Attachment 09.1P

Alternative Control Services Metering Overview Document

2019-20 to 2023-24

16 March 2018

Contents

1. Purpose and structure of this document

This document explains and justifies at a high-level, our building block revenue and indicative prices for our Alternative Control Services (ACS) (electricity) Metering Services for the next regulatory period 2019-24. It supports our Regulatory Proposal to the Australian Energy Regulator (AER) and references other supporting documentation and models that further explain and justify the detail of our ACS Metering Services revenue forecast.

The document is structured as follows:

- Chapter 2 sets out our metering services and how they change under chapter 7A of the Northern Territory National Electricity Rules (NT NER) from 1 July 2019.
- Chapter 3 sets out our regulatory baseline that underpins our forecasts and the key documents that support our forecasts.
- Chapter 4 sets out our new and replacement smart meter policy position, which underpins our capital expenditure (capex) and operating expenditure (opex) forecasts.
- Chapter 5 sets out our forecasts over the 2019-24 regulatory period that make up our annual revenue requirement (ARR) for ACS Metering Services.
- Chapter 6 sets out our ARR and resulting X-factors for ACS Metering Services.
- Chapter 7 sets out our ACS metering prices.
- Chapter 8 sets out our proposed pass through events.

2. Our ACS Metering Services

Consistent with the AER's Framework and Approach (F&A) paper, our ACS Metering Services comprise:

- Type 1 to 6 metering services, and
- customer requested provision of additional metering/consumption data.

2.1 AER F&A Classification

As set out in chapter 8 of our Regulatory Proposal, we agree with the AER's position in its F&A paper to classify our Type 1 to 6 metering services and customer requested provision of additional metering/consumption data (together Metering Services) as ACS.

We also note that the AER's proposed service classification for our Type 1 to 6 metering services is a change to how they are currently classified by the Utilities Commission (UC).

Table 2-1 details our proposed service classification, which is consistent with that proposed by the AER in its F&A paper and compares it to the classification for the current 2014-19 regulatory period. We note the following difference between the terminology used by the UC to classify our services in the current period and that used by the AER under the NT NER:

- The UC's "regulated network access service" is equivalent to a Standard Control Service (SCS).
- The UC's "excluded network access service not subject to effective competition" is equivalent to an ACS.
- The UC's "excluded network access service subject to effective competition" is equivalent to the service not being classified and therefore not regulated by the AER.

Table 2-1 – Our proposed ACS Metering Service classification

Service group/Activities included	2014–19 classification	2019–24 classification
Type 1 to 6 metering services	SCS	ACS
Type 7 metering services	SCS	SCS
Customer requested provision of additional metering/consumption data	ACS	ACS

Our proposed service classification will promote fit-for-purpose regulation and future competition in metering services.

2.2 AER control mechanism

Control mechanisms set controls over changes in our revenues and prices over a regulatory period that ensure that we only earn what the AER has allowed.

In its F&A paper, the AER has decided to apply price caps to our ACS in the next regulatory period. We accept this decision, but note:

- this is a change from the treatment of ACS in the current regulatory period, whereby clause 72(4) of the *Electricity Networks (Third Party Access) Code 2015* requires us to provide ACS on fair and reasonable terms; and
- this is a change in the treatment of metering services, which are classified as regulated network access services (the equivalent of SCS) in the current regulatory period, and so are subject to a revenue cap.

We accept the AER's approach to the formulae for giving effect to the price caps for our type 1 to 6 metering services.[1] Attachment 1.8 details how we will apply our control mechanisms to these services.

2.3 Our services

We have adopted the following descriptions of metering services from the AER's F&A paper and chapter 7A:

- metering coordinator;
- metering provider, including providing, installing, maintaining, inspecting, replacing and testing meters;
- meter reading, including scheduled and special meter reads (e.g. move-in and move-out meter reading, final read on removed meter); and
- meter data services, including collection, processing, management, delivery and storage of metering data.

Our metering services are split by the following meter types:

- Single Phase
- Three Phase, and
- Metering Dedicated Current Transformers (CTs) and Voltage Transformers (VTs).

We also propose a suite of customer requested fee-based metering charges, which are set out in our Tariff Structure Statement.

[1] That is, the price cap formulae set out in Figure 2.2 at p42 of the AER's F&A.

Our customer requested fee-based metering services also include 'customer requested provision of additional metering/consumption data' where we charge for data beyond the standard provision for retail billing purposes.

2.3.1 Reasons for selection of meter types

Following analysis and customer feedback, we have reduced the number of meter types from those that we previously used. In doing so, we can:

- Reflect our customers' stated needs and preferences:
  - advanced meters meet all customer requirements, without the need for many different meter types.
- Improve efficiency:
  - move from current complex inventory of existing meters to one brand, with consistent functionality; and
  - minimise administrative complexity and associated costs, that carried no corresponding benefits.
- Recognise that there is little difference in the upfront cost of a unit itself, or of installation and connection costs for different meter types.

3. Supporting documents

This chapter sets out the regulatory baseline that we have used in developing our forecasts and the key documents that support our forecasts.

3.1 Regulatory baseline

As set out in Chapter 4 of our Regulatory Proposal, the legislative and regulatory framework within which we operate is undergoing extensive changes. Importantly, the changes are occurring as a phased transition that is intended to deliver bespoke instruments and differential rules suitable for the NT. To manage this situation and provide certainty for the purposes of this Regulatory Proposal, we have established a pragmatic regulatory baseline for developing our capex and opex forecasts. The baseline uses legislative and regulatory instruments as in force on 1 July 2017.

