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MANAGEMENT PLAN 2011

METERING ASSETS

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1 PURPOSE

The purpose of this document is to describe, for Metering Assets:

- Aurora's approach to asset management, as reflected through its legislative and regulatory obligations, Network Management Strategy and Management Strategy 2011: Network Metering;
- The key projects and programs underpinning its activities for the period 2012/13 - 2016/17; and
- Forecast CAPEX and OPEX, including the basis upon which these forecasts are derived.

2 STRATEGY

The objective of the Network Management Strategy and Management Strategy 2011: Network Metering is:

> *Minimise cost of supply to the customer whilst:*
>
> *a. Maintaining network performance;*
>
> *b. Managing business operating risks; and*
>
> *c. Complying with regulatory, contractual and legal responsibilities.*

3 SCOPE

This document covers type 6 (accumulation) metering assets. It excludes type 1-4 interval meters as these are not part of the regulated asset base and are covered by the Australian Energy Market Operator (AEMO) approved NA R AM 28 Wholesale Metering Asset Management Plan (reference 3). This plan also excludes metering ancillary equipment such as metering transformers and panels, which are covered by the Management Plan 2011: Connection Assets (reference 4).

4 DESCRIPTION OF ASSETS

The metering asset family consists of various combinations of equipment to record energy consumed and to control when some tariffs are available such as off peak and multi rate products.

The main categories are:

1. Single phase - electromechanical
2. Single phase - electronic
3. Three phase - electromechanical
4. LV Current transformer – (with electromechanical meters)
5. LV Current transformer – (with electronic meters)

Single phase electromechanical and electronic meters are used in domestic and small commercial applications. This is the largest category of meters in Aurora.

Three phase electromechanical and electronic meters are installed where customers load requirements are slightly larger than the single phase or there is a need to operate three-phase equipment.

LV current transformer electromechanical and electronic meters are installed in commercial applications where the maximum demand is greater than 100 amps per phase.

The standard meters currently being purchased and installed by Aurora are:

- Single phase direct connect meter – EDMI mk7A
- Multi phase direct connect meter – EDMI mk10A
- LV CT connect meter – EDMI mk10A
- HV CT connect meter – EDMI mk6E

The approximate number of installed metering assets as at July 2010 is shown in Table 1.

Table 1: Number of installed metering assets (as at July 2010)

Asset Type	Volume
Single phase electromechanical meters	314,000
Multi phase electromechanical meters	21,500
LV CT connected electromechanical meters	1,000
Single phase electronic meters	44,500
Multi phase electronic meters	13,500
LV CT connected electronic meters	1,500
Total	*396,000*

During the 2008/09 and 2009/10 periods, approximately 700 direct connect and 1,800 transformer-connected meters were replaced with type 3 and type 4 interval meters for contestable customers. These interval meters are not included in the number of installed metering assets for this management plan.

Meters that are removed from service are refurbished and returned to service if they are deemed suitable. Full details of the meter types that are suitable to returning to service are included in the Metering Technical Specification TS1003 (reference 5).

Meter families have been tested with those families that failed being replaced in accordance with this management plan.

The age profile of the meter fleet is shown in Figure 1. The asset life that is applied to meters is 25 years for mechanical meters and 15 years for electronic meters in accordance with the 2007 Pricing Determination. Approximately 1,000 electromechanical meters that are greater than 50 years old remain in service. These meters are all included in the replacement program as it is not economical to continue testing these meters due to the small volumes in each family or the test results for those meter families show that the meters are no longer compliant and require replacement.

