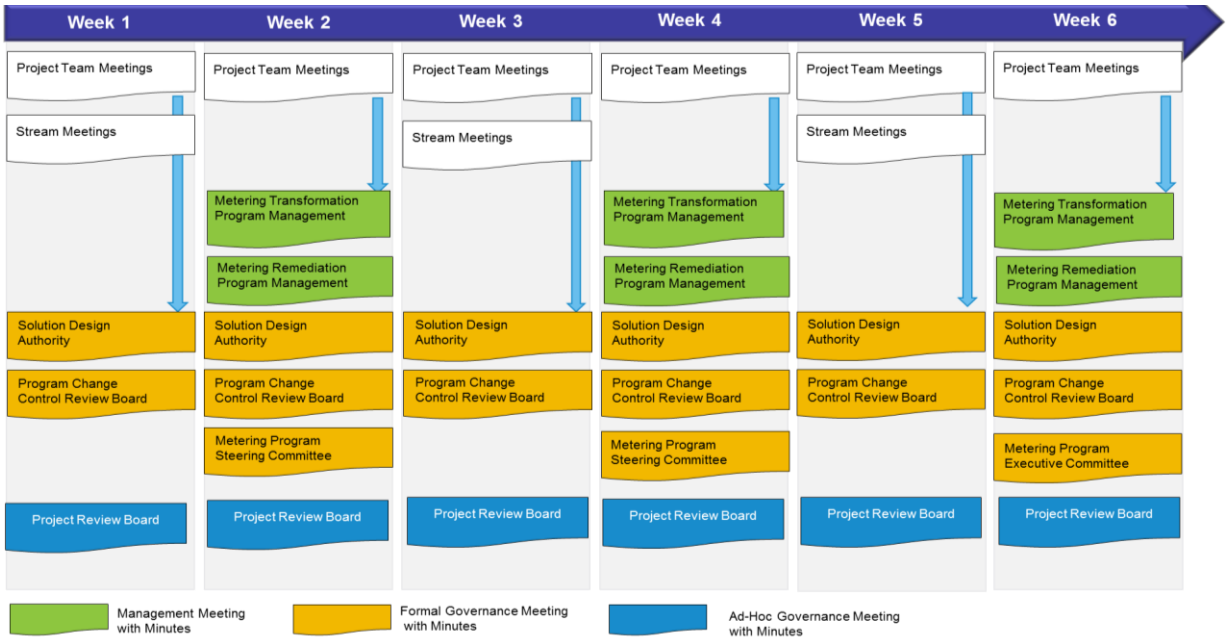
- program reporting;
- schedule management;
- financial management and reporting;
- scope management;
- procurement;
- risk and issue management;
- dependency management;
- change control;
- resource management; and
- delivery acceptance.

AusNet Services' AMI Program management arrangements are of a comprehensive nature. Figure B.3 shows the weekly scheduled AMI Program schedule, reports and meetings in 2014. Figure B.4 shows the six weekly meeting schedule in 2015. Each meeting served as a forum to discuss and resolve issues that arise during the course of the program, and was attended by the relevant program stakeholders and advisors.

Figure B.3: Weekly meeting and reporting cycle (2014)

	Monday	Tuesday	Wednesday	Thursday	Friday	No dedicated day
Meetings			7 AMI Program Council	AMI Alignment Meeting 9 AMI Program Mgmt. Meeting	2 AMI Stream meetings (may happen on Thursdays)	Executive Committee (monthly) Corporate Risk Meeting (Fortnightly) Commercial Management meeting (fortnightly) Town Hall (ad hoc)
		AMI Pipeline Management process	Triage meetings (defects)	CCAB (Change Requests)	AMI Gate meeting (Initiatives)	
	ICT Release process	ICT Pre-CAB (Production release)	Solution design Authority (SDA)	ICT CAB		
Reports		6 AMI PMO distribute AMI Program Council report	8 AMI PMO distribute AMI program Mgmt meeting agenda, minutes & actions	AMI PMO prepare and send ICT report (fortnightly)	3 Stream leads prepare and send their weekly status reports to AMI PMO	Inputs to the AMI executive pack (monthly) Report to EPMO (monthly)
Schedule	4 Master scheduler integrates stream schedules into Integrated Milestone Schedule (IMS)	5 Program Director approves updated IMS, for upload into EPPM	1 Stream schedule updates (with PMO planners)	1 Stream schedule updates (with PMO planners)	1 Stream schedule updates (with PMO planners)	

Figure B.4: Weekly meeting cycle (2015)



As noted above, effective program governance and management arrangements provide significant assurance that expenditure will be incurred efficiently. AusNet Services considers that its Program Management process, which includes comprehensive governance and project management arrangements, provides such assurance. Therefore, as noted in section 6.8, AusNet Services is applying for approval of the expenditure excess in program management costs up to 30 June 2014 as the costs were not related to the WiMAX technology, but rather to ensure that smart meters can be rolled-out to all customers.

Appendix C – Deloitte Ex-post Review Report

Deloitte Access Economics

AusNet Services

Ex-post Review of AMI Expenditure in 2014 and 2015

Final report

30 May 2015

Deloitte.

Contents

1 Executive Summary

Deloitte Access Economics (Deloitte) has been engaged to provide advice in respect of expenditure in excess of an AER approved budget which was incurred by AusNet Services under the Advanced Metering Infrastructure (AMI) Cost Recovery Order in Council (OIC) in 2014 and 2015. This follows on from an earlier report we prepared in relation to AusNet Services' 2013 excess expenditure, which was submitted to the AER as part of AusNet Services' 2013 Excess Expenditure Application.

Since 2013, there have been a number of changes to the AMI OIC, including changes to the factors which the AER must take into account in assessing excess expenditure. While the AER used benchmarking to determine an efficient cost for certain components of the AMI rollout in its budget decision, benchmarking has now been given a greater level of importance in the revised OIC.

For each category of costs, we have reviewed AusNet Services' excess expenditure and considered the drivers of the overspend in the context of the broader AMI rollout and the challenges it has faced since 2012, as well as the AER's previous decisions on AusNet Services' AMI expenditure, including its recent decision for 2016-20 metering costs.[1]

As we noted in our earlier report, in conducting our review it was clear that in a program of the scale, scope and complexity of the AMI rollout it is difficult to link cause and effect in relation to delays and cost increases, particularly when so much of the program is interlinked and when so many complex challenges have emerged. As a result, it is difficult to identify the precise source of cost increases across some categories of expenditure. Accordingly, our approach has been to understand the broad issues that emerged during the AMI rollout and consider the evidence for links between these issues and the excess expenditure in 2014 and 2015.

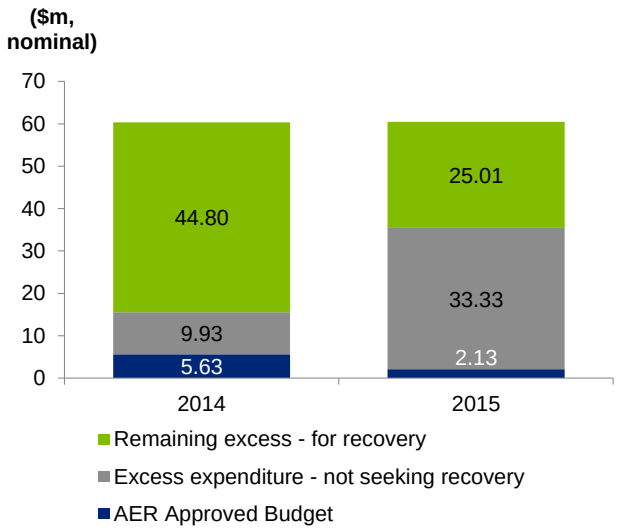
The AER's final decision on AusNet Services' metering costs for 2016-20 identified that its actual 2014 metering costs were broadly efficient, and were therefore used as a base for future operating expenditure (opex). As the actual 2014 AMI costs exceeded AusNet Services' AMI budget, this implies that the AMI budget for some categories was materially insufficient. This is also demonstrated by observing the actual AMI expenditure of Powercor, which for some categories exceeded AusNet Services' AMI budget allowance for 2014 and 2015. The AER used Powercor as a benchmark comparator to AusNet Services when setting its AMI budget for 2012-15, suggesting that in categories where Powercor's actual AMI costs exceeded AusNet Services', some excess expenditure should be recovered.

AusNet Services has advised that it will not seek cost recovery 42% of its excess expenditure in 2014 and 2015. These excess costs have been identified by AusNet Services as associated with either WiMAX or mesh communications technologies, or IT remediation activities, or they reflect expenditure above the AER's determined efficient metering costs for 2016-20. While we have not carried out a detailed inspection of AusNet Services' financial records or systems, we consider that the overall approach it took to identifying affected activities is reasonable, noting the difficulty of linking cause and effect in the AMI rollout.

[1] AER, AusNet Services preliminary decision 2016-20.

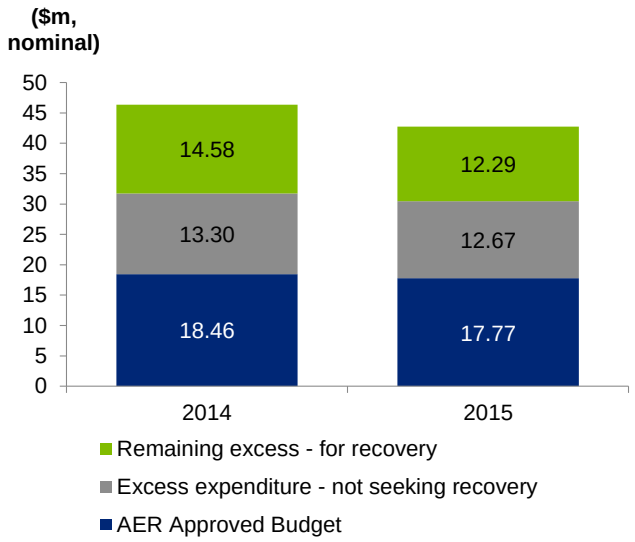
The following figures provide a breakdown of the AER budget, excess expenditure being sought and that which AusNet has excluded, due to it being associated with remediation activities, WiMAX or mesh communications.

Figure 1: AMI capex breakdown ($m)



Source: AusNet Services

Figure 2: AMI opex breakdown ($m)



Source: AusNet Services

The following table summarises our findings on each category of excess expenditure.

In forming our views we have relied on information provided by AusNet Services. We have not conducted a review of primary documentation supporting the information provided.

Table 1: Excess expenditure in 2014 and 2015 ($m)

Category	AER budget	Actual Expenditure	Excluded Excess	Remaining excess sought	Key drivers
Meter supply*	4.3	32.5	4.4	23.9	• 3G infill proportion • Delays in comms card delivery
Meter installation	0.0	17.6	3.1	14.5	• General rollout delays • Inherent risks in the AMI rollout
Communications infrastructure capex	3.5	9.0	5.5	0.0	• NA - WiMAX
IT capex	0.0	61.8	30.3	31.5	• Technology performance • Project management • Inherent risks of the AMI rollout
Meter reading	1.0	9.6	5.4	3.2	• Insufficient budget • Delays in AMI rollout • Technology performance
Meter data management*	5.4	10.1	0.2	4.4	• Insufficient budget • Delays in AMI rollout • Technology performance
IT opex*	14.2	29.8	7.5	8.1	• Insufficient budget • Delays in AMI rollout • Technology performance • Project management
Communications infrastructure opex	10.4	17.6	3.4	3.8	• Insufficient budget • Delays in AMI rollout • Technology performance
AMI Project Management Office	0.0	14.8	9.5	5.3	• Delays in AMI rollout • Technology performance
Overheads and Indirect Costs (2014)	5.2	7.2	0.0	1.9	• Insufficient budget • Nature of the rollout obligation • Technology performance • Inherent risks in the AMI rollout

*Note: Summary numbers are affected by rounding differences.

2 Background

In order to implement the Victorian Government's policy for distributors to roll out Advanced Metering Infrastructure (AMI) to all Victorian small electricity customers, in 2007 the regulatory arrangements for metering, including cost recovery of AMI, were specifically carved out of the National Electricity Rules (NER) and regulated under a Cost Recovery Order in Council (OIC), enacted under the *Victorian Electricity Industry Act 2000*.

In 2011 the AER determined AusNet Services' regulatory budget for the 2012-15 period, as required under clause 5C.6 of the OIC.

2.1 2013 Excess Expenditure Review

In 2013, for a range of reasons, AusNet Services' expenditure exceeded the approved budget by $70.2 million. Similarly, AMI expenditure by distributors Jemena and United Energy also exceeded their 2013 budgets, by $25.7 million and $53.7 million respectively.

The AER and its consultant Energeia reviewed the excess expenditure applications against the requirements of the OIC in late 2014. In December 2014, the AER determined that $47.5 million of AusNet Services' excess AMI expenditure in 2013 was prudent. The majority of AusNet Services' excess costs associated with meter capex, meter installation and communications capex were assessed as prudent by the AER, while some of the smaller cost categories (meter data services, overheads and customer service costs) were approved without a detailed review. Capital costs associated with WiMAX communications technology, and operating costs for meter reading and project management were considered not prudent.

2.1 AER Final AMI Budget Determination 2012-15 and Tribunal Orders

The AER released its Final Determination on the Victorian distributors' AMI Budgets for the 2012-15 period in October 2011.

In its Final Determination for AusNet Services, the AER concluded that in relation to certain expenditure, AusNet Services' proposed expenses reflected a substantial departure from the commercial standard. [2] AusNet Services appealed the AER's Final Determination to the Australian Competition Tribunal (Tribunal). The Tribunal's subsequent Order (April 2012) required the AER to allow an amount for foreign exchange contracts and project management labour costs, as well as to reconsider its determination of WiMAX communications expenditure.[3] On remittal, the AER determined that a reasonable business in AusNet Services' circumstances, having undertaken a full reconsideration of its communications solution in early 2011, would have switched from WiMAX to mesh radio.

[2] AER Final Determination: Victorian AMI Budget and Charges Applications 2012-15 p.69-75.

[3] AER, Final Determination: AMI review SPI Electricity Pty Ltd 2012-15 budget and charges applications: Amendments pursuant to the Australian Competition Tribunal's Orders, p.iv.

The AER's Amended Determination (February 2013) made additional budget allowances of $15.8 million for foreign exchange contracts and $1.7 million for project management labour costs but made no allowance for WiMAX related costs. [4]

AusNet Services appealed the AER's Amended Determination to the Tribunal and at the same time sought judicial review by the Federal Court. On 1 August 2013, the Tribunal dismissed AusNet Services' appeal. In 2014, the Federal Court also dismissed AusNet Services' appeal and upheld the AER's Amended Determination.

2.2 Best endeavours audit

Over the period from March to June 2014, independent audits were undertaken of the compliance of the Victorian distributors with their obligations arising from the AMI Program. The results of the audits were presented in the Essential Services Commission's (ESC) final report on 'Compliance with AMI Regulatory Obligations as at 31 December 2013 (Victorian Electricity Distributors)', released in October 2014. This report also detailed the ESC's conclusions on the distribution businesses' best endeavours to comply with AMI obligations, focusing on functionality, service levels and AMI rollout target.

Although the audit found that AusNet Services was partially compliant in the areas of functionality, service levels and AMI rollout target, the ESC stated that AusNet Services' inefficient internal processes and controls did not indicate a use of best endeavours to comply with the AMI obligations. Furthermore, the ESC considered that the information presented did not meet a sufficient level of assurance that AusNet Services made appropriate decisions to meet its rollout obligations.

AusNet Services explained that external factors were responsible for these outcomes, such as political uncertainty, customer hostility, demanding timeframes and complex systems and interfaces. However, the ESC considered that there was no evidence that AusNet Services was disproportionately affected when compared to other distribution businesses.

Furthermore, the ESC considered that the particular circumstances faced by AusNet Services were due to insufficient data management and its management and implementation process.

2.3 Recent changes to the regulatory framework

The OIC establishes a separate cost recovery arrangement for the AMI Program, enabling costs for 'AMI metering services' as defined in the OIC to be recouped. The OIC has been amended several times since it was first established, with most changes having the effect of limiting or providing restrictions on the costs that DNSPs can seek to recover.

Clause 5I, which was part of the original OIC, provides for recovery of expenditure provided that certain criteria set out in clause 5I.8 are met. Relevant clauses are:

- Clause 5I.7 which provides that the distributor must satisfy the AER that the expenditure excess is prudent

[4] AER, Final Decision: AMI review SPI Electricity Pty Ltd 2012-15 budget and charges applications: Amendments pursuant to the Australian Competition Tribunal's Orders Ibid, p.viii.

- Clause 5I.7A provides that the expenditure excess is prudent where it reasonably reflects efficient costs
- Clause 5I.7B provides that for the purposes of being satisfied regarding efficient costs, the Commission may take into account:
    - Where expenditure is a contract cost, whether the contract was let in accordance with a competitive tender process
    - The matters set out in clause 5I.8 (hereafter referred to as the Prudency Criteria).

In 2013, changes were made to the OIC to require that where an AMI meter was not installed by 30 June 2014, or where a meter was installed but not functioning as intended, a rebate must be paid to affected customers. This change to the OIC provided an additional incentive for DNSPs to complete their rollouts within six months of the original planned completion date of 31 December 2013. By allowing the rollout to continue for six months before the rebate was payable, these changes to the OIC also recognised the delays that DNSPs had experienced during their rollouts, which were partly beyond their control. The changes effectively provided for a six month extension of the 'best endeavours' requirement for the Victorian distributors to install AMI for households and small businesses.

On 30 June 2015, a number of further changes were made to the OIC which have impacted this excess expenditure application:

- In clause 5I.8, the Prudency Criteria was expanded to explicitly ensure the AER may make use of benchmarking analysis in assessing the prudency of excess costs
- Clause 5I.7B was changed to require that the AER Is to consider whether an expenditure excess reasonably reflects the efficient costs of a business rolling out AMI over the entirety of the AMI initial regulatory period, rather than in a single year
- changes were made to prevent DNSPs from submitting further Revised Budget Applications, such that the 2012-15 AMI Budgets cannot be revised except through Excess Expenditure applications
- changes were made to require that 2014 and 2015 Expenditure Excess applications would be submitted concurrently after 30 April 2016 and before 30 May 2016, after the AER's broader Final Determination on Victorian distribution revenues.[5] Changes were also made to ensure greater stakeholder consultation during the AER's assessment of the 2014 and 2015 Excess Expenditure applications.