3.2 Key supporting documents

Our key supporting documents for our ACS Metering Services forecasts are:

- Metering Asset Management Plan (Metering AMP): The purpose of the Metering AMP is to define our approach to managing metering assets. It frames the rationale and direction that underpins the management of these assets into the future:
  - Short Term (0 to two years): Detailed maintenance and capital works plans for the upcoming financial year based on current asset condition.
  - Medium Term (two to seven years) 2019-24 regulatory period: Plans based on trends in performance and health indicators.
  - Long Term (seven to 12 years) 2024-29 regulatory period: Qualitative articulation of the expected long-term outcomes.

  The Metering AMP is part of a suite of documentation that encapsulate the management of our electricity network assets and our asset management system (AMS). The suite includes higher-level asset management (e.g. policy and strategy), interfacing systems (e.g. risk management), related-AMPs for other asset classes, and detailed business cases of asset investments.
- Metering Business Needs Identification (BNI): This document provides supporting information about our capex forecast required to implement our new and replacement smart meter policy position. It explains: the nature of the capex; why and when it is required; options considered; the forecasting method used, including any validation; and the project benefits.
- SCS and ACS Opex Step Changes (Attachment 3.2): This details and justifies our step changes for our SCS and ACS, including those related to metering.

- Cost Benefit Analysis (CBA) model (Attachment 12.19): Our CBA model sets out our justification for our new and replacement smart meter policy position. It also develops our capex forecasts that support our new and replacement smart meter policy position and our expected step changes in opex, as we implement our new and replacement smart meter policy position. Our CBA is discussed in detail in Chapter 4.

4. New and replacement smart meter policy position

Our new and replacement smart meter policy position is the significant driver of our ACS Metering Services' costs. It sets out what meters we plan to use when replacing or installing new meter connections over the 2019-24 regulatory period and the services that we expect from those meters for us and our customers. Our Metering AMP sets out how we plan to manage our metering assets over the 2019-24 regulatory period, including how we plan to implement our new and replacement smart meter policy position.

Our new and replacement smart meter policy position is informed and supported by:

- A CBA that has identified a policy that will provide the least cost option to our customers, and which meets the AER's expectations of the evidence required to justify our preferred position (only two clear material benefits to our customers have been considered);
- our customers' preferences; and
- non-quantifiable benefits that may be derived by us and the broader community (generators, retailers, and customers).

4.1 Cost benefit analysis

We have completed a CBA of feasible metering scenarios for our new and replacement smart meter policy position.

4.1.1 Rationale for excluding manual meter scenarios

In identifying feasible scenarios, we made a conscious decision to exclude the use of manual electronic meters or induction disk meters that don't have remote acquisition capabilities ie can't be communications enabled now or in the future (often referred to as "dumb meters", given their limited capability) as a feasible solution. We believe this is appropriate for the following reasons.

- **NT Government's Roadmap to Renewables commitment -** The NT Government has committed to a fifty per cent renewable energy target by 2030 and supported or supported in-principle the recommendations of the Roadmap to Renewables Report[2]. Government noted, and is undertaking further work to assess, the recommended core and supporting enabling actions, including: [3]

[2] Northern Territory Government Expert Panel, Alan Langworthy Chair, *Roadmap to Renewables*, September 2017

[3] See Recommendations 8(f) and 9(a).

  - metering requirements to enable more appropriate tariff structures, flexible customer services and imported data for network management; and
  - future system planning to support renewables,

  but it is clear to us that to facilitate such a significant renewable penetration, smart grids and smart meters will be necessary.

- In particular, we note Recommendations 7(b) and 8(f) of the Roadmap to Renewables regarding support for tariff structures, and changes to metering rules to allow for: competition in providing metering services; and innovative tariffs to encourage more efficient consumption by consumers.[4]

- **NEM and likely NT NER evolution** - The NEM is moving away from Type 6 (accumulation manual electronic meters) to Type 4 (interval) and Type 4(a) (advanced capable) meters. Chapter 7 of the National Electricity Rules (NER) supports the Power of Choice (PoC) program in the NEM, and therefore includes obligations which require advanced meters.

- Whilst we understand that the Department of Treasury and Finance is reviewing Chapter 7A of the NT NER as part of the next round of rule changes for 1 July 2018, the current version that will commence on 1 July 2019 is based on Chapter 7 of the NER, with modifications for the NT. Though there is no government-mandated roll out of smart meters in the NT, the current Chapter 7A of the NT NER includes some obligations which support advanced meters.

- We think that it is reasonable to expect that the NT will fully transition to Chapter 7 of the NER at some stage.

- **Energy Network Association's Electricity Transformation Roadmap -** Extensive penetration of smart meters is a fundamental assumption of the Energy Network Association's (ENA's) Electricity Transformation Roadmap which focusses on incentivising efficiency and innovation in the electricity industry. The roadmap asserts that investment in advanced metering is required to support reforms to pricing (including ensuring a fair system of prices), and to facilitate other benefits such as remote sensing and network operations. Its Milestone 1 assumes a high penetration of advanced meters installed across Australia by 2021. We note that this roadmap was developed through a two-year work program involving hundreds of stakeholders, an evidence base of 19 expert reports and unprecedented analysis of energy system outcomes to 2050.

[4] It was recommended that the government resist adopting metering requirements that include communications, unless fully financially justified.

- **Customer outcomes and feedback -** We believe long-term access by our customers to better quality information and cost reflective tariffs will result in more efficient use of energy and our network. It would be a step backwards for our customers if we installed manual electronic meters (especially those that could not be communications enabled in the future), going against the national trend of providing customers with more and better-quality information to make decisions on how they consume electricity. During the engagement process, our customers told us that they would prefer access to advanced meters provided that the costs of doing so are comparable (see Engagement Overview at Attachment 1.4). If smart meters would be cheaper or equal cost over the life of the meter based on the cost of interval meters:
  - 73% of our customers that we surveyed as part of our customer engagement for our regulatory proposal found our proposal to roll out smart meters to all new customers to be completely acceptable (scoring 10 out of 10); and
  - 71% of our customers found the proposal of replacing old meters for existing customers when they fail or are at the end of their normal life completely acceptable (scoring 10 out of 10).

