Attachment 8.15

Type 5 & 6 metering services proposal

May 2014

CONTENT

1 Summary

Metering services is one of the terms developed by the Australian Energy Regulator (AER) to group classes of services provided by NSW distribution businesses. The AER has divided the class of Metering services into the following three categories[1];

1. **Metering Installation Types 1, 2, 3 and 4**
   The Rules require a Type 1, 2, 3, or 4 metering installation at premises where energy consumption is greater than 160MWh per annum[2]. These types of meters record detailed energy usage and have a number of other required capabilities[3], the most significant being the requirement to have remote communication facilities installed.

   The provision of Metering services Types 1, 2, 3, and 4 for Metering Installation is provided in a competitive market and is therefore not regulated by the AER.

2. **Metering Installation Types 5 and 6**
   Type 5 metering installations record energy in 30 minute intervals, without the requirement to remotely acquire the data. Typically, these meters are read every three months, sometimes monthly[4]. Often the term MRIM (Manually Read Interval Meter) is used interchangeably for Type 5 Meter. A Type 5 metering installation however, is not the same as a *Smart Meter*[5] installation.

   A Type 6 metering installation is defined as a 'general purpose' meter that records *accumulated energy data* only[6]. The term 'BASIC meter', accumulation meter and Type 6 meter can be used interchangeably.

   Currently, distribution businesses are required to provide metering services at premises with energy consumption less that 160MWh per annum where Type 5 or 6 metering is installed[7].

3. **Metering Installation Type 7**
   A Type 7 metering installation applies to the condition where it has been determined by the Australian Energy Market Operator (AEMO) that the metering installation does not require a meter. Examples may include, street, traffic, park, and community lighting, traffic parking meters.

   The AER has decided that Metering Data Services associated with Type 7 Metering Installations, like Network Services, will continue to form part of Standard Control Services.

Ausgrid is responsible for approximately 1.6 million National Metering Identifiers (NMIs) connected to its distribution network where Type 5 or Type 6 meters are installed. Some NMIs have one meter, whilst others have two or more. This is why Ausgrid's total Type 5 and Type 6 meter population is approximately 2.4 million meters.

From 1 July 2015, NSW distribution businesses are required to develop separate prices for metering services for Metering Installation Types 5 and 6. This Attachment outlines the steps we have followed to establish pricing for these services.

First, in order to provide relevant context for our proposal, in Section 1.1 we outline in more detail the activities we undertake to deliver metering services for Type 5 and 6 Metering Installations.

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[1] AER, Stage 1 Framework and approach paper - Ausgrid, Endeavour Energy and Essential Energy - Transitional regulatory control period 1 July 2014 to 30 June 2015 - Subsequent regulatory control period 1 July 2015 to 30 June 2019, March 2013.
[2] An average domestic customer consumes approximately 7MWh pa.
[3] Meter capabilities include the ability to record 1/2 hr energy consumption (kWh), data storage requirement >35 days, the measurement of reactive energy (kvarh) (for Type 1, 2 and 3) and the ability to access the meter data on a daily basis (i.e. remote communication facilities).
[4] The time between meter reads is normally a function of the network tariff applicable to a customer's premises.
[5] The National Electricity Law defines *smart metering infrastructure* as "infrastructure (and associated systems) associated with the installation and operation of remotely read electricity metering and communications, including interval meters designed to transmit data to, and receive data from, a remote locality.
[6] Processes used to convert the *accumulated metering data* into *trading interval metering data* for settlements purposes are included in the *metrology procedure.*
[7] For Metering Installation Types 1, 2, 3 and 4, the customer's retailer is the Responsible Person and contracts an MPB and MDP.

Note: Throughout this document, and from this point onwards, we will use the term 'Type 5 and 6 metering services' when referencing metering services for Types 5 and 6 Metering Installations.

1.1 Activities undertaken to deliver metering services

In the AER's Framework and Approach paper published in March 2013, the AER outlines four sub-categories of metering services relating to Type 5 and Type 6 meters. These sub-categories are defined as:

1. ***Meter provision*** - The capital costs of purchasing the meters;
2. ***Meter maintenance*** - covers works to inspect, test, maintain, repair and replace meters;
3. ***Meter reading*** - refers to quarterly or other regular reading of a meter; and
4. ***Metering data services*** – services incorporating the collection, processing, storage and delivery of metering data and the management of relevant NMI Standing Data in accordance with the Rules.

For Ausgrid, the direct Information Technology systems that are utilised to provide Type 5 and 6 metering services have formed part of the corporate wide IT systems and programs of work. We discuss the services and costs associated with Metering IT in more detail in Sections 4 and 5.

1.1.1 Meter provision

In NSW, Accredited Service Providers (ASPs)[8] install Type 5 and Type 6 whole current meters at new and upgraded connections. The cost associated with the ASP installing the meter(s) at a new or upgraded premise is paid by the customer to the ASP as part of the total costs for electrical works and therefore does not form part of Ausgrid's metering price. Ausgrid purchases rules compliant meters and manages the logistics of issuing the meters to the ASPs.

Currently there is an exception where Ausgrid does install meters at new and upgraded connections. This is when Current Transformer (CT) connected Type 5 or 6 metering is required. This represents approximately 900 installations per year. Distribution businesses are proposing a new Ancillary Network Service fee will apply for this installation service from 1 July 2014 and therefore these costs have been removed from the Alternative Control Service for Type 5 and 6 metering services.

1.1.2 Meter maintenance

Ausgrid's Meter Asset Management Plan (MAMP), submitted and approved by the Australian Energy Market Operator (AEMO), outlines our asset management strategy for the maintenance of metering and associated equipment[9]. The activities performed include:

- Replacement of damaged or defective meters;
- Emergency maintenance of metering installations within 10 days as required by the Rules;
- Customer or retailer requested meter accuracy tests;
- In-service sample meter testing to verify that meter populations remain accurate;
- In-service sample CT testing and inspection to verify that CT populations remain accurate;
- Inspection of metering installations; and
- Maintenance of Controlled Load Profile Sample of NMIs (200 remotely read interval meters registered as Type 6 in the market) to allow AEMO to calculate a deemed net system load profile to enable Type 6 metering installations to be settled in the NEM.

Specific meter maintenance tasks performed by Ausgrid are as follows:

Low Voltage Current Transformer (LVCT) accuracy sample testing & inspections - Accuracy testing and inspection of LVCT's in accordance with AEMO LVCT testing guideline. This is made up of approximately 2000 inspections and 40 accuracy tests annually involving supply interruption

Meter accuracy sample testing - Accuracy testing of samples of the various meter families in order to determine the in-service condition of the meters, in accordance with AS1284.13. This is made up of approximately 2,200 meter accuracy tests annually, requiring supply interruption

[8] An ASP is a suitably qualified person or company accredited (by NSW Trade & Investment) and under which individual(s) representing the ASP, are authorised by Ausgrid to work on or near Ausgrid's network, with a specific category of the accreditation required for the installation of direct connected meters.

[9] The obligations detailed in the MAMP encompass RP compliance responsibilities that span more broadly than Type 5 and Type 6 metering services governed by the Alternative Control Service regulatory framework.

High Voltage Instrument Transformer Accuracy Testing & Inspections – Within the Ausgrid network there are a small number of Type 5 and Type 6 High Voltage installations. The Metering Asset Management Plan requires Ausgrid to conduct primary injection accuracy tests on CT's and VT's for these installations, on a 10 year cycle;

Reactive meter maintenance - Ausgrid responds to failure of metering installations (i.e. failed probe read, faulty display or port, zero registration on accumulation meter) plus failures of Type 5 meters on remote communications. Reactive meter maintenance represents approximately 12,000 service orders annually;

Engineering support & licence compliance - This task spans compliance reporting to AEMO maintenance of accreditations such as ISO9001, ISO17025 and NATA for Metering Provision, maintenance of the Meter Verifying Authority under the National Measurements Institute, Maintenance of quality documentation for metering, the direct technical support for field operatives carrying out compliance and maintenance functions; the maintenance of technical and testing equipment for compliance and maintenance functions and the recycling of returned meters.

1.1.3 Meter reading and meter data services

Ausgrid is required to obtain routine meter readings from all Type 5 and Type 6 metering installations connected to the Ausgrid network. This includes physical onsite meter reading, meter reading route scheduling and maintenance. To meet Ausgrid's obligations, some reactive (off cycle) meter reading is required, such as when a routine read fails some validation parameters.

Ausgrid is required to engage an accredited Meter Data Provider for the provision of metering data services. Ausgrid itself is an accredited Meter Data Provider, and thus performs services which include:

- forward estimation of Type 5 metering data (to allow NEM settlements to occur weekly);
- validation of Type 5 and 6 metering data after collection;
- substitution of Type 5 and 6 metering data where required;
- storage of Type 5 and 6 metering data in accordance with the Rules;
- forwarding of metering data to eligible market participants, for billing purposes; and
- forwarding of metering data to AEMO to allow for market settlement.