2.4 Updated Prudency Criteria

In determining the prudency of excess expenditure, the AER may take into account whether or not a contracted cost was let in a competitive tender or any of the following as set out in Clause 5I.8:

(a) The information available to the distributor at the relevant time;

[5] Current advice from AusNet Services indicates that the Final Determination may now not occur before Expenditure Excess applications.

(b) The nature of the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems;

(c) The nature of the rollout obligation;

(d) The state of the technology relevant to the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems;

(e) The risks inherent in a project of the type involving the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems;

(f) The market conditions relevant to the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems;

(g) Any metering regulatory obligation or requirement;

(ga) the matters set out in clauses 5I.8B(b)(ii) and 5I.8B(c); and

(h) Any other relevant matter.

New clauses 5I.8A and 5I8B were added in July 2015 and provide as follows:

5I.8A In any case where an application pursuant to clause 5L is made, the matters the Commission must also take into account include the expenditure of a benchmark efficient entity over the entirety of, or any part of, the initial regulatory period.

5I.8B For the purposes of clause 5I.8A:

(a) Benchmark efficient entity:

In determining what may be or is a benchmark efficient entity the Commission may have regard to (but is not limited to):

(i) meter density; and

(ii) number of meters subject to regulation under this Order.

(b) Benchmarking methods:

(i) The Commission may make use of either or both category level benchmarking and aggregated category benchmarking;

Note: See section 2.4.1 of the AER's Expenditure Forecast Assessment Guideline for Electricity Distribution, November 2013.

(ii) The Commission may have regard to (but is not limited to), both for the benchmark efficient entity and the distributor:

(A) capitalisation policies; and

(B) any allocation of costs between distribution services that are metering services and distribution services that are not metering services.

(c) Benchmarking:

(i) That a distributor is the only distributor that incurs particular expenditure or engages in a particular activity is not a matter, and is not to be taken as a matter, that prevents or limits the use of benchmarking;

(ii) That a benchmark efficient entity might not have incurred particular expenditure or engaged in a particular activity is not a matter, and is not to be taken as a matter, that prevents or limits benchmarking of that entity against a distributor and vice versa;

(iii) The Commission is not bound to proceed on the basis that the starting point for benchmarking is what a distributor has in fact done but may instead proceed from the starting point of what a hypothetical benchmark efficient entity would have done;

(iv) Without limiting clause 5I8B(c)(iii), the Commission may proceed on the basis that a benchmark efficient entity's remotely read interval meters become logically converted remotely read interval meters at either or both different rates and different times from the rates and times at which the distributor's remotely read interval meters become logically converted remotely read interval meters; and

(v) The Commission may disregard (in whole or in part):

(A) expenditure with respect to Distribution IT Systems where such systems are required for all customers of a distributor and not just for distribution services that are metering services; and

(B) expenditure with respect to Distribution IT Systems where that expenditure has been or is sought to be brought into account as expenditure for the purposes of standard control services.

Note: For Distribution IT Systems, see also the scope of a distributor.

(vi) Clauses 5I.8B(c)(i)-(v) do not limit the matters that the Commission may have regard to when benchmarking.

It is important to note that the OIC requires that distributors must satisfy the AER that the excess expenditure is prudent. Where the AER is satisfied that the excess expenditure is prudent after taking into account the factors in Clause 5I.8 outlined above, it may include the excess expenditure in the building block costs underpinning revised charges.

2.5 AER Determination on AusNet Services' metering costs for 2016-20

In late May 2016, the AER released its final decision on AusNet Services' regulatory proposal for the 2016-20 regulatory control period. This decision set out the AER's final positions on the efficient level of metering capex and opex for 2016-20, following its preliminary decision in October 2015.Based on its benchmarking results, in its preliminary decision the AER considered that AusNet Services had been operating relatively efficiently compared to other distributors in the national electricity market, and therefore used AusNet Services' 2014 revealed (past actual) AMI operating costs as the starting point for forecasting efficient opex:

> *We consider that following the removal of non–recurrent expenditure, AusNet Services' actual opex in 2014 does not contain material inefficiencies. We reached this conclusion on the basis that the Victorian distribution businesses are generally efficient. This is compared to their counterparts in other regions of the national*

electricity market. We have therefore decided not to make an efficiency adjustment to the base level of opex.[6]

The AER upheld this position in its final decision, confirming its view that AusNet Services' 2014 metering opex was efficient.

From the base year costs, the AER subtracted what it considered were one-off costs associated with the AMI mass rollout to calculate the base metering opex. The AER generally estimated AusNet Services' one off AMI rollout costs by calculating the difference between AusNet Services' proposed average annual metering opex over 2016-20 and its actual 2014 costs. In total, the AER identified $20.7 million of one off costs in a total 2014 opex of $48.5 million. This implies that $27.8 million is an efficient base year opex cost for metering services in a business as usual scenario.

By comparison, the AER's budget for AMI opex in 2014 (which it set in 2012[) was $19.2 million, substantially lower than the business as usual efficient base year cost it subsequently determined. At a minimum, this implies that AusNet Services should be provided with additional operating expenditure budget up to the efficient base year determined by the AER for 2014 and 2015.

In addition, given the AMI rollout was continuing in 2014 and 2015, consideration should be given to additional expenditure beyond the business as usual efficient base year cost. The AER's final decision allowed for higher metering costs at the start of the 2016-20 regulatory period, with the total opex allowance declining by 24% over the next regulatory period as AusNet Services' metering business settles into business as usual. This again confirms that AusNet Services' should be able to recover additional expenditure in 2014 and 2015 above its AMI budget which was set even lower than efficient costs at the start of the 2016-20 regulatory period.

In its Initial Proposal for its electricity distribution network for the 2016-20 regulatory control period, AusNet Services proposed around $100 million to undertake a staged replacement of its existing WiMAX communications infrastructure. However, this was rejected by the AER in its preliminary determination on the basis that AusNet Services had already been provided with sufficient cost recovery for a transition to mesh radio through the AMI budget. AusNet Service's revised proposal outlined an alternative approach to replacing its WiMAX infrastructure, which involved a higher cost replacement of comms cards on an as-needs basis, responding to an increasing technology failure rate it expected due to the continuation of WiMAX technology. In the final decision, the AER did not accept this additional proposed capex, and broadly maintained its preliminary decision to reject additional capex for WiMAX replacement and approve capex for business as usual meter and equipment replacements only.[7]

2.6 Scope of our work

Deloitte has performed a review of expenditure incurred in excess of the 2014 and 2015 AMI budget which was determined by the AER (in 2011), across the following categories:

- Meter supply capital expenditure

[6] AER, Draft Decision, Attachment 16, p.46.

[7] AER, Final Decision, Attachment 16, p. 57.

- Meter installation capital expenditure
- Communications infrastructure and installation capital expenditure
- IT capital expenditure
- Meter reading operating expenditure
- Meter data management operating expenditure
- IT operating expenditure
- Communications infrastructure maintenance
- AMI Program Management Office (PMO) operating expenditure
- Overheads and indirect costs.

For each category, Deloitte has reviewed AusNet Services' excess expenditure and considered the drivers of the overspend in the context of the broader AMI rollout and the challenges it has faced since 2012, as well as the AER's previous decisions on AusNet Services' AMI expenditure, including the AER's final decision for 2016-20 metering costs.

In forming our views we have relied on information provided by AusNet Services. Our overarching assumption is that all the information provided to us, by and/or on behalf of AusNet Services is true, correct, complete, current and not misleading. We have not conducted a review of all primary documentation supporting the information provided.

3 Our approach

3.1 Interpreting the OIC

In preparing this advice we have had regards to the nature of the OIC and in particular the requirements of clause 5I.8.

Three overarching points are worth making. Firstly, despite recent changes, the OIC still provides in section 4.1(a) that "there shall be a pass through of the costs of a distributor for Regulated Services". This approach was adopted in order to provide distributors with confidence that they can recover (prudent and efficient) costs in the context of a rollout program which was foreshadowed to be subject to significant technological, financial and political risks. This has indeed proven to be the case.

Secondly, and in relation to the specific provisions of clause 5I.8 we note that in the past the AER has been reluctant to provide specific information on the way it will interpret each of the sub-clauses. Instead it has simply advised that it will consider these provisions on a case by case basis in light of the application and the information at hand. Further, no excess expenditure applications have yet been considered by the AER under the new provisions in clause 5I.8A and 5I.8B of the OIC.

Nevertheless, we consider it helpful to provide some overarching comments on each of the sub-clauses in 5I.8 in order to provide background as to the reasons for our views later in this paper.

(a) The information available to the distributor at the relevant time

This clause suggests that when considering the prudency of a decision it is important to consider the information that was available at the time the decision was made. Although decisions and actions may subsequently appear wise or unwise in hindsight as outcomes are influenced by later information and events, it is not reasonable to expect distributors to have perfect foresight.

(b) The nature of the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems

As noted above, the AMI rollout program is a significant undertaking for Victorian distributors and one which has brought with it significant technological, financial and political risks. No program of such scope and complexity will ever proceed entirely smoothly. Changes to approach, the impact of external and internal factors, technology changes and other unexpected matters are inevitable. These will have implications for costs, and the AER needs to take this into account.

AusNet Services' AMI cost over-runs are not atypical of those experienced by major infrastructure projects in Australia. In a 2014 report, Deloitte found that on average, Australian infrastructure projects have seen cost over-runs in seven of the previous eight years, and that for larger infrastructure projects cost over-runs averaged 12.7%.[8]

[8] Deloitte Access Economics 2014, 'Major infrastructure projects: costs and productivity issues'.

Further, the Victorian Auditor General recently handed down a report on Phase Two of its Status Review of ICT Projects and Initiatives undertaken by the Victorian Government,[9] which found significant evidence of delays and cost overruns in a sample of ICT projects undertaken by Victorian Government agencies. The report noted:

> *None of the ICT projects considered in this audit were completed or will be completed as initially budgeted. One of the six projects examined finished on schedule. One project was terminated prior to system delivery, six years after the planned completion date and having cost twice the intended budget. Most of the six projects examined in this audit faced significant challenges at various points during implementation.*[10]

The Victorian Auditor General found that nearly 35% of 1249 ICT programs it reviewed exceeded their initial budget.[11] While it does not justify cost overruns in ICT, these findings confirm that large, innovative ICT projects are inherently challenging to manage and that cost overruns are not atypical of projects such as the AMI Program.

(c) The nature of the rollout obligation

The OIC originally required distributors to use their 'best endeavours,' to the extent practicable to install remotely read interval meters to all customers by 31 December 2013. This was then extended to 30 June 2014, to reflect the delays that had been experienced by most distributors, and allow for the application of a customer rebate payable where installation of a working meter was not completed in time.

Under normal commercial considerations, if a business makes a decision to invest in an asset but it subsequently becomes apparent that constructing the asset in the timeframes planned may be very costly, the business may:

- Elect not to construct the asset;
- Decide to construct a smaller or cheaper version of the asset; or
- Stage construction of the asset over a longer period.

However, because the timeframe and specifications for the rollout are imposed by the OIC, distributors do not have the ability to make these choices. Thus they are committed to incurring expenditure that they may not otherwise have chosen. We believe this clause requires the AER to take this into account in its decision making.

This clause also suggests that where the rollout obligation changes then costs must change accordingly. This should also be the case for implicit changes – for example the need to undertake a higher level of customer consultation, or the need to repair more meter boards, than originally envisaged.

(d) The state of the technology relevant to the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems

As the distributors have (in our view, correctly) identified[12], the AMI roll-out is an *innovative project involving the development, installation, and operation of cutting-edge metering and communications technology on a large scale, in a short amount of time*. *ICT*

[9] Victorian Auditor General's Office, *Digital Dashboard: Status Review of ICT Projects and Initiatives – Phase 2*, March 2016

[10] Ibid, p. xiii.

[11] Ibid, p. 1.

[12] AER, Final Determination: AMI review SPI Electricity Pty Ltd 2012-15 budget and charges applications, p.11.

projects of this size are inherently difficult and complex to implement – particularly for relatively new and immature technology.

Any new technology project of the scale and scope of the AMI Program faces the risk of unforeseen problems with equipment failing to work as envisaged or needing more time to be spent on particular aspects. The AMI Program is not unique in this sense.

We note that while the Victorian Government set the minimum performance standards and service levels for the technology employed as part of the AMI Program, it did not specify the particular technologies that were to be employed. From an economic principles view point, to specify the technology could have resulted in a less efficient rollout as distributors would have been bound to particular service providers, in a limited market, rather than being free to make choices and flexibly respond to market conditions. In our view, the state of the technology is an important factor to consider when reviewing cost overruns in the AMI Program, given the inherently uncertain nature of the technology employed by all the Victorian distributors. The cutting-edge nature of the systems being installed and integrated has, unsurprisingly in our view, led to circumstances and costs which were not foreseeable at the time in which AMI budgets were determined.

(e) The risks inherent in a project of the type involving the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems

This clause suggests the AER should take into account the uncertainty involved with rolling out the AMI program by allowing for *reasonable* adjustments to the AMI budget where unforeseen circumstances occur. As we have described above, large scale technology-based projects such as the AMI Program are particularly prone to uncertainty and costs are difficult to forecast, increasing the risk of overruns.

(f) The market conditions relevant to the provision, installation, maintenance and operation of advanced metering infrastructure and associated services and systems

In the context of AusNet Services' excess expenditure in 2014 and 2015, we interpret this clause to suggest that the AER should take into account the market conditions faced by AusNet Services throughout that period. If costs are pushed up or down by external market factors such as exchange rates, the availability of contractors, wages and other pressures in the economy, then this needs to be taken into account by the AER. It is also reasonable to expect AusNet Services to respond to market conditions, including changes in relative costs.

(g) Any metering regulatory obligation or requirement

Similar to sub-clause (c) this clause suggests that the AER should take into account the compulsory nature of all AMI program requirements. One implication is that if AusNet Services needs to (efficiently) undertake expenditure to meet the rollout timeframes, then it is obliged to do so, even if this expenditure exceeds the levels approved in the AER's 2012-15 initial budget and charges determination. The AER may also take into account broader regulatory requirements which operate outside of the OIC, such as Meter Data Provider (MDP) obligations and metrology procedures published by the Australian Energy Market Operator.

(ga) Expenditure of a benchmark efficient entity over the entirety of, or any part of, the initial regulatory period

Clause (ga), and its accompanying clause 5I.8A and 5I.8B were introduced in 2015, and as such are yet to be considered or applied by the AER in assessing AMI expenditures.

While benchmarking had previously been used by the AER in assessing excess expenditures in 2013, the new clauses provide more specific direction on what the AER is to consider appropriate from a benchmarking perspective where relevant. Important factors which we believe the AER should consider in benchmarking AusNet Services' AMI expenditure include:

- Differences in network terrain among the Victorian DNSPs, noting that while it is accepted that AusNet Services should have switched away from WiMAX communications technology to mesh, the requirement for a greater proportion of infill communication technology (3G and mesh) where WiMAX was not functioning was at least partly driven by the geographic factors affecting AusNet Services' network.
- The impact of the extension of the AMI rollout to 30 June 2014 on project management costs for DNSPs which had not yet completed their rollouts, driven by the need to continue to manage the rollout in challenging circumstances.
- Any benchmarking of the AMI costs of the five Victorian DNSPs must take into account the differences in cost allocation approaches and reporting. Our experience in reviewing the DNSPs' AMI templates confirms there are significant differences in the way that costs are allocated between AMI and other network charges, particularly for back office IT expenditure.
- The efficiencies of scale which some of the Victorian DNSPs were able to achieve by combining their rollout programs, particularly where CitiPower's and Powercor's back office systems were able to be shared to meet the AMI specifications more efficiently than a standalone network like AusNet Services.

4 Key drivers of excess AMI expenditure in 2014 and 2015

The AMI Program has required an infrastructure and technology rollout that is unprecedented in the Victorian and indeed the Australian electricity industry. Installing over 2.5 million electricity meters to all Victorian households and small businesses has presented significant challenges from the technical, political and economic arenas.

While the OIC originally incorporated a schedule for the rollout over 2009 to 2013 which formed the basis for the cost recovery arrangements for the AMI Program over 2012-15, for a range of reasons discussed in this chapter meters were not installed according to the original timetable (which was deleted from the OIC as part of the revisions). The AER's Final Determination on the Victorian distributors' AMI Budgets for the 2012-15 period was made in October 2011. The Final Determination was made on the basis of a forecast of meter installations which did not eventuate. The divergence between the 2011 forecast and the actual meters installed in each year has impacted the cost of the AMI rollout for AusNet Services.

The following table compares actual meters installed by AusNet Services with the assumed installation rate underpinning the AER's Final Determination.

Table 2: Assumed versus actual meter installations (000's)

	Jun-10	Dec-10	Jun-11	Dec-11	Jun-12	Dec-12	Jun-13	Dec-13	Jun-14	Dec-14	2015 total
Actual installations over the preceding 6 months	35.1	37.9	80.8	26.4	110.1	120.6	122.7	122.8	36.5	0.5	0.0
Budgeted installations over the preceding 6 months	35.9	35.9	81.9	81.9	151.1	151.1	71.3	71.3	0.0	0.0	0.0
Difference	**-0.8**	**2.0**	**-1.1**	**-55.5**	**-41.0**	**-30.5**	**51.4**	**51.5**	**36.5**	**0.5**	**0.0**
Cumulative installations (excl. new installations)	35.1	73.0	153.8	180.2	290.3	410.9	533.6	656.4	692.9	693.4	693.4
Cumulative budgeted installations (averaged)	35.9	71.9	153.8	235.8	386.8	537.9	609.2	680.5	680.5	680.5	680.5
Difference	**-0.8**	**0.2**	**-1.2**	**-58.7**	**-125.1**	**-177.6**	**-137.8**	**-96.6**	**12.4**	**12.9**	**12.9**

Table 2 demonstrates that while the Final Determination assumed that 2012 would be by far the largest rollout year, in fact most of AusNet Services' meters were installed in 2013. The flow on effects of this delayed rollout schedule impacted AusNet Services' AMI costs in 2014 and 2015.

The following sections discuss the key external factors that contributed to the delay in AusNet Services' meter installations.

