

Tasmania Department of State Growth Advanced Metering Consultation Paper - Response



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Introduction

In this response to the *Advanced Metering Consultation Paper* (April 2016) I focus on the overall issue of benefits, rather than the specific questions listed in the Consultation Paper. In other words, I concentrate here on providing background information in relation to the following request:

“The Department is particularly interested in feedback relating to the value of these potential benefits (and any other potential benefits not listed) to Tasmanian consumers, the timing of when these benefits are likely to become important to consumers, and potential barriers that may prevent the full realisation of these benefits.”
(Advanced Metering Consultation Paper, p5).

I draw on recent research I have been doing across Australia on existing smart grid and advanced metering programs, funded by the Australian Research Council. The brief analysis below provides information on the modeled and actual benefits realized when advanced meters have been deployed.

Summary

General observations:

- The costs of smart metering installation are more certain than the benefits
- The benefits data we have for Australia is from mainland states, and not Tasmania. Tasmanian-specific data would be most valuable of course because of Tasmania’s different climate, pattern of peak demand, fuel mix etc.
- Most Australian studies are about modelled>actual benefits of advanced meters. However, there are sufficient numbers of advanced meters now installed across Australia to use ‘real’ data>hypothetical data. So in time it is expected that cost benefit analyses (CBA) will adjust and update
- Customer benefits arising from changes in consumption behaviour have been identified as the most variable and unpredictable type of benefit arising from advanced metering programs.

And key findings in more detail:

- Benefits from advanced meters are uncertain. Most of the advanced metering cost benefit analyses (CBA) in Australia have been based on modeled or assumed benefits, rather than actual benefits, and have been proved to be inaccurate;
- Benefits are assumed to be financial. Benefits which are not easily quantified and/or translated into monetary value have not tended to be taken into account, e.g. improvements in governance, community cohesion, improved householder trust in utilities, reputation/brand improvements, climate change mitigation;
- The hardest category of advanced metering benefit to predict is customer benefits from demand reduction ([Deloitte 2011](#): 66). There is a range of categories of benefits, and some are easier to estimate or calculate than others e.g. avoiding manual reading of meters, faster network outage detection etc. Customer benefits arising from demand reduction have proven to be the hardest to predict accurately, and have tended to be overestimated, e.g. Victorian AMI - \$9.19 million benefits from tariffs and demand management were expected to be realised by 2014, of which \$0.23 million was actually achieved (VAGO 2015: 35);
- More generally, estimated benefits from advanced metering have typically been higher than actual benefits. e.g. the original 2005 business case for the Vic AMI predicted a net incremental benefit of \$79 million, but by 2015 this had changed to an estimated cost of \$319 million (VAGO, 2015, p.vii);
- most Australian CBAs have drawn heavily on international studies about customer benefits, rather than relying on Australian-specific data (see [Deloitte 2011](#) for example, p69, p72). An exception to this is the *Smart Grid Smart City analysis*, which is extensive, and based on c17000 smart meter installations and customer survey of 3000 households in NSW.

Australian studies on benefits arising from advanced metering

In this section I explore in more detail CBA and other studies that have been done on advanced metering in Tasmania, Victoria, and in relation to the *Smart Grid Smart City* trials (NSW).

Tasmanian studies

There are no detailed Tasmanian studies on actually-realised advanced metering costs and benefits (as opposed to hypothetical), though it is noted that a Tariff Trial is currently being planned by TasNetworks and Aurora. There is some analysis of actual benefits in the OTTER (2006) *Costs and Benefits of the Rollout of Interval Meters in Tasmania* report based on pay as you go meter (PAYG) customers, but indicating little impact of PAYG on consumption:

“Currently, almost 40 000 residential customers have transferred from the standard tariff agreement to PAYG. As noted earlier in this Report, this represents around 18 per cent of Tasmania’s residential customers and as such, this group constitutes a significant sample on which to form an estimate of price elasticity of simple TOU tariffs. To date, Aurora Energy reports that it has not noticed any tangible impact on peak demand from the implementation of PAYG, though it has not conducted a thorough review.” (Office of the Tasmanian Energy Regulator 2006, p27).

But there is some uncertainty about the reliability of this interpretation. For example a TasCOSS submission to the OTTER report suggests there has been load shifting/reduction in energy consumption in PAYG households (p28). Load shifting in PAYG customers is also indicated in the preliminary results from the UTAS *Get Bill Smart* project.¹

State of Victoria Advanced Metering Infrastructure (AMI) Program

There have been a number of studies on the AMI Program in Victoria, with a particular focus on CBA. The AMI program was a mandatory government-led program that implemented advanced meters in all households and small businesses in Victoria in the period 2009-2013.

The Victorian Auditor General wrote two reports on the AMI (VAGO 2009; 2015). The second report - VAGO (2015) *Realising the benefits of smart meters* - was especially critical of the low level of benefits arising from the Victorian AMI program:

“When the rollout was announced, the benefits were promoted widely. However, when the government reviewed the program in 2011 it was clear there would be no overall benefit to consumers, but instead a likely cost of \$319 million.”

(VAGO 2015) Auditor General’s introductory comments, p.vii

The original 2005 business case for the Victorian AMI predicted a net incremental benefit of \$79 million.

The benefits for the Victorian AMI have therefore been found to be much lower than originally forecast. For instance, \$9.19 million benefits from tariffs and demand management were expected to be realised by 2014, of which only \$0.23 million was actually achieved (VAGO 2015, p35). Consumer benefits are the category most behind schedule, with only 2.5% of the projected benefits actually realised to date (based on data from a *2014 Benefits Realisation Assessment* (note could not source this secondary VAGO report)).