2 Establishing a separate Type 5 and 6 metering services regulated asset base

Up until 30 June 2014, all metering assets will form part of Ausgrid's total Regulated Asset Base (RAB) for Standard Control Services. The standard control RAB represents the 'regulatory' value of all the assets purchased and installed by Ausgrid to provide network-related services to customers[10].

As a consequence of the AER's reclassification of Type 5 and 6 metering services as an Alternative Control Service from 1 July 2014, all NSW distribution businesses are required to separately identify the opening RAB value as at 1 July 2014 for Type 5 and 6 metering assets (a new Metering RAB). This is a necessary process in order to determine the allowed return on these metering assets that will be recovered through the separate meter prices (see Section 7).

The value of the metering assets that we have identified (and have deducted from the RAB for Standard Control Services) is approximately $260 million. This total is made up of a number of asset classes that are used, either wholly (directly) or partially (indirectly), in the provision of Type 5 and 6 metering services. This is shown in Table 1. Controlled load assets, such as time switches and ripple control devices, do not form part of the Type 5 and 6 metering services RAB and remain within Standard Control Services.

The process followed to separate the RAB is provided in detail in Attachment 8.17 entitled "Type 5 and 6 metering services RAB.doc".

Table 1- Opening Type 5 & 6 metering services RAB at 1 July 2014 ($ million, nominal)

Asset	Opening Metering RAB	Remaining Life (yrs)	Standard Life (yrs)
Customer Metering (Mechanical/Electromechanical)	93.97	14.5	25.0
Customer Metering (Digital)	127.66	12.7	15.0
Furniture, fittings, plant and equipment	0.98	12.4	17.4
Land (non-system)	0.23	n/a	n/a
Other non system assets	1.58	7.5	29.4
IT systems	28.28	3.2	5.0
Motor vehicles	2.63	6.4	10.2
Buildings	4.86	15.0	15.0
Equity raising costs	0.59	15.0	15.0
Total	**260.77**		

[10] The RAB value is not necessarily the same as the 'accounting' or 'book' value

3 Forecasting volumes

To develop forecast expenditure for the next five year period, we have needed to forecast the growth in meter numbers over the next 5 year regulatory period 2014 /15- 2018/19 in the following categories;

- New and modified connections;
- Reactive replacement volumes; and
- Proactive replacement volumes.

Ausgrid supplies different meters, dependent on the physical supply arrangements at the customer's premises. Table 2 describes the different types of meters that Ausgrid currently provides.

Table 2 – Different type 5 and 6 meters sourced by Ausgrid

Meter Code	Meter Type	Description
B1	Type 6	Single phase, direct connected, accumulation meter
B3	Type 6	Three phase, direct connected, accumulation meter
E1	Type 5	Single phase, direct connected interval meter
E2	Type 5	Single phase, dual element, direct connected interval meter
E3	Type 5	Three phase, direct connected interval meter
E4	Type 5	Three phase, current transformer connected interval meter

In the sections below, we outline the process we have followed to develop forecast volumes of each meter type, in the three categories (new and modified connections, reactive replacements and proactive replacements).

3.1 New and modified connections

Ausgrid is required to provide new Type 5 or Type 6 metering assets at new or upgraded premises consuming less than 160MWh per annum. To forecast volumes associated with the provision of meters at new and upgraded premises we have considered the following:

- Forecasts for the number of new network connections for the next 5 years
- Historic meter usage at new and upgraded premises and metering configurations applicable to different customer categories
- The Metering Strategy developed by Networks New South Wales, which has sought to choose an efficient metering technology solution from 1 July 2014, specifically:
    - Accumulation meters (BASIC) for applications where total energy registration is all that is required (projected to be 90% of new and upgrade installations); and
    - Manually read interval meters (MRIM) for applications where time based energy registration is required (projected to be 10% of new and upgrade installations).
- Known future changes in circumstances (the most prominent for the forthcoming regulatory period is the end of the Solar Bonus Scheme in December 2016 and the likely requirement to change the metering in order to convert these customers to a net metering configuration)
- The numerous metering arrangements that occur: for example, 3 phase versus single phase, multiple meter requirements versus single metering arrangements etc. Based on historical information, existing population, and the new Metering Strategy for new and upgraded premises, we have determined hardware configurations (i.e. ratio of meters to customers' premises) for different supply arrangements.

Based on these factors, we forecast new and upgrade meter volumes of 327,407 in the next five year regulatory period. The detailed process used to establish these forecasts is provided in Attachment 8.16. This attachment also provides a breakdown of the different meter types that make up this total.

3.2 Reactive replacement numbers

Meter repairs are to be completed within ten business days of fault identification and this often involves the replacement of the meter. To develop a forecast capital expenditure associated with the reactive replacement of failed meters we have used the average yearly quantity of reactive meter replacement numbers recorded in the current Regulatory Period.

Whilst in the current Regulatory Period Ausgrid has been using Type 5 meters for reactive replacement, from 1 July 2014, Ausgrid proposes to replace failed meters "like for like". Based on historic replacement numbers, we forecast reactive replacement of 56,254 Type 5 installations and 9,293 Type 6 installations in the next regulatory period (see Table 3).

The details supporting our forecasts for reactive meter replacement numbers are included in Attachment 8.18 entitled "Forecast Capex for Type 5 and 6 metering". This attachment also includes historical reactive meter replacement volumes.

Table 3: Reactive meter replacement volumes (FY15 – FY19)

Category	Description	Average historic volumes (FY10-FY14)	FY15	FY16	FY17	FY18	FY19	TOTAL
Reactive	Faulty Type 5 Meters	11,251	11,251	11,251	11,251	11,251	11,251	56,254
Reactive	Faulty Type 6 Meters	1,859	1,859	1,859	1,859	1,859	1,859	9,293
Total			**13,109**	**13,109**	**13,109**	**13,109**	**13,109**	**65,547**

3.3 Proactive replacement numbers

As required by the Rules, Ausgrid monitors the performance of in-service meters using the sample testing procedures we have developed in compliance with Australian Standard and as defined in the Meter Asset Management Plan (MAMP) that has been submitted to, and been approved by, AEMO. The process for determining the performance of Ausgrid's meter assets and the likely meter population failures involves a staged-test process and is in accordance with Australian Standard 1284.13.

Meters are broken into 'like' populations, such as make and model, and each population is field tested for accuracy and functionality under a sample testing regime defined by AS1284.13. AS1284.13 details the number of samples required for a given meter population. The next step involves the analysis of the collected results.

For better performing populations, the standard allows for longer periods before the population requires retest. The poorer the statistical performance of the populations, the shorter the time permitted before a new cycle of sample testing is required. At certain thresholds, the standard directs that the entire population be replaced. In such circumstances, a Fault Repair Plan is developed by Ausgrid for presentation to AEMO detailing the proposed replacement program for that population of meters. The Fault Repair Plan is required because the meters cannot be practically replaced in the otherwise agreed timeframe of ten business days.

3.3.1 Identified meter populations failing compliance

Ausgrid has been monitoring the performance of in-service meters for a number of years, using the sample testing procedures defined in the MAMP. In 2011, information on likely meter population failures was documented and an increased replacement plan was developed in February 2012. Whilst this increased replacement plan was placed on hold prior to the commencement of field replacements, sample testing of meter accuracy has continued.

The meter populations that previously indicated compliance failure have been further confirmed as compliance failure, with performance deteriorating. The test results are made up of only randomly selected sites as per AS1284.13. In Table 4, we show a high level summary extract of the identified meter population analysis at 20 February 2014.

Table 4: Extract of identified meter population analysis (at 20 February 2014)

Meter Make & Model	Population Size	Sample Tests Completed To Date/Max. tests allowable	Primary Failure Category	Acceptance Threshold	Actual Performance to Date	Result
Email SD	29,421	272/500	Light Load Accuracy Criteria 3	<21	35	FAIL
Email AZ	2,746	110/125	Light Load Accuracy Criteria 3	<14	20	FAIL
Email BAZ 10-40	93,624	376/500	Light Load Accuracy Criteria 3	<21	26	FAIL
Email BAZ 10-60	134,218	375/500	Light Load Accuracy Criteria 3	<21	18 (24 projected)	Projected FAIL

3.3.2 Approach and timeframe for meter replacement

The proposal to replace a metering population is based primarily on the meter type's functional and accuracy performance. Whilst there is correlation between meter age and population failure, the age itself is not the determinant. The most numerous failed populations with poor sample testing performance are approximately 40 years old and have jewel bearings - this is an indicator of risk areas for future failures. However, it is the performance of the specific population that is the determinant.

The data collected and analysed to date reveals:

- In addition to the specific performance of non-compliant meters, the overall performance also indicates a general skew of meters running, on average, fast, up to 0.9% within a class accuracy range of only 1.5%, resulting in a higher than legitimate network charge to the customer; and
- Whilst further testing is required to fulfill the obligations of the Metering Asset Management Plan in full, the results to date indicate that Email BAZ, Email AZ and Email SD meter populations, numbering in total 255,487 meters (across 192,631 NMI's) have failed.

