



Program Business Need Identification

Power and Water Corporation

CONTROLLED DOCUMENT

PRD33458

Metering - capex

Proposed:

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Date: 15/2/2018

Approved:

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Michael Thomson
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Date: 23/2/2018

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Djuna Pollard
General Manager
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Date: 15/2/2018

Refer to email
D2018/72353

Finance Review
Date: 06/02/2018

Refer to email
D2018/731015

PMO QA
Date: 16/02/2018



1 Program Summary

Program Name:	Metering Capex		
Program No:	PRD33458	SAP Ref:	
Financial Commencement:	Year	2019-20	
Business Unit:	Power Networks		
Program Owner (GM):	Djuna Pollard	Phone No:	8985 8431
Contact Officer:	Kam Vessali	Phone No:	8924 5230
Date of Submission:	23-02-2018	File Ref No:	D2017/571352
Primary Driver:	Service Improvement	Secondary Driver:	Compliance
Program Classification:	Capital Works Program		

2 Recommendation

It is recommended that IRC note the proposed five year Metering - Capex Program for an estimated budget of \$26.49 M (\$2017-18) for the period 2019-20 to 2023-24, and approve the inclusion of this Program into the SCI for this amount, with a corresponding completion date of June 2024.

The current forecast for this program of work extends beyond the current SCI period. The first two years of this program aligns with the last two years of the 2017-18 SCI. This program will be included in the 2019-24 Regulatory Proposal to the Australian Energy Regulator (AER).

Note that individual projects within the program will be documented in Business Cases and go through the appropriate governance processes.



3 Description of Issues

PWC is obligated by its licence to make an offer to connect consumers. Each connection point must be metered so that energy flows can be determined and charged for. Metering services comprise:

- inspection and testing of metering installations¹
- new and replacement metering installations
- metering installation abolishment

This document covers all capex associated with the delivery of metering services in PWC’s regulated networks. It does not cover non-asset management functions such as meter reading, metering communications or non-network IT.

The provision of metering services is an Alternative Control Service regulated under Section 7A of the NT version of the National Electricity Rules (NT rules)², except that Type 7 metering services (unmetered connection points) are a Standard Control Service. Type 7 metering services are not covered by this document. Note that prior to FY20, Type 1 to 6 metering services were also classified as a Standard Control Service.

3.1 Project Drivers

The drivers for metering services are set out below.

3.1.1 Demand
<p>The demand for new metering installations grows at a rate consistent with new housing connections, with one new meter typically required for each new connection. The assumed growth rate is in-line with AEMO’s connection forecast dated October 2017 (see section 8 of the Metering AMP D2017/539082).</p>

^{1 1} The assembly of components including the instrument transformer, if any, measurement element(s) and processes, if any, recording and display equipment, communications interface, if any, that are controlled for the purpose of metrology and which lie between the metering point(s) and the point at or near the metering point(s) where the energy data is made available for collection.

Note:

- 1) The assembly of components may include the combination of several metering points to derive the metering data for a connection point.
- 2) The metering installation must be classified as being for revenue purposes and/or as a check metering installation.

² Chapter 7A of the National Electricity Rules version 88



3.1.2 Compliance

The NT rules set out obligations for the provision of metering on PWC's regulated network. PWC has established a new and replacement policy that complies with section 7A of these rules (see section 9.1 of the Metering AMP D2017/539082).

3.1.3 Customer consultation or other benefits (if not compliance obligation)

Metering for domestic customers has traditionally been in the form of accumulation meters (NT Rules Type 6), with simple block tariffs used to differentiate pricing. Different tariff structures are needed to allow prices to better reflect costs and to allow for two-way energy flows such as occur when PV is installed in a customer's electrical installation (NT Rules Type 4). PWC has established a new and replacement meter policy to reflect these needs (see section 9.1 of the Metering AMPD2017/539082).