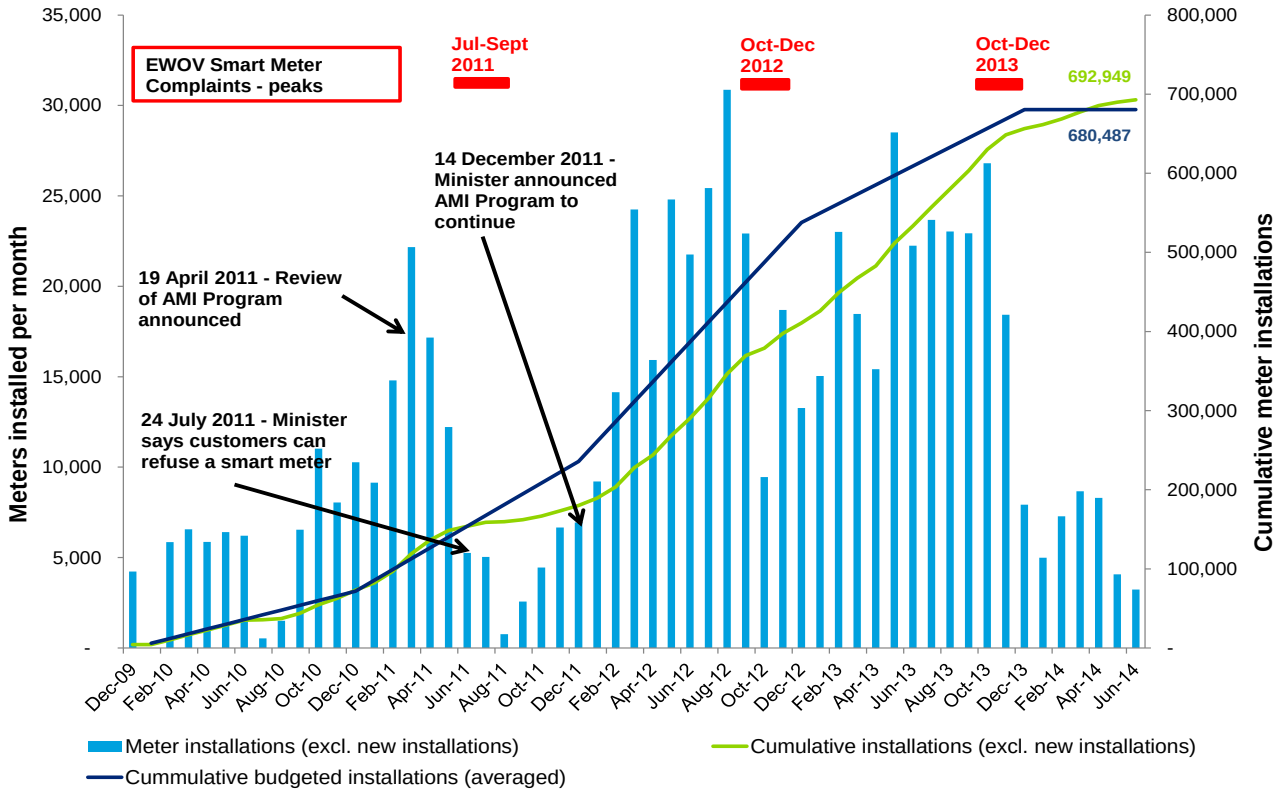
4.1 Customer resistance and policy uncertainty

As we noted in our review of AusNet Services' 2014 excess expenditure, the AMI Program faced substantial external challenges over the period from 2011-13, in which policy uncertainty and customer resistance contributed to delays in the infrastructure rollout.

During 2011, the AMI program encountered considerable resistance from Victorian electricity customers, as well as negative media coverage. This had a number of implications, including a very high level of customers refusing to accept new AMI meters, and therefore a delay in meter installations which has affected the rollout since 2011.

The Energy and Water Ombudsman of Victoria (EWOV) published the rate of smart meter complaints it received over the three years to January 2014.[13] As shown in Figure 3, the quarterly peaks in the number of EWOV complaints aligns with the dips in installation rates for AusNet Services' rollout, as well as corresponding to the periods after particular announcements were made by the Victorian Government.

Figure 3: Divergence of actual installations from AER budgeted installations in 2011 and 2012 and peak periods of EWOV complaints



Source: AusNet Services

[13] EWOV Website: http://www.ewov.com.au/reports/solar-and-smart-meter-update-january-2014/three-year-overview

While it was assumed there would be some challenges in dealing with customers for the rollout, and indeed the level of customer complaints was increasing in 2011 leading AusNet Services to incorporate some additional budget for dealing with customers, the degree of uncertainty in the overall Government policy was not anticipated at the time that AusNet Services prepared its Budget Application for the 2012-15 period, in February 2011.

Increased customer refusals and wasted visits led to extensive program delays and substantial increases in average installation costs. Communications infrastructure deployment was also impeded by community opposition, which included site obstructions, protests and the prevention of construction by councils. For example, AusNet Services has advised that the average cost of communications towers increased due to the need for community negotiations, design changes and site reselection following customer complaints.

In part as a response to community concerns, the incoming Victorian Government undertook a wide-ranging review of the AMI program in 2011, including customer impact studies, a cost-benefit analysis, field studies and a privacy impact assessment.

These reviews eventually concluded that the AMI program was safe, appropriately protected customer privacy, and was flexible enough to allow for alternate pricing structures for customers vulnerable to time-of-use pricing. Given the continuation of the program from 2012 was expected to result in net benefits of $713 million ($2011, NPV at 2012)[14], the government made the decision to proceed with the rollout, subject to some alterations to address community concerns.

Despite government assurances, customer resistance remained relatively high throughout 2011 and 2012. In order to ensure the safe and efficient rollout and the Government, it was necessary for AusNet Services to increase expenditure on customer consultation and education.

To compensate for program delays in 2011 and 2012, the volume of meter installations performed and towers constructed in 2013 was substantially higher than expected. These delays also impacted AusNet Services' rollout activities in 2014, and to a lesser degree, 2015.

During periods of uncertainty as to the future of the AMI Program (in 2011 and 2012), AusNet Services paused its rollout activities, which was a prudent response to the risk of the AMI Program being discontinued by the new Victorian Government. During those periods, AusNet Services scaled down its program management office activities and sought opportunities to reduce its labour force. Following the Government's announcement that the rollout would continue, it then needed to scale up its AMI workforce, retrain employees and re-establish employment contracts. These changes created additional costs for AusNet Services over and above the determined budget, and contributed to its excess expenditure.

4.2 Technical issues

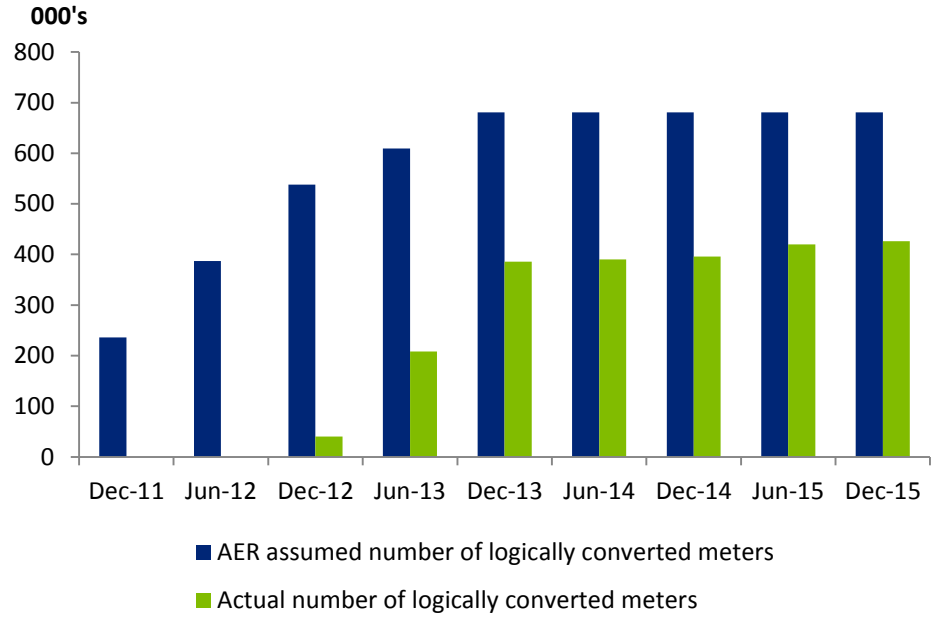
In addition to policy instability and customer backlash discussed in Section 4.1, AusNet Services' AMI rollout has faced considerable technical challenges. These technical challenges are associated both with the communications infrastructure and back office IT systems supporting AMI.

[14] Deloitte, Department of Treasury and Finance – Cost Benefit Analysis of the AMI Program, August 2011, p.8.

The issues faced by AusNet Services which contributed to its IT overspend include:

- Logical conversions – Meters are logically converted when they are registered as remotely read interval meters in the market system by AEMO. In 2011, AusNet Services faced systems integration issues which prevented data from flowing through the back office systems to market. As a result, the volume of logical conversions achieved in 2011 was significantly less than planned. While the problem was resolved in late 2012, meter reading routes which were expected to be retired continued into 2015, increasing operating costs. Figure 4 presents a comparison of the expected cumulative logical conversions and the actual logical conversions, to December 2015.
- Delayed delivery of 3G cards – AusNet Services' supply of 3G cards was delayed in 2013 due to the need for the communications modules to undergo proof of concept and prototype testing. These delays prevented AusNet Services from installing the cards at the same time as the meters were rolled out, requiring installers to revisit sites in 2014.
- AEMO Level 1 Breach - On 12 March 2014, AEMO issued AusNet Services a level one breach, which is defined as a breach which causes a "material impact" on the National Electricity Market. The breach was issued due to AusNet Services' technical and operational issues impacting meter data quality, quantity and National Electricity Market compliance. In response, AusNet Services submitted an action plan outlining corrective and preventative measures to be taken in two phases.

Figure 4: Assumed versus actual logical conversions (cumulative, 000's)



Source: AusNet Services

The other Victorian DNSPs generally completed their AMI rollouts and the logical conversion of AMI meters faster, and at lower cost, than AusNet Services. We noted in our report on AusNet Services' 2013 excess expenditure that this result is in part due to business decisions and project management, particularly around use of AMI technology. However, we note that the Victorian DNSPs had different IT systems at the outset of the

AMI Program, and this may have affected the necessary time and cost to integrate AMI systems. We note that there were other differences between the Victorian DNSPs' decisions on AMI technology aside from the choice of WiMAX or mesh communications equipment, for examples, Meter Data Management (MDM) systems. As part of the AMI rollout, AusNet Services implemented a Siemens MDM system, while the other Victorian DNSPs implemented Itron systems.

While we have not carried out a detailed review of the technology platforms and challenges faced by AusNet Services as compared to the other Victorian DNSPs', and we are unable to confirm whether the IT platforms at the commencement of the AMI rollout were significantly different, in our view this is a factor that the AER should consider in its benchmarking of AMI technology costs.

4.3 Regulatory changes

In response to the increased rate of customers refusing an AMI meter, in November 2012 the Victorian distributors and the Department of Primary Industries developed a Customer Issues Management Protocol to establish principles for dealing with customer complaints and to ensure a consistent approach to completing the rollout. The Customer Issues Management Protocol incorporated three streams of issues management. These steps include:

- The pre-installation provision of information about the program and two letters detailing the installation process, and the installation date, forty days and ten days prior to installation;
- In the event of a customer refusal, assign a customer service specialist to engage with the customer, provide more detailed explanations and references to information sources, allowing two weeks for the customer to digest the information, followed by a follow up consultation; and
- In the event of a continuing refusal, assign a case manager to assess the customer's concerns and utilise the following options:
    - Option 1: offer to speak to a technician or internal specialist
    - Option 2: offer face-to-face engagement where possible
    - Option 3: consult with industry peers or representatives
    - Option 4: onsite technician visit and exploration of technical alterations.

This process resulted in increases in customer management related costs and overheads in 2014.

Since it was put in place, there have been multiple amendments made to the OIC reflecting various policy changes that were implemented after the review of the Program in 2011. The most significant changes occurred in 2012 and 2013 and brought about more stringent regulatory requirements and costs, required considerable regulatory oversight including new treatment of above-budget expenditure. These costs were unforeseen at the time that the budget was determined in 2011.

More recent changes have included the application of a customer rebate, payable when the installation of a working meter was not completed in time, and the amendments made to the cost recovery prudency criteria, discussed in section 2.4.

These changes, while designed to improve the economic outcomes of the AMI Program, have contributed to increases in AusNet Services' AMI costs, particularly regulatory team costs. We note that the costs associated with the customer rebate, which have been approximately $37 million for AusNet Services, are not able to be recovered from customers.

4.4 Conclusion

This chapter has outlined a range of factors that contributed to AusNet Services' excess expenditure in 2014 and 2015 which were largely external to AusNet Services' decision making and control of the program.

While external factors are responsible for some of the excess expenditure in 2014 and 2015, other factors have also increased costs. These include the overall management and governance of the AMI Program, the way that particular unforeseen challenges were dealt with, and the forecasts underpinning the original budget which were made in early 2011.

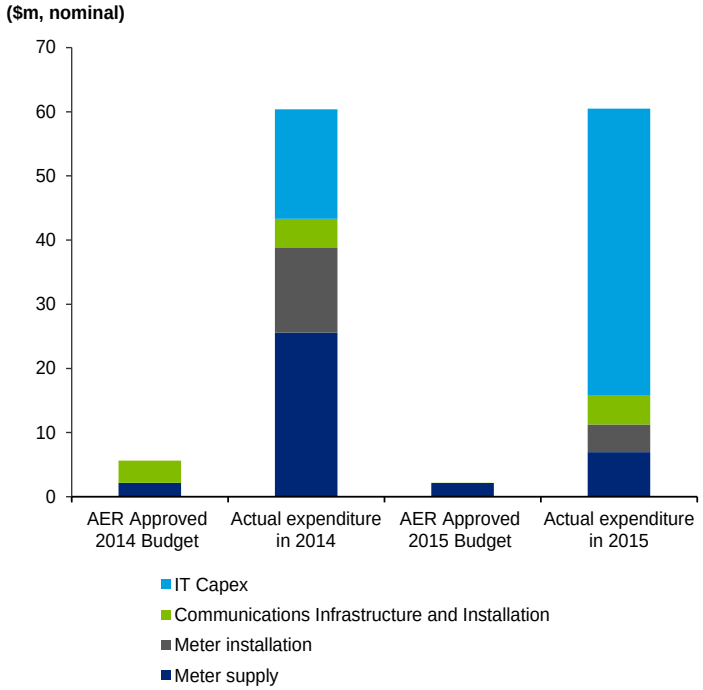
In a program of the scale, scope and complexity of the AMI rollout, it is difficult to link cause and effect in relation to delays and cost increases, particularly when so much of the program is interlinked and when so many complex challenges have emerged. As a result, it is difficult to identify the precise source of cost increases across some categories of expenditure. Accordingly, our approach has been to understand the broad issues that emerged during the AMI rollout and consider the evidence for links between these issues and the excess expenditure in 2014 and 2015.

5 Expenditure category analysis

AusNet Services' total AMI expenditure exceeded the AER's approved budget by approximately $82.5 million in 2014 and $83.4 million in 2015.

The majority of this excess relates to capital expenditure.

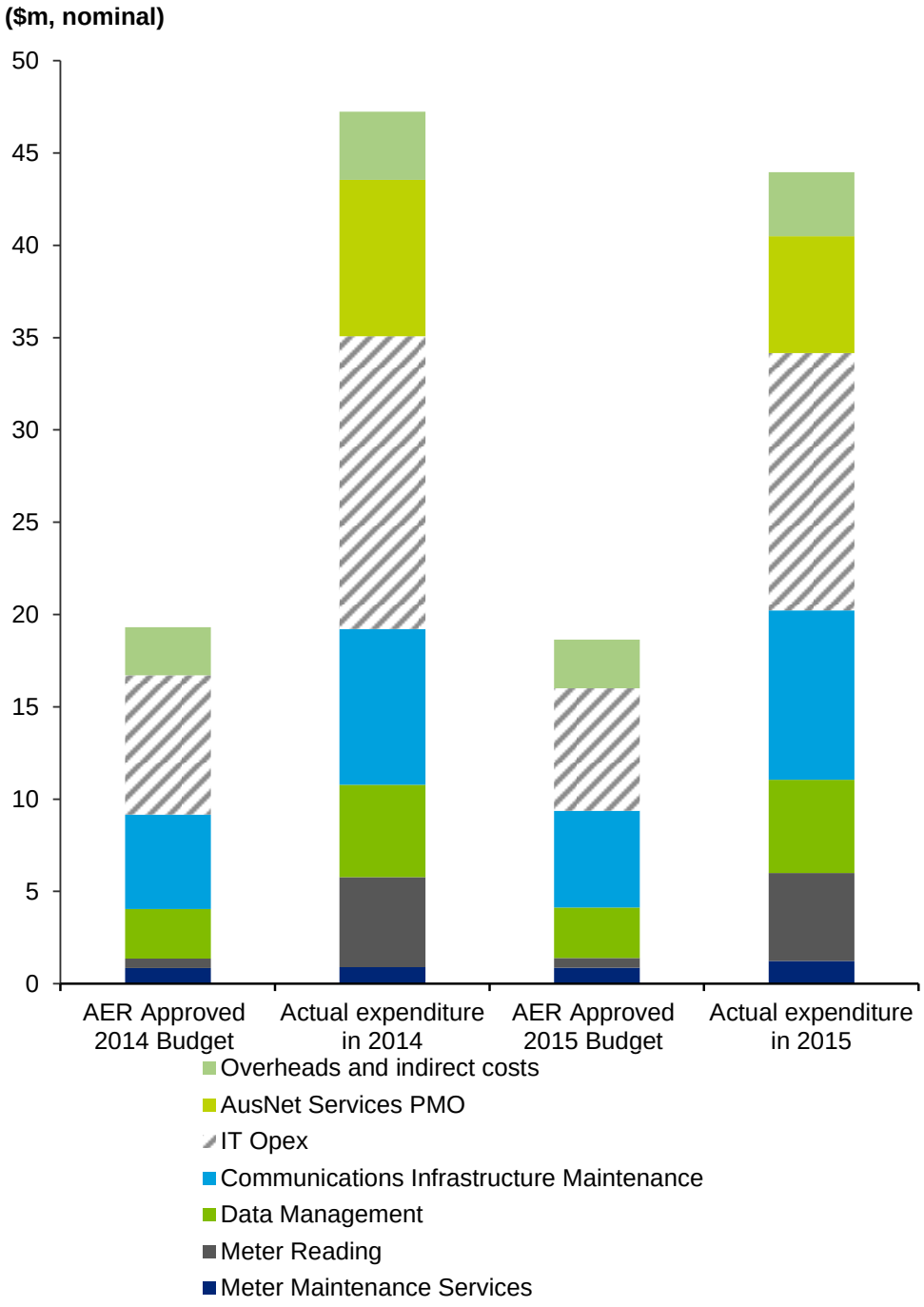
Figure 5: Comparison of 2014 and 2015 capital expenditure against the AER budget ($m)



Source: AusNet Services

Operating expenditure also exceeded the AER's approved budget in 2014 and 2015.