In determining the timeframe to replace these meters we have sought to strike a balance between demonstrated past replacement capability volumes, an 'acceptable' timeframe to reach compliance and impacts to capital expenditure (and corresponding prices paid by customers). As a result we have sought to replace the identified meters over a five year period because;

- It demonstrates to AEMO a commitment to achieving compliance in a regulatory period based on the current known non-compliances;
- A shorter period of time such as 2 or 3 years may stretch resources unreasonably and drive increased capital expenditure in the beginning of the period;
- Data we have obtained on other large meter populations installed in the Ausgrid network indicate replacement in the future may be required. By maintaining a five year time frame for the replacement of the identified populations, it reduces the chance of an overlap with new replacement obligations that are likely to occur if the program stretched to 7 or 8 years.

Compliance obligations for the 192,631 NMI's are therefore projected to be completed within five years. Replacement volumes for 2014/15 reflect historical replacement volumes followed by increasing replacement volumes in 2015/16 and 2016/17 prior to flattening in the last two years of the Regulatory Period. All proactive meter replacement installations are presently registered as BASIC and will be replaced like-for-like, meaning accumulation meters will be installed.

We address the deliverability of the proposed proactive replacement volumes in Section 5.5.

4 Forecasting operating costs to deliver metering services

The AER has identified three components of Type 5 and 6 metering services operating costs as follows:

- **Meter Maintenance** - covers works to inspect, test, maintain, repair meters;
- **Meter Reading** - refers to quarterly or other regular reading of a meter; and
- **Meter Data Processing** – the collection, processing, storage and delivery of metering data and the management of relevant NMI Standing Data in accordance with the Rules.

In addition to these operating cost components, there are also IT costs associated with providing meter services and an allocation of shared operating expenditure (related to general IT, Furniture, Plant, Other and Non-system assets).

The process we have followed to develop our forecast operating expenditure for these cost components is outlined in this section of the proposal.

4.1 Operating Costs for Meter Maintenance, Meter Reading and Meter Data Services

Ausgrid has been recording the direct operating expenditure (opex) associated with its metering business for a number of years, and at a granular level since FY11. Thus, as the historic costs associated with meter maintenance, meter reading and meter data services for Type 5 and 6 metering installations are available at a detailed level, we have used the actual opex to derive the efficient underlying opex base.

The FY13 operating expenditure is the latest complete data available. We have reviewed these costs with prior years and considered the drivers of variations between years (note: we provide more detail regarding historical operating expenditure in Section 4.4).

FY13 meter maintenance costs are below historical costs due to the diversion of resources to the Smart Grid Smart City (SGSC) program in that year. Due to a change in metering strategy from 1 July 2014 and that as a result the volume of new Type 5 meters is now expected to plateau, we are not forecasting any growth in Type 5 related costs. Notwithstanding, the impact of the SGSC, we have determined that using FY13 is the best representation of current volumes and efficiencies.

Using FY13 actual operating costs for Type 5 and 6 metering services, we have developed unit costs for meter maintenance, meter reading and meter data services. These unit costs, combined with the number of customers which the appropriate unit costs apply to, forms the forecast operating expenditure for these three service components for the 2014-19 Regulatory Period.

Table 5 details the forecast operating costs to provide Type 5 and 6 metering services for the regulatory period.

Table 5: Forecast meter maintenance, reading and data processing operating costs for FY15 – FY19 ($ million, Real $FY14)

Service Category	Meter Type	FY15	FY16	FY17	FY18	FY19	Total
Metering Maintenance	Type 5	$3.18	$3.22	$3.28	$3.34	$3.40	**$16.42**
	Type 6	$2.31	$2.34	$2.38	$2.42	$2.47	**$11.92**
Meter Reading	Type 5	$3.25	$3.30	$3.36	$3.42	$3.49	**$16.83**
	Type 6	$4.75	$4.82	$4.91	$5.00	$5.10	**$24.57**
Metering Data Services	Type 5	$3.84	$3.89	$3.96	$4.04	$4.12	**$19.85**
	Type 6	$0.93	$0.94	$0.96	$0.98	$1.00	**$4.81**
Metering ICT Opex	Type 5	$3.17	$3.19	$3.23	$3.26	$3.29	**$16.14**
	Type 6	$1.36	$1.37	$1.38	$1.40	$1.41	**$6.92**
Opex Overheads (Indirect)	Type 5 and 6	$4.28	$4.41	$4.49	$4.58	$4.66	**$22.42**

Total	**$27.07**	**$27.47**	**$27.95**	**$28.44**	**$28.94**	**$139.87**

4.2 IT operating costs directly attributable to Type 5 and 6 metering services

Ausgrid incurs operating costs for the IT systems directly attributable to supporting Type 5 and 6 metering services. The functions provided by IT systems relate to the data collection, validation, storage and distribution of data to authorised parties for in-area sites with annual usage of less than 160MWh per annum.

Ausgrid's Information, Communication and Technology (ICT) group manages all aspects of investment in information technology, and does not form part of the separate metering business. This business structure results in Ausgrid's Type 5 and 6 metering services IT costs forming part of a cost centre that also provides standard control services and unregulated services. That is, the IT operating costs relating to metering services include:

- Unregulated services (comprising contestable Type 1-4 metering services);
- Standard Control Services including Type 7 metering services;
- Alternative Control Services (ACS) - Type 5 and 6 metering services; and
- Alternative Control Services (ACS) - metering-related Ancillary Network Services.

We have applied our Cost Allocation Method, as approved by the AER[11], in preparing our forecast for direct metering related ICT operating expenditures. In our document *ID00003 Direct allocation of metering related ICT expenditure*, provided as a supporting document to Chapter 8, we explain in more detail the process of identifying and attributing ICT portion of metering related costs to Type 5 and 6 metering services.

The result of this process is an allocation of approximately $23.1 million of operating expenses to the provision of Type 5 and 6 metering services over the 5 year period as shown in Table 6. This in turn represents approximately 16% of the total operating costs for Type 5 and 6 metering services, reflecting the fact that the provision of metering services for Type 5 and 6 metering installations has a notable reliance on IT system capability.

Table 6 – Direct IT operating costs FY15 – FY19 ($'000, Real $FY14)

OPEX Category[12]	FY15	FY16	FY17	FY18	FY19	Total
Type 5 Metering IT opex	$3,171	$3,193	$3,226	$3,260	$3,295	**$16,144**
Type 6 Metering IT opex	$1,359	$1,369	$1,382	$1,397	$1,412	**$6,919**

4.3 Allocation of shared operating expenditure to Type 5 and 6 metering services

The shared operating costs relate to the following costs:

- Information and Communications Technology (ICT);
- Finance and compliance functions;
- Insurances;
- Contact Centre, Human Resources, Internal Audit and Corporate Communications;
- Property;
- Safety Management; and
- Networks NSW (NNSW) Management costs.

Forecast operating expenditure that could not be directly attributed to Type 5 and 6 metering services have been allocated based on the application of causal or non-causal allocators as outlined in table 3 of our Cost Allocation Method[13]. Consequently we have allocated a portion of the shared operating costs to Type 5 and 6 metering

[11] Ausgrid's Cost Allocation Method approved by the AER on 2 May 2014 and provided at Attachment 5.10.
[12] IT operating costs are allocated between Type 5 and Type 6 based on the unit cost ratio of meter maintenance, meter reading and meter data processing, that is; 70/30%.
[13] Ausgrid's Cost Allocation Method approved by the AER on 2 May 2014 and provided at Attachment 5.10.

services by utilising FTEs, weighted revenue and floor space) resulting in the allocation of $22.4m of shared operating expenditure to Type 5 and 6 metering services over 5 years, as shown in Table 7.

Table 7 – Allocation of corporate overheads FY15 – FY19 ($'000, Real $FY14)

OPEX Category	FY15	FY16	FY17	FY18	FY19	Total
Corporate overheads[14]	$4,279	$4,408	$4,491	$4,576	$4,664	**$22,417**

4.4 Historic trends in operating expenditure (FY10-FY14)

In Table 8, we outline historical operating costs for meter maintenance, meter reading and meter data services (where available) for the current period FY10 – FY14. During this period all new sites, upgraded sites, and reactive and proactive replacements received a Type 5 meter.

Table 8 – Historic Type 5 – 6 metering services operating expenditure ($'000, Nominal)

OPEX Category	FY10	FY11	FY12	FY13	FY14 (Forecast)	Total
Meter Maintenance	$3,953	$6,114	$6,621	$5,753(2)	$5,453	**$27,894**
Meter Reading	$7,792	$6,942	$7,128	$7,748(3)	$7,967(3)	**$37,577**
Meter Data Services	$3,372	$4,213	$4,434	$4,793	$4,745	**$21,558**
Total	**$15,117**(1)	**$17,270**	**$18,184**	**$18,294**(4)	**$18,165**	**$87,029**

The following notes associated with Table 8 are provided to explain year on year variations:

(1) Historical business processes resulted in the allocation of operating costs between the components of meter maintenance, reading and data services, not being reliable in FY10 for comparison purposes, however total costs reflect actuals.