  To further support this we are investigating options to invest the Demand Management Innovation Allowance in an online portal facilitating customer access to their interval meter data.

- **Tariff support -** Manual electronic meters will not enable us to implement our proposed tariff reform (see out Tariff Structure Statement at Attachment 2.1) to provide cost reflective tariffs to encourage our customers to use our network more efficiently.

- **Increasing costs -** Manual electronic meters are likely to be available worldwide for some time yet (possibly 20-30 years), however, their cost is expected to increase as their use declines.

The transition to smart meters is inevitable and the decision is not if, but rather when the transition should be made.

4.2 CBA plausible scenarios

Figure 1 below provides a high-level overview of the five plausible CBA scenarios that we have considered.

Figure 1: CBA scenarios

	Meter choice			Meter Installation Consideration			Meter Reading Method	
Scenario Name	Smart Capable	Smart Meter	Dumb Meter i.e. can't be comms enabled	All new & replacements	Selective new & replacements	Second installation visit required	Manual meter reads required for new meters	Timing of remote meter service enablement
S1 - Current practice - advanced capable meters (comms enabled later)	✓			✓		✓	✓	Timing dependant on meter volumes
S2 Targeted roll-out	✓	✓		✓	✓	✓	✓	Advanced meters enabled immediately. Advanced capable dependant on meter volumes
S3 Advanced meters, enabled immediately - Invest early in all networks		✓		✓				Advanced meters enabled immediately
S4 Advanced capable meters, enabled strategically	✓	✓		✓		✓	✓	Comms effective from 1 July 2024
S5 Transition via advanced meters - simplify transition and delay ICT investment		✓		✓			✓	Timing dependant on meter volumes

Descriptions of the plausible scenarios in the CBA model listed down the left hand side of Figure 1 above are:

- **S1 Current practice** - For all new and replacement meters we install interval meters which are configured for accumulation output and therefore manually read, but could be upgraded with remote communications in the future.
- **S2 Targeted roll-out** - Current practice with targeted advanced meter roll-out each year of the regulatory period and communications enabled in the future. In special circumstances (e.g. hard to access/rural areas, public housing), advanced meters would be installed for new connections and replacements and communications enabled immediately.
- **S3 Advanced meters, enabled immediately** - For all new and replacement meters we would install interval meters. Modems and antenna would be installed immediately with communications enabled and supporting IT systems to achieve national Type 4 specifications.
- **S4 Advanced capable meters, enabled strategically** - For all new and replacement meters we would install interval meters, which would be initially configured for accumulation output with no remote communication and manually read. Modems and antenna would be installed during 2023-24 to be effective from 1 July 2024.
- **S5 Transition via advanced meters** - For all new and replacement meters we would install advanced meters, but they would be manually read. We would convert installed advanced-capable meters to advanced meters and enable remote communications for all meters from 1 July 2024 (beginning of subsequent regulatory period, assuming a future decision is made that we will no longer be the deemed Metering Co-ordinator).

4.3 CBA key assumptions

The key assumptions underpinning our CBA and forecast capex for the plausible scenarios are:

- If an existing installation is on an asbestos board, the cost of replacing the asbestos board (if required) is included.
- Consistent with what we have submitted in our Regulatory Proposal for SCS:
  - The assumed forecast real pre-tax rate of return is 4.43%.
  - Assumed inflation is 2.42%.
  - The forecast connection growth rate is as has been developed by the Australian Energy Market Operator (AEMO).[5]
- The forecast cost of meters is based on [redacted] advanced meters supplied by [redacted] based on tendered costs updated for best available market information. [redacted] we will update our CBA analysis and forecast capex.
- The forecast costs have not been based on historical costs, but rather a bottom up build of expected costs given:
  - [redacted]
  - we have historically had inadequate systems to report metering 'asset' cost data and we consider the reported historical data provides a highly inaccurate reflection of our actual meter installation costs.
- The forecast installation cost is based on our internal labour and fleet costs, and where appropriate, current contracted service providers.
- The forecast total metering installations will be proportionate across our three network areas.
- We will upgrade our existing meter management system to enable up to 32,000 advanced meters and pay a nominal annual licence fee.
- An economic life of 15 years for meters and technology (modem and antennae) is consistent with recent AER determinations.

[5] We note the limitations of these forecasts, but consider them reasonable to use as the best available data at this time. However, we have requested a further breakdown of the data from AEMO, and if provided in time, we will update the forecasts in our revised regulatory proposal accordingly.

- The meter replacement profile reflects our 10 year catch-up strategy set out in the Metering AMP and thereafter is based on replacement at the end of useful life and a 2% failure / fault replacement rate.
- [redacted]
- For modems, a new technology upgrade will occur every 15 years and for meters installed in the first five years, an additional cost of conversion is required. For meters installed in years 6 to 15 of the 15 year period the new technology will be included in the new meter cost. A technology upgrade from 3G to 4G is also assumed in 2022-23.

4.4 CBA outcomes

Table 1 shows the CBA outcomes based on NPV of costs over a 40 year timeframe.

Table 1: CBA scenarios

Scenario (NPV, $m, Real $2018, mid-year, RY18 to RY57)	Base Case - Advanced Capable Meters (S1)	Targeted roll out (S2)	Advanced meters, enabled immediately (S3)	Advanced capable meters, enabled strategically (S4)	Transition via advanced meters (S5)
Net (Cost) / Benefit	(126.18)	(141.08)	(140.83)	(140.69)	(141.16)

Our CBA analysis demonstrates that the least cost option is to install advanced capable meters which are manually read (S1). This assumes that these meters are not communications enabled in the foreseeable future, which is unlikely given the rationale outlined in 4.1.1. In addition, this outcome does not include all benefits likely to be achieved by installing advanced meters including the long-term access to better quality information and cost reflective tariffs, which we expect will result in more efficient use of energy, and of our network, reducing total network costs. These additional benefits are discussed below.