¹ The *Get Bill Smart* project has involved placing sensors in homes to gain fine-grained data on energy use, and researching the impact of energy efficiency interventions in vulnerable homes. The households are all based here in Hobart (c500 involved in total, with a subset of 50 with sensor monitoring), in Rokeby and Clarendon Vale. Households involved in the project have a mix of PAYG and other meters, and there is the potential to do follow up analysis to distinguish between PAYG consumption (as a proxy for advanced meters) and other metering types.

There are a number of reasons identified for the lower benefits including:

- only 0.27% of households in 2014 took up flexible pricing offers in Victoria, compared to 4% forecast;
- customer benefits have not been passed on by distributors to retailers, and then on to customers.

Figure 3A
Major anticipated benefits realisation to 2014 against the 2011 baseline (\$ million)

Benefit category	2011 CBA forecast benefit 2008–14	Actual benefit realised 2008–14	Percentage of 2008–14 forecast realised	Contribution to \$746.58 million realised by Dec 2014
Avoided cost of accumulation meters	\$579.31	\$591.99	102.19%	79.30%
Network operational efficiency	\$218.94	\$107.98	49.32%	14.46%
Tariffs, products and demand management	\$9.19	\$0.23	2.50%	0.03%
Total	\$807.44	\$700.20	86.72%	93.79%

Note: Figure 3A does not include all benefits categories.

Source: Victorian Auditor-General’s Office based on the 2014 Benefits Realisation Assessment.

source: VAGO 2015, p32

Benefits realisation is, however, forecast to take place gradually, in the period up to 2028. Ultimately the assumptions behind the \$778 million benefits assume 75% of Victorian households will change their consumption behavior in response to the AMI (VAGO 2015, p43).

The VAGO 2015 report has a number of useful suggestions about how to maximize consumer benefits (see Chapter 4), principally: a sustained customer engagement program, appropriate market offers, and further government programs to encourage customer participation, such as the deployment of in-home displays. Note that it is commented by VAGO that:

“Effective retail competition is essential to ensure that the market provides appropriate offers for consumers to take up flexible tariffs that better suit their needs.” (VAGO 2015, p44)

The lack of current market competition in Tasmania is therefore seen as an impediment to effective tariff reform.

There is also extensive analysis of the Victorian AMI program costs and benefits in a report by [Deloitte \(2011\)](#). The Deloitte Report assumed a much more modest reduction in residential energy consumption - 0.02% - than previous CBA on the Victorian AMI (Futura 2010; Oakley Greenwood). This is based on

Deloitte’s review of Australian (e.g. Endeavour Energy and Energex trials in mid-2000s) and international studies (California in particular). Note that results from the *Smart Grid Smart City* trials were unknown at the time of the Deloitte 2011 Report.

Deloitte note that benefits generated from innovative tariffs and demand management “...are the most difficult to estimate, and given their higher potential variability than the avoided cost or network efficiency benefits, pose the greatest risk to the success of the AMI Program.” (Deloitte 2011, p66).

Table 4.20 below (Deloitte 2011, p82) shows the variability over time in estimated Victorian AMI program benefits, with the three CBA (Futura, Oakley Greenwood and Deloitte) using different assumptions, and hence generating quite different results.

Table 4.20: Total AMI Program benefits (millions, NPV at 2008)

Benefit category	Oakley		
	Futura	Greenwood	Deloitte
Avoided costs resulting from AMI Program	855	855	802
Benefits derived from efficiencies in network operations	1 029	956	587
Benefits generated from innovative tariffs and demand management	413	498	490
Other smaller benefits	343	280	151
Total	2 640	2 588	2 030

source: Deloitte 2011, p82

Smart Grid Smart City (NSW)

Smart Grid Smart City (SGSC) was a federal government funded program that ran from 2010-2013 in NSW. It involved a number of different trials, but included a large number of households having advanced meters installed (17,000). Over 3000 households (3,125) took part in the SGSC customer survey (see p3 [Smart Grid Smart City Customer Research Report](#) (2014); and Final CBA Report, p17).

The Executive Summary of the [Final Report](#) for SGSC is presented as a CBA. It is acknowledged in the introduction that:

“Customers play a major role in smart grids, however, little is known about how they might perceive or respond to the opportunities that smart grid technologies offer.” (AEFI 2014, p16).

[Part 2](#) of the full SGSC Final Report is about the ‘Business Case for Smart Grids in Australia’. Table 2-13 (p235) is interesting because it compares the original assumptions about smart metering benefits with the actually realised benefits:

- *Dynamic tariffs and customer feedback technologies with smart meter infrastructure*: originally assumed to give \$1.3 billion in benefits, SGSC 2013 CBA reveals only \$145.4 million benefits.
- *Standalone smart meter infrastructure*: \$500 million in benefits, reduced to \$31.8 million.

Key References

- AEFI** 2014 Smart Grid, Smart City: Shaping Australia's Energy Future - Executive Report Arup, Energeia, Frontier Economics, & the Institute for Sustainable Futures (University of Technology Sydney) (AEFI) Canberra
- Deloitte** 2011 Advanced metering infrastructure cost benefit analysis
Department of Treasury and Finance
- Office of the Tasmanian Energy Regulator** 2006 Costs and benefits of the Rollout of Interval Meters in Tasmania Office of the Tasmanian Energy Regulator (OTTER) Hobart, Tasmania
- VAGO** 2009 Towards a 'smart grid' – the roll-out of Advanced Metering Infrastructure Victorian Auditor-General Melbourne
- VAGO** 2015 Realising the benefits of smart meters Victorian Auditor-General's Office (VAGO) Melbourne, Australia