Queensland Competition Authority

Ministerial advice

Benefits of advanced digital metering

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Contents

EXECUTIVE SUMMARY

This report is prepared in response to a request from the Minister for Natural Resources, Mines and Energy for advice to allow him to better understand the benefits associated with the deployment of advanced digital meters (also known as 'type 4' or 'smart' meters) in south east Queensland.

The Minister's direction to the QCA, issued under section 89B of the *Electricity Act 1994,* is in Appendix A.

We would like to thank all those who have contributed information to this report, in particular retailers, metering coordinators, meter manufacturers, and technology companies, who have made a particularly valuable contribution to this report and its conclusions.

Methodology

We engaged ACIL Allen to assist with estimating the value of the benefits of advanced digital meters. ACIL Allen estimated the costs and benefits on a net present value[1] basis using the most up-to-date data from both public and confidential sources. While we consider ACIL Allen's analysis to be reasonable, stakeholders should note that forecasting over a 30-year time period requires making assumptions and using inputs which are necessarily subject to uncertainty.

Costs of deploying meters

While the Minister seeks advice on the benefits of advanced digital meters, we consider that benefits need to be considered in light of the net additional costs from the deployment of advanced digital meters. We estimated the net cost of advanced digital meter deployment based on the costs of deploying advanced digital meter hardware and the information systems needed to support them, less the costs saved by not installing accumulation meters and meter reading costs.

We estimate that the cost in 2018–19 was $23m, and will grow to $1,502.6m by 2049.

Summary of benefits

We estimate that by 2049, south east Queensland could potentially cumulatively benefit by $1,111.4m from deploying advanced digital meters. However, based on the latest information and policy, we estimate that the south east Queensland market is likely to actually realise $331.3m in cumulative benefits by 2049.

These benefits fall into ten categories:

- *Better information to help customers manage electricity bills* - The more detailed data provided by advanced digital meters can help customers understand, and mange, their electricity usage. Retailers report that the additional data helps them identify, and assist, customers who may be experiencing financial hardship and reduce the costs of bad debt.
- *More options to reduce electricity costs* - Advanced digital meters give networks, and retailers, greater ability to offer electricity tariffs that reflect their costs. This gives customers more opportunities to save on their electricity bills by moving their usage to cheaper off-peak times.
- *Lower network costs* - The incentives to reduce electricity use at peak times is expected to reduce peak demand on the network. Over time, reduced peak demand is expected to reduce the need to augment

[1] ACIL Allen estimated the value of future cash flows out to 2049, and used a discount rate to express these cash flows in today's dollars to ensure estimates from different periods are comparable.

the network, lowering network costs. These lower network costs will be passed through to consumers in the form of lower regulated network prices than would have otherwise been the case.

- *More accurate bills* - The remote reading capabilities of advanced digital meters will significantly reduce the number of electricity bills issued based on estimated electricity usage. This reduces the number of complaints retailers have to address, as well as reducing the number of billing issues that need to be investigated by the Energy and Water Ombudsman Queensland.
- *Cost savings from special meter reads* - The remote reading capabilities of advanced digital meters mean that it is no longer necessary to have a manual meter read performed when a customer moves out of a property, or wishes to transfer to a new retailer.
- *Ability to change retailers more quickly* - As advanced digital meters are read remotely, customers no longer need to wait for a quarterly meter read to transfer retailers and take advantage of a better electricity offer. This means that customers can switch to a cheaper offer, and start saving money on electricity, sooner.
- *Remote energisation* - Advanced digital meters can energise, and de-energise, premises remotely. This is both faster, cheaper and delivers a better standard of service to customers. However, this benefit is limited by Queensland legislation. This is discussed further in the section on barriers.
- *Improved service delivery by networks* - Advanced digital meters are capable of providing additional information about the electricity supply to the premises. This allows networks to better optimise their networks, detect faults more quickly and accurately, and provide better service to customers. While these benefits are likely to be realised, Queensland networks plan to obtain this information from a roll out of network monitoring devices. As such, these benefits cannot be attributed to advanced digital meters.
- *Reduced electricity theft* - Advanced digital meters improve the ability to identify cases where customers bypass electricity meters or otherwise obtain electricity illegally.
- *Reduced greenhouse gas emissions* - The introduction of advanced digital meters is expected to reduce electricity usage, which results in a commensurate reduction in greenhouse gas emissions.

Impact on participants in the electricity supply chain

The deployment of advanced digital meters will result in benefits being realised throughout the electricity supply chain. Given the south east Queensland electricity market is competitive, we expect that competitive pressures, and the regulation of electricity networks, will ultimately see the value of all benefits, and costs, passed through to customers.

Table 1 summarises the estimated benefits of advanced digital meters—listed according to where in the electricity supply chain these benefits originate.

Table 1 Impact of advanced digital meter deployment on the electricity supply chain in south east Queensland ($m, 2019)

Benefit		*2018–19*	*2019–20*	*Cumulative impact until 2049*
NET COSTS				
	Net cost of advanced digital meter installation and operation	-23.0	-4.4	-1502.6
BENEFITS				
Realisable benefits				
	Direct benefits realised by customers	1.9	2.8	205.3
	Savings in retail costs	0.1	0.2	23.3
	Savings in network costs	0.4	0.6	101.8
	Reduction in greenhouse gas emissions	0.0	0.0	0.9
	Total realisable benefits	**2.5**	**3.7**	**331.3**
Additional potential benefits				
	Direct benefits potentially realisable by customers	1.4	2.0	141.5
	Potential savings in retail costs	0.0	0.0	0.0
	Potential savings in network costs	10.0	14.5	621.5
	Potential reduction in greenhouse gas emissions	0.2	0.4	17.1
	Total potential additional benefits	**11.7**	**17.0**	**780.1**
Total realisable and potential benefits		**14.2**	**20.7**	**1111.4**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019 table A.2 p A.2.
Totals may not add due to rounding.

Barriers to realising benefits

Remote re-energisation

Unlike Victoria where it is standard procedure, premises in Queensland cannot be re-energised remotely due to safety regulations.[2] This issue was by far the most commented on by stakeholders. Multiple retailers noted they were currently able to provide a higher level of service to their Victorian customers than they could provide their Queensland customers due to the ban on remote energisation.

Given the unanimous support from stakeholders, and the potential cumulative benefits of $122.9m identified for customers, the Government could consider if this legislative restriction is still warranted. Advanced digital meters, and network monitoring devices, can be configured for instantaneous fault detection, and notification, in real time. GHD Advisory conducted a risk assessment of remote de-

[2] *Electrical Safety Regulation 2013*, section 220. See section 3.6 of this report for further information.

energisation and re-energisation and found the risks of remote re-energisation to be extremely low[3], and remote energisations are performed routinely in Victoria.

Table 2 Estimated benefit of allowing remote energisation of premises in south east Queensland ($m, 2019)

Benefit	***2018–19***	***2019–20***	***Cumulative impact until 2049***
Potential benefit			
Avoided cost of after-hours manual re-energisation.	0.0	0.0	2.1
Avoided cost of manual re-energisation in business hours	0.6	0.9	72.2
Avoided cost of manual de-energisation (when less than 60 per cent of meters installed are advanced digital meters)	1.0	1.4	48.6
Total potential benefits of allowing remote energisation	**1.6**	**2.3**	**122.9**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

Customer understanding

The additional data provided by advanced digital meters, along with the new types of tariffs available, provide new opportunities for customers, but also make comparing electricity offers a significantly more complex process. The Energy Made Easy comparison website is unable to accept advanced digital meter data files, and as a result Queensland customers must perform complex calculations to compare offers featuring new tariff types.

Both retailers and customer groups suggested a Government led education program on digital metering and the potential uses and benefits could act to overcome a general reluctance for customers to accept advanced digital meters.

Future developments

While it is difficult to predict future developments in technology, the next major development appears to be in technologies which use data and other inputs to actively manage and coordinate appliances, solar, and electricity storage to minimise costs—with minimal need for input from the customer. These developments are discussed in more detail in Chapter 7.

Regional Queensland

Contrary to south east Queensland, the cumulative benefits of deploying advanced digital meters in regional Queensland are expected to outweigh the costs by $544.6 million. This is largely due to:

- significantly greater cost savings from remote meter reading
- lower costs for information technology systems as there is effectively only one retailer
- larger benefits for networks.

Appendix B discusses benefits specific to regional Queensland.

[3] GHD Advisory conducted a risk assessment for remote de-energisation and re-energisation and found that the risk of a fatality from remote energisation was 1 in every 546 years.
GHD Advisory, *Remote Services with Smart Meters Semi Quantitative Risk Assessment*, June 2018, p ii.

1 INTRODUCTION

1.1 This report

On 24 April 2019, the QCA received a direction[4] from the Minister for Natural Resources, Mines and Energy, the Hon Dr Anthony Lynham MP (the Minister), to provide a report on the benefits associated with the deployment of advanced digital meters (also known as 'smart' meters) in the south east Queensland designated market area (see Appendix A).

The Minister states in his cover letter that he wishes to better understand potential benefits to participants in the electricity supply chain, the extent to which these benefits are being realised, what barriers exist to realising further benefits, and what future developments may result in direct benefits to customers.

This advice details the benefits advanced digital meters could provide to the participants in the electricity supply chain. It should be noted that some benefits of advanced digital meters covered in this report are qualitative in nature and cannot realistically be quantified.

In addition to information on benefits, we have included estimates of the net costs of advanced digital meters. We consider these provide important context for advanced meter benefits, and enables a more balanced understanding of the issues.

While the direction relates specifically to the south east Queensland designated market area, we have included additional information relevant to regional Queensland. This information is in Appendix B.