Figure 6: Comparison of 2014 and 2015 operating expenditure against the AER determined budget ($m)



Source: AusNet Services

The following sections present information on the drivers of this excess expenditure.

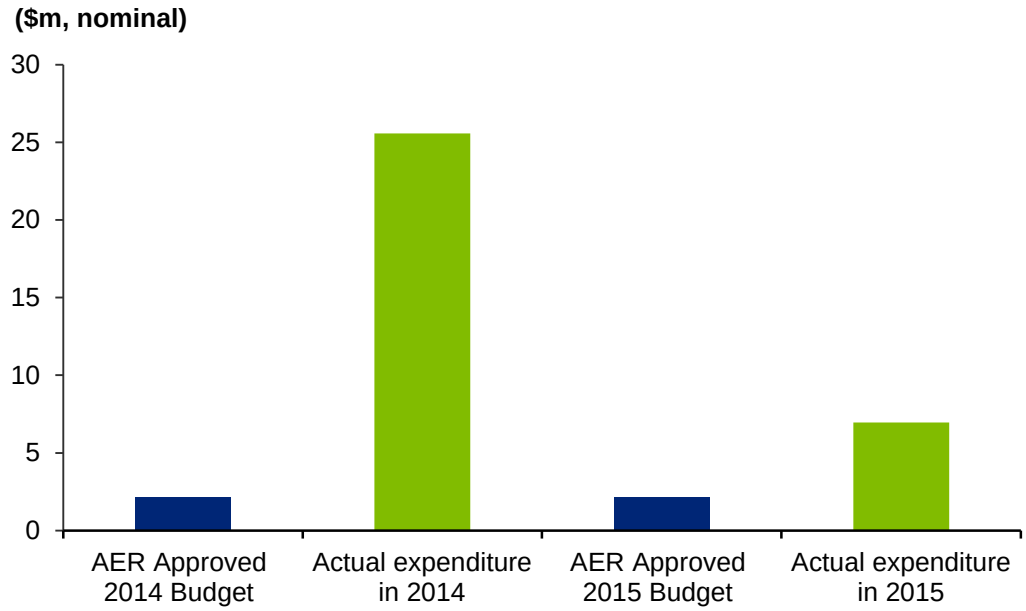
5.1 Capital Expenditure

5.1.1 Meter supply capital expenditure

Meter supply capital expenditure relates to the procurement of meter hardware, communications (comms) cards and antennas.

As shown in Figure 7 below, meter supply capital expenditure in 2014 significantly exceeded the AER budget of $2.2 million by $23.4 million. For 2015, meter supply costs exceeded the AER budget of $2.1 million by $4.8 million.

Figure 7: Comparison of 2014 and 2015 meter supply expenditure against the AER determined budget ($m)



Source: AusNet Services

5.1.1.1 Discussion

The key reasons for the 2014 overspend were:

- Delayed comms card delivery
- Greater use of infill technology

The key reason for the 2015 overspend was the purchase of a greater number of meters and comms cards than forecast. AusNet Services has decided not to seek to recover the proportion of its 2015 excess expenditure associated with mesh comms cards.

In identifying the drivers of excess expenditure in this category, Deloitte has reviewed the following:

- AER budgeted meter volumes[15]
- AER determined total meter supply budget (including comms card costs)[16]
- AER amendments to AusNet Services' foreign exchange allowance[17]

[15] AER 2011, Final Determination: Victorian AMI 2012-15 budget and charges, table 2.6, p.56.
[16] Ibid, p.122.

- AusNet Services' allocation of the additional foreign exchange allowance provided by the AER amendment[18]
- Actual meter supply volumes and expenditure[19]
- AER data detailing the mesh comms card and antenna unit costs used to determine the meter supply budget for 2012-15[20]
- Details of signed contracts (dates, prices, length) with the following suppliers:
    - Landis & Gyr (Meters and WiMAX comms cards)
    - Ericsson (3G comms cards)
    - Panorama (Antennas)
    - Silver Spring Networks (mesh communication cards, antennas, access points and relays.

Delayed capital expenditure

The key reason for the delay in purchasing comms cards and antennas was technical performance issues. However, the delay in the mass rollout (discussed in Chapter 4) contributed to the delay in AusNet Services completing its metering rollout.

AusNet Services' AMI budget for meter supply in 2014 and 2015 was based only on capex for new connections, as it was originally expected that the mass rollout would have been completed in 2013. With the effective extension of the rollout timeframe in the OIC changes in 2013, and acknowledging the drivers of delay during the rollout period, the original assumptions on which the AER's 2014 AMI meter supply budget was determined were no longer valid.

The AER's budget allowed for 10,112 metering units to be purchased in 2014, and 9,852 metering units to be purchased in 2015. The AER's budget was based on an implied nominal unit cost of $214 and $216 per meter in 2014 and 2015 (including comms cards, antennas and meter hardware).[21]

While the majority of AusNet Services' budgeted AMI meters (90%) had been installed by January 2014, the rollout of comms cards and antennas continued in 2014 and 2015. As some meters were installed without comms cards in 2009-13, AusNet Services needed to return to those sites and install communications cards in 2014 and 2015. AusNet Services purchased the comms cards and associated antennas in 2014 and 2015, some of which were also warehoused over that period, incurring additional costs.

In 2015, AusNet Services undertook a higher number of new connections than forecast in the AER's budget, installing AMI for 14,925 new customers compared to a forecast of 9,852. In addition, AusNet Services replaced 3,319 faulty meters, and purchased an additional 4178 meters which were not installed (building up meter stores).

These factors contributed to higher meter supply costs in 2015.

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[17] AER 2013, Final Decision AMI review SPI Electricity Pty Ltd 2012-15 budget and charges applications: amendments pursuant to the Australian Competition Tribunal's Orders, p.122.
[18] Provided by AusNet Services
[19] Provided by AusNet Services
[20] Provided by AusNet Services
[21] Provided by AusNet Services.

Greater use of infill technology and increased unit costs

AusNet Services has advised that the majority of the excess meter supply costs in 2014 ($20.8 million) are associated with the purchase of 3G comms cards, which were planned to be used as infill technology where the primary communications technology was unable to provide a signal due to geographic limitations.

The AER's final budget for AusNet Services' meter supply was based on 3G infill technology coverage of 3%.[22] While AusNet Services had forecast a requirement for 15% 3G coverage in developing its proposed AMI budget, this lower proportion was selected by the AER as it is equivalent to Powercor's coverage of 3G infill technology in its AMI rollout. As the only other rural DNSP in Victoria, Powercor was selected by the AER as the most relevant comparator for AusNet Services' AMI rollout, in terms of the nature and size of AusNet Services' business.

In 2013, AusNet Services commissioned 'WeDoIT Consulting' to provide a comparative analysis of the variation in terrain roughness and property density between its network area and Powercor's network area.[23] Terrain variability affects the performance of AMI communications technology. A more mountainous terrain presents barriers to signals and reduces communication performance. Property density is another measure of the 'serviceability' of communications technology.

WeDoIT Consulting noted that serviceability is a measure of the challenges of wireless network connection in a given area, and therefore the associated costs.[24]

By examining the slope variability and density per square kilometre, WeDoIT Consulting developed a 'Servicability Index Matrix', which rates a large proportion of the land within AusNet Services' area as 'difficult.'

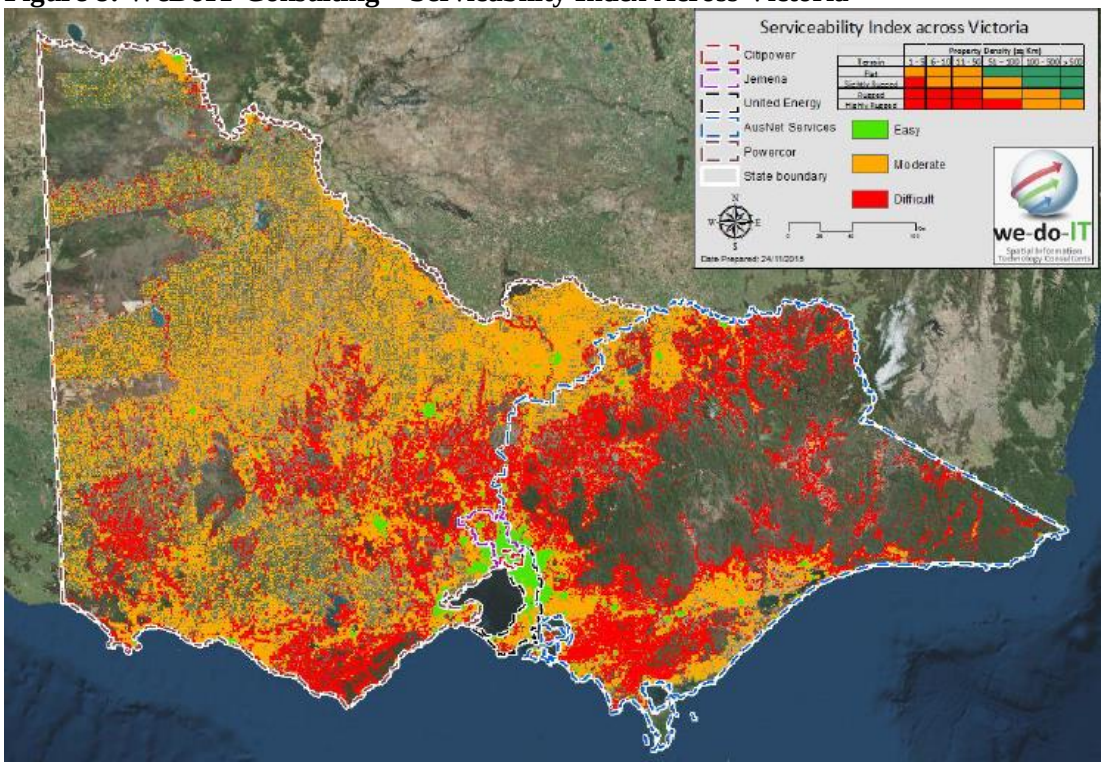
In 2015, AusNet Services engaged WeDoIT to extend its analysis to assessing the terrain of the other Victorian DNSPs. The results are presented in the following figure.

[22] AER, SP AusNet AMI 2012-15 Remittal, p.36.

[23] WeDoIT Consulting, SP AusNet PowerCor Region Terrain comparison Project- Project Report, 2013, p. 7.

[24] WeDoIT Consulting, SP AusNet PowerCor Region Terrain comparison Project- Project Report, 2013, p. 7.

Figure 8: WeDoIT Consulting – Servicability Index Across Victoria



Source: WeDoIT Consulting, Electricity Distributors Terrain comparison Project- Project Report, 2015, p. 7.

Overall, WeDoIT Consulting identified that the proportion of 'rugged to highly rugged properties' is approximately 16% for the AusNet Services region (120,000 properties) and only 5% across the Powercor region (43,000 properties). It found that 74% of the 'rugged to highly rugged' properties are within AusNet Services' region, and the proportion of properties with difficult serviceability in AusNet Services' area is 10%, compared to Powercor's proportion of 5%.[25]

Data provided by AusNet Services on the number of 3G comms cards purchased in 2014 suggests that actual 3G infill coverage required in its AMI network is 18%. This is six times higher than the AER's assumed proportion of 3%. AusNet Services' 3G comms cards exceeded the AER's budget for comms cards by approximately $100 per unit.

We note that in AusNet Services' 2015 Financial Report for the ASX, it recorded a write off for its investment in relation to WiMAX and 3G communication cards for smart meters that would no longer be used under their current program.[26] We note that while the write off of purchased technology is unfortunate, technical challenges of the nature experienced by AusNet Services are part of the risk of large, unprecedented technology investment programs such as the AMI rollout.

Breakdown of excess expenditure

In its Final AMI Budget Determination, the AER decided that an aggregated meter unit cost (incorporating meters and communications modules) was an appropriate approach to

[25] WeDoIT Consulting, Electricity Distributors Terrain comparison Project- Project Report, 2015, p. 9-11.

[26] AusNet Services, *Results for Announcement to the Market Year Ended 31 March 2015,* p.65.

setting the approved budget.[27] For 2014, the aggregated meter unit cost determined by the AER was $214, and for 2015 it was $216.

As shown in Table 3, using the AER approved unit costs, $10.7 million of the $23.4 million expenditure excess for 2014 can be attributed to a larger proportion of 3G comms cards purchased than expected. The remaining $8.3 million in expenditure excess relates to the purchase of additional comms cards above the AER budget, associated with the delay in the AMI rollout. AusNet Services is not seeking cost recovery for the proportion of these cards which were WiMAX ($0.85 million).

For 2015, the majority of the excess expenditure related to the purchase of mesh comms cards. AusNet Services has identified this cost is associated with the switch to mesh and is therefore not seeking to recover this expenditure excess from customers. The remaining excess expenditure is associated with the purchase of a greater number of meters than budgeted, which was offset by lower meter unit costs achieved in 2015.

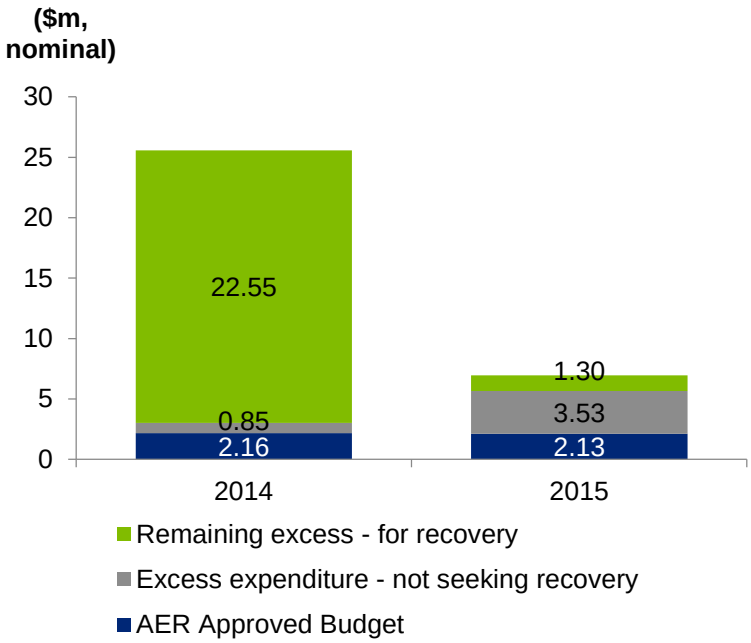
Table 3: Breakdown of AusNet Services Excess meter supply expenditure in 2014 and 2015 ($m)

Nominal $M	$m, 2014	$m,2015
AER Final Determination Budget	2.16	2.13
Excess incurred due to more meters purchased	-	2.71
Excess incurred due to additional communications cards purchased (at AER approved unit cost)	10.74	3.53
Excess incurred due to greater proportion of 3G infill technology required at a higher cost	11.82	-
Excess incurred due to WiMAX comms cards	0.85	-
Difference due to lower meter unit costs	-	-1.41
Total meter supply expenditure	**25.57**	**6.96**

The following graph provides a breakdown of the AER budget, excess expenditure being sought and costs for which AusNet Services is not seeking recovery, due to it being associated with WiMAX or mesh communications.

[27] AER 2011, Final Determination: Victorian AMI 2012-15 budget and charges, p.85.

Figure 9: Expenditure breakdown ($m)



Source: AusNet Services

5.1.1.2 Conclusions

Almost all of the excess expenditure being sought by AusNet Services in this category relates to the need to purchase more 3G communications than originally forecast. 3G is more expensive than either mesh or WiMAX. As noted above, the AER budget for AusNet Services' meter supply capex appears to be based on a benchmark of infill technology required by Powercor. In our view, and supported by the analysis carried out by WeDoIT Consulting, the AER's benchmark for infill technology was insufficient for AusNet Services' network area.

AusNet Services' need for a greater proportion of 3G infill technology than Powercor is associated with two factors:

- The relative terrain roughness and property density of its network area compared to Powercor, as reported by WeDoIT Consulting, which is relevant to the identification of an appropriate benchmark efficient entity (consistent with clause 51.8A of the OIC).
- The performance of the WiMAX technology, which required a greater infill technology support than expected at the time AusNet Services' AMI budget was forecast and determined by the AER. This relates to the state of the AMI technology (consistent with clause 5I.8(d) of the OIC).

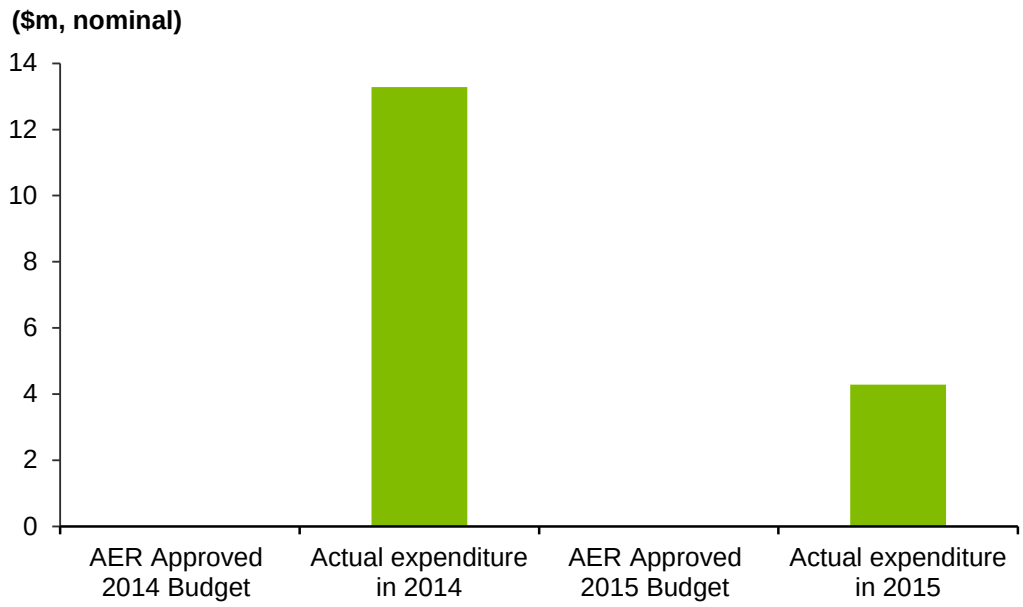
5.1.2 Meter installation capital expenditure

Meter installation capital expenditure relates to costs associated with:

- Normal installation
- Wasted visits
- Antenna installation
- Meter board repair and replacement.