4 Potential Solution

4.1 Preferred Option

A new and replacement policy has been established, based on installing a Type 4 meter with remote communications enabled. Five options were considered:

1. **Base Case - Advanced capable meters:** These meters are capable of remote reading and remote disconnection, however are installed without the remote communications module installed.
2. **Targeted roll out:** Replacement of specific accumulation meters with advanced meters (Type 4) e.g. hard to access sites, in addition to all new and replacement meters being advanced capable.
3. **Advanced meters, enabled immediately:** All new and replacement meters to be Type 4 with remote meter reading enabled.
4. **Advanced capable meters, enabled strategically:** All new and replacement meters to be advanced capable, but with remote meter reading enabled in 2023-24.
5. **Transition via advanced meters:** as per option 4 except with remote reading enabled from 1 July 2024.

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

- **NT Government's Roadmap to Renewables commitment** - The NT Government has committed to a fifty per cent renewable energy target by 2030 and supported or



supported in-principle the recommendations of the Roadmap to Renewables Report³. Government noted, and is undertaking further work to assess, the recommended core and supporting enabling actions, including:⁴

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

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

- In particular, we note Recommendations 7(b) and 8(f) of the Roadmap to Renewables regarding support for tariff structures, and changes to metering rules to allow for: competition in providing metering services; and innovative tariffs to encourage more efficient consumption by consumers.⁵
- **NEM and likely NT NER evolution** - The NEM is moving away from Type 6 (accumulation manual electronic meters) to Type 4 (interval) and Type 4(a) (advanced capable) meters. Chapter 7 of the National Electricity Rules (NER) supports the Power of Choice (PoC) program in the NEM, and therefore includes obligations which require advanced meters.
- Whilst we understand that the Department of Treasury and Finance is reviewing Chapter 7A of the NT NER as part of the next round of rule changes for 1 July 2018, the current version that will commence on 1 July 2019 is based on Chapter 7 of the NER, with modifications for the NT. Though there is no government-mandated roll out of smart meters in the NT, the current Chapter 7A of the NT NER includes some obligations which support advanced meters.
- We think that it is reasonable to expect that the NT will fully transition to Chapter 7 of the NER at some stage.
- **Energy Network Association’s Electricity Transformation Roadmap** - Extensive penetration of smart meters is a fundamental assumption of the Energy Network Association’s (ENA’s) Electricity Transformation Roadmap which focusses on incentivising efficiency and innovation in the electricity industry. The roadmap asserts that investment in advanced metering is required to support reforms to pricing (including ensuring a fair system of prices), and to facilitate other benefits such as remote sensing and network operations. Its Milestone 1 assumes a high penetration of advanced meters installed across Australia by 2021. We note that this roadmap was developed through a two-year work program involving hundreds of stakeholders, an evidence base of 19 expert reports and unprecedented analysis of energy system outcomes to 2050.

³ Northern Territory Government Expert Panel, Alan Langworthy Chair, *Roadmap to Renewables*, September 2017

⁴ See Recommendations 8(f) and 9(a).

⁵ It was recommended that the government resist adopting metering requirements that include communications, unless fully financially justified.



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

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

- **Tariff support** - Manual electronic meters will not enable us to implement our proposed tariff reform (see our Tariff Structure Statement in Attachment 2.1 D2017/366257) to provide cost reflective tariffs to encourage our customers to use our network more efficiently.
- **Increasing costs** - Manual electronic meters are likely to be available worldwide for some time yet (possibly 20-30 years), however, their cost is expected to increase as their use declines.

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

A cost/benefit analysis was undertaken on the five viable options (PWC – Metering CBA – V7 – DRAFT - 15 November 2017.xlsx). An additional base case of installing advance capable meters is provided for comparison only, as this option does not meet the objective for Tariff reform.

Table 4.1: Cost benefit analysis – metering new and replacement

Option	NPV (\$m, REAL 2018)
Base Case - Advanced capable meters	(126.18)
Targeted roll out	(141.08)
Advanced meters, enabled immediately	(140.83)
Advanced capable meters, enabled strategically	(140.69)
Transition via advanced meters	(141.16)



The cost/benefit analysis shows that all of the viable options had similar NPVs. Of these, option 3 (advanced meters enabled immediately) meets the corporate objective for Tariff reform in the shortest timeframe and meets customers' expectations. Other options to not install communications or to target the roll out did not offer a material cost saving and hence are rejected.

