Technology program

Metering Lifecycle

PUBLIC

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1 Document Background

1.1 Purpose of this document

The purpose of this document is to outline a business case for a proposed program of work that will form part of AusNet Services' Technology EDPR submission.

1.2 References

Document	Version	Author
AusNet Services FY19-FY23 Technology Plan	V1.00	AusNet Services
Strategies to Mitigate Cyber Security Incidents	V1.00	Australian Cyber Security Centre

1.3 Document History

Date	Version	Comment	Person
24/08/2018	V0.1	Pre SME input	Priya Nellaiappan
09/03/2019	V07	Benefits Document	Libby Leonard
12/03/2019	V08	Doc tidy up	Priya Nellaiappan
	V1.1	Post SME input	
	V1.2	Minor changes	
	V2.1	Post any additional major input	
18/03/2019	V09	Consistency edits	John Hancock
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21/03/2019	V11	Risk Tables updates	Priya Nellaiappan
28/03/2019	V12	Minor updates	Janine Perri
24/07/2019	V13	Cost updates and customer focus	Emily Pong & Jackson Shen
15/08/2019	V14	Post AN review	Emily Pong
15/10/2019	V17	Reviewed for FY	Yargi Kilinc
28/10/2019	V18	Draft issued to Regulation Team	Samantha Scanlon

1.4 Approvals

Position	Date
Technology Leadership Team	

2 Executive summary

2.1 Program summary

This Program will address the lifecycle management of key metering applications and supporting systems and perimeter hardware located in the Data Centres.

AusNet Services relies upon a number of key technology systems to operate its metering solutions. These are grouped into two major categories:

- Enterprise Systems that are designed to integrate business functions and exchange information across multiple platforms and organisational structures. These include analytics and reporting software that enable AusNet Services to monitor and track compliance with market obligations
- Telecommunication Systems that include the meter and network management systems.

The focus of this lifecycle investment program is on the following systems:

- Meter Management Systems
- Monitoring and Compliance Reporting Systems

Some of these systems components are nearing end of life and/or require substantial lifecycle maintenance to ensure that they can continue to support critical day-to-day business operations. If AusNet Services does not keep its systems up to date with regular patching, enhancements and upgrades refreshes, not only does AusNet Services lose vendor support (resulting in higher risks and higher costs) but it becomes a potential target for cyber security incidents. Many attacks are performed by scanning the current environment to exploit known vulnerabilities, and without constant investment in and patching of its applications, AusNet Services is at risk of not being protected from the ever-evolving threat landscape.

Therefore, AusNet Services needs to take the necessary measures to sustain its business performance, and to reduce significant risks to our customers associated with network performance, service delivery, regulatory compliance, customer satisfaction, operational efficiency and cost control. Examples of the risks that exist in the absence of sufficient investment include:

- System failures that directly affect the collection of meter data for customers and impact accuracy and timeliness of customer billing
- Delays to asset maintenance and asset replacement programs of work
- Degraded service level performance and/ or customer satisfaction (e.g. increased incident response times and/or an inability to perform Remote Services)
- Inability to satisfy regulatory reporting requirements in a timely manner
- Penalties associated with compliance breaches (e.g. new customer connections, meter data delivery)
- Increased vulnerability to security threats and intrusions
- Loss of vendor support and system specific expertise
- Inability to access enhanced system functionality that provides more efficient ways of working

The table below provides a summary of the program discussed in this brief. Additional information is provided following the table and throughout the brief.