As shown by the figure below, the AER did not approve any expenditure for meter installation in 2014 and 2015, as at the time the budget was determined it was expected the mass rollout would be complete.

Figure 10: Comparison 2014 and 2015 meter installation expenditure against the AER determined budget ($m)



Source: AusNet Services

5.1.2.1 Discussion

The primary drivers for AusNet Services' expenditure on AMI meter installation in 2014 include:

- Delayed capital expenditure: the delays and challenges that the AMI Program experienced during 2011 and 2012, driven by policy uncertainty and customer backlash to the AMI Program. Substantially fewer than expected meters were installed in 2011 and 2012, which meant that many more meters than expected needed to be installed in the later years of the program, particularly late 2013 and 2014.
- Delayed delivery of communications cards: AusNet Services' demand for 3G comms cards was greater than originally anticipated, and 3G product testing took longer than planned. Due to the rollout timetable required by the OIC, AusNet Services

continued to rollout meters without comms cards in 2014, which required it to revisit around 7,000 premises later in 2014. Despite the need to revisit premises, AusNet Services' total cost per completed meter installation was still below the AER's benchmark cost.

In 2015, the key drivers of AusNet Services' meter installation expenditure were:

- Replacement of 3,319 faulty meters
- Installation of 8,833 mesh communications cards, for which AusNet Services is not seeking cost recovery.

In identifying the drivers of excess expenditure in this category, Deloitte has reviewed the following:

- AER budgeted installation volumes[28]
- AER determined total meter installation budget[29]
- Total installation costs and monthly volumes for installations conducted by Electrix, Ozwide and Select Solutions.[30]

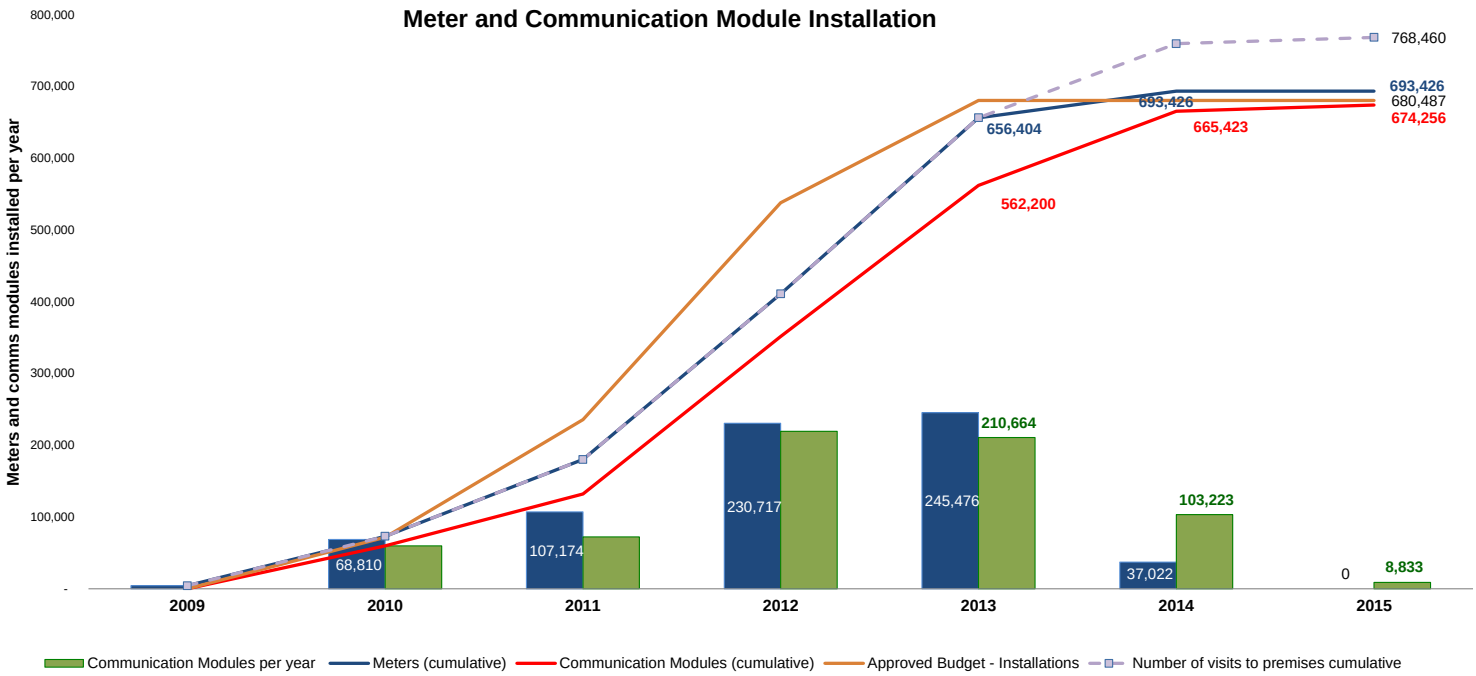
Delays in capital expenditure and 3G comms card delivery

As shown in Figure 11 below, in the early years of the AMI Program there was a substantial divergence in the actual number of installations performed compared to the number of installations envisaged in the AER budget. The rollout never fully recovered from the 2011 and 2012 delays, and required installation activities to extend into 2014 and 2015, triggering the excess expenditure.

In 2014, as the 3G comms cards became available, AusNet Services revisited premises to finish the rollout, eventually exceeding the number of visits to premises expected in its AMI budget. As discussed above in relation to meter supply costs, in 2015 AusNet Services installed meters for a higher number of new customers and meter faults than was originally forecast in the AER's budget.

[28] AER 2011, Final Determination: Victorian AMI 2012-15 budget and charges, p.22.
[29] Ibid, p.122.
[30] Provided by AusNet Services.

Figure 11: Installations of AMI meters and comms cards – 2009-15



Source: AusNet Services. Note: Excludes forecast meters for new connections.

The AER's 2012-15 AMI budget allowed a unit cost per installation of $116. In its review of AusNet Services' 2013 Excess Expenditure Application, the AER's consultant Energeia recommended a higher benchmark cost per installation of $151 ($2013). This higher unit rate was based on its review of the other Victorian DNSPs' costs, the market for installers and travel times.[31] It was accepted by the AER.

Despite its higher than expected number of visits to premises, AusNet Services' cost per completed meter installation (including the revisit costs for some comms cards) over the entire rollout period was 9% below the AER's benchmark cost of $151 per completed installation. In total over the 2009-15 AMI rollout period, AusNet Services' average installation cost per completed meter (including revisits to install comms cards) was $138.15.[32] This suggests that AusNet Services' AMI meter installation was substantially more cost effective than the benchmark determined on the basis of the costs incurred by the other Victorian DNSPs.

[31] Energeia 2013, p. 25.

[32] Information provided by AusNet Services.

Table 4: Meter installation unit cost analysis

	AER Budget	AusNet Services actual
Total installation budget ($m, nominal)	$76.7	$96.8
Total meters installed (completed sites)	680,487	700,805
Total visits to premises	680,487	768,460
Unit cost per completed installation ($, nominal)		$138.15
Difference – AusNet Services efficiency saving on AER benchmark of $151		-9%

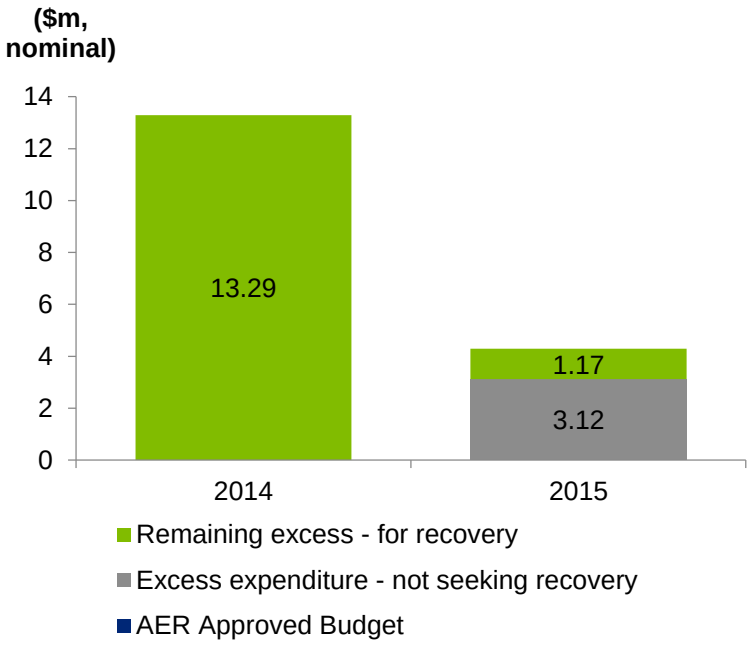
Source: Deloitte analysis of data provided by AusNet Services

All of the excess expenditure for meter installation can be attributed to a larger number of meters and comms cards installed than expected in 2014 and 2015.

However, AusNet Services has identified that a proportion of the excess expenditure in 2015 ($3.1 million) was associated with the installation of mesh radio comms cards, for which it is not seeking cost recovery.

The following figure provides a breakdown of the AER budget, excess expenditure being sought and that which AusNet Services has excluded, due to it being associated with remediation activities, WiMAX or mesh communications.

Figure 12: Expenditure breakdown ($m)



Source: AusNet Services

5.1.2.2 Conclusions

Delays in the AMI Program in 2011 and 2012 impacted the rate at which AusNet Services' AMI installation costs were incurred, with a significant number of meter installations being required in the later years beyond the budgeted allowance. While the challenges faced by AusNet Services in its communications technology and in the timely supply of 3G infill

comms cards led to it revisiting some premises in 2014, despite the additional travel and installation time per site that this required, the total cost per completed installation is 9% below the AER's accepted benchmark cost of $151 per installation. This consideration is relevant to the prudency criteria in clause 5I.8A of the OIC, being 'the expenditure of a benchmark efficient entity over the entirety of, or any part of, the initial regulatory period.'

The nature of the rollout obligation (clause 5I.8(c)) is also relevant to this cost category, as significant delays were caused by the policy uncertainty and the customer issues surrounding the AMI Program. Delays caused by the delivery of 3G cards are also associated with the nature of the rollout obligation under the OIC timetable. In addition, the inherent risks in the AMI project (clause 5I.8(e)) are important considerations as the issues relating to meter procurement are inherent risks of projects such as the AMI rollout, particularly given the mandatory nature of the project timeline.

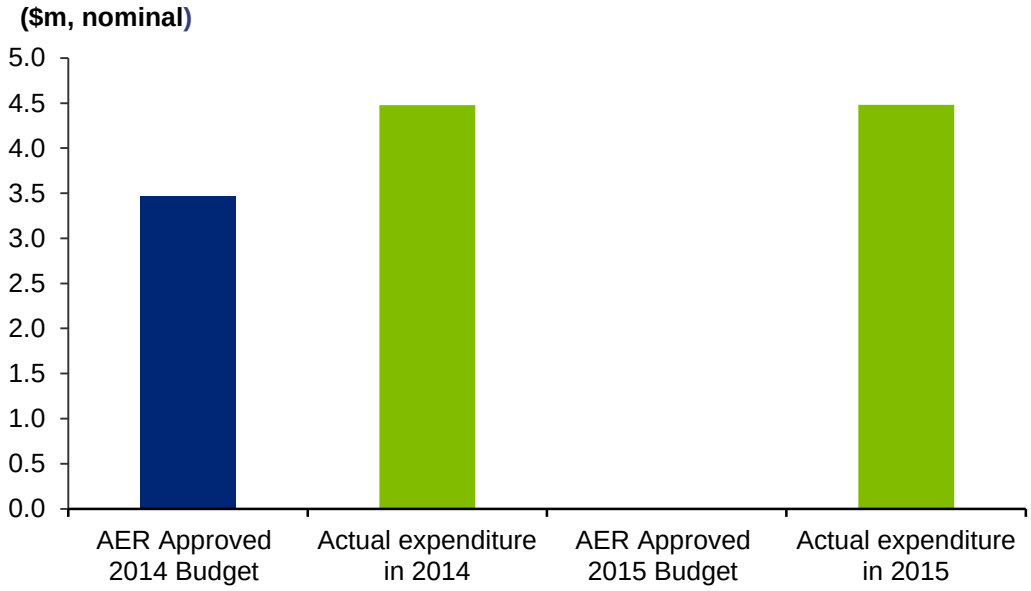
5.1.3 Communications infrastructure and installation capital expenditure

Communications infrastructure and installation capital expenditure relates to the costs of constructing communications network infrastructure, including:

- Site acquisition
- Architectural design
- Site build
- MPLS install

As shown below, communications infrastructure and installation capital expenditure exceeded the AER budget in 2014 and 2015 by $1.0 million and $4.5 million respectively. No communications infrastructure budget was provided in 2015.

Figure 13: Comparison of 2014 and 2015 communications infrastructure and installation capital expenditure against the AER determined budget ($m)



Source: AusNet Services

5.1.3.1 Discussion

AusNet Services has advised that its excess expenditure on communications infrastructure and installation capex in 2014 and 2015 is associated with its WiMAX communications technology and implementation of mesh communications in 2015. Accordingly, AusNet Services is not seeking cost recovery for this excess expenditure and therefore we have excluded this category from our review.

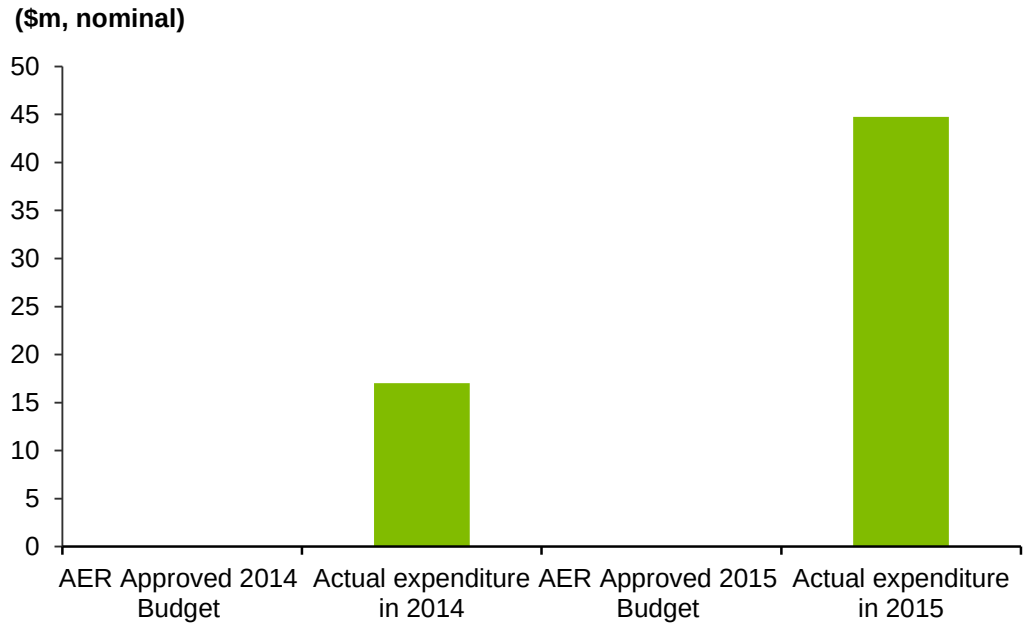
5.1.4 IT capital expenditure

IT capital expenditure relates to costs incurred in building IT systems, including:

- Hardware
- Platform software licences and maintenance
- System integration and software customisation
- Asset and network management systems
- Workforce scheduling and mobility
- Connection point management systems
- Outage management systems
- Meter data management systems
- Performance and regulatory reporting systems
- Program support systems

As shown by the figure below, the AER did not approve a budget for IT capital expenditure in 2014 and 2015, as it was expected the AMI rollout would have been completed. AusNet Services incurred IT capex costs of $17.0 million in 2014 and $44.8 million in 2015.

Figure 14: Comparison 2014 and 2015 IT capital expenditure against the AER determined budget ($m)



Source: AusNet Services

5.1.4.1 Discussion

As we noted in our report on its 2013 AMI Excess Expenditure, AusNet Services experienced significant challenges in establishing its IT platforms for the AMI systems. Most notably, issues surrounding AusNet Services' implementation of new a Meter Data Management (MDM) system, new communications infrastructure and the high number of meter exchanges contributed to systemic issues with the data delivery processes. Due to the data issues, AusNet Services paused logical conversion of meters in late 2013.

In early 2014, following AusNet Services' provision of market data from its AMI meters, AEMO undertook a compliance assessment on AusNet Services' data quality (and resultant impact to market) in accordance with their Service Provider Compliance Assessment and Deregistration Procedure. On 12 March 2014, AEMO issued AusNet Services a level one breach, which is defined as a breach which causes a "material impact" on the National Electricity Market and constitutes an on-going risk to the ability of AEMO (and other participants) to undertake market business efficiently, or remain compliant to the National Electricity Rules. If a level one breach is found (and the DNSP cannot resolve the breach) AEMO may take action including for example in the most extreme circumstances deregistration of AusNet Services as a Meter Data Provider.

The following corrective activities were undertaken as part of the rectification of AusNet Services' meter systems:

- Correction and implementation of nine system defects, preventing further exceptions occurring;
- Implementation of six new IT system improvements, preventing further exceptions from occurring, and resolving existing exceptions with impacts to meter data; and

- Development and implementation of four new business processes to prevent and resolve exceptions, and manage impacts to both AEMO and Market Participants.