4.5 Benefits not included in our CBA

Our CBA is focused on the lowest cost outcome and has limited the quantified benefits to those associated with reduced meter reading and disconnection costs. However, there are many other potential benefits from advanced meters such as:

- Benefits that the Victoria Distribution Network Service Providers (DNSPs) are achieving from the Victorian AMI functionality relating to:
  - Safety - through applying advanced analytics, the Victorian networks can identify the conditions to prevent fatal electric shock i.e. neutral integrity.

  - Renewable energy - customers can install roof top solar or wind generation without changing their meters.
  - More transparent energy bills - Victorian customers are already receiving daily 6:00 AM remotely read metering data.
  - Load control and outage notification**.**

- Additional benefits that the Victorian DNSPs are achieving beyond the Victorian AMI functionality, such as:
  - customer loss of neutral (LV Service Integrity) monitoring;
  - optimised management of LV network loading, by monitoring individual phases on local LV networks;
  - identification of energy theft;
  - solar alert; and
  - unauthorised export.

- Benefits identified and accepted through our customer focus groups (some of which are captured in the Victorian experience described above), being:
  - support for new technology such as batteries, solar and in-home automation;
  - reduced need for estimated meter reads;
  - reductions in illegal electricity consumption;
  - allowing customers to choose a different retail tariff offer or retailer at no extra metering cost;
  - enabling cost-reflective demand pricing;
  - improving our understanding of usage to better inform appropriate future investment in the network; and
  - allowing customers to better monitor their usage.

- More efficient energy consumption that results from reform of our network tariffs.

- Generation/retailer benefits, such as improved wholesale market settlement and reduced bill estimates and associated queries.

Appendix A estimates the indicative value of other benefits not captured in our CBA, but included in analysis undertaken for the Victorian Government in 2011 (the Deloitte report).[6] The Deloitte report was commissioned by the Victorian Department of Treasury and Finance and used to support its decision for a mandated advanced meter rollout.

The Deloitte report was subject to much debate by the industry and was criticised by the Victorian Auditor-General in reviewing the benefits of smart

[6] Deloitte, *Department of Treasury and Finance – Advanced metering infrastructure cost benefit analysis*, 2 August 2011

meters in 2015[7] for overstating the likely benefits. The Victorian Auditor-General considered a more realistic estimate of the benefits to be at 80% of the Deloitte levels. Despite that assessment, Victorian DNSPs are delivering both benefits that were debated in the past, and some benefits that were not envisaged in 2011.

We think that the Deloitte study, adjusted down to 80% for the Victorian Auditor-General findings, can provide some useful insight into the potential benefits that NT customers may receive from advanced meters across the full supply chain. After reducing the value for the expected Victorian benefits for the Victorian Auditor General's findings in 2015, and then further assuming only 50% of the benefits are realised in the NT and scaling these down again for our meter base compared to Victoria, our indicative analysis suggests that NT electricity consumers would expect to receive at least an additional $6.1 million to $15.4 million of benefits from advanced meters (see Appendix A). This range is based on there being regulatory constraints (that is, the Pricing Order remains in place with zero realisation for associated benefits) and no regulatory constraints respectively.

4.6 Our new and replacement smart meter policy position

The transition to smart meters is inevitable and the decision is not if, but rather when the transition should be made.

Whilst our CBA suggests that the least cost option is to base our new and replacement smart meter policy position on advanced capable meters (with manual reading), this option assumes that the meters will not be communications enabled in the foreseeable future. This is unlikely to provide the optimal long-term solution for our customers and is inconsistent with both the direction of the NEM, and with our customers' preferences.

Other benefits that we and other parties (retailers, generators, and customers) may realise are conservatively estimated at $6.1 to $15.4 million. Further, our customers strongly support our new and replacement smart meter policy position being based on advanced meters.

Therefore, our new and replacement smart meter policy position is to install advanced meters immediately supported by the necessary IT communications to give effect to remote reading and remote re-energisation and de-energisation. Our capex and opex forecasts have been developed on this basis. Attachment 12.19 sets out our business needs identification for our new and replacement smart meter policy position.

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[7] Victorian Auditor-General's Office, *Realising the Benefits of Smart Meters,* September 2015, available at www.audit.vic.gov.au/report/realising-benefits-smart-meters

5. Forecasts

This chapter sets out our forecasts over the 2019-24 regulatory period for:

- customer connections;
- current average asset lives;
- capex;
- opex;
- regulatory asset base and depreciation;
- rate of return, inflation and debt and equity raising costs;
- estimate cost of corporate income tax; and
- annual revenue requirements and X-factors.

5.1 Customer connections forecast

Consistent with our approach to developing the SCS demand forecasts, we engaged AEMO to prepare our forecast customer connections[8].

Table 5-1 sets out AEMO's forecast connections for our three network areas.

Table 5-1 – AEMO customer connection forecasts, 2019-20 to 2023-24

Network areas	2019-20	2020-21	2021-22	2022-23	2023-24
Darwin-Katherine	71,219	71,937	72,668	73,054	73,442
Alice Springs	12,217	12,253	12,296	12,282	12,274
Tennant Creek	1,636	1,658	1,677	1,692	1,703
Total	**85,072**	**85,848**	**86,641**	**87,028**	**87,419**

AEMO forecasts that customer connections for all three network areas will show good alignment with historical trends. [9]

[8] Attachment 4.4, Power and Water Corporation Maximum Demand, Energy Consumption and Connections Forecasts - 2017 implementation of forecasting procedure, AEMO, September 2017.