Program Brief

Table 2-1 Summary table

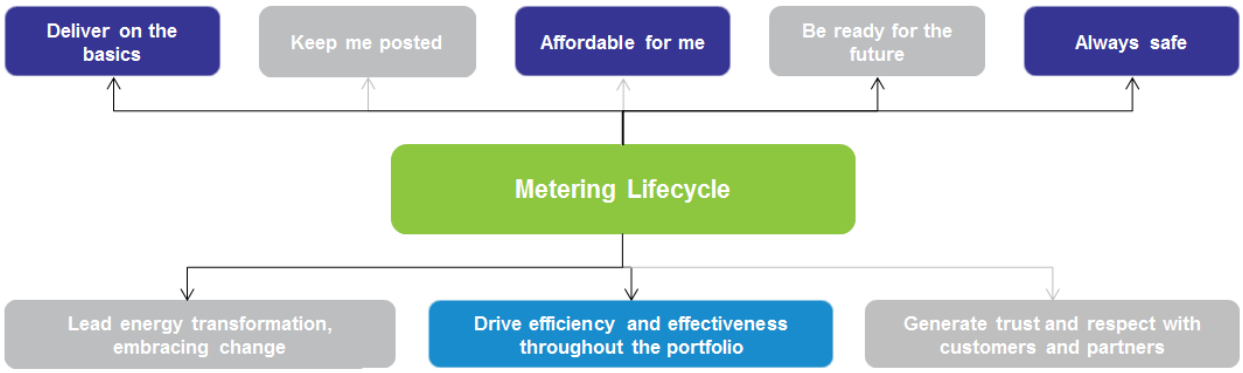
Key objective(s) of the program		Periodic upgrades refreshes, patching of the application, and metering technology assets to ensure a supported, compliant metering technology solution			
Key benefits		• Ensure a continued safe operation of the metering assets. • Ensure the AusNet Services metering solution is fully compliant with all regulatory obligations while continuing to meet business needs in the most efficient manner possible with optimal total life cycle cost • Reduce the operational costs/risk in alignment with the AusNet Services business plan which seeks to improve outcomes to customers through efficiencies and increasing network reliability. • Maintain metering services for our customers • Continue to meet our regulatory compliance obligations • Customer trust and transparency relating to metering services			
Cost allocation	Electricity Distribution	100%	Electricity Transmission	0%	
	Gas Distribution	0%			
Program type	**Recurrent**	☒			
	Non-Recurrent	☐			
	Client Devices	☐			
Program timings	Program duration:	Multiple Initiatives throughout the Regulatory period			

	($m)	**FY 2022**	**FY 2023**	**FY 2024**	**FY 2025**	**FY 2026**	**Total**
Expenditure forecast	CAPEX	[C-I-C]					
	OPEX						
	Electricity Distribution Total program cost						
	Total program Electricity Distribution Cost						

Estimated life of system	Lifecycle management typically occurs on a 5-year timeline within Technology at AusNet Services
Customer engagement	As the first DNSP in Australia to trial the New Reg process, we held deep dive workshops with stakeholders, including the Customer Panel, on ICT. In that engagement we described the importance and need for ICT expenditure to meet our customers' evolving needs and to support compliance with regulatory and legal obligations. Material associated with all our deep-dives is available on AusNet Services' website. A key theme of our engagement with the Customer Forum was the need for us to provide clarity on what we were proposing and what the expected customer benefits

	were. We acknowledge this feedback and have taken it into consideration when proposing the most appropriate option for this business case.

Figure 2-1 Summary of customer and business drivers of this program



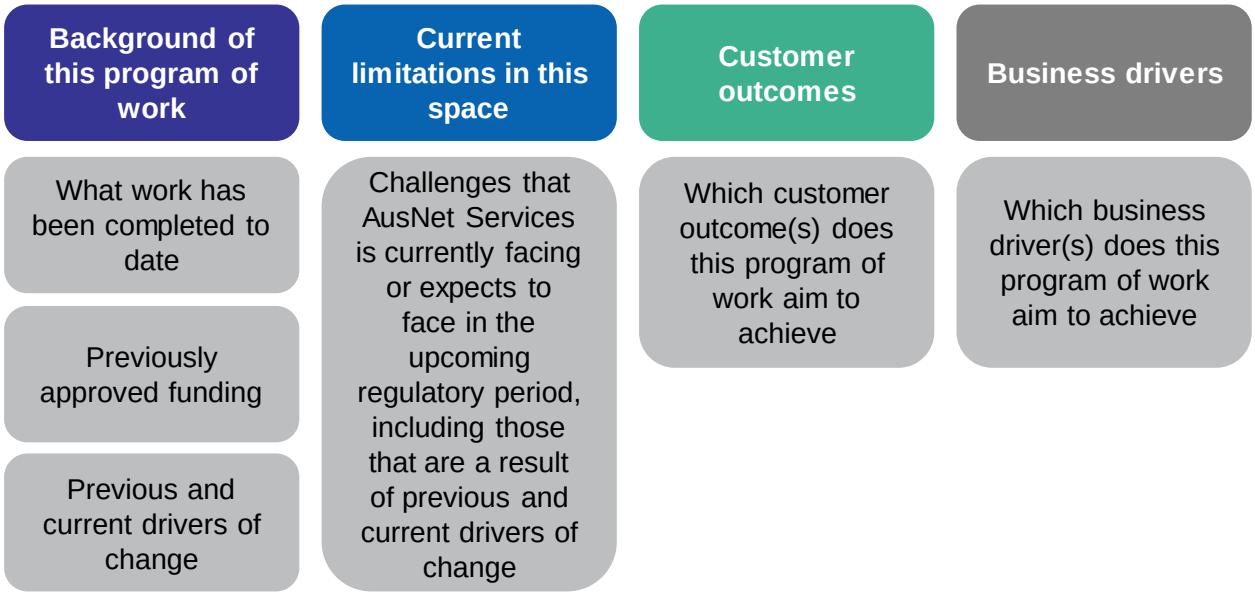
Alignment with AER ICT expenditure assessment framework