1.2 What are advanced digital meters?

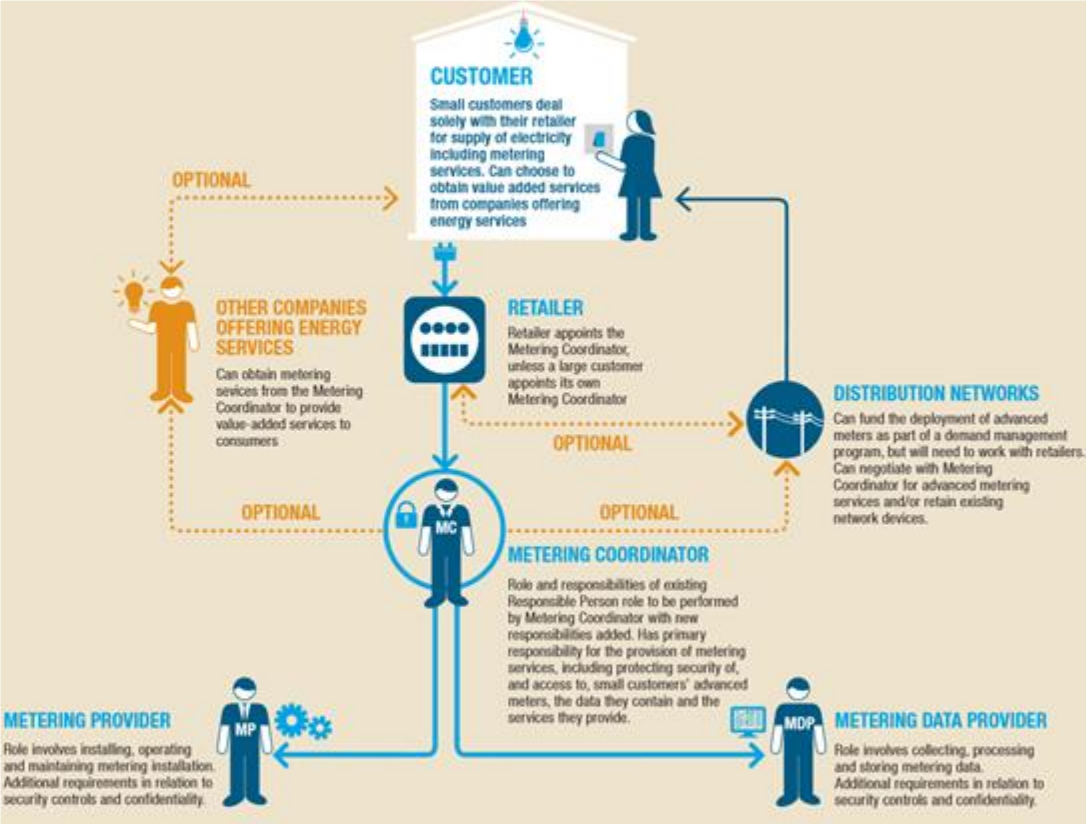
At present, electricity usage of most residential and small business customers in Queensland is measured using what is called an accumulation meter.[5] These meters record accumulated electricity usage over time, and are read manually each quarter. Early accumulation meters were mechanical meters with a 'spinning disc' and clockwork dials to record electricity consumption. Modern accumulation meters have a digital display.

The electricity most large business customers consume is measured through an advanced digital meter, which records data in 30 minute intervals.[6] These meters, frequently referred to as 'interval' or 'smart' meters, are usually read remotely.[7] Under 'Power of Choice' reforms implemented by the Australian Energy Market Commission (AEMC), advanced digital meters that have similar functionality are provided to residential and small business customers when they need a new meter, or where the customer requests an advanced digital meter be installed.

[4] Issued under section 89B of the *Electricity Act 1994* (Electricity Act).
[5] A type 5 or 6 meter.
[6] In future these meters will be required to measure in five minute intervals.
[7] Where communication infrastructure, such as a mobile phone network, is not available, advanced digital meters must be read manually.

The roll out of these meters is market-led. Retailers must appoint a metering coordinator who arranges for meter installation, maintenance and reading on behalf of the retailer.[8] The new market structure is shown in the AEMC infographic (Figure 1) below.

Figure 1 Power of Choice metering arrangements



Source: AEMC.[9]

Costs

Advanced digital meters provide significant additional functionality, and data, compared to accumulation meters. However, this functionality also comes at an additional cost. Table 7 shows the annual charges for residential and small business customers for each type of meter.

[8] For existing accumulation meters, distributors will be the default metering coordinator. However, retailers may appoint a different metering coordinator party to perform these metering services in future. Large customers or non-market and exempt generators are permitted to appoint their own metering coordinator.

[9] AEMC, http://www.aemc.gov.au/getattachment/87a49036-707f-446b-92fb-b333543da21b/Information-sheet-—-overview.aspx.

Table 3 South east Queensland annual metering costs ($/pa excluding GST)

Tariff type	*Accumulation meter*[a]	*Advanced digital meter*[b]
Primary	35.66	117.52
Load control	10.70	2.3

a Source: https://www.energex.com.au/home/our-services/meters/metering-charges.

b Costs for a single phase meter. Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table 2.4, p 15.

Note: While metering fees are separate costs to retailers, a number of retailers present these fees as part of the daily service to property charge on customer bills.

1.3 Data sources and confidentiality

Our analysis relies on a variety of sources, including: public reports, stakeholder submissions, direct discussions with stakeholders, and information requested from retailers formally under the Electricity Act. A notable amount of the data and commentary provided by stakeholders in the course of this investigation is considered to be commercial-in-confidence.

In this report, we have provided references for all publicly available information. Where information provided is confidential, we have:

- presented quantitative data as either ranges, summary statistics (averages, medians etc.), or otherwise anonymised, and
- generalised commercially sensitive comments and attributed them to the type of stakeholder making the comment, without identifying the specific stakeholder.

All amounts in this report exclude GST.

1.4 ACIL Allen Methodology

To estimate the cumulative impact of advanced digital meters, ACIL Allen used a net present value (NPV) analysis.[10] This analysis used a number of data sources, including recent reports on advanced digital meters conducted in Australia and internationally. In particular, ACIL Allen's analysis drew upon the:

- 2011 report by Deloitte for the Victorian Government[11]
- 2016 report by the United Kingdom Department for Business, Energy and Industrial Strategy.[12]

In addition to public reports, ACIL Allen used confidential information obtained from retailers and other participants in the electricity supply chain.

While there are some limitations in the information available on advanced digital meter deployments, we consider the information sources used by ACIL Allen to be reasonable to estimate the benefits associated with advanced digital meters in south east Queensland.

[10] The value of a future cash flow expressed in today's dollars and calculated using a particular discount rate. Present value calculations provide a means to ensure that cash flows at different times are comparable.

[11] Deloitte, *Advanced metering infrastructure cost benefit analysis*, Final report, 2 August 2011.

[12] Department for Business, Energy & Industrial Strategy, *Smart Meter Roll-out Cost-Benefit Analysis, Part II – Technical Annex*, August 2016.

As with all forecasting, ACIL Allen had to make a number of assumptions in order to complete its NPV analysis. In summary the key assumptions, and the reasoning behind them, are:

- A discount rate of 4 per cent. ACIL Allen established this discount rate after consideration of rates of return allowed under revenue determinations made by the AER.
- A number of benefits were assumed to accrue once a critical mass of 60 per cent of deployment was achieved. ACIL Allen based this critical mass on the 2016 report by the United Kingdom Department for Business, Energy and Industrial Strategy.[13]
- Advanced digital meter deployment. ACIL Allen calculated the number of advanced digital meters currently deployed based on data supplied by retailers—and forecast meter deployment rates based on assumed rates for new connections, meter replacements and voluntary installations.
- The cost of advanced digital meters remains constant in real terms. ACIL Allen based this assumption on its view that the costs of advanced digital meters have not changed materially for a number of years.
- The NPV analysis was conducted over a 30-year timeframe. While this does not represent a full roll-out of advanced digital meters[14], ACIL Allen found that estimates beyond this timeframe, when discounted, are not material in each subsequent year.

[13] https://erranet.org/download/smart-meter-roll-cost-benefit-analysis-part-ii-technical-annex/ page 28.

[14] In 2049, ACIL Allen forecast that 87 per cent of meters in the Energex distribution area will be advanced digital meters.

2 NET COSTS OF ADVANCED DIGITAL METER DEPLOYMENT

While advanced digital meters provide many benefits to customers, they are also more expensive than accumulation meters. In order to evaluate the magnitude of benefits in the correct context, the benefits need to be considered in light of the net additional costs from the deployment of advanced digital meters.

The costs are broken up into four categories, namely the:

- costs of deploying the meters themselves
- costs of the information systems required to support advanced digital meters
- cost savings from not installing accumulation meters
- cost savings from not having to manually read accumulation meters.

2.1 Advanced digital meter costs

ACIL Allen estimated the costs of advanced digital meters based on the number of advanced digital meters forecast to be installed, and the cost of these meters.

Forecast number of advanced digital meters installed

The current number of advanced digital meters installed is based on confidential data provided by retailers. This data includes the overall number of residential and small business customers, the type of meter arrangement[15], the type of meter installed and whether customers had a solar installation.

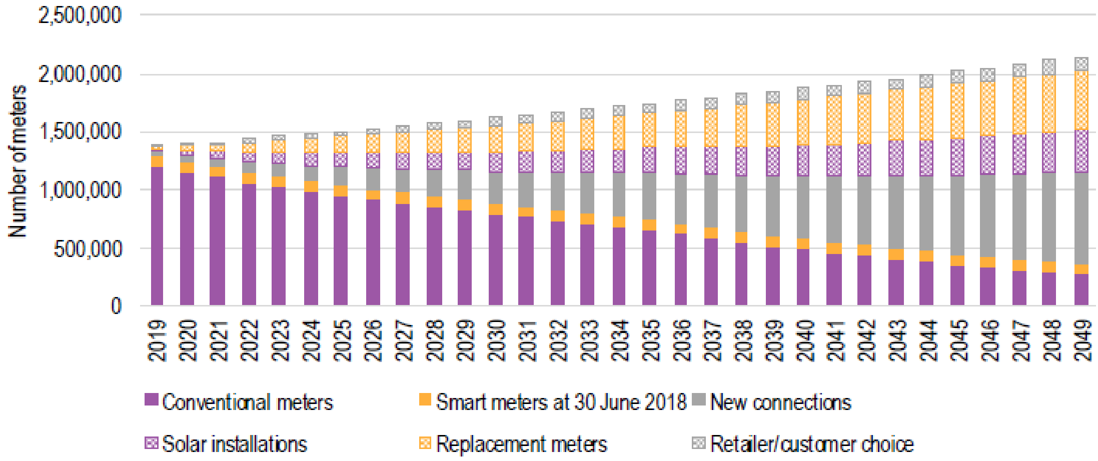
The number of advanced digital meters deployed in future was projected based on assumptions around new connections, meter replacements, solar installations, and installations resulting from retailers or customers choosing to install advanced digital meters. Specifically, ACIL Allen assumed:

- The number of customers increases by 1.5 per cent per annum over the forecast period. This is based on the customer growth forecasts by Energex in its most recent regulatory proposal.
- 2.5 per cent of accumulation meters are replaced by advanced digital meters each year. This is consistent with a 40-year life span for accumulation meters.
- The projected number of meter replacements resulting from solar installations was based on the current proportions of solar installations and metering types.
- The projected number of voluntary advanced digital meter installations was based on the current proportion of accumulation meters being replaced by choice in the Energex distribution area.

We consider ACIL Allen's estimates to be reasonable, as they are based on its analysis of the most recent data from retailers and distributors.