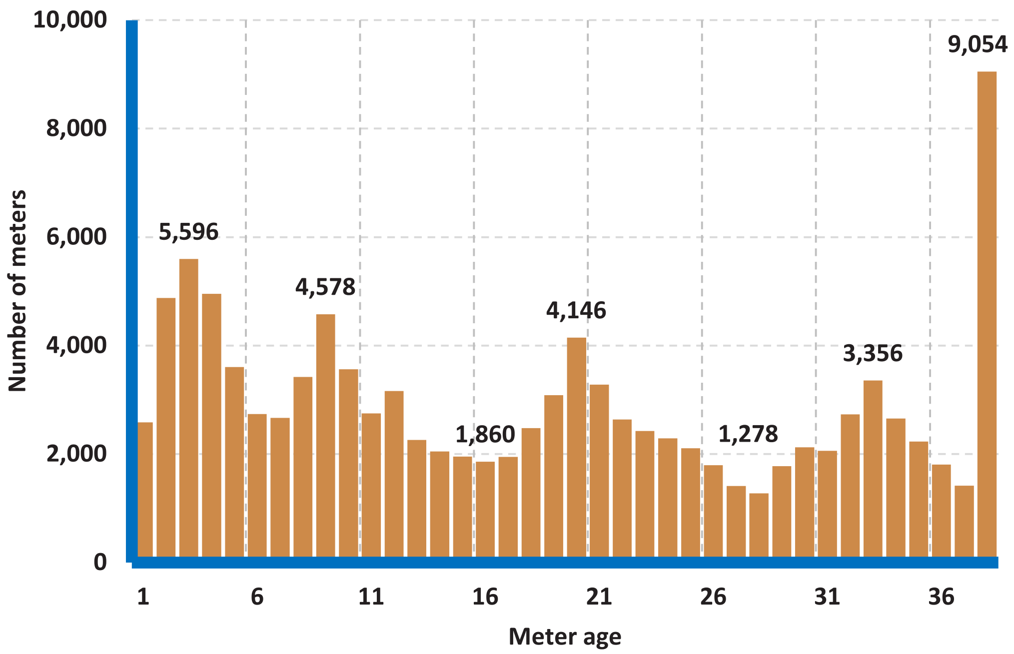
[9] Ibid, pages 5-11, pages 12-17 and pages 5-11. As per Footnote 4 above, we note the limitations of these AEMO forecasts, and consider them likely to understate the numbers.

5.2 Current meter asset lives

The average age of Power and Water's regulated meter fleet is 18 years, though this varies substantially by meter type. For example, the average age of 1-phase meters is 22 years, compared to an average age of electronic meters of five years.

From an accounting depreciation perspective, the useful life of a mechanical meter is 25 years, and as result, many meters in the Power and Water fleet have been fully depreciated.

Figure 1: Existing meter fleet age profile



Note: Any meter installed pre-1980 is listed as being 38 years.

5.3 Capex forecasts

Table 5-2 details our forecast ACS Metering Service capex for the 2019-24 regulatory period required to implement our new and replacement smart meter policy position. We forecast that:

- We will add or replace between 5,300 to 5,700 advanced meters per annum required to (1) meet the AEMO customer connections forecast; (2) replace our meter base for those meters at the end of their useful life; and (3) for a 2% failure and fault replacement rate. Our detailed new and replacement meter assumptions are set out in the 'Input Meter Movements' spreadsheet in our CBA model at Attachment 12.19.
- In 2019-20 we will spend $2.7 million on upgrading existing advanced capable meters with modems and antennae to convert them to advanced meters.
- In 2022-23 we will upgrade the communications capability of our existing advanced meters from 3G to 4G technology, at an estimated cost of $3.8 million.

- Non-network capex of approximately $1.2 million per annum associated with fleet, property, equipment and other based on historical costs.

Table 5-2 – Forecast Metering Service capex 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Metering capex	3.22	3.48	3.58	3.12	3.40	16.80
Metering communications	2.89	0.18	0.19	4.18	0.18	7.62
Non-network capex	0.54	0.09	0.04	0.17	0.11	0.94
Total ACS Metering Service capex	**6.65**	**3.75**	**3.80**	**7.48**	**3.69**	**25.37**

Our detailed capex forecast is set out in the 'Output AER Capex' spreadsheet in our CBA model at Attachment 12.19.

5.4 Opex forecasts

We have used a base step trend (BST) approach to forecast our opex for the 2019-24 regulatory period. This is consistent with the approach that we proposed in our Expenditure Forecasting Method that was submitted to the AER in May 2017 and the AER's preferred approach for how it would like us to prepare our opex forecast, as detailed in its Expenditure Forecast Assessment (EFA) Guideline.

A BST approach involves forecasting our opex at an aggregate level, rather than preparing individual forecasts for each category of opex, as detailed in the AER's Annual RIN.

The BST approach involves the following stages:

- Nominating an efficient base year.
- Applying rate of change adjustments to the efficient base year opex for growth in:
  - labour and non-labour prices;
  - output; and
  - productivity.
- Applying step changes.

The following sections set out the above components of our opex forecast.

5.4.1 Our base step trend forecast

Table 5-3 sets out our BST forecast opex over the 2019-24 regulatory period. The following sections discuss each component.

Table 5-3 – Forecast opex – Base-Step-Trend 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Efficient Base Year	4.72	4.72	4.72	4.72	4.72	23.60

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Step Changes	0.20	0.07	-0.07	-0.21	-0.34	-0.35
Output Growth	0.03	0.07	0.11	0.13	0.15	0.49
Price Growth	0.03	0.05	0.09	0.13	0.16	0.45
Productivity Growth	-	-	-	-	-	-
Debt raising costs	0.01	0.01	0.01	0.01	0.02	0.06
Total	4.99	4.92	4.86	4.78	4.71	24.26

Our detailed opex forecast is set out in the ACS Metering PTRM Attachment 12.2.

5.4.2 Efficient base year

Consistent with our approach to developing our SCS forecast, we have chosen 2016-17 as our base year for our opex forecast because it is the most recent, full regulatory year of actual reported expenditure at the time of preparing this Regulatory Proposal.