In accordance with the draft framework outlined in the AER's Consultation paper – ICT Expenditure Assessment of May 2019, we have categorised this program as recurrent expenditure, on the basis that it relates to ongoing refresh of AusNet Services' application and metering technology assets, a cost that must be incurred periodically.
Consistent with AusNet Services' internal practices, we have developed a detailed business case for the chosen option.

3 Context

This section provides an overview of this program of work and key areas to be discussed.

Figure 3-1 Key areas of the context to be discussed



3.1 Application Systems in scope for this brief

The application systems in scope for this brief include:

[C-I-C]

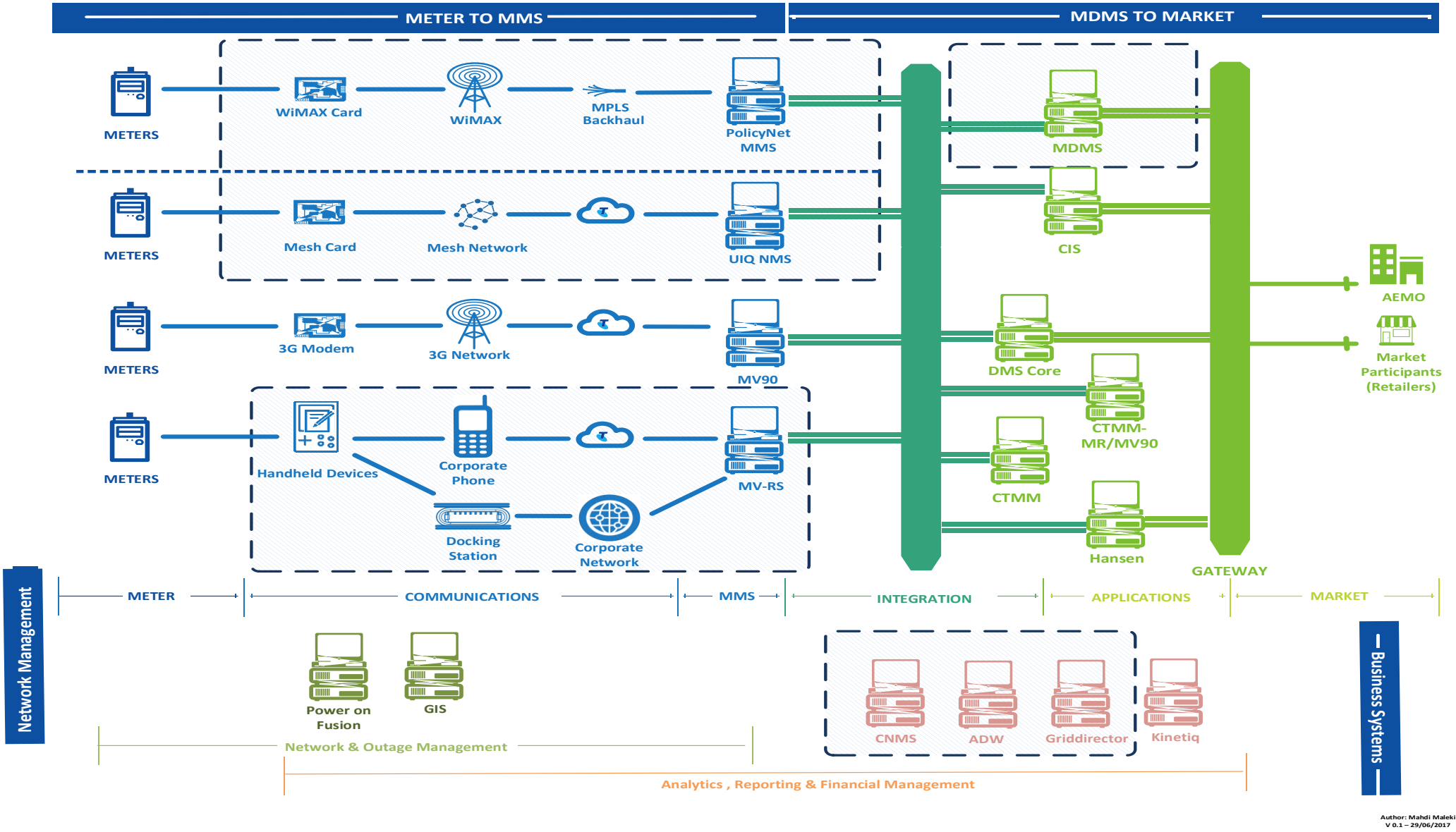
3.2 Perimeter Communication Equipment in scope for this brief