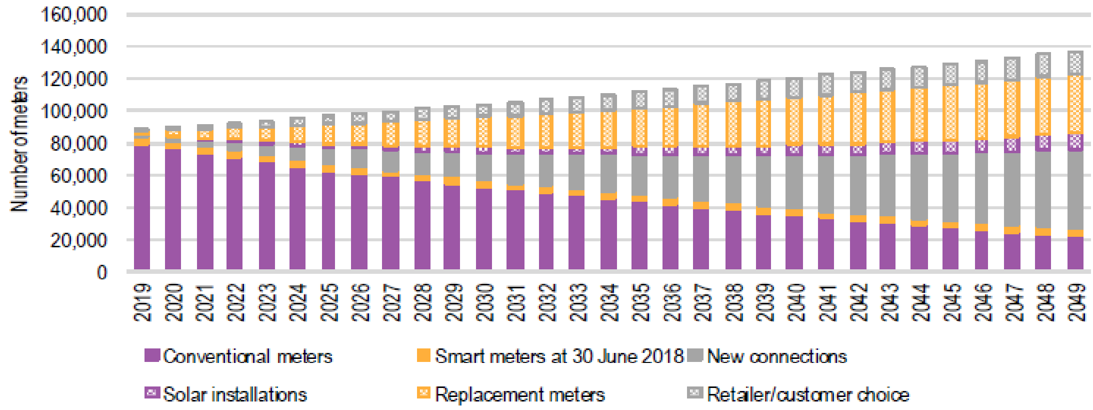
[15] Single phase or three phase power, with and without controlled loads.

Figure 2 Forecast residential advanced digital meter installations (Energex distribution zone)



Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, p 13.

Figure 3 Forecast small business advanced digital meter installations (Energex distribution zone)



Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, p 13.

Costs of advanced digital meters

The costs of advanced digital meters are based on a weighted average of metering cost data provided to the QCA by retailers on a confidential basis. We agree with ACIL Allen's treatment of the metering cost data, including the removal of two data points which were outliers.

Table 4 Estimated costs of advanced digital meters by type ($/pa)

Meter type	*Cost*
1 phase	117.52
1 phase with load control	119.82
3 phase	183.81
3 phase with load control	173.68

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table 2.4, p 15.

Table 5 Estimated overall costs of installation of advanced digital meters in south east Queensland ($m, 2019)

	2018–19	*2019–20*	*Cumulative impact until 2049*
Advanced digital meter costs	–17.0	–25.4	–2022.8

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.s

2.2 IT system costs

Advanced digital meters provide significant additional data compared to accumulation meters. In addition, this data is acquired from multiple data providers and can be in multiple formats. In order to produce bills for customers, and provide beneficial information to them, retailers must modify their information technology (IT) systems to accommodate this new data and accept data from their metering coordinator.

The costs of IT systems required by advanced digital meters are based on confidential data from retailers. ACIL Allen used data for the years of 2019–2028, and maintained these costs in real terms to the end of the modelling period. Table 5 shows ACIL Allen's estimates.

Table 6 Estimated IT system costs in south east Queensland ($m, 2019)

	2018–19	*2019–20*	*Cumulative impact until 2049*
IT system costs	–24.0	–3.9	–137.5

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

2.3 Avoided costs of accumulation meter installation

As discussed in section 1.2, advanced digital meters replace accumulation meters. As such, distributors and metering coordinators avoid the current costs of installing accumulation meters. The estimate of the cost of each meter is based on the 2015–16 up front capital charge. This charge was indexed according to the x-factors in the AER revenue determination, and escalated by CPI to establish a charge for each year.

The number of meter installations avoided was equal to the advanced digital meter installations estimated to calculate advanced digital meter installation costs (see section 2.1).

Table 7 Estimated avoided costs of accumulation meter installation in south east Queensland ($m, 2019)

	2018–19	*2019–20*	*Cumulative impact until 2049*
Avoided cost of accumulation meters	15.8	21.7	357.4

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

2.4 Avoided costs of meter reading

At present, meter readers must attend each street which has accumulation meters to perform readings. There is a cost saving from meter readers not having to enter properties with advanced digital meters. However, this is counterbalanced by a fall in meter reading productivity, as meter readers have to travel further to read the same number of meters as before.

Over time savings will increase, and peak where advanced digital meter penetration reaches saturation. This is consistent with Mondo's submission which stated:

> Remote reading avoids the need for manual reading and is likely to reduce labour costs. These benefits may only become apparent once digital meter penetration reaches a particular threshold.[16]

Estimates of the avoided costs of meter reading are based on the latest non-capital metering charges proposed by Energex. We expect that the efficiency of manual meter reading will decline over time as the proportion of manually read meters declines. This is to take into account that while meter readers must continue to cover the same streets to manually read meters, as the proportion of manually read meters in these streets declines productivity will also decline. We consider that the decline in productivity should be less than the meter replacement rate of 2.5 per cent per annum. ACIL Allen have assumed a 1 per cent productivity decline each year, which we consider reasonable.

Table 8 Estimated avoided costs of accumulation meter reading in south east Queensland ($m, 2019)

	2018–19	*2019–20*	*Cumulative impact until 2049*
Avoided cost of meter reading	2.2	3.3	300.4

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

[16] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 2.

2.5 Net costs of advanced digital meters

Table 9 Estimated net costs of advanced digital meter deployment in south east Queensland[17] ($m, 2019)

	2018–19	*2019–20*	*Cumulative impact until 2049*
Advanced digital meter costs	–17.0	–25.4	–2022.8
IT system costs	–24.0	–3.9	–137.5
Total costs	**–41.0**	**–29.3**	**–2160.4**
Avoided cost of accumulation meters	15.8	21.7	357.4
Avoided cost of meter reading	2.2	3.3	300.4
Net cost of meter deployment	**–23.0**	**–4.4**	**–1502.6**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.
Totals may not add due to rounding.

[17] See Appendix B for estimates of the net costs of advanced digital meters in regional Queensland.

3 BENEFITS FROM ADVANCED DIGITAL METER DEPLOYMENT

The deployment of advanced digital meters will result in benefits being realised throughout the electricity supply chain. Given the south east Queensland electricity market is competitive, we expect that competitive pressures, and the regulation of electricity networks, will ultimately see the value of all benefits discussed being passed through to customers.

3.1 Better information to help customers manage electricity bills

A key benefit of advanced digital meters is that they provide vastly more detailed data on electricity usage. Accumulation meters provide a single usage measurement each quarter, making it extremely difficult for customers to discern which patterns of electricity, or appliance, usage within this period contribute most to their electricity bills. Advanced digital meters provide usage data every 30 minutes[18]—which helps customers to identify which days, and the time of those days, when their electricity usage is having the greatest impact on their electricity bills. QCOSS stated that the ' information should help consumers to gain a better understanding of their energy use, budget more effectively and reduce their energy consumption and costs.'[19] Mondo stated that more regular billing allowed for 'earlier identification of energy wasting appliances and behaviours.'[20]

By identifying the patterns of usage which contribute to high electricity bills, customers can more effectively take action to lower their electricity bills. Advanced digital meters can also be configured to provide usage data in real-time, providing customers with rapid feedback on their usage. The more detailed data provided by advanced digital meters also allows customers to make a more informed decision on making investments in alternative energy solutions—such as energy efficiency, solar generation, and battery storage.

For retailers, the more detailed information gives them the ability to provide a higher level of service to their customers and reduce debt management costs. Using data from advanced digital meters, retailers can provide information and advice to customers to help customers manage their electricity use. In addition, the increased frequency of data from advanced digital meters may also help retailers identify customers at risk of payment difficulties, as well as potential billing and metering issues, sooner. Mondo concurred stating this would 'allow for early identification of payment issues' and 'more regular and accurate billing would likely reduce the rate of bad debt.'[21]

Is this benefit being realised?

Retailers reported they have been using the information provided by these meters to assist customers to better understand their electricity usage, including helping them to assess measures such as solar installations. Retailers reported they have developed, or are developing, online facilities for customers to access the additional information provided by advanced digital meters.

[18] From 6 February 2022, meters will be required to record data in five minute intervals. See https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement for more information.

[19] QCOSS, *submission to the draft determination on regulated retail electricity prices for 2018–19*, p 3.

[20] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 2.

[21] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 2.

Retailers also indicated the additional data provided by advanced digital meters increases their ability to manage customer debt. Retailers reported they were actively using this data, and developing systems and analytics to improve their ability to use this data. Retailers also stated that this data was particularly valuable when assisting hardship customers to better understand and manage their electricity usage, bills, and debt levels.

Table 10 outlines the estimates of reduced debt management costs that can be attributed to advanced digital meters. These estimates are based on data published by the Department for Business, Energy and Industrial Strategy in the United Kingdom.

Table 10 Estimated value of reduced retailer debt management costs ($m, 2019)

Benefit	***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefit			
Reduced retailer debt management costs	0.6	0.9	75.4

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

3.2 More options to reduce electricity costs

As discussed in section 3.1, the additional data provided by advanced digital meters gives customers greater ability to understand which patterns of electricity, or appliance, usage contribute to their electricity bills. This enables customers to take more effective action to reduce their overall electricity usage.

In addition, advanced digital meters provide retailers, and networks, with far greater flexibility to set price structures which better reflect the underlying costs of supplying customers. Typically these price structures offer cheaper electricity prices outside of peak times, and/or where customers are able to keep their electricity demand levels low. This gives customers the opportunity to reduce their electricity bills by changing when they consume electricity, even where they use the same amount of electricity overall.

These types of tariffs also provide opportunities for using technologies such as solar panels and battery storage to import less from the electricity grid during peak times, and save on electricity bills.

Is this being realised?

At present only a small proportion of customers have opted for tariffs made possible by advanced digital meters. Based on confidential information obtained from retailers, we estimate that around 5 per cent of customers with advanced digital meters in south east Queensland have moved to non-flat rate tariffs.

The second factor which impacts the realisation of this benefit is the degree to which customers on non-flat rate tariffs are willing, or able, to shift their electricity usage to off-peak periods. As a result, the benefit to individual customers will vary according to the degree to which they respond to pricing signals.

It is important to note that in the short term overall savings for customers will be limited in terms of network costs, which make up approximately 45 per cent of a typical electricity bill. This is because network costs are regulated under a revenue cap, whereby networks recover the same amount of revenue from customers overall—regardless of any changes in customer behaviour. So while individual customers may be able to benefit from adopting new tariff types and changing their behaviour accordingly, the reductions in network costs for south east Queensland customers as a whole will come in the longer term where changes in customer usage patterns in response to more cost-reflective pricing lower the cost of the electricity network.

ACIL Allen have estimated the benefits to customers from changes in usage patterns (see Table 12). It identified that customers would benefit from reducing their usage, and by shifting usage away from peak times.

After considering data from studies conducted in Australia and the United Kingdom, ACIL Allen estimated that customers with advanced digital meters on a time-of-use tariff would:

- reduce their overall consumption by 2 per cent. The cost of energy saved was calculated using south east Queensland energy costs previously calculated for the QCA for notified prices.
- shift 10 per cent of their usage from peak periods to off-peak periods. The benefit was quantified based on the difference in the marginal cost of energy during these periods.