The new and replacement policy affects the purchase of new meters required at each new connection point (refer section 8 of Metering AMP), and replacement meters forecast to be installed in the regulatory period for:

- meters at end of life (refer section 9.5 of the Metering AMP) - assumption that 2% of meter families will fail the in-situ testing and require replacement; and
- other replacements due to additions and alterations to customers' electrical installations (refer section 9.6 of the Metering AMP).

It also affects one-off meter replacement programs that are scheduled for completion in 2019:

- obsolete prepaid meters that are to be replaced by Type 4 meters (refer to section 9.3 of the Metering AMP); and
- interval metering roll out program to replace all existing accumulation meters (Type 6) for customers consuming 40 MWh – 750 MWh pa (refer to section 9.4 of the Metering AMP).

4.2 Non Network alternatives

No non-network alternatives are possible as revenue tariff structures currently in place rely on energy flow information. Hence, metering is required at each connection point.

4.3 Capex/Opex substitution

All metering assets will be sample tested on a cyclic basis to assess condition. Typically, no maintenance or repairs can be undertaken to address issues found and it is not possible to extend the life of these assets through increased maintenance. Therefore, capex opex substitution is not a viable solution for these asset types. Typically, once the asset has failed testing, it can only be replaced.

4.4 Contingent Project

This program does not qualify as a contingent project as defined by the NER Clause 6.6A.1. It is an ongoing requirement for the revenue billing of the network and is not contingent based on an external driver and does not exceed \$30 million or 5% of the forecast capital budget forecast.



5 Strategic Alignment

The new and replacement meter programs are contributing to the implementation of PWC’s key strategy for tariff reform as outlined in the Tariff Structure Statement. It is also consistent with the feedback received during PWC’s 2017 customer engagement program as outlined in the Engagement Overview.

6 Timing Constraints

Small meter families (less than 8 meters in the family) that are identified as having failed as part of the annual meter test are scheduled for replacement in the subsequent year’s replacement plan.

Large meter families that are identified as having failed as part of the annual meter test are scheduled for replacement across one or more annual meter replacement programs. The replacement program is prioritised to address the critical issues such as safety, percentage of the errors, polyphase or single phase and large consumption sites.

7 Expected Benefits

Driver	Benefit	Measure
Growth / Demand	New connections are provided with a meter	Compliance with Chapter 7A
Asset Renewal	Metering remains available for revenue billing purposes	Compliance with Chapter 7A
Compliance	Metering meets the accuracy requirements set out in the NT Rules	Annual independent audit
Service Improvement	New and replacement metering supports innovative tariffs	Number of Type 4 meters installed

8 Milestones (mm/yyyy)

Investment Planning	Project Development	Project Commitment	Project Delivery	Review
01/2018	06/2018	04/2019	07/2024	09/2024

9 Key Stakeholders

Stakeholder	Responsibility
Internal governance stakeholders	Executive General Manager Power Networks
	Senior Manager Metering Services
	Group Manager Service Delivery
	Chief Engineer



Internal design stakeholders	Senior Manager Asset Management
	Manager Test & Protection Services
	General Manager System Control
External – Unions and public	Local Residents
	ETU
	Ministers
External regulators	Utilities Commission
	Australian Energy Regulator

10 Resource Requirements

Not applicable. Resourcing requirements for this program are considered Business as Usual and will be incorporated into the development of Category C Business Cases for each activity that will be signed off by the Executive General Manager of Power Networks.

11 Delivery Risk

Key delivery risks are:

- A higher than forecast failure rate will impact the ability to replace defective meters.
- A higher than forecast new connection rate will impact the ability to provide metering required to connect customers in a timely manner.

12 Financial Impacts

12.1 Expenditure Forecasting Method

Unit rates for new and replacement meters have been established from current contracts (refer section 10.1.1 of the Metering AMP).

New meters grow at a rate consistent with new housing connections. The Metering AMP shows the growth rates (consistent with the AEMO connection forecast dated October 2017) and forecast meter volumes.