Following AEMO's assessment of AusNet Services' performance, compliance and actions taken following the breach, AEMO withdrew the level 1 breach on 23 September 2014.

AusNet Services has identified that the circumstances surrounding the breach incident and the rectification of the AMI systems were associated with its choice of AMI communications technology. Accordingly, AusNet Services is not seeking cost recovery for the remediation IT capex costs it incurred in 2014 and 2015, which amount to $8.1 million and $6.7 million respectively.

AusNet Services identified the activities associated with remediation which have been excluded from its excess expenditure application. We reviewed a list of the activities AusNet Services identified by AusNet Services from its financial systems, which appear to be based on remediation tasks. While we have not carried out a detailed inspection of AusNet Services' financial records or systems, we consider that the overall approach it took to identifying affected activities is reasonable, noting the difficulty of linking cause and effect in the AMI rollout.

The remainder of the excess expenditure on IT capex in 2014 ($9.0 million) is associated with activities with a greater scope than originally expected, or were not reflected in AusNet Services' AMI budget. These include:

- Customer Information System (CIS) expenditure, which relates to the portion of the CIS allocated to the AMI program. This includes application development and test planning and execution. In 2014, AusNet Services undertook more of these activities than it anticipated.
- Network management system (NMS) expenditure which comprises the communications network management and meter management systems (MMS). In 2013 and 2014, AusNet Services undertook a range of tasks which were not anticipated in its original budget, which related to:
    - The implementation of event management, performance management, fault management and correlation management of the NMS;
    - The implementation of High Availability and Disaster Recovery (HADR) requirements;
    - Application design and design validation of existing communication network; and
    - Alignment of build outcomes to AMI solution architecture and operational support.
- IT infrastructure upgrades to address the high computing and system availability requirements of the AMI solution and other enterprise applications.
- Quality assurance, including an independent review of the AMI solution to ensure optimisation of AMI meters and associated data to meet the meter data provider and the OIC specifications. This activity led to a greater understanding of IT system and infrastructure behaviour and underlying solution redundancy and fault tolerance.

In addition to the remediation expenditure, AusNet Services identified $15.5 million of IT capex in 2015 which was associated with its WiMAX communications technology. AusNet

Services has also excluded this expenditure from its excess expenditure application. AusNet Services has identified that the remaining $22.5 million of IT capex in 2015 is associated with the activities outlined in the following table.

Table 5: IT capex activities in 2015 associated with excess expenditure

Activity	Scope of works in 2015	$M
SAP Customer Information System (CIS) Application migration	Migrate the SAP Customer Information System (CIS) applications to the converged infrastructure platform, delivering operational resilience through the introduction of virtualised environment and providing a stable platform for the AMI applications. This activity provides reliable backup and recovery features as well as improves reliability to ensure systems are available for daily operations. This activity also addresses end of life issues with operating system components.	3.4
Migration of the Enterprise Application Integration (EAI)	This activity involved AusNet Services migrating, redesigning and reinstating its key integration application, Enterprise Application Integration (EAI). This activity was particularly challenging due to the integral role this application plays and in particular the dependency on keeping the existing logically converted meters operational in the market on a daily basis. This migration improved business processes, enabled improved processing of data, improved communications card fault processes and enables remote services capability. The activity is required to provide sustainable and compliant AMI systems. The migration increased the application's processing time, improved its messaging capabilities and removed single point of failure.	3.6
Migration of, and minor Business As Usual (BAU) upgrades to the Meter Data Management System (MDMS)	This activity involved migrating the Meter Data Management System (MDMS) application to the new infrastructure platform as well as implementing Business As Usual (BAU) releases to improve business processes, in particular relating to new standing data synchronization which improves the data quality and reduces exceptions and manual intervention overtime. There was also a requirement to reinstate the integration to AusNet Services' network billing system, Kinetiq. This IT capex cost was significant due to the central role the MDMS plays in AusNet Services' metering systems and daily metering data processing activities. This means the MDMS is one of the most connected systems within AusNet Services. On top of the challenges and complexities brought about by this central role, AusNet Services' MDMS system has been historically inflexible and as a result, changes are difficult, require custom codes and a tremendous amount of testing governance to ensure this critical system does not fail.	8.2
Migration of the Meter Management System (MMS)	This activity involved migrating the Meter Management System (MMS) to the new infrastructure platform as well as making minor BAU changes to improve communication card fault processes and enable remote services capability. This activity is required to provide sustainable and compliant AMI systems. The activity ensures that the solution is more efficient and facilitates the lifecycle replacement of ageing servers and infrastructure.	2.3
Reporting and monitoring upgrades	This activity involved making improvements and additions to reporting and monitoring of AMI systems, including an upgrade of current operational dashboards, additional minimum compliance reporting and a dashboard for the Communications Network Monitoring System (CNMS). This activity improves AusNet Services' ability and capability to	4.2

	monitor its AMI systems. Due to the complexity of the AusNet Services' AMI infrastructure and the requirement to have comprehensive reporting that enabled fast and effective identification of issues, the cost of the reporting tool were significant.	
Establishment of a stress and volume testing environment	This activity creates a dedicated stress and volume testing environment for AMI systems, instead of having to perform stress and volume testing in the respective IT application or system. This environment can be utilised by other AMI systems, providing cost efficiencies. The requirement surrounding this activity was greater than originally anticipated.	0.8
Total		**22.5**

Source: Data provided by AusNet Services.

As we noted in our review of AusNet Services' 2013 excess expenditure, some of the challenges that it faced in rolling out AMI IT capex were associated with the communications technology and some were associated with overall system integration problems and discrete issues with particular systems. Consistent with our approach to reviewing 2013 excess expenditure, we have not carried out a detailed review of the technical challenges which have in part driven AusNet Services' expenditure excess in IT capex as this would require an extensive investigation which is beyond the scope of our analysis. However, we have reviewed documents prepared by AusNet Services at various points in the rollout which identify the considerable challenges it has faced and the decisions which it has made to resolve issues. There have been a number of internal and external reviews of AusNet Services' AMI IT architecture which have sought to resolve major difficulties in system performance and integration. Some of these difficulties have resulted in expenditure that was not anticipated at the time the 2012-15 budget was determined.

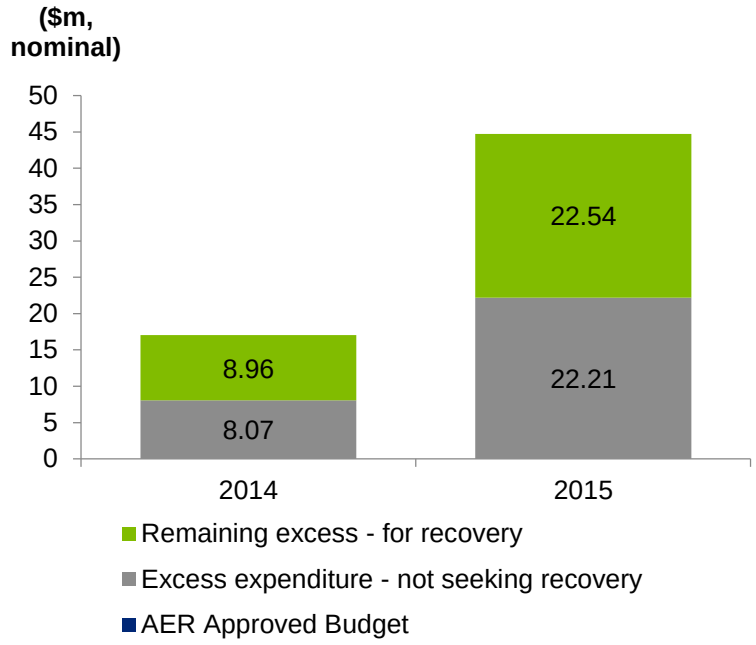
The timeframes for the AMI program including the delivery of daily meter data for the installed meters which were mandated in the OIC required AusNet Services to quickly resolve complex problems. In the meantime, AusNet Services was required to continue to operate its manual meter reading and meter data services to ensure that it met its market requirements under the National Electricity Rules. This has resulted in adverse outcomes and cost overruns. For example, short term workarounds to problems were implemented to meet market requirements, but doing so caused cost increases over the longer term.

As we highlighted in our earlier report, not all of the problems faced by AusNet Services have been associated with technical issues and some were associated with project management of the IT capital program.

Given the nature and extent of the AMI Program and its impact on AusNet Services' business, it is difficult to accurately separate the excess costs incurred which were associated with unforeseen technology challenges, cost increases caused by broader economic conditions, program delays caused by factors outside of AusNet Services' control, and AusNet Services' project management of the IT capital program. All of these played a role in the cost increases in this area. However, our review has confirmed that the issues faced are significant in their effect on the rollout and have led to AusNet Services incurring costs over and above the budgeted allowance for the AMI Program.

The following graph provides a breakdown of the excess expenditure being sought and that which AusNet Services has excluded, due to it being associated with remediation activities, WiMAX or mesh communications.

Figure 15: IT capital expenditure breakdown ($m)



Source: AusNet Services

5.1.4.2 Conclusions

We consider that the $9.0 million in 2014 and $22.5 million in 2015 which AusNet Services is seeking to recover are not associated with either remediation activities or the WiMAX communications technology. Instead they are largely associated with the fact that systems were delayed in line with the meter installation schedule, and are costs that had been anticipated earlier. As for other categories of capex discussed above, we consider this delay in expenditure to be a result of a range of factors largely outside of AusNet Services' control, as discussed in Chapter 4.

As described in Table 5, a major driver of the 2015 excess expenditure was the need for AusNet Services to migrate its various applications to a new infrastructure platform, to transition its existing hardware platform that had reached the end of its life. The need to implement a new infrastructure platform and migrate existing applications to it was not anticipated at the time the AMI budgets were determined, as the technology had not yet evolved. AusNet Services has described the new infrastructure platform as providing unmatched reliability, flexibility, automation and performance, which is needed to cope with the volume of data that AMI produces.

Considering the factors in Clause 5I.8 of the OIC, in our view the excess expenditure was driven by:

- Nature of the rollout obligation (5I.8(c)): AusNet Services was required to install new systems to support the AMI meter data, requiring substantial investments in IT capex over the rollout period. Delays in the program and unanticipated technical

problems have led to excess expenditure, which was exacerbated by the mandatory nature of the rollout obligation and the timeframes in the OIC.

- State of the technology (5I.8(d)): the considerable technical challenges faced by AusNet Services in the AMI Program relate to the fact that the technology being employed was cutting edge and implemented at a large scale within a defined timeframe. In addition, the technology for infrastructure platforms evolved during the 2012-15 budget period, and important hardware improvements emerged that had been previously unforeseen. In our view, under such circumstances and in the timeframe for the AMI rollout, cost overruns are not unexpected.
- Inherent risks in the AMI project (5I.8(e)): There are inevitably cost risks associated with a cutting edge technology project, the implications of which are difficult to forecast. Delays in the rollout caused by the review of the program and customer backlash also impacted on the IT capex program, resulting in more costs being incurred in 2014 and 2015 than anticipated.
- Regulatory obligation (5I.8(g)): The requirement for AusNet Services to continue to operate its existing meter data systems at the same time as shifting customers onto the new AMI systems within a defined timeframe has contributed to the problems faced and the cost overruns.
- Project management of the IT capital program.

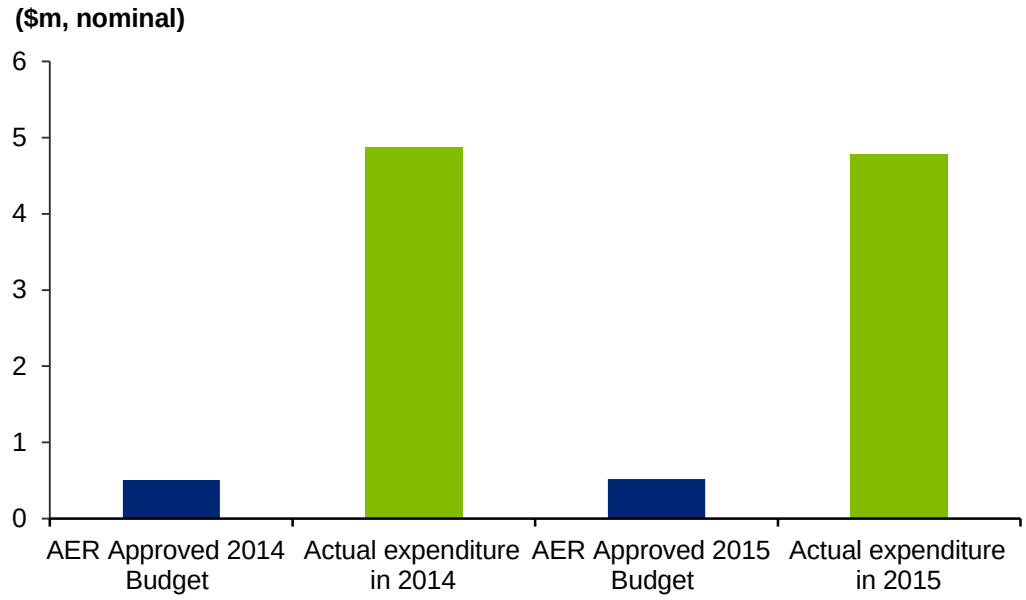
5.2 Operating Expenditure

5.2.1 Meter Reading

Meter reading expenditure relates to the costs associated with the manual reading of meters, including labour and vehicle costs.

As shown below, meter reading expenditure exceeded the AER budget by $4.4 million in 2014 and $4.3 million in 2015.

Figure 16: Comparison of 2014 and 2015 meter reading expenditure against the AER determined budget ($m)



Source: AusNet Services

5.2.1.1 Discussion

The key reasons for AusNet Services' overspend in meter reading activities were:

- Lower than expected reduction in manual meter reading requirements;
- Higher than expected per meter reading costs.

More manual meter reads than expected

The AER's budget for meter reading in 2014 and 2015 was based on the expectation that only a small proportion of extremely remote and rural customers would require manual meter reading on an ongoing basis.

Delays in the earlier years of AusNet Services' AMI rollout, along with technical challenges which prevented the logical conversion of installed meters (discussed in relation to IT costs above), led to a significantly higher proportion of meters requiring manual meter reading than originally expected. As a result, AusNet Services was only able to retire 1% of its manual meter reading routes.

It was anticipated that just under 715 000 of AusNet Services' meters would be logically converted by 1 January 2014. Instead, only 54% (386 000) were logically converted. As at 31

December 2014, around 325 000 extra meters required manual reads and as at 31 December 2015, around 289 000 extra meters required manual reads. This is illustrated in Figure 4 in section 4.2 above.

Higher cost per read than expected

As shown below in Table 6, AusNet Services has exceeded the AER's budget for meter reading opex in every year of the AMI rollout, even in the early years when manual meter reading costs were forecast based on few AMI meters being installed.

Table 6: Variance between AusNet Services' actual meter reading opex and the AER budget between 2009 and 2015 ($m, nominal)

	2009	2010	2011	2012	2013	2014	2015
AER Approved Budget	2.8	3.1	4.1	3.0	2.4	0.5	0.5
Actual expenditure	9.5	9.5	6.2	5.6	6.8	4.9	4.8
Variance	**-6.7**	**-6.3**	**-2.0**	**-2.6**	**-4.4**	**-4.4**	**-4.3**

Source: AusNet Services.

We note that the AER's AMI budget for meter reading was based on AusNet Services' own forecast of meter reading costs for the 2012-15 period, without any adjustments. It is now apparent that this budget was insufficient.

While only a few manual customers were expected to remain, a higher cost per meter read was expected at the time the budget was determined, due to the longer travel distances between the remaining sites. In reviewing AusNet Services' proposed meter reading costs for 2012-15, the AER's consultant, Impaq Consulting, noted:

> *Impaq accepts that as the AMI roll out proceeds, the remaining manually read meters will have a higher proportion of more difficult and thus more expensive sites to read. From June 2014, the remaining meters will be the most remote sites that will remain with manually read interval meters.*[33]

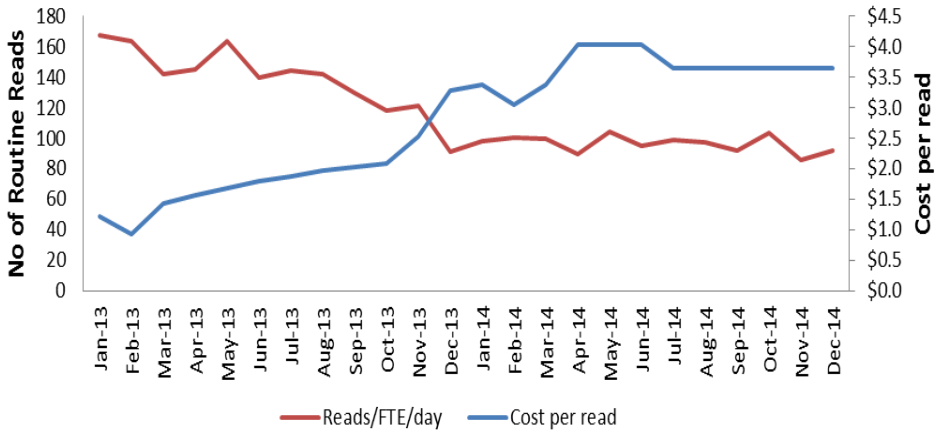
Impaq Consulting recognised that lower density of meters along reading routes would increase the average cost per read.

In addition, the cost per read is affected by the greater proportion of manually read interval meters which take up to 5 minutes to read as compared to Type 6 meters which take approximately 10-20 seconds to read contributed to increasing costs.

As expected, average cost per read increased as the rollout progressed. Although the number of manual meter reads reducing by 60% over 2011-15, the cost per read increased by 157%.

[33] Impaq Consulting, *AMI review 2012-15*, p.130.