We have considered these estimates in light of other studies. A report prepared for the Department of Energy and Climate Change in the United Kingdom[22] looked at 15 time-of-use tariff trials from around the world. The following table summarises the average reduction in peak demand from each of these trials:

[22] Frontier Economics and Sustainability First, *Demand Side Response in the domestic sector- a literature review of major trials*, 2012, pp. 14–15.

Table 11 Summary of time-of-use trial results

Name of trial	***Time period***	***Country***	***Average reduction in peak demand (%)***
California State-wide Pricing Pilot	2003-04	USA	1-6
CL&P Pilot	2009	USA	2-3
PG&E's Trial	2008-10	USA	11
Ireland Electricity Smart Metering Behaviour Trials	2009-10	Ireland	7-12
Ontario Smart Price Pilot	2006-07	Canada	0
myPower Trial	2006-07	USA	3-6
Energy Demand Research Project Trials	2007-10	UK	varied
Norway EFFLOCOM Trial	2001-04	Norway	Maximum 10
Northern Ireland Powershift Trial	2003-04	Northern Ireland	Small reduction
Integral Energy Trial	2006-08	Australia	Unknown
Xcel Energy Trial		USA	5.19-10.63
Florida Gulf Power Select Programme	2000 onwards	USA	Unknown[a]
Idaho DSR Trial	2005-06	USA	0
Missouri CPP Trial	2004-05	USA	0
PSE's ToU trial	2001-02	USA	5

a. As part of the trial some customers were on a critical peak period tariff. Customers on this tariff saw an average peak demand reduction of 22 per cent.

Source: Frontier Economics and Sustainability First, Demand Side Response in the domestic sector- a literature review of major trials, 2012, pp. 14–15.

This review found average demand reduction for customers on time-of-use tariff trials ranged between 0 and 12 per cent.

The Department of Energy and Climate Change paper also looked at critical peak pricing (CPP) trials and found higher average reductions in peak demand under these tariffs. However, CPP price signals, and demand responses, only occurred for a maximum of twelve events per year. In addition, the price signals used in CPP tariffs are far more extreme than in regular time-of-use tariffs. The Department of Energy and Climate Change study reported CPP peak charges between 720 and 3,636 per cent higher than off-peak charges, compared to 143 to 408 per cent for regular time-of-use tariffs.[23] As a result, the higher average demand reductions under CPP are not comparable to time-of-use tariffs that are currently offered in Australia.

[23] Frontier Economics and Sustainability First, Demand Side Response in the domestic sector- a literature review of major trials, 2012, pp. 14–17.

The 0 to 12 per cent range found by the Department of Energy and Climate Change is consistent with findings from:

- the US Department of Energy[24], which found average demand reductions of 6 per cent for customers recruited on an opt-out basis, and 11 to 13 per cent for customers who voluntarily opted-in to a time-of-use tariff
- Newsham and Bowker, who found that 'a simple time-of-use program can only expect to realise on-peak reductions of 5%.'[25]
- the Customer-Led Network Revolution Trial, which found a peak demand reduction of 96 W (from 1.219 kW to 1.123 kW) for domestic customers.[26]

ACIL Allen's estimate of 10 per cent is within the broad range of results found by these studies, and as such can be considered reasonable. Estimates of realisable benefits are based on maintaining the current 5 per cent proportion of customers on alternative tariffs. Potential benefits were calculated based on the assumption that all customers moved to alternative tariffs, and responded to the price signals accordingly.

Table 12 Estimated value of changes in customer usage ($m, 2019)

Benefit		***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefits				
	Reduction in energy consumption	0.0	0.0	0.1
	Shift in energy consumption from peak to off-peak periods	0.1	0.1	7.2
	Total realisable benefits	**0.1**	**0.1**	**7.3**
Potential additional benefits				
	Reduction in energy consumption	0.0	0.0	2.0
	Shift in energy consumption from peak to off-peak periods	1.3	1.9	137.4
	Total potential additional benefits	**1.4**	**2.0**	**139.4**
Total realisable and potential benefits		**1.4**	**2.1**	**146.7**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

Totals may not add due to rounding.

Sensitivity analysis

As discussed above, trials of time-of-use tariffs have shown significant variability in average demand reductions. In addition, future technological developments, such as home energy

[24] US Department of Energy, *Final Report on Customer Acceptance, Retention and Response to Time-Based Rates from the Consumer Behavior Studies*, 2016 p. 33.

[25] Newsham, G and Bowker, B, The effect of utility time-varying pricing and load control strategies on residential summer peak electricity use: A review, Energy Policy, Vol 38, Issue 7, July 2010, pp. 3289–3296.

[26] Customer-Led Network Revolution, *Developing the smarter grid: the role of domestic and small and medium enterprise customers*, 2015 p. 46.

management systems and battery storage may increase the average demand reduction. We have included a sensitivity analysis, showing the impact on the estimated benefits if the average reduction in peak demand is greater or lower than assumed by ACIL Allen in its analysis.

Table 13 Shift in energy consumption from peak to off-peak

Amount of energy shifted from peak to off peak (%)	***Cumulative impact until 2049 ($m)***
6.7	4.8
10	7.2
15	10.8

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, p. 62.

The sensitivity analysis shows that assuming a 15 per cent, as opposed to 10 per cent, increase in the amount of energy shifted from peak to off-peak increases the cumulative benefit by $3.6m. While this would be a significant increase for this particular benefit, this would only increase the overall benefits of deploying advanced digital meters by 0.3 per cent.

ACIL Allen have based their $30/MWh estimate of current energy costs on the marginal resource cost of energy between peak and off-peak times. However, the cost of energy has exhibited significant volatility in recent years. As such, we consider it prudent to include a sensitivity analysis, showing the impact on the estimated benefits if the value of energy shifted from peak to off-peak periods varies from that estimated by ACIL Allen.

Table 14 Value of energy shifted from peak to off-peak

Value of energy shifted from peak to off peak ($/MWh)	***Cumulative impact until 2049 ($m)***
20	4.8
30	7.2
40	9.6

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, p. 61.

The sensitivity analysis shows that assuming a $40MWh value for the marginal cost of energy, rather than $30MWh, would result in a cumulative increase of $2.4m in 2049. This would not have a noticeable impact on our analysis, as a $2.4m increase would only increase the overall benefits of deploying advanced digital meters by 0.2 per cent.

3.3 Lower network costs

As discussed in section 3.2, the introduction of more efficient pricing signals is expected to lower peak demand on the network. All else equal, lower peak demand will reduce the need for network augmentation over time, lowering network costs. Any reduction in the costs of the network are passed through to retailers in the form of reduced network prices, and/or service charges, determined through the AER's regulatory process. In a competitive market, we expect these lower network costs will be passed through to customers by retailers in the form of lower retail prices.

Is this benefit being realised?

The benefits of reduced network augmentation from more efficient pricing signals are limited at present. As discussed in section 3.2, information obtained from retailers shows that only around

5 per cent of customers have opted for tariffs which provide price signals that provide an incentive to reduce their electricity usage during periods of peak load on the network. In addition, as network assets generally have an operating life of multiple years, significant reductions in network investment occur over longer time periods.

Estimates of the likely realisable benefits are based on maintaining the current proportion of customers adopting more cost reflective tariffs and reducing their level of peak demand. Potential benefits are calculated based on assuming all customers adopt more cost-reflective tariffs and reduce their peak demand accordingly.

Table 15 Estimated savings in network costs from customers shifting demand ($m, 2019)

Benefit		***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefit				
	Deferred network augmentation due to reduction in energy demand	0.4	0.6	36.2
Potential additional benefits				
	Deferred network augmentation due to reduction in energy demand if all customers move to cost-reflective tariffs	8.4	12.1	500.7
Total realisable and potential benefits		**8.9**	**12.8**	**536.9**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

Based on information from studies in Australia and the United Kingdom, ACIL Allen have used a 10 per cent average reduction in peak demand in their analysis of benefits. However, as discussed in section 3.2, trials of time-of-use tariffs show a range of reductions in peak demand by customers. We consider it prudent to include a sensitivity analysis of the impact of varying reductions in peak demand.

Table 16 Realisable benefit for network augmentation for varying levels of peak demand reduction

Proportion of energy shifted from peak to off-peak (%)	***Cumulative impact until 2049 ($m)***
5	18.1
10	36.2
15	54.2

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, p. 62.

The sensitivity analysis shows that assuming a 15 per cent increase in the proportion of energy shifted from peak to off-peak, rather than 10 per cent, results in an increase in estimated benefits of $18m. Overall this would increase the overall benefits of deploying advanced digital meters by 1.6 per cent.

3.4 More accurate bills

A leading cause of billing errors, and bill shock, is where a bill is issued based on an estimate, rather than an actual meter reading. This usually occurs because the meter reader was unable to read the customer's meter. Advanced digital meters do not require physical access to provide meter readings—which results in a significantly lower number of customer bills received based on estimated electricity usage. While in most cases estimates are reasonably accurate, in some cases they can be highly inaccurate.[27]

In addition, some customers opt to receive bills monthly to help manage their budgets and cash flow. For customers on accumulation meters, which are manually read quarterly, these monthly bills must be estimated.[28] The daily data provided by advanced digital meters allow for bills to be issued at any time, reducing the number of estimated bills. This was confirmed by EnergyAustralia, who agreed that a key benefit of advanced digital meters was that customers can obtain more frequent and accurate billing data from smart meters, leading to a reduction in estimated bills and providing further clarity on customers' usage patterns.[29] QCOSS also stated that the roll out of advanced digital meters would 'facilitate the provision of more accurate bills and up to date energy usage information.'[30] Mondo added that 'regular and accurate billing is likely to reduce bill shock.'[31]

Where a customer receives an inaccurate electricity bill, they must contact their retailer to have the issue resolved. In some cases this may require multiple phone calls, and contacting the Energy and Water Ombudsman Queensland (EWOQ) to have the issue resolved. While this may not be a financial penalty paid by customers, we consider it should still be recognised as a cost to customers.

For retailers, rectifying errors resulting from estimated meter readings can involve:

- increased numbers of calls to retailer call centres
- increased investigations
- increased number of complaints
- increased cases dealt with by EWOQ
- a lower level of service delivery, which may lead to losing customers.

Reducing the number of electricity bills issued based on estimated usage lowers retailers costs, and improves customer satisfaction.