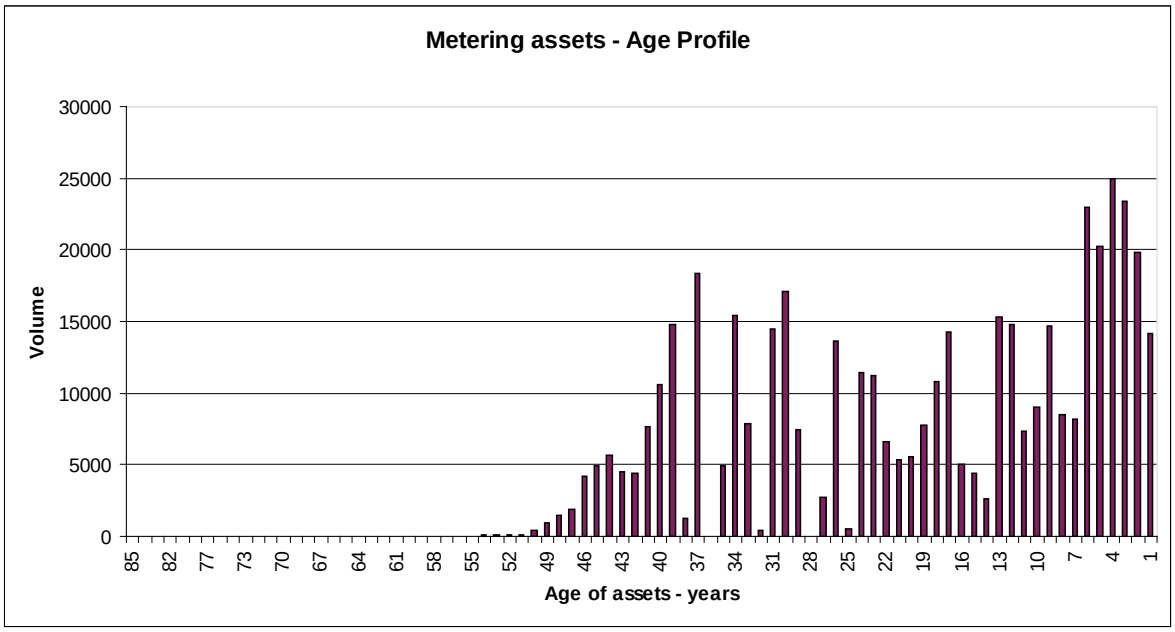

Figure 1: Age Profile of installed meters as at July 2010

4.1 Condition

4.1.1 Single phase electromechanical

Analysis of the result data from the routine sample inspection of meters has found that the majority of the meter fleet at present is within the acceptable errors allowed by the National Electricity Rules (NER) and the Tasmanian Electricity Code (TEC) (references 6 and 7). In the early 1960's metering technology significantly changed and results have shown that most meters built after this time have not deteriorated in performance.

4.1.2 Multi phase electromechanical

Routine testing has found that the type 'SD' meters have failed the light load test. These meters have been included in the meter replacement program. The rest of this meter type continues to be monitored in the meter-testing program.

4.1.3 LV CT connected electromechanical meters

These meters are all individually inspected and tested every 5 years and replaced when they fail testing.

4.1.4 Single phase electronic

There are no identified issues with single phase electronic meters with the majority of these meters being less than 10 years old. However, one particular group of pre-payment meters are showing signs of early failure of the display. These faulty meters will be replaced as part of the meter replacement program.

4.1.5 Multi phase electronic

There are no identified issues with multi phase electronic meters with the majority of these meters being less than 10 years old.

4.1.6 LV CT connected electronic meters

There are no identified issues with multi phase electronic meters with the majority of these meters being less than 10 years old.

5 FACTORS INFLUENCING ASSET MANAGEMENT STRATEGIES

The principal factors in influencing asset management strategies are classified as per objectives set out in Section 2.

5.1 Minimise the Cost of Supply to the Consumer

- Meter selection ensures a least cost option over the service life of the asset;
- Ensure replacement activities are only performed when required; and
- Ensure replacement activities align with Management Strategy 2011: Network Metering and Network Management Strategy to achieve lower cost to serve by installing new technologies and implementing more efficient processes.

5.2 Maintaining Network Performance

- Ensuring meter replacement activities are completed efficiently to minimise the duration of the supply outage required to complete the work; and
- Ensuring planned maintenance and replacement activities are completed efficiently to minimise the frequency of the supply outages required to complete the work.

5.3 Managing Business Operating Risks

- Ensuring all risks are identified and have adequate management plans integrated into the business' practices;
- Ensure loss of revenue due to non-compliant or faulty meters is minimised.; and
- Ensure replacement activities align with Management Strategy 2011: Network Metering and Network Management Strategy to address specific business needs such as access, obsolete technologies and safety issues.