Figure 17: Decline in efficiency of routine meter reading



Source: AusNet Services

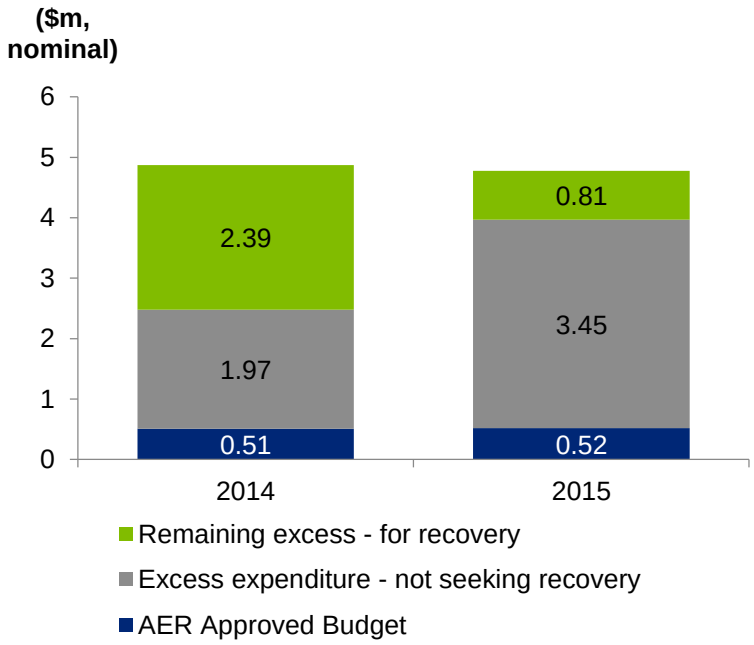
The 2015 AMI budget for meter reading of $519,873 was clearly insufficient, as demonstrated by the AER's recent final determination on AusNet Services' metering costs for 2016-20, which found that actual 2014 meter reading costs of $4.9m ($2014) was an efficient base year cost. Of this, the AER considered that $4.0m was associated with non-recurrent meter reading, due to the continuation of the mass rollout.

AusNet Services has advised that it is only seeking to recover a proportion of its excess meter reading opex for 2014 and 2015, in recognition that failure to logically convert meters is also associated with its WiMAX communications technology. Of the $4.4 million total excess expenditure in 2014, AusNet Services is seeking to recover $2.4 million. This reflects meter reading costs incurred in the first half of 2014, when AusNet Services was working to complete its rollout in line with the extended timeframe.

Of the $4.3 million excess expenditure in 2015, AusNet Services is seeking to recover $810,124 which reflects the difference between the AER's AMI Budget for meter reading and the efficient 2016 meter reading used in the AER's final determination.

The following graph provides a breakdown of the AER budget, excess expenditure being sought and that which AusNet Services has excluded due to it being associated with remediation activities, WiMAX or mesh communications, or being greater than the AER's recent decision on efficient ongoing costs for meter reading.

Figure 18: Expenditure breakdown ($m)



Source: AusNet Services

5.2.1.2 Conclusions

The excess expenditure relating to meter reading opex has been primarily driven by the following factors:

1. Insufficient budget originally forecast for meter reading, demonstrated by consistent excess expenditure even in the early years of the rollout, as well as the AER's recent determination on efficient base year metering costs which significantly exceeds the AMI budget.
2. Delays due to fewer than expected logical conversions of installed meters, which related both to delayed meter capex, installation labour market pressures in the earlier years of the AMI rollout and technical issues including management of the IT program
3. Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout
4. Declining productivity (and rising costs per meter) resulting from lower manually read meter density, to the extent this wasn't already provided for in the AER budget.

As we have noted in the previous section in relation to IT capex, the information we have reviewed suggests that there were a range of challenges faced by AusNet Services in the AMI Program, some of which related to project management of the IT capital program, which have played a part in the fewer than expected logical conversions of installed meters.

Based on the information we have reviewed, we understand that the technical systems integration problems relating to logical conversions were caused by a range of factors, and we note that such technical problems are common in projects of the size and scope of the AMI Program. However, on balance we also consider that it is likely that some aspects of

the IT capital program could have been better managed by AusNet Services, and that this has in part contributed to the excess expenditure in this category.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

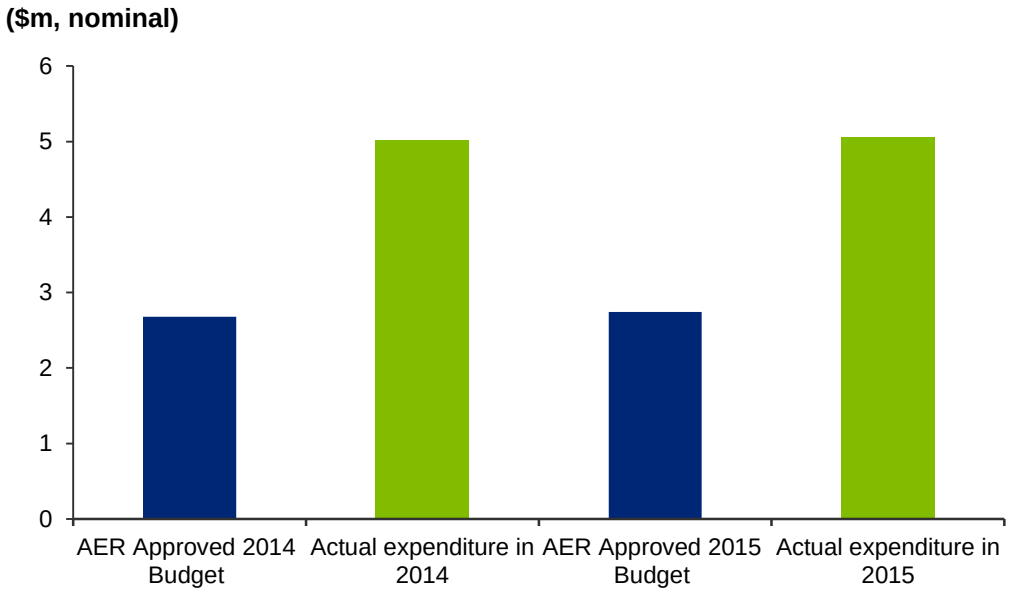
- Nature of the rollout obligation (clause 5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program decreased the density of meter reading routes and contributed to logical conversion delays.
- State of the technology (clause 5I.8(d)): the technical problems with logical conversions.
- Inherent risks in the AMI project (clause 5I.8(e)): The issues relating to meter procurement, installation and technical issues are an inherent risk in projects such as the AMI Program.

5.2.2 Meter data management

Meter data management expenditure refers to activities related to compiling and recording data obtained from meters.

As shown by the figure below, meter data management exceeded the AER budget by $2.3 million in both 2014 and 2015.

Figure 19: Comparison of 2014 and 2015 meter data management expenditure against the AER determined budget ($m)



Source: AusNet Services

5.2.2.1 Discussion

Over the 2009-15 rollout period, AusNet Services incurred an expenditure excess of $3.6 million for meter data management, the majority of which occurred in 2014 and 2015. In the early years of the AMI rollout (2009 and 2010), AusNet Services underspent in this category, in line with its delayed rollout. Similarly, in the first two years of the 2012-15 AMI budget period, AusNet Services underspent its meter data management budget, also in line with its reduced AMI capital spend, to which the general program delay contributed. The

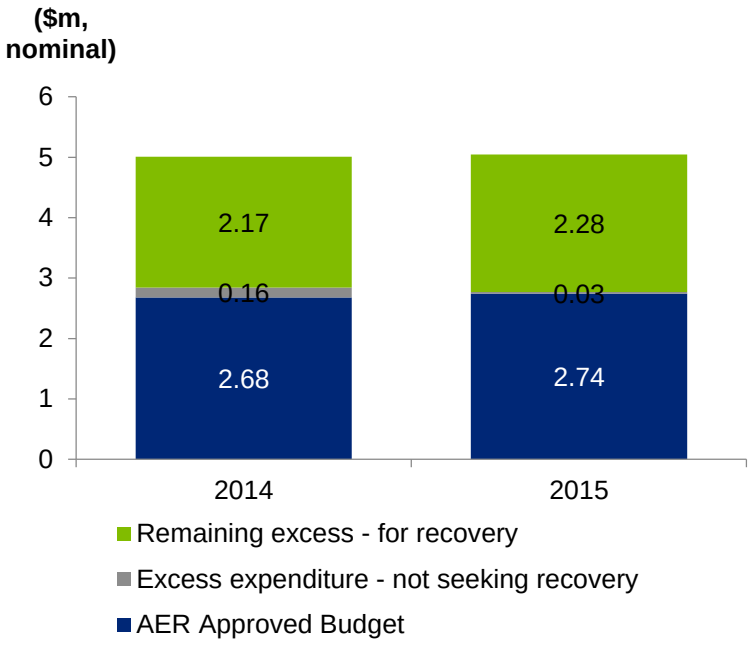
higher meter data management costs in 2014 and 2015 were also associated with technical issues.

The AER's recent final determination on AusNet Services' metering costs for 2016-20 suggests that the AMI budget for meter data management was insufficient. The AER found that AusNet Services' actual meter data management opex of $5.0 million ($2014) in 2014 was efficient. This suggests that the original budget of $2.7 million in 2014 and 2015 was set too low.

AusNet Services is seeking to recover the difference between the original AMI budget and the efficient base year cost in the AER's Determination ($2.2 million in 2014 and $2.3 million in 2015).

The following graph provides a breakdown of the AER budget, excess expenditure being sought and that which AusNet Services has excluded, due to it being above the AER's recent decision on efficient base year costs for meter data management.

Figure 20: Meter data management expenditure breakdown ($m)



Source: AusNet Services

5.2.2.2 Conclusions

The excess expenditure relating to meter data management opex has been primarily driven by the following factors:

1. Insufficient budget originally forecast for meter data management, demonstrated by the AER's recent determination using 2014 costs as an efficient base year
2. Delays in meter capex, and technical issues including management of the IT program
3. Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

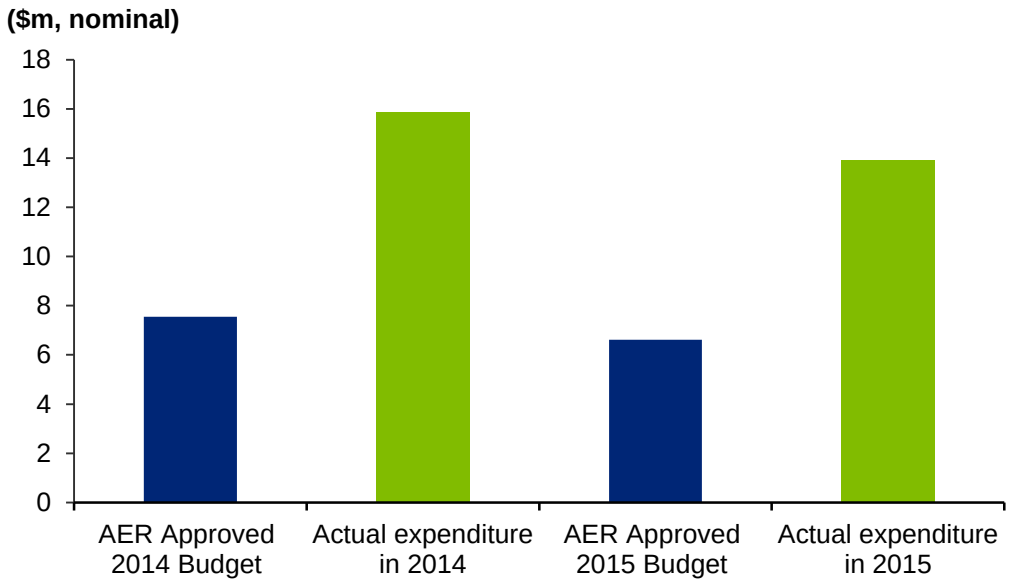
- Nature of the rollout obligation (5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program
- State of the technology (5I.8(d)): the technical problems faced by AusNet Services
- Inherent risks in the AMI project (5I.8(e)): Technical challenges are an inherent risk in projects such as the AMI Program.

5.2.3 IT opex

IT opex relates to the support and maintenance costs of IT infrastructure, such as hardware, software and systems.

As shown by the figure below, IT opex exceeded the AER budget by $8.3 million in 2014 and $7.3 million in 2015.

Figure 21: Comparison of 2014 and 2015 IT opex expenditure against the AER determined budget ($m)

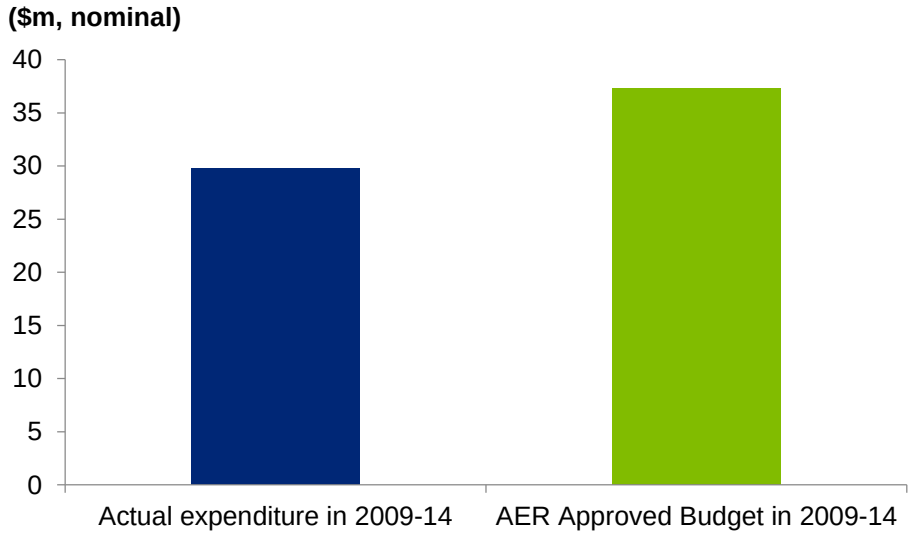


Source: AusNet Services

5.2.3.1 Discussion

As IT opex is related to IT capex, the excess expenditure in 2014 and 2015 in this category was primarily driven by the deferral of IT capex during 2011. We note that AusNet Services underspent the AER's allocated budget for IT opex in every year between 2009 and 2013. Overall, for the 2009-14 period, AusNet Services' expenditure on IT opex was below the original AMI budget, only exceeding the total budget in 2015 when the AMI IT capex was completed.

Figure 22: Comparison of AusNet Services' actual IT opex over 2009-14 and AER budget for 2009-14 ($m)



Source: AusNet Services

AusNet Services' IT opex profile is linked to the timing of its AMI IT capex, which was subject to delays during the rollout period. By 2014, AusNet Services' IT opex reflected the capex installed over 2012-13, with increases associated with new licence fees and maintenance activities.

AusNet Services identified that $3.3 million of its 2014 excess expenditure was associated with remediation activities, and is not seeking to recover this amount. In 2015, IT remediation activities were predominately capitalised, involving replacement and upgrading of IT systems, with the remaining IT opex reflecting business as usual expenditure on licences and IT system maintenance.

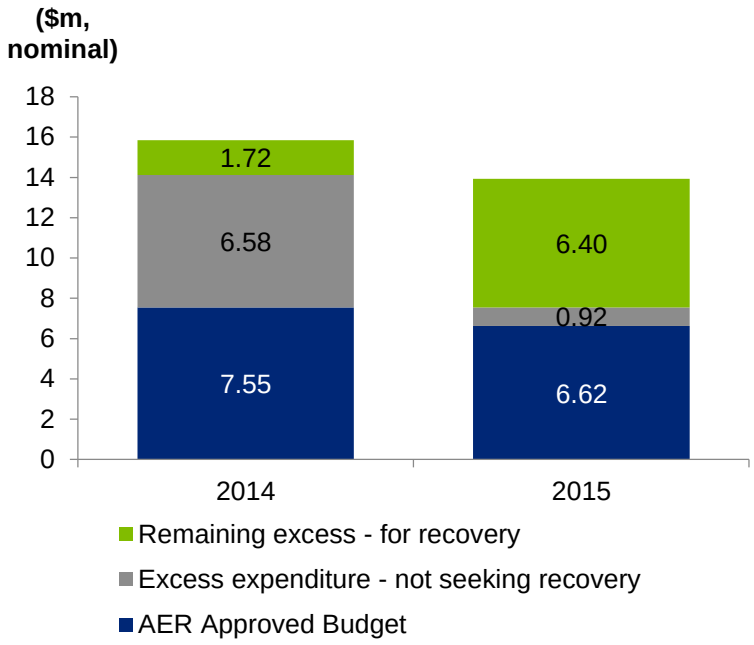
The AER's recent final determination on AusNet Services' metering costs for 2016-20 suggests that the AMI budget for IT opex was insufficient. The AER found that AusNet Services' actual IT opex of $15.8 million in 2014 was efficient, and consequently used it as a basis for determining 2016-20 opex. This suggests that the original budget of $7.6 million in 2014 and $6.6 million in 2015 was set too low.

Acknowledging that multiple factors contributed to its excess expenditure on IT opex, for 2014 AusNet Services is seeking to recover $1.7 million, which is less than the difference between the original AMI budget and the efficient 2016 IT opex used in the AER's final determination.

For 2015, AusNet Services is seeking to recover the difference between the original AMI budget and the efficient 2016 IT opex cost used in the AER's final determination ($6.4 million).

The following graph provides a breakdown of the AER budget, excess expenditure being sought and that which AusNet Services has excluded, due to it being associated with remediation activities, or above the AER's recent decision on efficient ongoing costs for IT opex.

Figure 23: IT operating expenditure breakdown ($m)



Source: AusNet Services

5.2.3.2 Conclusions

As per the discussion above on IT capex, the excess expenditure relating to IT opex has been primarily driven by the following factors:

1. Insufficient budget originally forecast for IT opex, demonstrated by the AER's recent determination
2. Delays in meter capex, and technical issues including management of the IT program, pushing opex out to the later years of the rollout
3. Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

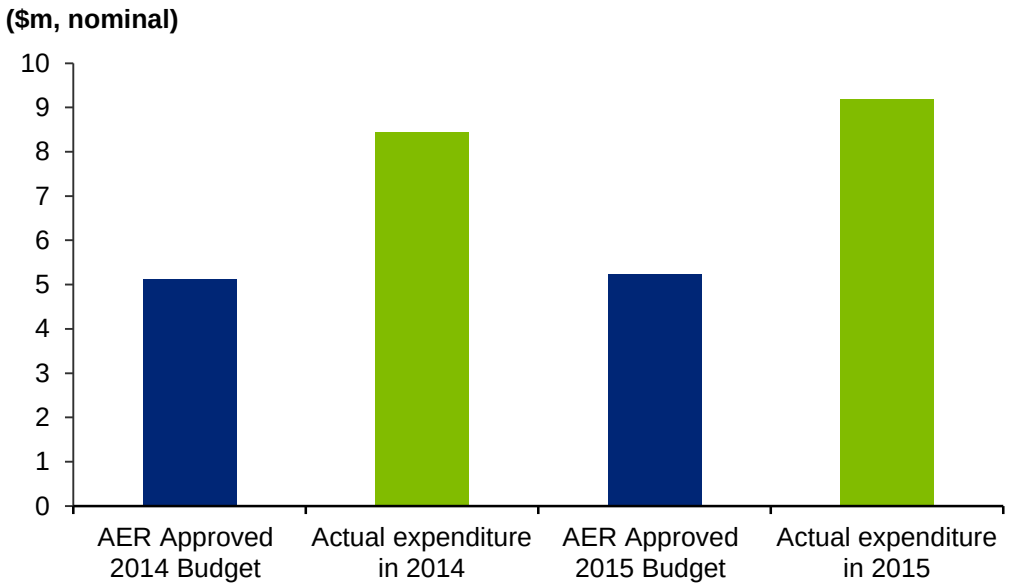
- Nature of the rollout obligation (5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program
- State of the technology (5I.8(d)): the technical problems faced by AusNet Services.
- Inherent risks in the AMI project (5I.8(e)): Technical challenges are an inherent risk in projects such as the AMI Program.