Mondo noted that the number of disputes over customer bills received based on estimated electricity usage in Victoria had dropped by around 70 per cent since the 2013–14 financial year,

[27] NQ woman shocked at 'tripled' electricity bill — https://www.townsvillebulletin.com.au/news/townsville/regional/hinchinbrook-shire-womans-electricity-bill-triples/news-story/43cfce33aab52c398c11514f20336742
'Sorry': CQ families hit with large estimate energy bills — https://www.themorningbulletin.com.au/news/sorry-cq-families-hit-with-large-estimate-energy-b/3169900/
Ergon issues explainer on shock bill increase after cyclone — https://www.dailymercury.com.au/news/ergon-issues-explainer-shock-bill-increase-after-c/3169843/

[28] Some retailers allow customers to provide their own meter readings for monthly billing purposes.

[29] Energy Australia*, submission to report on benefits of advanced digital meters*, June 2019, p 2.

[30] QCOSS, *submission to the draft determination on regulated retail electricity prices for 2018–19*, p 12.

[31] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 2.

when Victoria's digital meter rollout began.[32] Fewer cases involving estimated bills investigated by the ombudsman allows them to devote greater resources to investigating other cases.

Is this benefit being realised?

For customers with remotely-read advanced digital meters, this benefit is being realised. Based on advice from retailers, it is usual practice to base monthly billing on actual data recorded by advanced digital meters. In areas that lack the necessary communication infrastructure, advanced digital meters must be manually read—meaning that data frequency, and physical access, may still lead to estimated bills.

The estimated benefits from reducing estimated bills, and associated complaints, are based on:

- The number of billing complaints was based on Queensland complaint data.
- The number, and duration, of calls was based on Victorian energy retailer call centre data published by the Essential Services Commission.
- Customer time was valued using average weekly earnings data published by the Australian Bureau of Statistics.

We consider these data sources to be reasonable. While it may have been more optimal to use Queensland energy retailer call centre data, this data is not published and we consider data from Victoria published by the Essential Services Commission to be a reasonable alternative.

Table 17 Cumulative estimated value of customer benefits from the reduction in estimated bills ($m, 2019)

Benefit	***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefits			
Benefit to customers of reduced queries about estimated bills	0.2	0.3	17.4
Benefit to customers of reduced complaints about estimated bills	0.0	0.0	0.8
Reduced retailer costs from reduction in customer service calls	0.1	0.1	5.3
Reduced retailer costs from reduction in complaints	0.0	0.1	4.2
Reduced retailer costs from reduction in investigations	0.1	0.1	5.1
Reduced retailer costs from reduction in complaints to EWOQ	0.0	0.0	2.4
Reduced retailer costs from reduction in EWOQ investigations	0.0	0.0	2.5
Total realisable benefits	**0.4**	**0.6**	**37.7**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

Totals may not add due to rounding.

[32] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 2.

3.5 Cost savings from special meter reads

Whenever a customer moves out of a premises, or where they wish to transfer retailers prior to their next quarterly meter reading, a specially scheduled meter reading must be performed. For customers supplied through an accumulation meter, a meter reader must manually read the meter on the date specified. These meter reads are referred to as special meter reads. As advanced digital meters are remotely read, these costs are significantly lower, and in some cases free of charge.

Are these benefits being realised?

These benefits are readily available for customers with remotely read advanced digital meters. The estimated benefits are based on data from the Victorian electricity market. While these costs are not always passed through to customers in the form of separate charges by retailers, we consider that in a competitive market the cost savings will ultimately be passed through to customers.

Table 18 Estimated value of avoided costs of special meter reading ($m, 2019)

Benefit	***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefit			
Avoided costs of special meter reading	0.7	1.1	83.9

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

3.6 Ability to change retailers more quickly

In order for a customer to transfer to a different retailer, a meter reading must be performed. For a customer supplied through a remotely read advanced digital meter, the transfer can be performed in a far shorter timeframe than for customers supplied through manually read meters. Customers with manually read meters must either remain on their non-preferred offer until their next quarterly read, or have a special meter reading performed.

Being able to change retailers more rapidly allows customers to benefit from a better market offer earlier, and save money on their electricity bills faster. However, it must be noted that any additional savings made by customers are effectively offset by reduced revenue to retailers.

Are these benefits being realised?

These benefits are being realised for customers with advanced digital meters. As pricing is a key motivator for customer transfers in a competitive market, the estimates are based on the additional savings customers will receive by transferring to a cheaper electricity offer from another retailer more quickly than would be the case with a manually read meter.

Table 19 Estimated value of more timely customer transfers ($m, 2019)

Benefit	***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefit			
Customer saving from timely customer transfers	0.9	1.4	95.8
Reduced retailer revenue from more timely customer transfers	-0.9	-1.4	-95.8
Total realisable benefits	0.0	0.0	0.0

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

It is important to note that these savings to customers are offset by reduced revenue overall to retailers. This is discussed in section 4.2.

3.7 Remote energisation

A key technological ability of advanced digital meters is the ability to re-energise premises remotely. For customers with accumulation meters, re-energising a premises requires technical staff to attend the premises to insert a fusible link. Re-energising a premises remotely is significantly cheaper and can be performed in minutes, compared to a physical re-energisation that can take hours, even days.

Is this benefit being realised?

At present, this benefit is not being realised in Queensland. Although the advanced digital meters being deployed in Queensland support this function, Queensland legislation currently prohibits the effective use of this functionality. Under the *Electrical Safety Regulation 2013*[33], a property can only be re-energised after a distributor has performed a visual examination of the electrical installation.

While this restriction only applies to re-energisations, stakeholders report that it means that it is no longer efficient to perform remote de-energisations. Using the remote disconnection functionality would require two different processes for disconnection depending on the type of meter the customer was supplied through and, while the number of advanced digital meters deployed is low, ultimately be slightly more expensive than requesting manual disconnections.

Energy Queensland referred to this issue as 'One of the more immediately realisable indirect benefits of digital meters to retailers.'[34] EnergyAustralia highlighted that the cost of energisation in Victoria, where it is performed remotely, is significantly lower than in Queensland.

However, these costs are currently borne by distributors in Queensland. This is because under the *Electricity Regulation 2006*, distributors are not permitted to charge retailers for de-energisation and re-energisation during ordinary business hours.[35] As such, these additional costs are reflected in lower distributor profits, lowering the dividend payments distributors can make to the Queensland Government.

[33] Section 220.
[34] Energy Queensland, *submission to report on benefits of advanced digital meters*, June 2019, p 2.
[35] Schedule 8, part 2.

However, the cost of re-energisations performed after hours, and remote energisations, are paid for by retailers. In a competitive market, this increase in retailer cost will ultimately be passed through to customers.

In addition to costs, retailers highlighted that remote energisations can also be performed far more quickly as there is no need for technicians to physically attend the premises. One retailer noted that it was possible for them to energise a property while the customer was still on the phone. This level of service is simply not possible in Queensland under current regulations.

Mondo highlighted that remote energisation would benefit renters in particular. As remote energisation is both easier and cheaper, it would 'likely result in a reduction in the number of connections persisting after the occupants have left a property. Such connections often result in energy being wasted and the cost of that energy being recovered from the new tenant, the landlord or Retailers.'[36]

Eliminating the need to physically attend energisations would free up resources for metering coordinators[37] to improve service levels in other areas, reduce costs, or both. Mondo agreed with this principle stating 'Underlying connection & disconnection labour costs are expected to be lower once remote de/re –energisation is established.'[38] These reduced costs to retailers would allow them to offer cheaper electricity prices to customers, and the improved service timeframes would allow them to provide a higher level of service to customers.

The legislative restriction on energisations is currently implemented under the *Electrical Safety Regulation 2013*. However, an equivalent restriction has been in place for over twenty years.[39] While no specific objectives for this clause is provided, a stated purpose of the regulation is 'ensuring the electrical safety of licensed electrical workers, other workers, licensed electrical contractors, consumers and the general public.'

Given the unanimous support from stakeholders, and the benefits identified for customers, the Government could consider if this legislative restriction is still warranted. Remote energisations are performed routinely in Victoria. Advanced digital meters, and network monitoring devices[40], can be configured for instantaneous fault detection, and notification, in real time. GHD Advisory conducted a risk assessment for remote de-energisation and re-energisation and found the risks to be extremely low:

> ' The current risk level associated with smart meters remote de-energisation and re-energisation measured as Potential Loss of Life (PLL) in one year is 1.83 x 10-03 per year, which equates to a period of 546 years between fatalities.'[41]

It should also be noted that technical staff face a number of risks when physically attending a premises. They are exposed to threats from wildlife, pets, and increasingly from customers. Recently, Energy Queensland have had to introduce a new safety measure which requires two technicians to attend properties when disconnecting properties for debt reasons. This is due to technicians being threatened by customers when performing their duties—posing a threat to staff mental and physical health. As this measure has only been recently introduced, Energy Queensland is unable to provide an estimate of the additional financial cost of this measure. As such, it was not possible to incorporate these additional costs into the estimates. If this policy is

[36] Mondo , *submission to report on benefits of advanced digital meters*, June 2019, p 2.
[37] We understand that some metering coordinators have contracted distributors to perform energisations.
[38] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 2.
[39] *Electricity Regulation 1994*, section 146.
[40] See Chapter 5.
[41] GHD Advisory, *Remote Services with Smart Meters Semi Quantitative Risk Assessment*, June 2018, p ii.

maintained in the long term, the potential benefits of remote energisation will be higher than the current estimates produced by ACIL Allen. As the table below shows, allowing remote re-energisation would result in an estimated increase of benefits of $122.9m. While this measure alone would not be sufficient to make the deployment of advanced digital meters a net positive, this would reduce the deficit by 31.4 per cent, from $391.2m to $268.3m.