Forecasts for replacement meters in the regulatory control period are:

- Meters at end of life (refer section 9.5 of the Metering AMP) - based on trends in changes for each meter type
- Replacements due to faults and failures (refer section 9.5 of the Metering AMP) – for a meter type not in the end of life forecast, assumption that 2% of meter families will fail and require replacement
- Replacements due to additions and alterations to customers’ electrical installations (refer section 9.6 of the Metering AMP) – based on historic rates



- Other replacements (refer section 9.7 of the Metering AMP) – based on expected obsolescence of meter families and historic rates.

Forecasts will be reviewed upon finalisation of the metering panel contract.

12.2 Forecast Expenditure

Forecast expenditure is shown in Table 12.1.

Table 12.1: Metering services – Capex (\$m, real FY18 excluding capitalised overheads and cost escalation)

Program	2019-20	2020-21	2021-22	2022-23	2023-24	Total
Electronic Meters	■	■	■	■	■	■
Metering Communications	■	■	■	■	■	■
Metering Dedicated CTs and VTs	■	■	■	■	■	■
Metering Non-Network Other	■	■	■	■	■	■
Metering Non Network IT and Communications	■	I	I	I	I	■
TOTAL	6.66	4.13	4.20	7.53	3.98	26.50

12.3 Validation

Not relevant to this program of work.

12.4 Capex Profile

'The capex in the table below is in \$2017-18, and is excluding capitalised overheads and cost escalation'.

Phase	2019-20 (\$'000)	2020-21 (\$'000)	2021-22 (\$'000)	2022-23 (\$'000)	2023-24 (\$'000)	Total (\$'000)
Investment Planning						
Project Development						
Project Commitment						
Project Delivery	6.66	4.13	4.20	7.53	3.98	26.50
Review						
Total	6.66	4.13	4.20	7.53	3.98	26.50



12.5 Opex Implications

The transition to advanced meters (Type 4) is expected to result in an annual Opex reduction of \$1 million by 2023-24. This is expected to grow further as the roll-out progresses and is primarily driven by a change in the way Metering Services operate, with an expected reduction in manual meter reading and an increase in communications type costs as outlined below.

A. Net reduction in manual meter reading

In implementing our new and replacement smart meter program, we expect to increasingly reduce our manual meter reading and associated costs.

The table below details the forecast net savings from lower manual meter reading costs as set out in our Cost Benefit Analysis (CBA).

Forecast Opex reduction from reduced manual meter reads

\$,000, Real 2018-19	2019-20 \$000	2020-21 \$000	2021-22 \$000	2022-23 \$000	2023-24 \$000
Net reduction in manual meter reading	██████	██████	██████	██████	██████

B. Supplier communications (SIM data) costs

We expect to increase our annual communications costs as the number of installed Type 4 meters increases. These increased costs will partially offset the benefits of the savings made from reduced manual meter reads noted in the section above.

The table below details the forecast Opex increase for communications costs for remotely read installed interval meters as set out in our CBA which supports our new and replacement smart meter policy position.

Forecast Opex increase for interval meter communications

\$,000, Real 2018-19	2019-20 \$000	2020-21 \$000	2021-22 \$000	2022-23 \$000	2023-24 \$000
SIM data costs	██████	██████	██████	██████	██████

13 References

Documents relevant to this BNI are as follows:

1. NT Chapter 7A of the National Electricity Rules version 88.



2. AEMO, Metrology Procedure Part A – Section 2 covers the installation and testing of meters.
3. NT Chapter 7A – Schedule 7A.3.1 – requires that a meter installation is provided, installed and maintained in accordance with the Rules.
4. Power Networks Technical Code – version 3.1 (September 2013 – Table A4.1 describes the overall accuracy requirements for Revenue metering Installations. The requirements for the overall accuracy requirements is also included in the Table 7A1.1.1 of chapter 7A of the NT rules.

14 Definitions

Term	Definition
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
CT	Current Transformer
HV	High Voltage
LV	Low Voltage
Meter Family	Meter from a single manufacturer and of a specific design or pattern type
NATA	National Association of Testing Authorities
NEM	National Electricity Market
NER	National Electricity Rules
NT	Northern Territory
PWC	Power and Water Corporation
VT	Voltage Transformer
WC	Whole Current