Table 5-4 details our efficient base year opex for each year of the 2019-24 regulatory period.

Table 5-4 – Forecast base year opex 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Efficient Base Year	4.72	4.72	4.72	4.72	4.72	23.60

5.4.3 Step changes

Our opex step changes reflect new regulatory obligations which are not reflected in our base year. The new regulatory obligations result from the NT Government package 2A NT NER changes made on 1 July 2017 and the resulting new regulatory obligations under Chapter 7A of the NT NER. [redacted]

Attachment 3.2 provides more details of the new regulatory obligations and our estimated costs in meeting them. Table 5-5 details our forecast step changes for each year of the 2019-24 regulatory period.

Table 5-5 – Forecast step changes 2019-20 to 2023-24

$'000 Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Inspection and testing	312.4	312.4	312.4	312.4	312.4	1,562.1
Metering compliance Type 1-6	39.1	39.1	39.1	39.1	39.1	195.7
Southern region metering technicians	312.4	312.4	312.4	312.4	312.4	1,562.1
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	200.1	66.5	-72.3	-207.2	-335.9	-348.8

5.4.4 Rate of change – outputs

We have included an allowance in our opex forecast for the impact of output growth in the 2019-24 regulatory period. This reflects the fact that greater outputs cost more to operate and maintain.

Consistent with our approach to SCS, we have applied the output change measures and respective weightings that are detailed in the Economic Insights memo released with the AER's 2017 Annual Benchmarking Report, including the impact of economies of scale. The output growth factors used and their respective weights are:

- customer numbers (77.13 per cent);
- circuit length (9.73 per cent); and
- ratcheted maximum demand (13.14 per cent).

Table 5-6 details our forecast opex increase attributable to the impact of output growth in the 2019-24 regulatory period.

Table 5-6 – Forecast output growth 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Output Growth	0.03	0.07	0.11	0.13	0.15	0.49

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Output Growth Rate (%)	0.67%	0.77%	0.81%	0.45%	0.44%	N/A

5.4.5 Rate of change – price

The base year opex reflects the current prices of our cost inputs. Consistent with our approach to SCS, to adjust this base to account for real changes in input costs likely over the 2019-24 regulatory period, we:

- assigned the AER weights of 59.7% for labour and 40.3% for non-labour based on the AER's 2017 benchmarking report and supporting material;
- applied the AER's preferred forecast change in the wage price index (WPI) for the electricity, gas, water and waste services industry (the utilities industry) as the forecast change in the labour price. Specifically, we have used the average of the utilities WPI growth forecasts from DAE and BIS Shrapnel adopted by the AER in decisions made in 2017; and
- applied zero rate of change for non-labour component consistent with the AER's final decisions for the Victorian DNSPs in May 2016.

Consistent with past AER decisions, we note that using a labour (or wage) price index as we propose builds in some assumed labour productivity. We have not sought to quantify this, but note that this adds to our proposed top down efficiency target.

Table 5-7 lists our forecast average annual change in cost for each year of the regulatory period.

Table 5-7 – Forecast price growth 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Price Growth	0.03	0.05	0.09	0.13	0.16	0.45
Price Growth Rate (%)	0.54%	0.60%	0.72%	0.78%	0.66%	N/A

5.4.6 Rate of change – productivity

Consistent with our approach to SCS, as set out in Table 5-8 we have determined a rate of change productivity adjustment of zero per cent for each of the five years of the 2019-24 regulatory period. This is consistent with recent AER decisions and reflects the observation that, if anything, historical trends suggest that there has been declining productivity across the industry. Rather than propose a negative number – and to recognise that we are striving to reduce costs over time – we instead propose a zero productivity rate of change.

Table 5-8 – Forecast productivity 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Productivity Growth	-	-	-	-	-	-
Productivity Growth Rate (%)	0.00%	0.00%	0.00%	0.00%	0.00%	N/A

5.5 Regulatory asset base and depreciation

Our approach to determining the metering regulatory asset base (RAB) and depreciation is consistent with our approaches adopted for SCS set out in chapter 12 of our Regulatory Proposal.

The RAB is used to determine our returns on capital and the return of capital (depreciation) over the next regulatory period:

- the return on capital covers the efficient cost of financing investment in our network, and is calculated for each year of the next regulatory period by taking the opening RAB value and multiplying this by our proposed rate of return, and
- the return of capital reflects the depreciation of our assets over the regulatory period which is the decrease in their value due to usage and aging. We have calculated this using the year-on-year tracking method, which has been accepted in recent AER decisions.

For determining our RAB we have used the AER's roll-forward model (RFM). We established our opening RAB by:

- using the Sinclair Knight Mertz (SKM) value for metering as the opening balance;
- applying new ACS metering RAB asset categories in the RFM and then we mapped actuals/forecast values from 2014-15 to 2018-19 to the new categories for gross capex, capital contributions and disposals; and
- calculating the applicable remaining and standard lives to be applied to the new asset classes.

The key outputs of the RFM are linked directly to the opening balances for the PTRM.

Table 5-9 sets out our ACS Metering Services RAB over the 2019-24 regulatory period.

Table 5-9 – Opening and closing ACS Metering Services RAB for 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Opening ACS metering RAB	16.51	22.34	24.52	26.48	31.93
Plus capex (Excl. Funding)	6.81	3.75	3.80	7.48	3.69
Less customer contributions	-	-	-	-	-
Less disposals	-	-	-	-	-
Plus funding costs	0.14	0.08	0.08	0.15	0.07
Less straightline depreciation	-1.12	-1.65	-1.92	-2.18	-2.71
Closing ACS metering RAB	22.34	24.52	26.48	31.93	32.99

Our proposed regulatory depreciation forecast is shown in Table 5-10, which we calculated using the ACS Metering Services Post Tax Revenue Model (PTRM - at Attachment 12.2) as forecast real straight-line depreciation less forecast indexation of the RAB.