Table 20 Estimated avoided costs of manual energisation ($m, 2019)

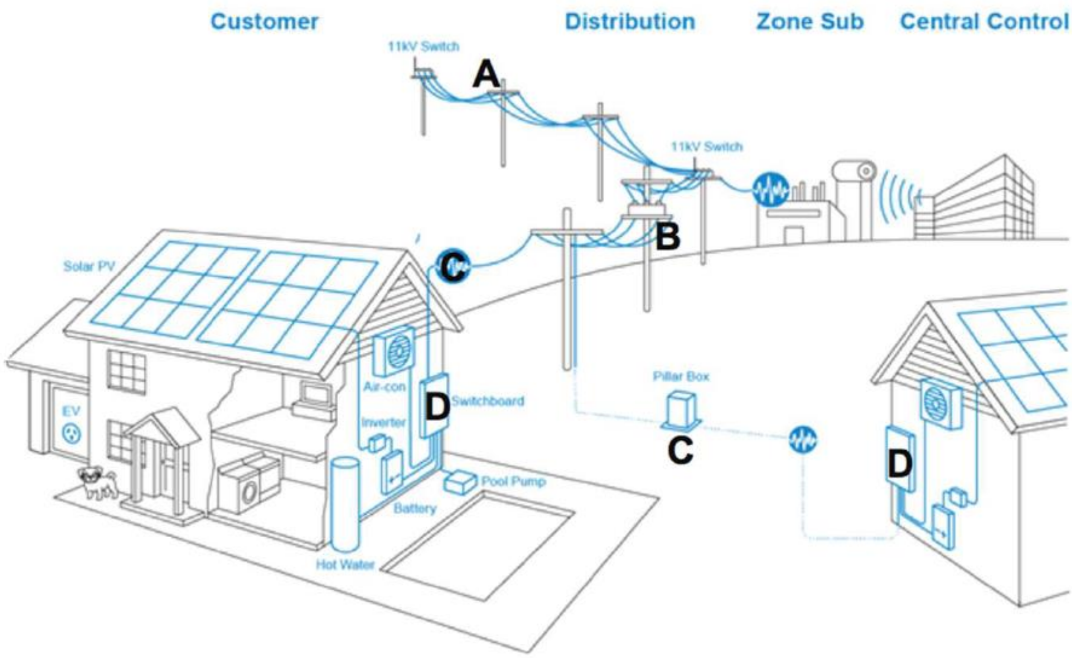
	Benefit	***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefits				
	Avoided costs of manual de-energisation (60% meter rollout)	***0.0***	***0.0***	***65.7***
Potential benefits				
	Avoided cost of after-hours manual re-energisation.	0.0	0.0	2.1
	Avoided cost of manual de-energisation (when less than 60% meter rollout)	1.0	1.4	48.6
	Avoided cost of manual re-energisation (business hours)	0.6	0.9	72.2
Total potential benefits if remote energisation is allowed		**1.6**	**2.3**	**122.9**
Total realisable and potential benefits		**1.6**	**2.3**	**188.6**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.
Totals may not add due to rounding.

3.8 Improved service delivery by networks

The data provided by advanced digital meters fits into two categories—energy data and engineering data. Energy data includes the amount of electricity exported and imported, as well as demand levels. This data is primarily used for retail and network billing purposes. Engineering data includes a number of metrics which relate to the power supply itself, such as electricity phase information, frequency, voltage levels and harmonic distortion levels. This data is important for networks to manage the reliability and quality of the electricity supply. This data can be obtained at various locations throughout the network, as shown in figure 4.

Figure 4 Distribution network data gathering points



a. 11kv feeder

b. distribution transformer

c. low voltage mains

d. customer switchboard

Source: Energy Queensland Low Voltage Network Monitoring Strategy

Each data reporting location provides similar data types. However, the closer the data is to where the electricity is ultimately used, the greater the granularity with which distributors are able to manage their network. For example, data collected at the distribution transformer can tell a distributor that the transformer is nearing capacity. However, this data does not inform the distributor which individual premise(s) are most contributing to the network load.

Data collected at the customer switchboard can be analysed to develop understanding of overall usage patterns, based on factors such as the time of day, weather patterns and seasonal factors. These insights can be used to better plan networks and generation, as well as manage distributed generation and storage. The data can also allow for more efficient operation of the network, by shifting customers to different phases or changing the operation of the network in other ways to better balance electricity loads. This can enable distributors to transport larger amounts of electricity, and allow for greater solar export loads—without affecting the service received by customers or augmenting the network (and increasing network costs).

This also allows distributors to detect supply faults both more quickly and more accurately. Distributors can proactively identify and rectify faults in their network, or with individual premises, improving safety and the quality of service received by customers, as well as reducing the number of customers having to raise complaints to report faults to distributors. EnergyAustralia highlighted that fault detection and faster fault rectification was 'particularly important for vulnerable and life support customers.'[42]

[42] EnergyAustralia, *submission to report on benefits of advanced digital meters*, June 2019, p 3.

In extreme cases, such as where power lines are down or a major fault occurs in the electrical system of a premises, the faster detection of faults can significantly reduce the risk of customers receiving electric shocks.

The increased service levels from distributors are also likely to result in reduced payments for poor performance under the Guaranteed Service Level requirements of the Electricity Distribution Network Code.

Is this benefit being realised?

At present, there is limited realisation of this benefit for customers with advanced digital meters. While distributors routinely gather data at higher levels in the network, such as transformers and substations, at this stage there are only pilot programs to gather and use this data.

In addition, while these benefits are highly likely to be accrued, based on the current strategy being proposed by Energy Queensland the benefits will not be attributable to advanced digital meters, as engineering data will be obtained from network monitoring devices. For this reason, we consider all benefits of additional engineering data to be a potential benefit of advanced digital meters.

The NER allows for distributors[43] to access data recorded by advanced digital meters.[44] During consultation on the rule determination, networks argued for a minimum specification that required advanced digital meters to include data required by distributors to manage their networks.

The AEMC considered that requiring all meters to include the data requested by distributors was 'likely to introduce more costs than benefits.'[45] The AEMC preferred to set a lower minimum standard for data, to minimise costs and ensure that customers only paid for the services that were required:

> The Commission considers that a relatively low minimum services specification allows the market to determine the services that consumers want at a price they are willing to pay. Over-specifying the minimum services that new and replacement meters for small customers must be capable of providing could result in consumers having to pay for meters that are capable of providing services that ultimately are not taken up, are of no benefit to them or could be provided in a more cost effective way through alternative technologies.[46]

The AEMC expected that this type of data would ultimately be supplied by advanced digital meters, through distributors negotiating with metering coordinators to obtain the data they require:

> … the Commission expects that most metering installations will include services in addition to those required by the minimum services specification because retailers, DNSPs and energy service companies will negotiate for additional services to be provided by the metering installation.[47]

[43] Referred to as local network service providers.

[44] Section 7.5.1, Schedule 5, Chapter 7, version 123 of the National Electricity Rules.

[45] AEMC, *National Electricity Amendment (Expanding competition in metering and related services) Rule 2015*, final rule determination, p 81.

[46] AEMC, *National Electricity Amendment (Expanding competition in metering and related services) Rule 2015*, final rule determination, p 70.

[47] AEMC *National Electricity Amendment (Expanding competition in metering and related services) Rule 2015*, final rule determination, p 70.

The AEMC also considered 'the ability under the framework for DNSPs to retain or install network devices.'[48] These devices could potentially compete against metering coordinators for the provision of data. The AEMC undertook to re-examine the issue as part of a review, stating that:

> … the Commission acknowledges the concerns raised, particularly by DNSPs, and considers it prudent to assess the state of competition once the market has had time to evolve. Therefore the Commission recommends that the need for access regulation should be reviewed three years after the new Chapter 7 of the NER commences.[49]

Under its Low Voltage Network Monitoring Strategy [50], Energy Queensland proposes to roll out its own network monitoring devices at customer premises to provide this information, rather than obtain it from advanced digital meters owned by metering coordinators. These devices, supplied by Redback technologies[51] have much of the same functionality as advanced digital meters, including communication and remote reading. However, these devices would be owned, controlled, and configured, by distributors. As such, the capital cost of these devices would be added to the regulated asset bases, and operating costs, of distributors—and would be paid for through network tariffs.

Energy Queensland's reasoning for using network devices, rather than advanced digital meters is that:

- It has no statutory right to have the data it wants captured by advanced digital meters (see table 21 below).
- It has no statutory right to data collected by advanced digital meters.
- Under the current rollout process, it has no control over where advanced digital meters are installed.

Table 21 Engineering data

Data sought by Energy Queensland[a]	***Minimum specification in NER***[b]
The status of the energisation switch.	The status of the energisation switch.
Voltage	Voltage
Voltage total harmonic distortion (THD)	-
Current	Current
Current total harmonic distortion (THD)	-
Power	Power
Power factor	-
Supply frequency	Supply frequency
Real-time data	-

[48] AEMC *National Electricity Amendment (Expanding competition in metering and related services) Rule 2015*, final rule determination, p 81.

[49] AEMC *National Electricity Amendment (Expanding competition in metering and related services) Rule 2015*, final rule determination, p 81.

[50] Energy Queensland, *Low Voltage Network Monitoring Strategy*, January 2019

[51] See https://redbacktech.com/government-funds-project-to-slash-household-power-bills/ for more information.

a. Source: Energy Queensland.

b. Section 7.5.1, Schedule 5, Chapter 7, version 123 of the National Electricity Rules.

Distributors in Victoria source this data from advanced digital meters.[52] Metering coordinators and advanced digital meter suppliers operating in Queensland confirmed they are able to configure meters to provide the data that Energy Queensland requires. Metering coordinators expressed a willingness to negotiate with distributors for access to the data they require.

Based on the information gathered in the process of preparing this report, the question of which is the best data source appears to be an economic, rather than technical, one. This is one of the matters which will be examined in depth by the AER in its consideration of Energy Queensland's Low Voltage Network Monitoring Strategy.

ACIL Allen estimate that the benefits of additional engineering data to be $185m for south east Queensland. As our analysis is based on Energy Queensland's current strategic direction, as outlined in the Low Voltage Network Strategy, these benefits are not included as a benefit of advanced digital meters.

3.9 Reduced electricity theft

Electricity theft occurs where illegal electricity connections either bypass the electricity meter at the property, or connect to another property to obtain power without paying for it. The additional data from advanced digital meters allows for far easier, and more accurate, detection of electricity theft.

Is this benefit being realised?

Retailers did not raise electricity theft, or the ability of advanced digital meters to detect it, as a significant issue. However, ACIL Allen note that studies in the United Kingdom[53] and Victoria state that electricity theft could be reduced by between 10 and 50 per cent.

Estimates of the amount of electricity recovered have been based on assumptions consistent with the recent study in Victoria, with energy costs based on the south east Queensland cost estimates previously calculated for 2019–20 notified prices.

Table 22 Estimated value of reduced electricity theft ($m, 2019)

Benefit	***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefit			
Reduced electricity theft	0.2	0.3	24.2

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table A.2, p A–3.

3.10 Reduced greenhouse gas emissions

As discussed in section 3.2, customers are expected to reduce electricity usage, and shift usage from peak to off-peak periods as a result of installing advanced digital meters and changing their

[52] Department of Primary Industries, *Advanced metering infrastructure minimum AMI functionality specification (Victoria)*, p 8.

[53] Department for Business, Energy & Industrial Strategy, *Smart Meter Roll-out Cost-Benefit Analysis*, August 2016.

behaviour in response to the more cost-reflective tariffs made possible by these meters. This reduction in peak, and overall, generation also results in lower greenhouse gas emissions.

Table 23 Estimated benefit of reduced greenhouse gas emissions ($m, 2019)

Benefit		***2018–19***	***2019–20***	***Cumulative impact until 2049***
Realisable benefit				
	Reduction in greenhouse gas emissions if the current proportion of customers on alternative tariffs is maintained.	0.0	0.0	0.9
Potential benefit				
	Reduction in greenhouse gas emissions if all customers opt for alternative tariffs.	0.2	0.4	17.1
Total realisable and potential benefits		**0.3**	**0.4**	**18.0**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, Table A.2 p A-4.
Totals may not add due to rounding.