5.4 Complying with Regulatory, Contractual and Legal Responsibilities

- Ensure adequate monitoring and inspection activities cover legislative compliance obligations.
- The testing program is designed to comply with:
  - NER – Section 7.6
  - TEC – Sections 9.17 and 9.18
  - AS 1284.13: 2002 Electricity Metering In-Service Compliance Testing (reference 8).

6 MANAGEMENT PLAN

6.1 Operational Expenditure Programs

6.1.1 Meter Reading

Volumes calculated to comply with the requirements of the NER – Chapter 7 and TEC – Chapter 9 and according to the number of installed meters with an allowance made for customer growth.

6.1.2 Meter Equipment Auditing and Testing

Inspection of meters for compliance is a mandated requirement in accordance with TEC – Chapter 9 and NER – Chapter 7 with volumes calculated according to the number of installed meters to ensure compliance.

Compliance testing of direct connect meters is conducted in accordance with AS 1284.13-2002. This involves completing tests on a random sample of meters in each meter family. The sample size is determined according to the number of meters in the corresponding meter family. Internal and external audits are conducted to ensure compliance with requirements of the NER and TEC.

Table 2 details the results of the testing program for direct connect meters as at July 2010.

Table 2: Direct Connect Meter Testing Program - Results as at July 2010

Year	Model	Test Result	Management Program
2002	AZ	Fail	Replace
2002	UVE	Fail	Replace
2002	MC3	Fail	Replace
2002	SD 30A	Fail	Replace
2002	SD 40A	Fail	Replace
2003	BAZ 10/40	Pass	Test – 7 years
2003	BAZ 10/60	Pass	Test – 7 years
2003	M2 10/80	Pass	Test – 7 years

Year	Model	Test Result	Management Program
2004	M3 15/100 (1987)	Pass	Test – 7 years
2005	WF2	Pass	Test – 7 years
2005	BAZ 10/60	Fail	Replace
2005	BAZ 10/40	Pass	Test – 5 years
2005	M1 15/100	Pass	Test – 7 years
2005	M2	Pass	Test – 7 years
2006	SD	Fail	Replace
2006	5162K	Pass	Test – 2 years
2006	M3 (1986)	Pass	Test – 7 years
2006	SDM 10/60	Pass	Test – 7 years
2007	WF3	Pass	Test – 7 years
2007	CL170	Pass	Test – 7 years
2007	M3 15/100 (1988)	Pass	Test – 7 years
2007	SDM CT	Fail	Replace
2007	SDME CT	Fail	Replace
2007	M1 10/60	Pass	Test – 7 years

Compliance testing of transformer connected meters is conducted in accordance with section 9.18 of the TEC. The requirement is for all transformer-connected meters to be tested every 5 years. Aurora maintains a testing schedule of all transformer-connected meters.

6.1.3 Metering Equipment Repairs

In general the assets are not maintainable and are deemed consumable items (replaced on failure) with volumes based on historical rates. Assets that fail in service must be replaced to ensure ongoing supply to the consumer and prevent loss of revenue.

6.1.4 Metering Equipment Removal and Disposal

This program is for the removal of meters from installations that are abolished and for the disposal of obsolete meters resulting from the meter replacement program. Volumes for removal are customer driven and are linked to the meter replacement volumes for disposals.

6.2 Capital Expenditure Programs

The volumes for the proposed capital program of work are contained in the document *POW task and estimate Volumes 2009/10 to 2019/20* (reference 9).

6.2.1 Install Metering Equipment (New Installations)

The installation program for customer driven work is based on historical volumes with an allowance made for customer growth. In accordance with the Management Strategy 2011: Network Metering (reference 2), all new meters installed will be electronic.

6.2.2 Non Demand Asset Replacement (Meter Replacement)

There are two key drivers for asset replacement:

1. Assets found to be non-compliant from the testing regimes must be replaced to ensure compliance to TEC – Chapter 9 and NER – Chapter 7.
2. Planned replacement to address specific business needs such as access, obsolete technologies and safety issues.