(2) Meter Maintenance costs for FY13 were lower than otherwise would have been due to the impact Smart Grid Smart City had on resources. Adjusting for the meter maintenance anomaly in FY13 results in approximate costs of $7.05million for maintenance.

(3) Unit costs for Meter Reading increased in FY13 and FY14 due to increased contract prices from outsourced companies.

(4) Adjusting for the anomaly due to SGSC impact (see Note (1)), the total opex expenditure for FY13 would be approximately $19.6 million.

As shown in Table 8, operating costs increased per annum by more than the growth in new connections, due to the increase in the volumes of Type 5 meters during the period. (Type 5 meters were provided at all new and modified connections and the operating costs of Type 5 meters is higher than Type 6 meters).Type 5 meter reads grew by approximately 14% over the last three years, with only a small reduction in Type 6 reads. Similiar trends occurred for Meter Data Services costs where costs increased with the growth of Type 5 meters. However, the trend of unit costs has been reducing over the period, and flattened in FY13, as would be expected for implementation of new technology.

We support Energeia's recommendation that "the impact of Type 5 metering on the historical operating costs profile warrants careful consideration when assessing the efficiency of Ausgrid's Base Year and trends"[15]. Unlike

[14] Overheads assumed to split equally across Type 5 and Type 6

Endeavour and Essential, Ausgrid's Type 5 population increased by approximately 14% per annum for the 3 year period from FY11 to FY13. The operating costs of Type 5 meters is roughly double the Type 6 costs and therefore as Type 5 meters were installed the cost base increased. Ausgrid's Type 6 operating costs are substantially less and we consider are a more useful benchmark.

In the next 5 year period, with the change in metering strategy and a reversion to Type 6 meters, growth in Type 5 meter costs will become limited.

In Table 9, we outline historical operating costs for Direct metering IT for the period FY10 – FY14. In FY11, direct IT opex was higher due to increased operating expenses following implementation of a new interval metering IT system, IEEE. Following the implementation of IEEE the average operating expenditure for the three years following the implementation was approximately $5.7 million per annum.

Table 9 – Historic direct IT operating expenditure ($'000, Real $FY14)

Opex Category	FY10	FY11	FY12	FY13	FY14 (Forecast)
Direct IT Opex	6,598	7,200	5,813	5,628	5,767

[15] Energeia Review of Ausgrid's Metering Tariff Arrangements 2014 – 19, April 2014, page 40

5 Forecasting capital costs to deliver metering services

Ausgrid is responsible for the provision, installation and maintenance of Type 5 and 6 *metering installations*; and the validation, substitution and estimation of *metering data* for Type 5 and 6 *metering installation*s in accordance with the Rules and the AEMO Metrology Procedure.

In addition to meeting the requirements of the Rules, Ausgrid invests capital expenditure in metering assets to meet the following objectives:

- To ensure metering equipment remains safe and accurate;
- To comply with all relevant legislative obligations applicable to metering equipment;
- To support network pricing strategies;
- To provide access (through customer opt-in) to more cost reflective pricing, such as time based tariffs; and
- To provide tariff flexibility to new embedded generation (including solar/PV) customers.

In order to meet these requirements, Ausgrid is proposing capital expenditure that can be grouped into two broad categories:

a. Assets wholly attributable to the provision of Type 5 and 6 metering services

Type 5 and 6 Metering capex wholly attributable to the provision of Type 5 and 6 metering services is made up of the following:

1. The provision of new metering assets at new or upgraded premises (noting that meter installation work at new or upgraded <100A premises is provided in a contestable environment, and therefore does not form part of meter provision costs);
2. the reactive and proactive replacement of meters that have failed in service or form part of Ausgrid's Meter Replacement Plan; and
3. IT investment directly attributable to supporting Type 5 and 6 metering services.

b. Assets which are partially attributable to Type 5 and 6 metering services.

This includes shared capital expenditure relating to shared IT, Furniture, Plant, Other and Non-system assets that can be attributed to Type 5 and 6 meters and is determined by Ausgrid's Cost Allocation Methodology (CAM).

The following section outlines our considerations in these two categories in developing our forecast capital expenditure for the next five years.

5.1 Determining metering hardware unit costs

In addition to the isolated, raw meter cost for the meters, the building blocks that determine the overall hardware unit cost include:

a. the NMI/Meter Ratios;

b. multiple suppliers strategy;

c. acceptance testing, meter release and handling costs for metering equipment; and

d. ASP logistics costs associated with new and upgrade meters.

In Section 3 of this Attachment we have outlined the process followed to establish forecast quantities of each meter type for the next five years utilising existing population data on NMI/Meter ratios , and the proposed Metering Strategy and configurations that will be utilised from 1 July 2014.

In order to secure the supply of metering equipment, a minimum of two independent equipment vendors are selected and used for each category of metering equipment. This approach ensures market and compliance obligations are met for the supply of equipment to ASP's and for the response time to equipment failures. This approach also mantains a competitive environment for metering equipment vendors. For each meter type, the average meter cost across the different vendors is used for the capital forecast.

As Ausgrid has not sourced Type 6 meters since 2004, we are currently tendering for the supply of these meters. Prior to having these contracts in place, and in order to forecast hardware costs for Type 6 meters for this proposal, we have obtained quotations from meter suppliers as a placeholder. Upon finalisation of contractual arrangements, we will update these prices.

Logistics and engineering directly associated with the introduction or supply of the meter is the third and fourth building block of the metering hardware unit cost. We have forecasted these costs based on FY13 costs, adjusted by volumes growth.

The four building blocks outlined above are factored into determining an overall metering hardware unit cost, which is outlined in detail in Attachment 8.18 titled "Forecast capex for Type 5&6 metering".

5.2 Determining meter installation labour costs for replacement

For new and upgrade sites, customers pay for the installation costs to the Accrediated Service Provider whom they select to undertaken the installation works. However, for proactive and reactive meter replacements, Ausgrid undertakes the installation work.

The costs incurred with installing replacement meters includes the direct labour involved with the replacement of the old meter with a new meter. In addition to this, the costs include (a) isolation of supply and associated customer liaison, (b) general hazard assessment and management of known hazards such as asbestos boards, (c) organising notices and approvals from customers under the new National Energy Customer Framework (NECF) obligations (d) organising access for security sites, (e) replacement of consumables between the service fuse and main switch and, dominantly, (f) technician travel time between jobs.

Both reactive and proactive meter replacement are not door-to-door operations thus have sub-optimal travel times. Further, the NECF has introduced additional obligations requiring individual customer notice and specific date and time appointments for supply interruption, which includes meter replacement work. This highlights that meter replacement is not a door-to-door process, which ultimately affects work throughput and travel time efficiency.

We have used FY14 YTD historical replacement costs and associated replacement numbers to determine an average unit cost for labour, with the additional impact of the NECF obligation included. This has resulted in an average meter installation cost of $246.42 per installation for reactive replacements and $215.97 for proactive replacements, as shown in Attachment 8.18 entitled "Forecast capex for Type 5&6 metering.xls".

5.3 IT capital expenditure directly attributable to Type 5 and 6 metering services

As outlined in Section 4.2 of this attachment, Ausgrid's ICT group manages all aspects of investment in information technology, and as a result IT costs associated with Type 5 and 6 metering services forms part of a cost centre that also provides standard control services and unregulated services.

We have applied our Cost Allocation Method, as approved by the AER[16], in preparing our forecast for direct metering related ICT capital expenditure. In our document *ID00003 Direct allocation of metering related ICT expenditure*, provided as a supporting document to Chapter 8, we explain more detail on the process of identifying and directly attributing ICT capital expenditure to Type 5 and 6 metering services.

The result of this process is an allocation of approximately $15.5 million of capital expenditure to the provision of Type 5 and 6 metering services over the 5 year period as shown in Table 10.

5.4 Proposed metering capex by driver

The resulting capital costs associated with new and modified connections, reactive replacements and proactive replacements and direct metering IT costs shown in Table 10.

[16] Ausgrid's Cost Allocation Method approved by the AER on 2 May 2014 and provided at Attachment 5.10.

Table 10: New, upgrade and replacement capex FY15 - FY19 ($ million, Real $FY14)

Capex category	FY15	FY16	FY17	FY18	FY19	TOTAL Capex
New and upgrade connections	4.92	5.28	8.54	8.47	5.11	**32.32**
Reactive replacement	5.16	5.16	5.05	5.04	5.08	**25.47**
Proactive replacement	4.32	7.74	13.59	13.55	13.71	**52.91**
Direct IT capex	4.09	2.58	4.86	2.03	1.91	**15.48**
Total	**18.49**	**20.76**	**32.04**	**29.08**	**25.81**	**126.18**

There is also some shared capital expenditure associated with shared IT, furniture, plant and non-system assets that is allocated to the provision of Type 5 and 6 metering services. These are detailed further in Section 6.