5.2.4 Communications infrastructure maintenance

Communications opex relates to the support and maintenance costs of IT infrastructure, such as installation services, backhaul capex and infrastructure capex.

As shown by the figure below, communications infrastructure maintenance exceeded the AER budget by $3.3 million in 2014 and $3.9 million in 2015.

Figure 24: Comparison of 2014 and 2015 communications opex expenditure against the AER determined budget ($m)



Source: AusNet Services

5.2.4.1 Discussion

Over the 2009-15 regulatory period, AusNet Services incurred an expenditure excess of $13.7 million for communications infrastructure maintenance, of which $7.3 million occurred in 2014 and 2015. In 2009 and 2010 AusNet Services underspent in the category, in line with its delayed rollout. Similarly, in the first year of the 2012-15 AMI budget period, AusNet Services underspent its communications infrastructure maintenance budget, also in line with its reduced AMI capital spend, to which the general program delays contributed. The higher costs in 2014 and 2015 were also associated with technical issues.

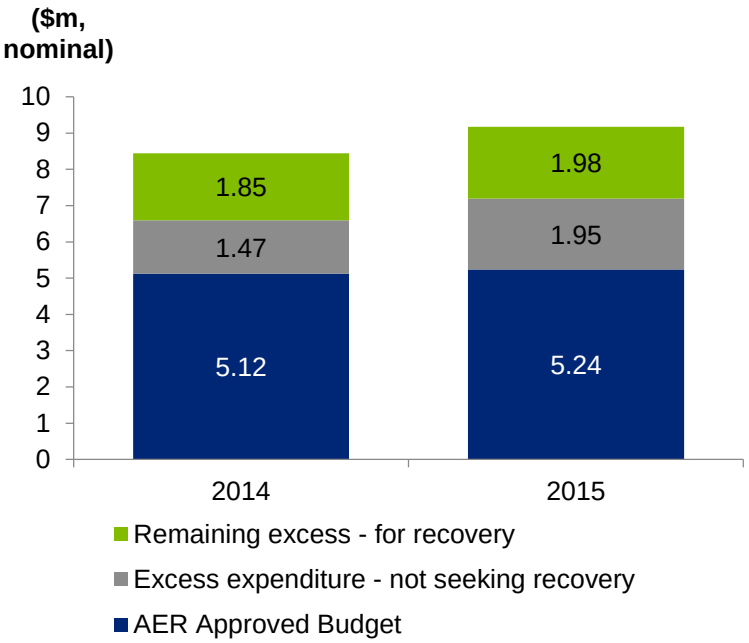
The AER's recent final decision on AusNet Services' metering costs for 2016-20 suggests that the AMI budget for communications opex was insufficient. The AER found that AusNet Services' actual communications opex of $8.4 million in 2014 was an efficient basis for forecast costs over 2016-20. This suggests that the original budget of $5.1 million in 2014 and $5.2 million in 2015 was set too low.

We note that in its 2012-15 AMI Budget for Powercor, the AER approved a budget of $6.7 million for communications maintenance expenditure in 2015, further confirming AusNet Services' original budget was insufficient.

Acknowledging that multiple factors contributed to its excess expenditure on communications infrastructure maintenance, AusNet Services is only seeking to recover the difference between the original AMI budget and the efficient 2016 communications infrastructure maintenance used in the AER's final determination (a difference of $1.9 million in 2014 and $2.0 million in 2015).

The following graph provides a breakdown of the AER budget, excess expenditure being sought and that which AusNet Services has excluded, due to it being above the AER's recent decision on efficient ongoing costs for communications infrastructure maintenance.

Figure 25: Communications expenditure breakdown ($m)



Source: AusNet Services

5.2.4.2 Conclusions

The excess expenditure relating to communications opex has been primarily driven by the following factors:

1. Insufficient budget originally forecast for communications opex, demonstrated by the AER's recent determination using higher actual 2014 costs as an efficient basis for forecasts, and Powercor's original AMI budget exceeding the AusNet Services AMI budget
2. Delays in meter capex, and technical issues including management of the IT program, pushing opex out to the later years of the rollout
3. Delays caused by the review of the AMI Program in 2011 and associated regulatory changes throughout the rollout.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

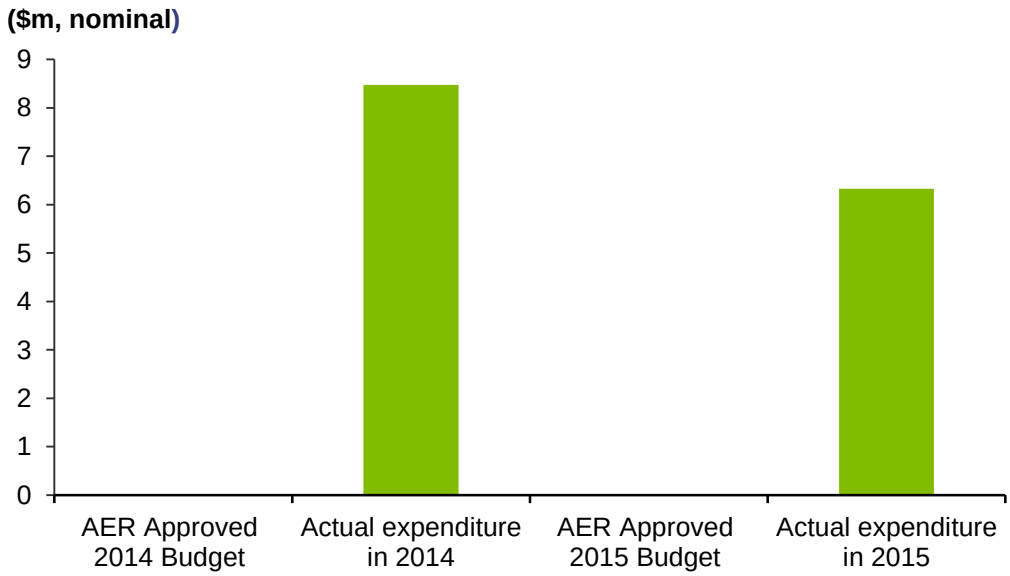
- Nature of the rollout obligation (5I.8(c)): installation delays caused by policy instability and customer resistance to the AMI program
- State of the technology (5I.8(d)): the technical problems faced by AusNet Services.
- Inherent risks in the AMI project (5I.8(e)): Technical challenges are an inherent risk in projects such as the AMI Program.

5.2.5 AMI Project Management Office (PMO)

AMI PMO expenditure relates to costs incurred in steering the delivery of the AMI program, such as the management of risks, issues, changes and resources.

As shown by the figure below, the AER did not approve a budget for the PMO in 2014 and 2015, as it was expected that the AMI rollout would have been completed by December 2013. This resulted in an overspend of $8.5 million in 2014 and $6.3 million in 2015.

Figure 26: Comparison of 2014 and 2015 AMI PMO expenditure against the AER determined budget ($m)



Source: AusNet Services

5.2.5.1 Discussion

AusNet Services has indicated that the key reasons for the expenditure excess in this area were project delays, particularly in 2011-12. In 2013, as the DNSPs endeavoured to catch up to their rollout schedule, AusNet Services installed 245,476 meters compared to a forecast of 142,589. In 2014, AusNet Services installed 37,022 complete meter units and a further 66,201 stand-alone communications modules, as well as replacing 4,060 faulty meters. This cost was substantial, given the AER did not approve any budget for meter installation in 2014. In 2015, the cost was less substantial as AusNet Services installed only 3,319 meters (replacing faulty meters) but also installed 8,833 mesh communications modules.

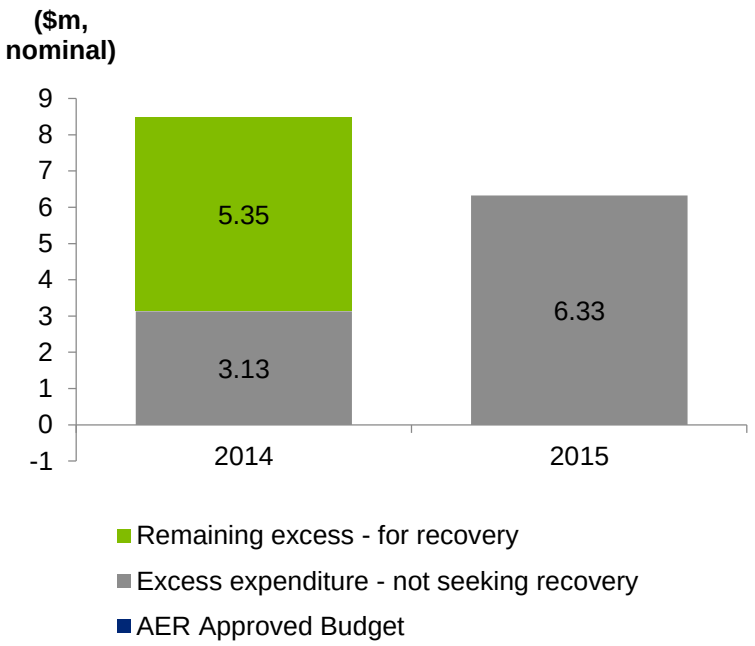
These delays resulted in a need to maintain employees to manage the AMI project beyond 2013, incurring PMO costs in 2014 and 2015. The PMO was involved with addressing the delays, which included rectifying the technical issues relating to meter procurement and the logical conversion of meters (see Section 4.2).

However, as the AMI project originally intended to finish in 2013, there was no budget allocated by the AER for 2014 and 2015 for program management purposes.

Acknowledging that multiple factors contributed to its delayed rollout, and the fact that changes to the OIC required it to continue to meet its 'best endeavours' rollout obligation, AusNet Services is seeking to recover only the costs of AMI PMO expenses for the first half of 2014, totalling $5.4 million.

The following graph provides a breakdown of excess expenditure being sought and that which AusNet Services has excluded.

Figure 27: Expenditure breakdown ($m)



Source: AusNet Services

5.2.5.2 Conclusions

The excess expenditure in this category relates to the need to maintain PMO staff after the AMI rollout was expected to have been completed, to complete the rollout and rectify technical challenges faced by AusNet Services.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

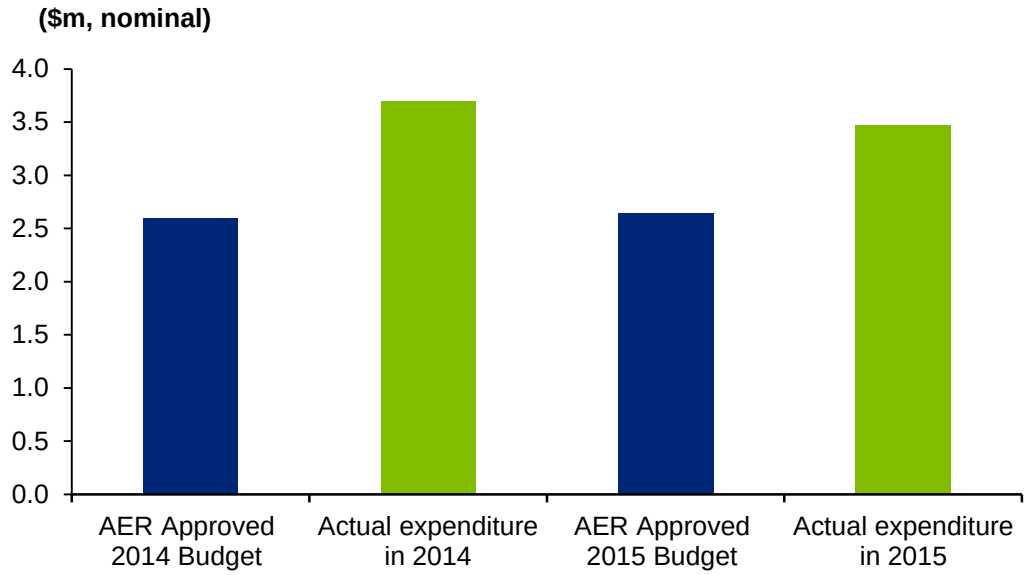
- Nature of the rollout obligation (5I.8(c)): The AMI PMO had to manage the delays which were caused by the policy uncertainty and customer issues. Costs associated with these delays were exacerbated by the mandatory nature of the rollout obligation to make best endeavours to complete AMI installations by the end of 2013.
- State of the technology (5I.8(d)): the AMI PMO required additional resources to manage the technical issues relating to the AMI Program.
- Inherent risks in the AMI project (5I.8(e)): The issues relating to meter procurement, customer resistance, regulatory obligations and tight labour market conditions are inherent risks of projects such as the AMI rollout, particularly given the mandatory nature of the project timeline. Consequently, excess PMO costs are also an inherent risk in a project of this type.

5.2.6 Overheads and indirect costs

Overheads and indirect costs relate to the costs of running the AMI program which are outside the PMO office costs. They are essentially the relevant portion of overhead costs attributable to AMI activities and include finance and administration staff time and costs, sundry costs and regulatory and government relations resources. This cost category incorporates meter maintenance expenditure.

As shown by the figure below, overheads and indirect expenditure exceeded the AER budget by $1.1 million in 2014 and $0.8 million in 2015.

Figure 28: Comparison of 2014 and 2015 overheads and indirect expenditure against the AER determined budget ($m)



Source: AusNet Services

5.2.6.1 Discussion

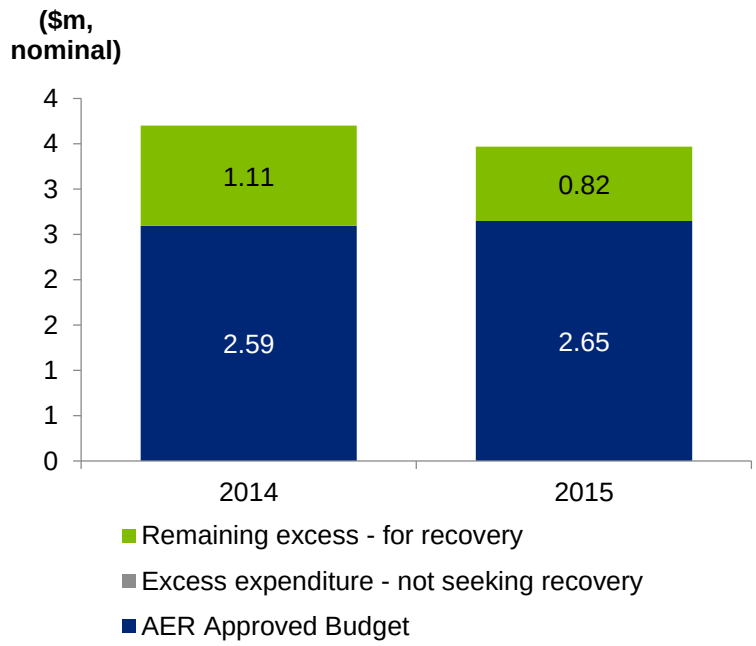
This cost category consists of allocated overhead costs including corporate relations, market operations and general business overheads. The delays in meter deployment, communications network infrastructure and logical conversion led to additional resource management costs and additional stakeholder management requirements in 2014 and earlier.

The AER's AMI budget for overheads was based on an expectation that the AMI rollout activities would cease at the end of 2013, in line with the original rollout schedule. The extension of the rollout to 30 June 2014 resulted in additional management time and effort which were not anticipated in the AMI budget.

The AER's recent determination on AusNet Services' metering costs for 2016-20 suggests that the AMI budget for overheads and indirect costs was insufficient. The AER found that AusNet Services' actual overheads and indirect costs of $3.5 million in 2014 (overheads plus meter maintenance) was efficient, and then approved a higher forecast of overheads ($2.6 million) and meter maintenance ($2.5 million) for 2016 than was actually incurred in 2014. This suggests that the original budget of $2.6 million in 2014 and $2.7 million in 2015 was insufficient. AusNet Services is therefore seeking to recover the full amount of its excess expenditure in this category.

The following figure provides a breakdown of the AER budget and excess expenditure being sought.

Figure 29: Expenditure breakdown ($m)



Source: AusNet Services

5.2.6.2 Conclusions

We consider it reasonable that time taken to manage the political, regulatory and technical issues that arose during the AMI rollout, as well as the higher than anticipated number of comms card installations during 2014, be allocated to the project.

However, in our view there is likely to be some element of the overhead costs driven by management of the AMI Program that could have been more efficient.

In relation to the factors in Clause 5I.8 of the OIC, excess expenditure was driven by:

- Nature of the rollout obligation (Clause 5I.8(c)): delays caused by policy uncertainty and customer responses necessitated increased management time to ensure that best endeavours were made to meet the extended rollout timeline.
- State of the technology (Clause 5I.8(d)): The technical issues relating to the AMI program needed to be addressed at a management level, requiring more time than anticipated at the time of the AER budget.
- Inherent risks in the AMI project (Clause 5I.8(e)): The issues relating to meter procurement, customer management, regulatory obligations, technology and tight labour market conditions are inherent risks of projects such as the AMI rollout, particularly given the mandatory nature of the project timeline. All require management attention.

Limitation of our work

General use restriction

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Appendix D – KPMG Audit Opinions for 2014 and 2015 (Commercial-in-Confidence)