The replacement program is designed to continue to rationalise the meter fleet by removing meter types with small numbers of meters and to future-proof the meter fleet by installing electronic type meters (instead of induction disc type technology). This will allow for reduced use of time switches since the new meters can have onboard contactors for time of use type loads.

Electronic meters will also allow communications to be installed for remote sites to reduce the cost of meter reading in remote locations (in particular monthly read installations). New technology will also allow for monitoring power quality, can be capable of remote disconnect/reconnect and can allow for retail products for customers without changing the meter.

Projected volumes are based on the detail contained in Section 8.1 with an allowance made for compliance driven replacements. Compliance driven replacements are projected to maintain existing levels. Projected replacement volumes are shown in Table 3.

Table 3: Meter Replacement Volumes 2012/13 – 2016/17

Driver	Year	Volume
Compliance	2012/13	5,150
Compliance	2013/14	5,150
Compliance	2014/15	5,150
Compliance	2015/16	5,150
Compliance	2016/17	5,150
ERT Replacement	2012/13 – 20/1617	7,300
Access & Key Management	2012/13 – 20/1617	36,000
Reading Issues	2012/13 – 20/1617	39,200
Total		*108,250*

7 PROPOSED OPEX PLAN

There are no significant changes to operational expenditure for the program of work proposed in the 2012/13 – 2016/17 regulatory period. All proposed volumes of work are based on either compliance for testing and reading of meters, or historical maintenance practices and fault responses. Operational activities can be divided into inspection and maintenance programs, which are detailed in Table 4.

Table 4: OPEX 2007/2008 to 2016/2017 ($)

OPEX	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Meter Asset Repair	236,928	293,843	367,592	280,000	280,000	254,485	246,302	242,729	237,476	235,296
Meter Equipment Auditing and Testing	274,842	37,048	1,039	274,274	274,274	200,345	193,471	190,470	186,057	184,225
Meter Equipment Removal and Disposal	90,925	66,458	45,045	332,700	332,700	429,801	427,119	425,948	424,227	423,512
Meter Reading and Special Meter Reading	3,732,576	3,670,135	3,118,226	4,000,000	4,000,000	2,855,302	2,779,900	2,767,846	2,730,428	2,736,833
Actual $$	4,335,270	4,067,484	3,531,901							
Proposed				4,886,974	4,886,974	3,739,934	3,646,792	3,626,993	3,578,188	3,579,866

8 PROPOSED CAPEX PLAN

The proposed capital program of work can be divided into customer driven new metering installations and network replacement of metering equipment. The installation of new customer meters and replacement of meters that fail compliance testing is all compliance driven. Other meter replacements are network driven to address business needs as described in section 8.1 below. The Capital Program is detailed in Table 5.

Table 5: CAPEX 2007/2008 to 2016/2017 ($)

CAPEX	2007/08	2008/09	2009/10	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17
Install Metering Equipment (New Installations)	3,574,717	4,733,685	4,434,023	4,620,000	4,675,000	5,492,869	5,523,015	5,575,490	5,610,650	5,681,356
Replace Metering Equipment	3,333,208	3,667,714	4,843,265	4,372,500	6,297,500	7,839,991	7,837,658	7,836,640	7,835,143	7,834,521
Actual	6,907,924	8,401,399	9,277,288							
Proposed				8,992,500	10,972,500	13,332,860	13,360,673	13,412,130	13,445,703	13,515,877

8.1 Major New Programs and Changes to Existing Programs.

In accordance with the Management Strategy 2011: Network Metering, the meter replacement program will be refocused from one based on aged replacement to one based on non-compliance and to resolve the following existing business needs:

8.1.1 ERT Replacement

Network has 7,300 installations, which incorporate Easy Read Technology (ERT) metering. These metering and reading technology assets are approaching the end of their useful life and it is becoming increasingly difficult to source spares and supplier support is due to expire in 2012. A meter replacement program is proposed to provide an electronic meter with remote communications functionality to these installations.