5.4.1 Relationship between proactive and reactive Meter Replacement

Reactive meter replacement and proactive meter replacement operate on separate failure modes. Proactive replacement is driven by the accuracy drift of families of meters (typically older meters), whereas reactive replacement is driven by individual operational, random failures of hardware, which are much more prevalent in (newer) electronic meters.

This mode of failure of reactive meter replacements is not related to the failure mode described in the proactive meter replacement plan. As such, the proactive meter replacement program as identified in our proposal will not reduce the random failure rate of the remaining meter hardware in the fleet, and hence does not notably affect the reactive meter replacement program. For example in 2013, of the meters we removed due to meter self-failure, 64% experienced internal fault (such as an internal component failure) and 31% experienced inadequate performance (such as probe read failure).

5.5 Historic capital expenditure (FY10-FY14)

In the early 2000s, Ausgrid began providing a Type 5 meter at all new and modified connections consuming less than 160MWh per annum (instead of a Type 6 meter). From 2004, Type 5 became the standard and only meter type for new, upgrade and replacement. The reason for providing a more expensive Type 5 meter instead of a Type 6 meter was supported by a business case for a broader network pricing and metering strategy endorsed by the Ausgrid Board.

For the current regulatory period (1 July 2009 to 30 June 2014), Ausgrid proposed to the AER a capital program for metering that reflected the metering strategy in place at the time and was based on:

- The provision of Type 5 meters at new and upgraded premises; and
- The proactive and reactive replacement of failed or non-compliant Type 5 meters[17]

As a result, we proposed to spend $94.2 million dollars of capital expenditure on Type 5 and 6 metering services over the 5 years.

During the 5 year period however, there were a couple of factors that contributed to a variation in the proposed and actual capital expenditure. This is due to the following reasons:

1. The number of meters required for new and modified connections has been below forecast, due to lower than expected growth in both new and modified connections, however this was largely offset by;

[17] Note, in Ausgrid's draft proposal to the AER for the 20010-14 period, a proactive 'roll-out' of Type 5 meters to replace existing Type 6 metering assets was proposed, however this was removed in the final revised submission.

2. The impact of NSW Solar Bonus Scheme and the requirement to provide substantially more meters than forecasted prior to the period commencing.

As a result Ausgrid's capital expenditure for the 2009/10-2013/14 period forecast to be approximately 4% above the regulatory allowance, shown in Table 11.

Table 11: Metering capital expenditure outcomes FY10-FY14 regulatory control period ($'000)

Metering Capital Expenditure	FY2010	FY2011	FY2012	FY2013	FY2014 budget	Total
Total Regulatory Allowance	11,802	10,422	23,287	24,009	24,638	94,161
Actual/Forecast:	19,674	26,659[18]	19,898	15,317	16,700[19]	98,248
Variance	**7,872**	**16,237**	**(3,389)**	**(8,692)**	**(7,938)**	**4,090**

Table 12 shows the actual capital expenditure for the period FY10 – FY14, separated into replacement and new/upgrade capital expenditure.

Table 12: Replacement and new/upgrade capital expenditure outcomes FY10-FY14 regulatory control period ($'000)

Metering Capital Expenditure	FY10	FY11	FY12	FY13	FY14	Total
Replacement capex	12,184	14,989	13,131	9,451	11,400	**61,155**
New/Upgrade capex	7,490	11,670	6,768	5,866	5,300	**37,094**
Total	**19,674**	**26,659**	**19,898**	**15,317**	**16,700**	**98,249**

The meter replacement quantities that are forecasted to have been completed in the current five year period are shown in Table 13.

Table 13: Meter replacement outcomes (reactive and proactive) FY10-FY14 regulatory control period

Outcome	FY10	FY11	FY12	FY13	FY14	Total
Meter Replacement Quantities	34,831	33,864	34,857	24,363[20]	34,857	**162,772**

5.6 Deliverability of proposed meter replacement program

[18] High value than forecasted due to NSW Government Solar Bonus Scheme
[19] FY14's October 2013 YTD projected
[20] Labour resources were transferred from the network meter replacement program to the Smart Grid Smart City meter replacement for 8,560 NMIs/sites (the funding was from the SGSC program)

As outlined in Section 3.3 of this Attachment, the results available to date indicate that Email BAZ, Email AZ and Email SD meter populations, numbering in total 255,487 meters (across 192,631 NMI's), have failed sample testing processes and need to be replaced. We also explained the reasons for proposing to replace the identified meters over the five year period. We have staged the replacement program over the period as shown in Table 14.

Table 14: Forecast proactive meter replacement volumes (NMIs) FY15 - FY19

Category	Description	FY15	FY16	FY17	FY18	FY19	TOTAL
Proactive	Faulty Type 6 Meters	15,000	27,631	50,000	50,000	50,000	**192,631**

The meter replacement volumes proposed for the next regulatory period are almost twice the volumes undertaken in the current regulatory period. The replacement volumes proposed in FY15 are consistent with the average proactive replacements undertaken over the last 5 years, and Ausgrid will utilise existing staff to undertake this replacement work. We are currently exploring options to aid with the projected replacement volumes post 1 July 2016, including considering:

a) Availability of additional metering staff as a result of the sale of the Contestable Metering business, particularly in addressing delivery in FY16;

b) Expanding the use of the three contracting companies presently utilised within the business; and/or

c) Seconding staff from other parts of the business, enabled through the lower capital program projected for the upcoming regulatory period.

6 Determining revenue requirements to provide Type 5 and 6 Metering services

In the sections above we have discussed how we have established the value of the existing meter asset base and the basis of developing forecast capital expenditure and operating costs. These are inputs into the calculation of the revenue we are proposing for the provision of Type 5 and 6 metering services for the next five years. This revenue requirement is the basis for the prices that we propose to charge customers.

As mentioned in Section 5, in addition to the direct capital expenditure forecast for Type 5 and 6 metering services, there is an allocation of capex shared between Alternative Control Services and Standard Control Services (as per the CAM). The annual amounts of shared capital expenditure allocated to Type 5 and 6 metering services are shown in Table 15.

Table 15: Shared capital expenditure allocated to Type 5 and 6 metering services, FY15 - FY19 ($ million, Real $FY14)

Metering services	FY15[21]	FY16	FY17	FY18	FY19	Total
Furniture, fittings, plant and equipment	0.13	0.08	0.11	0.11	0.13	**0.57**
Shared IT	0.28	0.26	0.34	0.37	0.30	**1.54**
Motor Vehicles	0.10	0.07	0.08	0.10	0.09	**0.44**
Buildings	1.92	3.29	2.42	1.31	0.11	**9.05**
Total	**2.43**	**3.71**	**2.95**	**1.89**	**0.63**	**11.60**

We have adopted the 'building block' approach to determine the future revenue requirements for Type 5 and 6 metering services. The building block approach calculates the total revenue requirements by summing up the return of and on capital, annual operating expenditure requirements and other costs (such as tax and incentive schemes)).

The capital costs reflect the cost of financing the capital value of the meters (the return on capital) and a return of this capital (regulatory depreciation). A key determinant of these costs is the value of the metering regulatory asset base (or Metering RAB) which is informed by the value of existing meters and the forecast value of Type 5 and 6 metering assets to be installed in the forthcoming Regulatory Period (1 July 2014 to 30 June 2019). The process we have used to establish the value of the Metering RAB is outlined in Section 2.

We have utilised the AER's Post Tax Revenue Model (PTRM) to calculate the return of and on Type 5 and 6 metering assets and this PTRM is provided in Attachment 8.19 titled "Type 5 and 6 metering services PTRM". The building block approach is the same approach used for establishing revenue requirements for Standard Control Services. Table 16 shows the quantum of each 'block' of revenue requirement. The reasons we have adopted a building block approach are:

- It is a well understood, straightforward and a stable approach that is familiar to both DNSPs and Regulators;
- The comprehensive assessment of costs inherent in the building block approach results in DNSPs fully recovering their costs;

- Charges can be based on the service provided; hence customers are not 'locked in' to pricing arrangements which reflect the technology of the day.

Given type 5 and 6 metering services are being unbundled from Standard Control Services for the first time, we consider there are some additional reasons which lend itself to a building block approach, including:

- The retention of the existing treatment of assets already installed, which minimises step changes in total customer bills;
- The creation of a clear trail of crumbs for the unbundling process in order to ensure it has been performed correctly; and
- The provision of simple and transparent pricing arrangements where costs to provide the service do not discriminate for historical spending decisions.

The key assumptions underlying our forecast of indicative revenue are:

- The rate of return or weighted average cost of capital (WACC) acknowledging that this will vary to reflect market conditions at the time of determination. It should also be noted that if the AER does not accept the proposed exit fee arrangements there would be a material increase in the risk to the metering business and this should be reflected in the allowed rate of return;
- Approach to depreciation (i.e. over the standard asset life for the meter type);
- New and upgrade capital costs for FY16 – FY19 are recovered through an up-front charge and as such are not rolled into the RAB;
- Forecasts for proactive and reactive meter replacements are as outlined in Section 3 and 5.