We calculated straight-line depreciation using the method in the AER's PTRM. Indexation is calculated by multiplying the opening value of the RAB each year by forecast inflation of 2.42% – see chapter 13 of our Regulatory Proposal for further detail.

Table 5-10: Forecast ACS Metering Services regulatory depreciation for 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24
Real straight-line depreciation	1.14	1.73	2.06	2.40	3.05
Less indexation of RAB	-0.40	-0.55	-0.62	-0.69	-0.85
Regulatory depreciation	0.74	1.18	1.44	1.71	2.20

5.6 Rate of return, inflation and debt and equity raising costs

In determining our ACS Metering Services revenue requirement, we have adopted the same rate of return and approaches to determining inflation and debt and equity raising costs as set out in chapter 13 of our Regulatory Proposal.

We propose a rate of return of 6.62%, inflation of 2.42% and Table 5-11 shows our forecast debt and equity raising costs.

Table 5-11: Forecast ACS debt and equity raising costs 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Debt raising costs	0.01	0.01	0.01	0.01	0.02	0.06
Equity raising costs	0.16	-	-	-	-	0.16

5.7 Estimated cost of corporate income tax

Like other businesses, we must pay income tax. The allowance for tax costs in our building block proposal reflects our expected tax liabilities over the next regulatory period.

In determining our ACS Metering Services revenue requirement, we have adopted the same approach to determining tax as set out in chapter 14 of our Regulatory Proposal.

Our proposed tax cost allowance for ACS Metering Services over the 2019-24 regulatory period (shown in Table 5-12) represents 1.5% per cent of our total ACS Metering Services building block costs. We calculated this allowance using an approach consistent with the NT NER[10] and the AER's PTRM by:

- determining the opening tax asset base as at 30 June 2019;
- rolling forward the tax base over the next regulatory period using forecast gross capex, asset disposals and tax depreciation;
- forecasting taxable income as forecast revenue less forecast expenses, including tax depreciation;
- multiplying forecast taxable income by the legislated income tax rate of 30 per cent to determine forecast taxable income; and
- reducing forecast taxable income by 40 per cent to reflect the *assumed* value recovered by equity investors through imputation or franking credits.[11]

[10] NER cl 6.5.3.

[11] The AER has adopted an assumed value of 40% in its most recent determinations, which is a departure from the 2013 rate of return guideline. For the reasons outlined in recent AER determinations, such as that for the Victorian DNSPs in May 2016, we also depart from that guideline. We also note that the AER is currently reviewing its approach to determining the

The estimated cost of corporate income tax is calculated in the *Analysis* sheet of our proposed PTRM for ACS Metering Services, at Attachment 12.2.

Table 5-12 – Forecast estimated cost of corporate income tax 2019-20 to 2023-24

$M, Real 2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Estimated cost of corporate income tax	0.08	0.09	0.12	0.15	0.16	0.61

value of imputation credits as part of its consultation on the 2018 rate of return guideline. We reserve the right to reconsider our position on the value of imputation credits as new evidence or positions come to light through that consultation.

6. Annual revenue requirements, X factors

We have adopted a building block approach to determining our revenue requirements for our ACS Metering Services, consistent with that applied to determining our SCS revenue requirements.

Table 6-1 sets out our proposed building block revenue requirements over the 2019-24 regulatory period for our ACS Metering Services. Our detailed calculation of our ARR is set out in our ACS Metering Services PTRM at Attachment 12.2.

Table 6-1 – ACS Metering Services total revenue requirement 2019-20 to 2023-24

$M, Nominal	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Return on capital	1.09	1.52	1.70	1.88	2.33	8.52
Regulatory depreciation	0.74	1.18	1.44	1.71	2.20	7.27
Opex (including Debt Raising)	5.11	5.16	5.22	5.27	5.31	26.07
Corporate income tax	0.09	0.10	0.13	0.17	0.18	0.66
Annual revenue requirement (unsmoothed)	7.03	7.95	8.49	9.03	10.02	42.52
X factors	0.00%	-6.98%	-6.98%	-6.98%	-6.98%	N/A
Maximum allowed revenue requirement (smoothed)	7.03	7.70	8.44	9.25	10.14	42.56

7. Indicative prices

This chapter details our indicative prices that we expect will recover revenues equal to, in net present value terms, the unsmoothed annual revenue requirements for our ACS Metering Services.

Our Indicative Pricing Schedule provides further details about our prices and our Tariff Structures Statement (TSS) explains and justifies them, in accordance with the requirements of Chapter 6 of the NT NER.

7.1 Approach to pricing our ACS Metering Services

For Type 1-6 metering services we determine from the revenue allowance a fixed daily charge per meter category derived to recover the capex and opex associated with provision of metering services for each meter class.

Our ACS metering customer requested fee-based charges have been developed using the activity cost methodology utilising our labour rates.

7.2 Indicative Prices for ACS Metering Services

Table 7-1 details our proposed prices for our ACS metering.

Table 7-1 – ACS Metering Tariffs (excluding GST)

Per Meter Charges $/day	2019-20	2020-21	2021-22	2022-23	2023-24
1 Phase Meters (including Prepayment)	0.1724	0.1894	0.2075	0.2274	0.2485
3 Phase Meters	0.1890	0.2077	0.2275	0.2493	0.2725
Metering Dedicated CTs and VTs - Remote read	0.3687	0.4052	0.4440	0.4865	0.5316

In addition to our metering tariffs a series of customer requested fee-based metering charges are proposed in Table 7-2

Table 7-2 – ACS metering customer requested fee-based charges (excluding GST)

Meter service	Basis of charging	Indicative 2019-20 charge
Special Meter Test	$/request	238.67
Exchange or Replace Meter - 3 Phase	$/request	502.01
Exchange or Replace Meter – Standard	$/request	411.97
Relocation of Meter	$/request	249.14
Remove Meter - Permanent removal of connection point (meter) from meter panel	$/request	249.14
General Meter Inspection	$/request	112.98
Special Meter Read – no appointment	$/request	28.38
Special Meter Read – appointment	$/request	60.77
Meter Program Change - no comms	$/request	133.93
Meter Program Change - with comms	$/request	8.72

8. Pass through events

The NT NER contemplates several mechanisms for adjusting the AER's building block determination after it has been made. One such mechanism is for pass through events. These are specific, pre-defined events that are unpredictable in nature, beyond our control and, if they occur, would involve us incurring high costs. The pass-through mechanism provides a means for recovering the efficient costs of these events that we would not otherwise be able to recover.