8.1.2 Access and Key Management

Approximately 36,000 sites are accessed using customer specific keys or have access difficulties. Difficult access sites include dogs, additions or modifications to buildings affecting reading access, irrigation pumps and communications towers. A meter replacement program is proposed to provide an electronic meter with remote communications functionality to these installations.

It is anticipated that by addressing these reading and access issues, Network will be able to gain efficiencies in processing and exceptions management and reduce the level of re-reads requiring additional field visits and improve customer service by reducing estimated reads and removing the need to schedule appointments to read meters.

8.1.3 Reading Issues

(a) PAYG installations

Approximately 39,000 Pay-As-You-Go (PAYG) meters are currently the property and responsibility of Aurora's Retail Division and energy consumption is not currently read at these sites thus limiting the ability of Network to produce a 'bottom up' reconciliation of its Distribution Use of System (DuoS) charges. It has been proposed that Network should take over ownership of PAYG meters and begin meter reading at these sites on a periodic basis (quarterly or annually). This would require access which is currently not required, raising customer issues. A meter replacement program is proposed to provide an electronic meter with remote communications functionality to these installations to remove the access issue.

The ability to read PAYG meters will assist Network in the preparation and accuracy of DUoS accounts, energy forecasting and the calculation of distribution system loss factors.

(b) Meter reading errors and processing issues

Meter configuration or other issues at approximately 200 sites result in higher than normal meter reading errors. These errors result in greater and more time consuming back office processing. Upgrading the metering at these sites and providing remote communications functionality would reduce processing time and reduce the volume of check reads and special reads at these sites.

9 CAPEX - OPEX TRADEOFFS

The management strategy for metering assets has allowed for specific tradeoffs between capital and operational expenditure where improved metering assets allow for savings in maintenance, inspection or meter reading programs.

Specifically, regular inspection of certain metering assets may be deferred based on meter age or model, as is has been deemed more cost effective to replace such meters rather than inspect them. Older induction meters may be replaced with electronic meters with communications allowing remote read capability. As remote read becomes more prevalent it is expected to decrease operational meter reading and time of use switching costs. Also, where appropriate, meters may be refurbished and returned to service rather than replaced in cases where this is a more cost effective solution.

There is also a relationship between programs that identify assets for replacement and the replacement programs of such assets. It is expected that inspections will trigger replacement work, meaning increased inspection requirements due to compliance will drive an increase in metering asset replacement.

10 ASSET MANAGEMENT INFORMATION

Aurora maintains records of metering assets through the information received from completed service orders to install, read, alter and remove metering equipment and also from periodic routine testing and inspection programs. The equipment details and attributes are recorded within the Market Data Management System (Gentrack).

Recorded information includes:

- Identification number (unique identifier);
- NMI / location / geographical details / site / access details / customer;
- Equipment attributes and ratings;
- Meter family test results and management program;
- Age of asset and components, installed / refurbished / removed date; and
- Billing data (consumption / reading dates)/

A number of systems are utilised by Network to ensure metering can deliver the outcomes required. These systems include:

- Market Data Management System (MDMS) – Gentrack;
- Service Order Management (SOM) – Brave suite;
- Task scheduler – TVD;
- Meter reading system (basic reads) – MVRS; and
- Meter reading system (interval reads) – MV90.

The management of these systems is included in the Distribution Network IT Strategy (reference 10).

11 RESPONSIBILITIES

The maintenance and implementation of this management plan is the responsibility of the Metering Assets Manager.

Approval of this management plan is the responsibility of the Group Manager – Asset Performance and Information.

A review of this management plan will be conducted annually or upon changes to applicable standards, rules, codes or legislation.

12 REFERENCES

1. Network Management Strategy
2. Management Strategy 2011: Network Metering
3. NA R AM 28 Wholesale Metering Asset Management Plan
4. Management Plan 2011: Connection Assets
5. Metering Technical Specification TS1003
6. National Electricity Rules (NER) – chapter 7
7. Tasmanian Electricity Code (TEC) – chapter 9
8. AS 1284.13: 2002 Electricity Metering In-Service Compliance Testing
9. NW 30009937 POW task and estimate Volumes 2009/10 to 2019/20
10. Distribution Network IT Strategy