4 BARRIERS TO REALISING BENEFITS FROM ADVANCED DIGITAL METERS

4.1 Customer barriers

Meter costs

As discussed in section 1.2, advanced digital meters are more expensive than accumulation meters.

In addition to increased annual costs and potential installation costs, customers may also face residual capital costs for their previous meter. If a customer requests an advanced digital meter be installed before their existing accumulation meter has reached the end of its economic life, the premises is still liable for the capital charge of the accumulation meter that has been replaced *in addition* to the charges for the advanced digital meter.

At present, most retailers do not charge customers individually for their particular metering costs. Retailers indicated that due to the relatively small number of advanced digital meters installed, they were either absorbing the additional costs, or spreading them across all customers. As the numbers of advanced digital meters increase, it is possible these practices may change.

As table 24 shows, a customer requesting the installation of an advanced digital meter would end up costing their retailer significantly more than a customer who had their advanced digital meter installed at the end of the meter's economic life.

Table 24 Costs of meters (south east Queensland $/pa excl GST)

Charge	***Accumulation meter***	***Advanced digital meter***	***Advanced digital meter requested***
Non-capital[a]	8.76		
Capital[a]	26.89		26.89
Advanced digital meter[b]		117.52	117.52
Total	35.66	117.52	144.41

a. Source: Energex website - https://www.energex.com.au/home/our-services/meters/metering-charges.

b. ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019, table 2.4, p 15.

While most retailers do not charge an up-front fee for installing an advanced digital meter, customers may still face up front installation costs. For example, customers may have to pay for their switchboard to be upgraded or repaired before an advanced digital meter can be installed. In extreme cases, such as where there is asbestos present, the cost of these remedial works could be thousands of dollars. Even where upgrades are not necessary, this may not be known to the customer in advance and the potential for large installation costs may make customers hesitant to upgrade their meter.

These costs could also be a significant barrier for renters wishing to take advantage of advanced digital meters. Any costs of installation would be borne by landlords, while the benefits would be received by renters.

Complexity

While there are significant additional costs associated with advanced digital meters, there are also significant potential benefits. However, the additional data recorded by advanced digital meters, along with the new types of tariffs available, make accurately identifying and taking advantage of the benefits, a complex process.

It may be possible for individual customers to save on their electricity bill by opting to have an advanced digital meter installed and change to one of the alternative tariffs made possible by these meters. While new tariff types provide more options for customers, and potentially greater savings, tables 25 and 26 show that new tariff types are not as simple, and assessing whether a customer can benefit by having an advanced digital meter installed, is a very complex task.

Making an accurate assessment of whether a customer can benefit from installing an advanced digital meter and adopting an alternative tariff can only be done using the type of data recorded by an advanced digital meter. As such, customers with accumulation meters are in a position where they effectively have to install an advanced digital meter to obtain the data required to accurately assess whether or not they would benefit from installing one.

Table 25 Comparison of flat rate and seasonal time-of-use and demand tariffs (excl. GST)

Charge	***Flat rate residential (Tariff 11)***	***Seasonal time of use and demand (Tariff 14)***
Supply charge (c/day)	90.345	45.773
Usage charge (c/kWh)	23.661	15.835
Peak demand charge ($/kW/month) 3 pm to 9:30 pm during the months of December, January and February. Demand charge is based on the maximum daily average demand.	–	59.412
Off-peak demand charge ($/kW/month) All other times. Demand charge is based on the greater of maximum daily average demand or 3 kW.	–	8.532

Table 26 Annual bill calculation for flat rate and seasonal time-of-use demand

Flat rate tariff (Tariff 11)	***Seasonal time-of-use demand (Tariff 14)***
Multiply the supply charge by the number of days in the year. Multiply the usage charge by the amount of electricity consumed for the year. Sum these two figures.	Multiply the supply charge by the number of days in the year. Multiply the usage charge by the amount of electricity consumed for the year. Calculate the peak demand charges for each of the summer months (December, January and February) by: • Averaging the 13[54] demand readings between 3 pm and 9:30 pm each day for the month, • Determining the largest daily average for the month, • Multiplying the largest daily average by the peak demand charge, and • Performing this calculation separately for each of the months of December, January and February. Calculate the off peak demand charges for each of the summer months (December, January and February) by: • Averaging the demand readings outside of 3 pm and 9:30 pm each day for the month, • Determining the largest daily off-peak average for the month, • Multiplying the off-peak demand charge by the greater of the largest daily off-peak average or 3 kW, and • Performing this calculation separately for each of the months of December, January and February. Calculate the off peak demand charges for all other months by: • Averaging the demand readings for each day for the month, • Determining the largest daily average for the month, • Multiplying the off-peak demand charge by the greater of the largest average daily demand or 3 kW, and • Performing this calculation separately for each of the non-summer months (March through October). Sum these 17 figures.

[54] Note: at present advanced digital meters are read in half hourly intervals. In February 2022, these will be upgraded to 5 minute intervals.

In Victoria, the Victorian Energy Compare website is able to use advanced digital meter data files to calculate electricity bills under a variety of offer types. However, at present there is no free or easily accessible service available to Queensland customers to use advanced digital meter data to compare offerings from different retailers. We understand the AER's comparison website (Energy Made Easy) may have this functionality in future.

Mondo highlighted this as an opportunity for energy advice platforms to assist customers in this process.[55] The ACCC is in the process of establishing a consumer data right (CDR) for energy customers.[56] This would allow customers to authorise third parties to securely access their data. When implemented this will allow organisations other than retailers to provide websites or applications which help customers understand their data. Given the rapid development in websites and software in other industries, it is reasonable to expect this competition will provide far more opportunities for customers to understand, and better utilise, their data in future.

Even where a customer is able to use advanced digital meter data to compare offers, a further complication is that the customer must also estimate their ability to move usage from peak to off-peak periods. There are limits to how much usage can realistically be changed to different times of the day. Some appliances, such as refrigerators, use power constantly throughout the day and cannot be realistically switched off for extended periods. Shifting other usage may require significant lifestyle changes which may not be practical. QCOSS questioned 'whether customers had the wherewithal to inform themselves'[57] in relation to consumption during peak times, and highlighted the difficulty of avoiding consumption during peak periods for vulnerable customers in particular.[58]

Both retailers and customer groups suggested a Government led education program on digital metering and the potential uses and benefits could act to overcome a general reluctance for customers to accept advanced digital meters.

4.2 Barriers faced by retailers

Customer acceptance of advanced digital meters

Retailers reported that there was a general reluctance for customers to accept advanced digital meters. Explaining the benefits of advanced digital meters to customers puts retailers in a somewhat counter-intuitive position. Retailers offering an advanced digital meter to a customer on the basis of electricity bill savings are effectively acting to lower the amount of revenue they receive from a customer. Many customers are sceptical of the claims made by retailers, even where they may be genuine.

Both retailers and customer groups highlighted the need for a Government led education program on digital metering and the potential uses and benefits. One retailer suggested that the program undertaken in New Zealand was highly successful, and could serve as a model for a similar program in Australia.

Government policy changes

The additional data provided by advanced digital meters provides an opportunity for retailers to improve their levels of customer service and better manage their business. However, taking

[55] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 5.
[56] https://www.accc.gov.au/focus-areas/consumer-data-right-cdr/energy-cdr.
[57] QCOSS, *submission to the draft determination on regulated retail electricity prices for 2018–19,* p 13.
[58] QCOSS, *submission to the draft determination on regulated retail electricity prices for 2018–19,* p 13.

advantage of these opportunities requires significant updates to billing and analytic systems, and the development of new analytical tools, which is a resource-intensive process.

During discussions with the QCA, a number of retailers commented that developing the systems to support advanced digital meters are but one demand of many on their resources. In particular, retailers noted they were devoting significant resources to implementing the default market offer, and ensuring compliance with the ACCC Electricity Retail Code.[59] Retailers are reporting that frequent policy changes, and the resulting demands on retailer resources, affect how quickly they are able to realise these benefits.

Pricing uncertainty

New types of network tariffs can vary markedly from year to year in terms of structure, and in pricing. A key reason is that when a new type of tariff is introduced it is usually based on either a small group of test customers and/or modelling of potential customer usage and demand. As the tariff is adopted by new customers, the distributor must adjust tariffs in response to this new data to ensure it meets revenue cap requirements. While well-established tariffs must also be adjusted for changes in customer usage, these tariffs are based on significant amounts of real-world data, and are relatively stable as a result.

In addition to potential forecasting error, these types of tariffs are specifically intended to encourage changes in customer usage patterns. The degree to which customers respond to these price signals can affect the tariff in two ways. Firstly, the degree of response will affect the revenue received under the network tariff, and require the distributor to adjust the overall price to ensure average revenue is consistent with its regulated revenue cap. Secondly, if there is insufficient response, or negative feedback from customers, the distributor may have to change the strength of the price signal and the structure of the network tariff, or scrap the tariff altogether.

For this reason, retailers may be reluctant to base their long-term pricing strategy on newly-developed network tariffs. In addition, tariffs with more cost-reflective price signals may be more difficult for customers to assess (as discussed above). A retailer may find it more effective, and less risky, to focus on providing simpler tariffs to its customers.

[59] https://www.accc.gov.au/business/industry-codes/electricity-retail-code.

5 FUTURE DEVELOPMENTS

Advanced digital meters represent a significant step forward in data gathering and the provision of additional services. More detailed data allows for greater understanding, and more efficient usage of resources to lower costs. The next major development appears to be in technologies which are able to actively respond to this new data, or to other inputs. Mondo highlighted the potential for third parties to provide solutions for customers, stating:

> Digital meters can supply advanced data to third parties acting on behalf of customers. For instance high frequency data can facilitate load disaggregation technologies and real time data can be used by home energy management systems (HEMS) to better manage energy use.[60]

A simple example would be for an energy management system which could monitor demand levels, and manage appliances in the home, to avoid peaks in demand. This would allow customers to benefit from demand tariffs, and for networks to get the demand response they need to lower network costs, without customers having to constantly monitor their demand and manually manage their use. A more advanced example may be an energy management system which is able to actively respond to price signals, or provide network stability services.

These systems could provide additional opportunities for retailers. For example, a retailer may choose to offer a fixed-price energy plan, and install an energy management system to manage costs of supply.

These systems may also create a secondary market for energy management systems, allowing technology or engineering organisations to provide services to customers. One system being developed in Australia is a system which operates in a similar manner to a smart phone, with customers able to choose different applications, from different parties, to allow for a variety of services.[61] The platform will be open to third parties, allowing for varying functionality for customers to choose from.