The resulting revenue requirements broken into the building block components are shown in Table 16.

Table 16: Building block revenue components ($ million, nominal)

Revenue Component	FY15	FY16	FY17	FY18	FY19
Return on capital	23.03	23.18	23.01	23.42	23.96
Return of capital	20.63	23.20	25.62	20.79	21.17
Operating expenditure (including overheads)	27.90	29.02	30.25	31.55	32.91
Cost of corporate tax	2.48	4.32	6.50	5.50	3.97
Total	**74.04**	**79.73**	**85.38**	**81.26**	**82.02**

It should be noted that the total building block revenue shown in Table 16 does not exactly align with the revenue we forecast to collect from multiplying the Type 5 and 6 metering services prices and customer volumes (as shown in Attachment 8.20, titled "Type 5 and 6 metering pricing model). The variation is due to the way we have allocated revenue to the various metering service components to achieve cost-reflective prices. For example, we have allocated meter maintenance revenue based on the number of meters per tariff, whereas revenue required for meter reading costs has been allocated by meter type and meter reading frequency. The revenue we are forecasting to recover over the regulatory period 2014/15 – 2018/19 is approximately $2million or 0.5% less then the building block revenue components shown in Table 16.

7 Pricing methodology for Type 5 and 6 metering services

A pricing approach has been developed to recover the revenue requirement which have been determined as described in Section 6. The pricing principles in the Rules (for network use of system pricing) that are relevant to developing prices for metering services are:

- Each metering service is appropriately defined, having regard to the need to:
  - group customers together on an economically efficient basis; and
  - avoid unnecessary transaction costs.

- The charges for each metering service will seek, to the extent practical, to:
  - reflect the long-run marginal cost of service provision without imposing unacceptable adjustment costs on retail customers;
  - minimise cross subsidy across individual metering services;
  - ensure that the metering business achieves an overall revenue recovery consistent with the regulatory entitlement to recover the efficient costs of metering service provision.

- Metering equipment capital costs for new and upgrade installations is charged up-front to the customer.

With the Rules and National Electricity Objectives in mind, we have adopted a set of principles to develop prices for Types 5 and 6 metering services.

Principle 1: The individual metering services offered by Ausgrid should result in customers with a similar 'metering cost to serve' receiving a similar metering charge. In grouping customers into metering services, we will consider the key drivers of costs associated with providing metering services (for example the type of meter, number of meters, frequency of reading and associated meter data services).

Principle 2: Ensure that the metering business achieves an overall revenue recovery consistent with regulatory allowance. Under a price cap (the form of regulation for Alternative Control Services) there is no guarantee that a business will earn the revenue allowance, as this is dependent on the extent to which metering charges are reflective of costs and any changes in volumes associated with individual metering services (e.g. Type 5 versus Type 6). Hence, there provides an incentive to allocate revenue requirements consistent with the costs borne by Ausgrid in providing the metering services and to determine whether a mechanism (e.g. exit fees or annual price adjustment factors) is required to manage volume risks.

Principle 3: Metering charges that are developed should consider practical issues associated with implementation in IT systems and should consider the existing network pricing strategy. Specifically, a solution requiring any IT system changes for Ausgrid and retailers (who bill customers) may result in a transitional pricing approach, given the imminent start date of 1 July 2014. The capability to implement solutions within existing IT functionality to minimise cost and complexity will be explored and additional costs identified.

Principle 4: The pricing solution should seek to balance customer considerations (for example, equity and simplicity) with practical implementation issues. The AER is seeking to provide clear price signals understandable by consumers. The metering charges should also enable NSW distribution businesses to meet the commitment to customers that total price changes will be constrained within CPI.

7.1 Cost drivers

As per Principle 1, appropriate cost drivers must be identified in order to provide cost reflective pricing for groups of similar customers. We considered the following factors that potentially drive operating costs and undertook some analysis to consider their impact to operating costs;

- Metering installation type (Type 5 or Type 6);
- Number of meter phases (e.g. single, dual, or multi phase);
- Number of meters at the premise; and
- Frequency of meter reading.

The findings from this process identified that the key driver of operating costs (meter maintenance, meter reading, meter data services and direct IT) relates to whether the premise has a Type 5 or Type 6 metering installation and how often the meter is read. Specifically;

1. Unit operating costs for quarterly read Type 5 varies by a factor of 3 – 4 times compared to Type 6 meters, due to different unit costs for all aspects of operating costs.

2. Monthly read Type 5 meters are three times as expensive as quarterly read Type 5 meters due to additional meter reading and meter data service costs.

3. Compared to 1 and 2, the number of supply phases had minimal incremental operating cost impact and in addition, any charges based on this attribute posed complexities from a billing perspective

4. There is an impact of multiple meters to operating costs, primarily related to meter maintenance costs

In the sections below we outline in more detail how operating costs for the respective cost drivers have been allocated to prices in order to reflect these aspects.

For historic capital expenditure and the recovery of those costs through prices, we propose to share costs across the customer base. We consider it inequitable for customers, not previously provided with an option of the type of metering hardware installed (e.g. Type 5 or 6 meter) to pay the historic capital cost difference. From 1 July 2015, all new and upgrade premises will fund their own cost of the meter up-front, and hence these costs will not form part of the metering services charges in the future. We discuss this is more detail in section 7.3.

In adopting different approaches for signalling operating and capital costs through meter prices we have sought to balance considerations such as cost reflectivity, equity and complexity.

7.1.1 Meter maintenance

Meter maintenance costs are dependent on the type of meter (5 or 6) and quantity of meters installed on site. These cost drivers are used to determine a single meter maintenance cost per tariff for each customer.

It is not practical to maintain the number of meters installed for each individual customer, and hence the average number of meters per tariff class is used as the scaling factor to account of multiple meters per NMI. The overall per Type 5 meter and per Type 6 meter cost is scaled by the ratio of meters to tariff to determine the meter maintenance cost per network tariff per customer.

Accumulation meters (Type 6) attract, on average, a lower maintenance cost than an interval meter (Type 5).

7.1.2 Meter reading

The cost driver for meter reading is per the method of reading the data, and the number of times it is read per year.

Primary network tariff customers are categorised as requiring MRIM quarterly, MRIM monthly or BASIC (quarterly) data. The MRIM monthly tariff tally (EA302) is scaled by 3 to reflect the higher cost of more regular meter reading. .

Meter reading costs are generally proportional to and charged by account (by NMI). Thus, irrespective of the number of meters at a site, a domestic installation visited 4 times per year for meter reading will attract four charges and a monthly read NMI will attract twelve charges in a 12-month period. A different individual charge is applied depending on whether the NMI is registered as MRIM or BASIC. The higher charge for MRIM manifests itself as a probe meter reading surcharge.

7.1.3 Meter data processing

The base cost driver for meter data processing is the volume of data being processed.

Meter data services are higher for processing and managing interval data compared with accumulation data (interval data contains over 4,000 data points). For accumulation data, installations are quarterly read and the processing cost is the same for all Type 6 installations.

For Type 5 installations, costs are dependent on both data volume as well as the number of meter reading transactions that take place. For monthly read interval metered customers, meter reading costs are scaled by 3

for monthly reads however the associated meter data processing costs are partly proportional to the number of reading transactions and partly proportional to the volume of data. Thus the monthly read interval metered customer attracts 2.2 times the meter data service cost of a quarterly read interval metered customer.

Meter data processing costs is attributed to primary tariffs only.

7.1.4 Information and Communication Technology (ICT) costs

Each network tariff is categorised as requiring Type 5 or Type 6 metering.

ICT costs generally align with the complexity of the systems being supported. ICT costs are proportional to the meter installation type.

ICT operating costs associated with metering are estimated to be allocated at a rate of 30% on Type 6 metering and 70% on Type 5 metering. To determine the proportion of cost per NMI, the Type 6 cost (30% of total) is divided by the number of Type 6 NMI's and the Type 5 cost (70% of total) is divided by the number of Type 5 NMI's. The per-unit cost for each tariff is allocated by the Type 5 and Type 6 categorisation.

7.1.5 Corporate overheads

We have distributed corporate overhead costs (associated with furniture, plant, property, shared IT etc.) evenly across all NMI's. The cost per NMI is calculated by dividing the corporate overhead associated with metering by the combined total number of all NMI categories.

7.2 Capital costs for existing and replacement assets

The return on capital, return of capital as well as tax components of metering costs are distributed evenly across all tariffs by meter numbers. This approach has been determined as a fair and reasonable application, given that in the past and up until now, customers have not been given a choice in the level or type of capital investment (i.e. a choice between Type 5 or Type 6 installation).