We have set out in chapter 16 of our Regulatory Proposal our nominated pass through events and that they specifically apply to both SCS and ACS Metering Services.

9. Appendix A – Indicative other NT benefits based on Victorian benefits

Table 9-1 and Table 9-2 below calculate the potential value of additional benefits not reflected in our CBA scenario 3 based on the Victorian Department of Treasury Finance commissioned 'Advanced metering infrastructure cost benefit analysis', final report dated 2 August 2011 prepared by Deloitte's. The value of the benefits has been proportionately calculated for the NT based on our forecast 110,510 average meters for the year 2017-18 as a proportion of the 2.67 million basic accumulation meters (or 4.14%) installed in Victoria in 2011.[12] We have reduced the 2011 Victorian benefits to 80% consistent with the Victorian Auditor General findings dated 16 September 2015.

Table 9-1 shows the indicative value of other benefits assuming no regulatory constraints and that there is a 50% probability of the benefits being achieved.

Table 9-1: Indicative benefits no regulatory constraints

Benefit	Vic forecast value 2011$M	2018$M reduced to 80%	Probability of achieving	Potential NT value
Additional avoided costs				
Reduction in unserved energy due to faster detection of outages and restoration times	66	60.24	50%	1.25
Savings from reduction in non-technical issues	27	24.65	50%	0.51
Avoided cost of proportion of transformer failures on overload and avoided unserved energy	29	26.47	50%	0.55
Ability to set emergency demand limits to share limited supply at times of network stress or supply shortage	82	74.85	50%	1.55
Benefits generated from innovative tariffs and demand management (assuming the Pricing Order falls away)				
Energy conservation from TOU tariffs	1	0.91	50%	0.02
Avoided network and generation investment due to peak demand response to TOU tariffs	11	10.04	50%	0.21
Avoided network and generation augmentation resulting from critical peak incentives	217	198.08	50%	4.10
Energy conservation from in home displays	77	70.29	50%	1.45
Reduced peak demand due to direct load control of air conditioners	184	167.96	50%	3.48
Other smaller benefits				
Avoided cost of investigation of customer complaints about voltage and quality of supply, including equipment cost and cost of reporting to the regulator	39	35.60	50%	0.74
Avoided costs of installing import / export metering	35	31.95	50%	0.66
Avoided cost of investigation of customer complaints of loss of supply which turn out to be not a loss of supply	15	13.69	50%	0.28
Reduction in calls to faults and emergencies	14	12.78	50%	0.26
Avoided cost of replacing service fuses that fail from overload	5	4.56	50%	0.09
Avoided cost of supply circuit breaker	4	3.65	50%	0.08
Avoided cost of end of line monitoring	4	3.65	50%	0.08
Avoided cost of communications to feeder automation equipment	3	2.74	50%	0.06
Reduction in the administration cost of bad debt on non-payment on move outs	2	1.83	50%	0.04
Total potential other advanced metering benefits				15.40

[12] AER, Draft Determination VIC Advanced Metering Infrastructure Review, 2012-15 budget charges application, 28 July 2011.

Table 9-2 shows the indicative value of other benefits assuming regulatory constraints (that is, the Pricing Order remains in place) and that there is 50% probability of the benefits being achieved.

Table 9-2: Indicative benefits regulatory constraints

Benefit	Vic forecast value 2011$M	2018$M reduced to 80%	Probability of achieving	Potential NT value
Additional avoided costs				
Reduction in unserved energy due to faster detection of outages and restoration times	66	60.24	50%	1.25
Savings from reduction in non-technical issues	27	24.65	50%	0.51
Avoided cost of proportion of transformer failures on overload and avoided unserved energy	29	26.47	50%	0.55
Ability to set emergency demand limits to share limited supply at times of network stress or supply shortage	82	74.85	50%	1.55
Benefits generated from innovative tariffs and demand management (assuming the Pricing Order remains)				
Energy conservation from TOU tariffs	1	0.91	0%	0.00
Avoided network and generation investment due to peak demand response to TOU tariffs	11	10.04	0%	0.00
Avoided network and generation augmentation resulting from critical peak incentives	217	198.08	0%	0.00
Energy conservation from in home displays	77	70.29	0%	0.00
Reduced peak demand due to direct load control of air conditioners	184	167.96	0%	0.00
Other smaller benefits				
Avoided cost of investigation of customer complaints about voltage and quality of supply, including equipment cost and cost of reporting to the regulator	39	35.60	50%	0.74
Avoided costs of installing import / export metering	35	31.95	50%	0.66
Avoided cost of investigation of customer complaints of loss of supply which turn out to be not a loss of supply	15	13.69	50%	0.28
Reduction in calls to faults and emergencies	14	12.78	50%	0.26
Avoided cost of replacing service fuses that fail from overload	5	4.56	50%	0.09
Avoided cost of supply circuit breaker	4	3.65	50%	0.08
Avoided cost of end of line monitoring	4	3.65	50%	0.08
Avoided cost of communications to feeder automation equipment	3	2.74	50%	0.06
Reduction in the administration cost of bad debt on non-payment on move outs	2	1.83	50%	0.04
Total potential other advanced metering benefits				6.14