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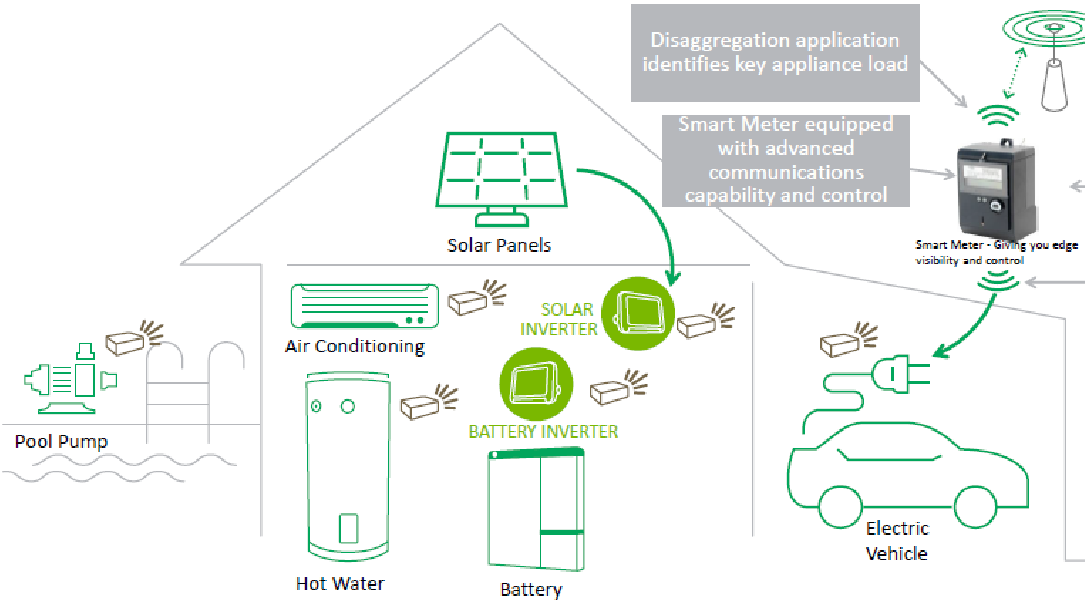
[60] Mondo, *submission to report on benefits of advanced digital meters*, June 2019, p 4.
[61] This system is being developed by Landis+Gyr.

Figure 5 Example of an energy management system, Landis+Gyr grid edge intelligence project



Source: Landis+Gyr

Predicting the future direction of technology is obviously difficult. However, these types of home energy management systems can be capable of using data beyond what is supplied by advanced digital meters themselves. For example, systems could use weather forecast data to increase or decrease storage levels to match future conditions. These systems may also be integral in enabling local electricity trading, or selling storage capacity to networks for grid stability.

APPENDIX A: MINISTERIAL DIRECTION

Queensland Government

The Hon Dr Anthony Lynham MP
Minister for Natural Resources, Mines and Energy

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Ref CTS 33829/18

QLD COMPETITION AUTHORITY
24 APR 2019
DATE RECEIVED

-5 APR 2019

Professor Flavio Menezes
Chair
Queensland Competition Authority
GPO Box 2257
BRISBANE QLD 4001

Dear Professor Menezes

The Queensland Government has a strong record of delivering stable electricity prices and is committed to ensuring that Queensland households and businesses continue to benefit from this government's actions in a fair and equitable way. In April 2018, I sought the Queensland Competition Authority's (QCA) advice on spreading digital metering costs across all regional small customers, rather than applying them only to customers receiving or having the new meters. This was due to my concern about the substantive impact small regional customers face, especially during the early stages of competitive metering reforms under the Power of Choice. I appreciated the QCA's advice on this matter and look forward to receiving revised advice for this year.

On 15 June 2018, I applied that original advice in setting metering prices for small regional standard contract customers for 2018–19. For a customer on Tariff 11, this reduced the annual cost of a digital meter from $111 (as identified by the QCA) to $44. I acknowledge that the cost of advanced digital meters is higher than standard accumulation meters and that they deliver benefits standard meters cannot.

I remain concerned that continuing with this approach will eventually mean that all customers will pay the full additional costs of digital metering without recognition of the benefits across the supply chain. For example, a retailer should achieve savings through being able to undertake remote (rather than manual reads) and by providing more frequent billing, which in turn may reduce the number of disconnections or customers in long-term hardship, providing additional benefit to retailers. A network business should also gain benefits and achieve savings by being able to respond more quickly to power interruptions, and to build a more accurate understanding of customers' energy demand, thus optimising future investments. Importantly, digital metering is the critical enabler of new cost reflective network tariffs which seek to drive more efficient use of electricity networks.

I wish to better understand the benefits associated with the deployment of advanced digital meters and seek the following advice:

- The potential benefits that may be realised by the various participants in the electricity supply chain.
- The extent to which these benefits are currently being realised by these participants.
- The barriers, if any, which currently limit potential benefits being passed through to customers and other participants in the electricity supply chain.

- Any anticipated future technology and/or retail product developments that may result in direct benefits to customers, or provide products and services that customers may be willing to pay a premium for.

Accordingly, I am issuing a direction notice under section 89B of the Electricity Act 1994 (the Act) for the QCA to provide advice. In making this request, I acknowledge the limitations to the QCA's information gathering powers under the Act.

The QCA is to provide written advice to me by 16 September 2019. I would also request the QCA publish the report on its website on 20 September 2019.

If you have any questions, please contact Ms Gayle Leaver, General Manager, Energy Division, Department of Natural Resources, Mines and Energy who will be pleased to assist you and can be contacted on 3166 0170.

Yours sincerely

Dr Anthony Lynham MP
Minister for Natural Resources, Mines and Energy

Att

ELECTRICITY ACT 1994
Section 89B(1)

MINISTER'S DIRECTION NOTICE

Pursuant to section 89B(1) of the *Electricity Act 1994* (the Act), I hereby direct the Queensland Competition Authority (the QCA) to provide a report on the potential benefits that are readily and directly available to participants in the Queensland electricity supply chain, and residential and small business customers for the period of 1 July 2018 to 30 June 2019 as the result of those customers having or receiving advanced digital electricity metering (Type 4), and being in addition to and compared to, the same customers having standard accumulation metering (Type 6).

The following are the Terms of Reference of this direction:

Terms of Reference

1. This report should consider:
   a. retailers' advanced digital metering deployment strategies, including deployments completed by 1 July 2019 and forecast installations to 30 June 2020;
   b. as far as is possible, the benefits from advanced digital metering that:
      i. various electricity supply sector participants such as but not limited to, electricity retailers, electricity distribution and transmission network entities, electricity generators, and market administrators; and
   ii. small retail customers can reasonably be expected to have available to them in 2018-19, or in future, regardless of whether or not they act to realise those benefits.
   c. In evaluating the potential direct benefits in the form of cost savings or avoided costs, reference should be made to the costs associated with providing retail advanced digital metering services to residential and small business customers in the Energex distribution area, in a manner consistent with the Government's Uniform Tariff Policy; and
   d. any other matter the QCA considers relevant.

2. The report should set out potential direct benefits for each relevant electricity chain participant group, and where possible be supported by:
   a. consideration of the available direct benefits advanced digital meters currently offer over standard accumulation metering setting aside considerations of any barriers to realising benefits;
   b. consideration of which participant group or groups each of those direct benefits can be largely accessed by, including the proportion of the total benefit each group may access;
   c. the potential for each of those direct benefits to be realised by 30 June 2019, compared to forecasts for 30 June 2020, and over the period when the expected maximum (up to 100%) meter deployment is reached;
   d. assessment of the barriers for each group in realising each of those direct benefits, and potential outcomes for retail customers if barriers are not removed; and
   e. where possible, assessment of the annual value of each benefit to each group, adjusted for the impacts of barriers to achieving the benefits.

Timing and publication of report

In accordance with section 89B(2)(b) of the Act, the QCA must provide me a final version of its written advice no later than 16 September 2019.

In accordance with section 89B(2)(c) of the Act, the QCA must publish this direction on the QCA website, and publish its written advice to me on the QCA website on 20 September 2019.

DATED this THIRD day of April. 2019.

SIGNED by the Honourable)
Dr Anthony Lynham MP)
Minister for Natural Resources,)
Mines and Energy)

(signature)

APPENDIX B: BENEFITS IN REGIONAL QUEENSLAND

While the Minister's direction is to report on benefits in south east Queensland, during the course of preparing this report we identified a number of differences between benefits, and the value of those benefits, in regional Queensland compared to south east Queensland. Table 27 shows a summary of ACIL Allen's overall estimates of the benefits of the deployment of advanced digital meters in regional Queensland.

The benefits of the deployment of advanced digital meters are largely the same in nature as those for south east Queensland. The exceptions are:

- Retailers report there is a smaller percentage of customers on alternative tariffs in regional Queensland.
- Reductions in network costs and meter reading costs are higher in regional Queensland, due to the higher network costs and greater geographical area.
- There is assumed to be no benefit associated with more timely customer transfers. Given competition for small customers in regional areas is limited due to the subsidies received by Ergon Retail under the Uniform Tariff Policy, this benefit is listed as potential for regional Queensland.
- Due to limited competition for residential and small business customers in regional Queensland, the value of benefits are expected to be passed through via notified prices, rather than by competition.

Table 27 Impact of advanced digital meter deployment on the electricity supply chain in regional Queensland ($m, 2019)

Benefit		***2018–19***	***2019–20***	***Cumulative impact until 2049***
NET COSTS				
	Net cost of advanced digital meter installation and operation	-10.0	-3.4	–362.5
BENEFITS				
Realisable benefits				
	Direct benefits realised by customers	0.2	0.4	39.3
	Savings in retail costs	0.3	0.6	48.6
	Savings in network costs	0.0	0.1	72.8
	Reduction in greenhouse gas emissions	0.0	0.0	0.0
	Total realisable benefits	**0.6**	**1.1**	**160.8**
Additional potential benefits				
	Direct benefits potentially realisable by customers	0.7	1.1	89.8
	Potential savings in retail costs	0.0	0.0	0.0
	Potential savings in network costs	8.5	13.3	648.4
	Potential reduction in greenhouse gas emissions	0.1	0.2	8.2
	Total potential additional benefits	**9.3**	**14.6**	**746.4**
Total realisable and potential benefits		**9.8**	**15.6**	**907.1**

Source: ACIL Allen, Costs and Benefits of Advanced Digital Meters, September 2019 p A.2-A.4.

Totals may not add due to rounding.

In addition to the above, ACIL Allen estimates that the regional Queensland electricity market as a whole will benefit by an additional $169.0m in NPV terms, by utilising more detailed engineering data. However, Energy Queensland plans to obtain this data from network monitoring devices, rather than advanced digital meters. As a result, this cannot be classified as a benefit of advanced digital meters for the purposes of this report.