7.3 Capital costs for new and modified metering installations

We are proposing that metering hardware costs and directly associated logistics and engineering costs will be charged as an up-front fee from 1 July 2015. The associated costs are averaged across the projected number of meters to be purchased in the 2014/15 – 2018/19 period. To reflect the cost differences of the metering equipment categories, the different hardware costs are used, thus the customer is required to pay for only the metering equipment that is installed on their premise.

Table 17 provides the proposed up-front meter prices from 1 July 2015 and the approach used to develop these prices is also consistent with the previously listed principles. The charge would be applied as a new part of the existing Inspection Fee process that operates with Accredited Service Providers for new and upgrade installations.

Table 17: New or upgraded meter charge, FY16-FY19 (Real $FY14)

Meter Code	Meter Description	FY15^	FY16	FY17	FY18	FY19
B1	Single Phase Single Element Two Wire Direct Connected Accumulation Watt-hour Meter	47.73	49.30	51.05	52.87	54.76
B3	Three Phase Single Element Four Wire Direct Connected Accumulation Watt-hour Meter	123.91	127.39	131.10	134.92	138.85
E1	Single Phase Single Element Two Wire Direct Connected Interval Watt-hour Meter	116.16	119.44	122.95	126.57	130.30
E2	Single Phase Dual Element Two Wire Direct Connected Interval Watt-hour Meter	177.29	182.10	187.18	192.40	197.77
E3	Three Phase Single Element Four Wire Direct Connected Interval Watt-hour Meter	239.67	246.04	252.71	259.57	266.62

E4	Three Phase Single Element CT Connected Interval Watt-hour Meter	578.64	593.48	608.84	624.60	640.78

^ No metering service charges are applicable in 2014/15 and these prices are indicative only. New fees are to apply from 1 July 2015.

7.4 Metering service pricing structure - aligned to network tariffs

Ausgrid's existing network tariff structure aligns well with the key cost drivers as outlined above, specifically;

- Inclining Block Tariffs (EA010 and EA050) are almost exclusively serviced with BASIC meters on a quarterly meter reading route;
- Residential Time of Use and Small Business Time of Use (EA025 and EA225) are serviced with MRIM meters on quarterly meter reading routes;
- LV 40-160MWh Time of Use (EA302) are serviced with MRIM meters on monthly meter reading routes;
- Controlled Load tariffs and Generator Tariffs (EA030, EA040, GENR, GGENR, GGENR2, NGENR, NGENR2) are identified as secondary tariffs on existing NMI's thus can be easily removed from NMI based cost drivers; and
- Metering equipment counts against network tariffs can be easily established.

As the network tariffs are already mapped closely with the key cost drivers for Type 5 and 6 metering services, we consider that developing pricing structures for the provision of Type 5 and 6 metering services that align to Ausgrid's existing network tariff structure:

1. Fits well with the outlined pricing principles;
2. (As network tariff based charging is already understood) is a simple concept for retailers and customers and therefore is likely to be considered a reasonable approach. This improves the likely success of communicating to the customer the application of the new metering services charging regime; and
3. Implementing network tariff based charging can be integrated into IT systems more easily, as the framework has already been established and interfacing to retailers is relatively straightforward.

In effect, the metering tariffs have a one to one mapping to the network tariff list. Table 18 provides proposed prices for Type 5 and 6 metering services for FY16 to FY19, mapped to Ausgrid's relevant network tariff code and name.

Table 18: Indicative annual metering service prices for 2014/15 – 2018/19 (c/day, nominal)

Network Tariff Code	Tariff Name	FY15^	FY16	FY17	FY18	FY19
EA010	Residential Inclining Block	9.23	9.51	9.84	10.16	10.49
EA025	Residential ToU	15.13	15.55	16.05	16.53	17.03
EA030, EA040	Controlled Load	3.72	3.84	3.98	4.12	4.27
EA050	Small Business Inclining Block	12.61	13.00	13.47	13.91	14.37
EA225	Small Business ToU	14.74	15.14	15.63	16.10	16.58
EA302	LV 40-160MWh ToU (System)	23.32	23.93	24.69	25.41	26.15

GENR, GGENR, GGENR2, NGENR, NGENR2	Generator Tariff	4.42	4.56	4.73	4.89	5.05

^ No metering service charges are applicable in 2014/15 and these prices are indicative only. New fees are to apply from 1 July 2015.

7.5 Type 5-6 metering pricing model

We have developed a Type 5-6 metering pricing model to convert and allocate the capex revenue requirements (calculated via the Type 5-6 Metering PTRM, provided as Attachment 8.19) and opex requirements (calculated from annual financial records) to tariffs as described in Section 7. For each cost driver described above, this model implements an allocation method to provide cost reflective prices. The model is provided as Attachment 8.20 to this proposal.

7.5.1 Approach to managing 'stranded costs'

Through their retailer, a customer can choose to have a Type 4 meter installed, where currently Ausgrid provides a Type 5 or Type 6 meter. A key element of the AEMC's proposed approach for competition in metering services is for a transparent and clearly defined exit fee(s) to exist where a consumer chooses to upgrade a meter that is currently managed and maintained by the local distribution network. This fee allows the service provider to recover sunk costs[22].

The AEMC considers that the exit fee be determined by the AER in order to provide sufficient transparency for all parties regarding fees, and certainty to networks that they are able to recover costs appropriately. The AEMC proposed a set of criteria for the AER to have regard to when making an exit fee determination. Among other things, these included:

- the exit fee must be reasonable;
- the exit fee must be based on the average remaining asset life of the existing meter type and operating costs;
- the exit fee may include efficient and reasonable costs of processing the consumer transfer to another Responsible Person;
- a cap must be placed on the exit fee. We consider that this should be, at a maximum, no more than three times the annual metering charge. This is to provide consumer confidence that costs will not be exceedingly high when willing to change their meter;
- the DNSP must remove the cost of the replaced metering installation from its asset base and reduce the DUOS tariff to the retailer accordingly; and
- the existing contribution that consumers have already paid towards the existing metering stock.

Ausgrid has considered the AEMC criteria and developed an exit fee with the following characteristics:

- The exit fee allows for the full recovery of stranded costs;
- Historical choices made by Ausgrid such as hardware or installation type do not adversely affect the customer;
- Stranded asset costs include both metering assets and supporting assets involved in the provision of metering services;
- The value of the stranded assets is based on the Type 5-6 Metering RAB;
- A removed meter is removed from the Type 5-6 Metering RAB; and
- Operational unit costs are unaffected by minor changes in the number of Type 5-6 Metering customers.

In practice, the exit fee developed comprises of two components, the stranded asset costs and administration costs.

- *The stranded asset costs* component is a proportion of the RAB value which is attributed to the metering installation (i.e. NMI) being removed/upgraded. This proportion is simply the RAB value divided by the number of NMIs with a Type 5 or 6 Meter; and
- *Administration* costs relate to the administrative requirement to change records to reflect the changed status, the return of the meter and the processing costs of relaying this information.

[22] AEMC Final Report "Power of choice review - giving consumers options in the way they use electricity", 30 November 2012, page 87

The corresponding reduction in the remaining Type 5 and6 Metering installations/customers is able to be incorporated in the building block approach (by reducing the RAB). The Post Tax Revenue Model putting into effect the building block approach has the facility to adjust the RAB and thus the Annual Revenue Requirement and the meter charge. This adjustment for the recovery of stranded asset costs is performed via the forecast asset disposals.

Therefore, a forecast of the number of customers upgrading their Type 5-6 meter has to be produced by Ausgrid and included in the forecast net capex which will in turn reduce the RAB which is used to develop Type 5-6 Metering charges. The correction between forecast and actual disposals will take place during the Roll forward process at the beginning of the next regulatory control period. This ensures no benefit or loss for customers with an inaccurate forecast in the long term.

The exit fee takes the form of an upfront charge as shown in Table 19 which is incurred when the customer elects to upgrade to a non Type 5-6 meter. It should be noted that these exit charges do not include the ongoing costs incurred by us to receive metering-related data from third parties for sites not metered by Ausgrid, which is then used to generate network use of system charges.

Table 19: Indicative Metering service Exit Fee for FY16 – FY19 ($ nominal)

Exit Fee	FY15^	FY16	FY17	FY18	FY19
Administration costs	36.00	37.47	39.20	41.01	42.89
Stranded Asset costs	160.64	157.76	158.68	160.48	161.78
Total Exit fee (Type 5 or 6 meter)	**196.64**	**195.24**	**197.89**	**201.49**	**204.67**

^ Exit fees are not applicable in 2014/15 and these prices are indicative only. New fees are to apply from 1 July 2015.

7.6 Comparisons to other DNSPs' services and prices

This is the first time that we are required to specify a separate price for metering services, so we have undertaken analysis to compare our proposed indicative prices to other Australian distributors who provide the same or similar services.

We have compared Ausgrid's Type 6 price with Aurora (TAS) and other NSW distribution businesses. For Aurora, as the published price is per meter, we have needed to weight the prices by the average numbers of meters at Ausgrid connections and hence are an approximation only. We have also escalated their prices by actual and forecast CPI to FY16 dollar terms. These comparisons have been separated into domestic and business tariffs and are shown in Tables 20 and 21 respectively.

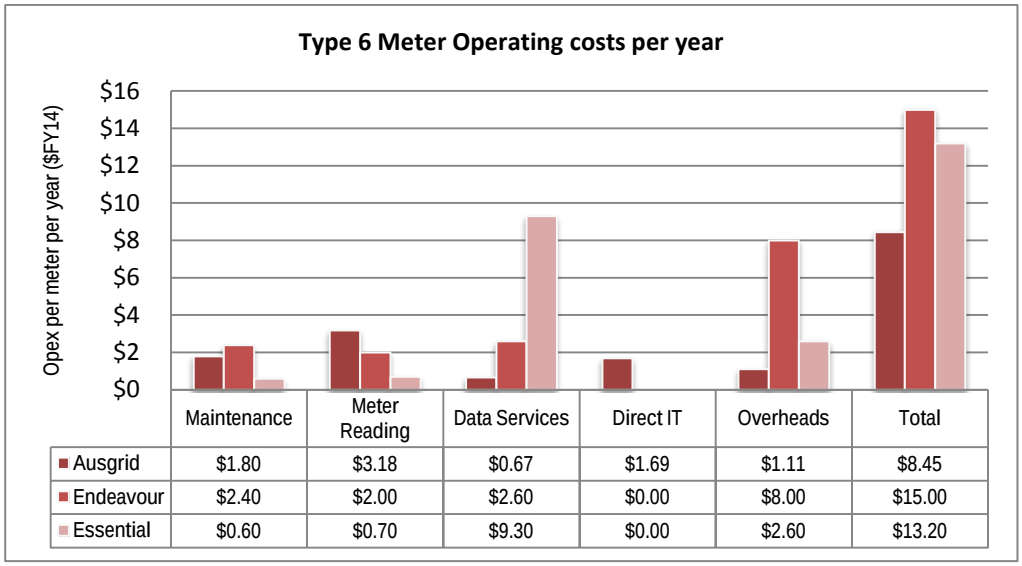
Table 20: Comparison of FY16 Type 6 Residential indicative metering service prices (c/day, nominal)

Distributor	Tariff Name	FY16 Price per NMI (installation) c/day
Aurora	LV domestic (Type 6)	8.99
Ausgrid	LV Domestic (Type 6)	9.51
Endeavour Energy	Residential "anytime" (Type 6)	7.23
Endeavour Energy	Residential "TOU" (Type 6)	13.33
Essential Energy	Residential "anytime" (Type 6)	13.31

Table 21: Comparison of FY16 Type 6 Business indicative metering service Prices (c/day, nominal)

Distributor	Tariff Name	FY16 Price per NMI (installation) c/day
Aurora	LV Business (Type 6)	21.36
Ausgrid	LV Business (Type 6)	13.00
Endeavour Energy	Business "anytime"(Type 6)	9.89
	Business "TOU" (Type 6)	21.32
Essential Energy	Business "anytime" (Type 6)	13.31

As outlined in Section 5, all Ausgrid customers, including Type 6 customers, share the costs of Ausgrid's past capital investment in Type 5 meters. This is reflected in a higher (than otherwise) Type 6 prices. To illustrate this factor, Energeia, who undertook an independent review of NSW distribution businesses Metering Proposals, produced the following comparison data on operating costs only for Type 6 metering services.



	Maintenance	Meter Reading	Data Services	Direct IT	Overheads	Total
Ausgrid	$1.80	$3.18	$0.67	$1.69	$1.11	$8.45
Endeavour	$2.40	$2.00	$2.60	$0.00	$8.00	$15.00
Essential	$0.60	$0.70	$9.30	$0.00	$2.60	$13.20

We have also compared Ausgrid's proposed Type 5 price with SA Power Networks, and the proposed prices for Endeavour and Essential Energy (NSW). It should be taken into consideration that Endeavour and Essential Energy have very small numbers of Type 5 meters and hence a NSW comparison of these meter types is not as useful a comparison. The results are shown in Table 22.

Table 22: Comparison of FY16 Type 5 Indicative metering service prices(c/day, nominal)

Distributor	Tariff Name	FY16 Price per NMI (installation) c/day
Ausgrid	Domestic/Small business ToU (average) ALL PHASES	15.47
SA Networks	Whole current up to 100amps, 1 phase, 1 element	18.08
	Whole current up to 100amps, 1 phase, 2 element	25.26
	Multi phase	41.34
Endeavour Energy	Residential Type 5	49.32
	Business Type 5	57.31

In Table 23 we compare the additional charge for a monthly read Type 5 meter. There is only one other distributor that has published a price for this service (SA).

Table 23: Comparison of FY16 additional charge for monthly reads

Type 5 tariff	FY16 Metering price (c/day)
SA- additional charge for monthly read (Type 5)	12.85
Ausgrid Type 5 – additional charge for monthly read (Type 5)	8.47

We have also compared Ausgrid's proposed meter exit fee with other distributors, and this is shown in Table 24.

Table 24: Comparison of FY16 meter exit fees (nominal)

Exit Fee	FY16
SA – Type 5 and 6 Meter Exit Fee	$319.76
Ausgrid Meter Exit Fee Type 5 and 6	$195.24
Essential Energy	$131.21
Endeavour Energy	$62.93

Note: SA prices have been weighted by Ausgrid's meter numbers (SA price is per meter, not per installation) and adjusted by CPI to obtain a FY16 value.

8 Changes since external review of our proposal

NSW distribution businesses engaged Energeia to independently review our proposed approaches, methodologies and resulting proposal for Types 5 and 6 metering services.

We provide a copy of Energeia's findings in Attachment 8.21 titled "Energeia Review of Ausgrid's Metering Tariff Arrangements 2014 – 19, April 2014".

Since the completion of Energeia's report, we have made some changes in the following two categories;

1. Minor errors in formula or numbers have been modified. An example of this is the slight revisions that have been made to shared capital and operating costs. As a result of global changes to shared costs, the CAM allocation of these costs to metering services has resulted in slightly different expenditure (method has not changed);

2. Changes to approach that have resulted in some small impacts to forecast expenditure; including
   - Starting customer numbers (2014/15): we have aligned customer numbers for Type 5 and 6 metering services with the customer numbers used for energy forecast customer numbers and network use of system charges. This has resulted in a small reduction in numbers of customers we forecast will receive Type 5 and 6 metering services.

   - Forecast OPEX. Previously we had used 2012/13 operating costs as the base year for forecasting future metering services operating expenditure with an adjustment made to account for the transfer of costs/resources during the Smart Grid Smart City project. As a result of this project, expenditure for 2012/13 was approximately 4 – 5% lower than otherwise.

     However since Energeia's review, we have revised this approach, and have adopted 2012/13 opex as the basis we no increase in costs as a result of increasing unit costs in meter maintenance, meter reading or meter data services or increasing Type 5 volumes. These increases will be offset by efficiency improvements in future years.

   - Inclusion of annual labour cost escalators in forecast OPEX and CAPEX. These costs had not previously been included.

   - Deliver timeframe for proactive meter replacements. Prior to completing their report, we advised Energeia that we were modifying the profile of proactive meter replacements, to more accurately align with deliverability timeframes. Energeia have reflected our intent in their final report and we have also reflected this change in this proposal.

   - Smoothing of revenue obtained from Type 5 and 6 metering services over the five year peiod. Our capital investment over the period is not smooth due to the timing of investments, particularly meter replacements. Due to the impact this would have on customer price volatility, we have smoothed the revenue over the period, whilst still recovering the same revenue (NPV is the same).

Appendix 1 – Relevant Attachments to the type 5 and 6 metering services proposal

Attachment Number	Attachment name	Content
Attachment 8.16	**Forecast opex for Type 5 & 6 metering**	Provides the basis for establishing operating expenditure forecasts for FY15- FY19 period.
Attachment 8.17	**Type 5 and 6 metering RAB**	Explains the process we used to establish the Type 5 and 6 metering services RAB.
Attachment 8.18	**Forecast capex for Type 5 & 6 metering**	Includes all data relevant to establishing forecasts for capital expenditure and includes data relating to metering configurations, volume forecasts for new and replacement meters, proactive and reactive meters, results of survey data for meters failing sample testing.
Attachment 8.19	**Type 5 and 6 metering PTRM**	Calculates the capital return and tax for Type 5 & 6 metering services
Attachment 8.20	**Type 5 & 6 metering pricing model**	Incorporates the outputs of the Type 5 and 6 metering services PTRM, includes forecast operating expenditure and calculates revenue requirements and prices. It also includes the calculations that form the basis of determining the proposed; i. Exist fees, and ii. Upfront prices for Type 5 and Type 6 meters.
Attachment 8.21	**Energeia review of Ausgrid's metering tariff arrangements 2014-19 - April 2014**	Energeia's findings following a review of our proposed approaches, methodologies and resulting proposal for Types 5 and 6 metering services.