[C-I-C]

3.3 Background

The integrated application suite supports AusNet Services in providing a compliant metering solution, delivering the required capabilities to specified service levels. It also underpins AusNet Services' smart network capabilities, providing timely delivery of the necessary consumption, supply quality and exceedance data, and enabling key functions in the monitoring of the electricity distribution network. The following diagram provides an overview of the metering systems.

Program Brief



This program brief proposes two different options to manage Metering Application & Communication Systems Lifecycle and recommends the option which best addresses these challenges given the associated costs, benefits, risks, and impacts on customer outcomes and business drivers. This analysis is discussed in sections 4 and 5.

3.4 Current limitations

The end-to-end AMI technology will be approaching twelve years old by 2020, and there are components that are reaching their end of product life or supported versions and need to be refreshed to maintain serviceability. Vendor supported versions of hardware must be in place to maintain security patching and functionality.

The Australian Signals Directive, part of the Australian Cyber Security Centre, has provided a series of recommendations on how to protect organisations from cyber security risks and lists patching applications as an essential mitigation strategy to prevent malware delivery and execution.[1]

3.5 Objective(s)

The focus of this program of work is to ensure AusNet Services' metering application & communication systems are appropriately maintained so that AusNet Services continues to have:

- Warranty and support from respective vendors for critical incidents
- Technical capability to meet business needs
- Asset Integrity to reliably perform the business functions
- Alignment to the Meter Asset Management strategy

3.6 Customer outcomes

Through customer research carried out by AusNet Services, a succinct list of key customer values and priorities were identified. These customer outcomes are:

- delivering basic services – "deliver on the basics"
- keeping customers informed – "keep me posted"
- affordable services – "affordable for me"
- adaptability – "be ready for the future"
- safety – "always safe".

Additional information on each of these customer outcomes is provided in the overarching Technology EDPR submission FY2022-2026. This research has been further validated through the ICT deep drive presented to the customer forum.

All expenditure programs identified and proposed by AusNet Services will have regard to the customer outcomes and can be directly linked to at least one of these five outcomes.

This program of work will be most relevant to "**deliver on the basics**", as it enables a continuous maintenance of the technology stack of AusNet Services metering fleet to sustainably provide good service to the customer. It is also relevant to "**affordable for me**" as it enables a consistent and cost effective service to the end customer and "**always safe**" through continuously providing smart

[1] Australian Cyber Security Centre (2017). https://www.cyber.gov.au/sites/default/files/2019-03/Mitigation_Strategies_2017.pdf

metering remote services capability and provide safe services to customers and also having up-to-date systems allows for better data interoperability, meaning that AusNet Services can make safer decisions. We will further explore this in the discussions of each of the options.

3.7 Business drivers

In the face of significant industry disruption resulting in a period of substantial uncertainty and increasing complexity across the industry, AusNet Services has selected two key business drivers which set the direction for the business.

These business drivers are:

- lead energy transformation, embracing change
- drive efficiency and effectiveness throughout the portfolio
- generate trust and respect with customers and partners.

All expenditure programs identified and proposed by AusNet Services will have regard to the business drivers and can be directly linked to at least one of these initiatives.

This program brief "**drives efficiency and effectiveness throughout the portfolio**" as it maximises the investment on WiMAX to operate a reliable metering service, and also "**generates trust and respect with customers and partners**" by taking a prudent investment approach that minimises impacts to customers.

The potential consequences of not maintaining the metering solution include:

- Increased frequency of system failure impacting the availability and reliability of the systems, compromising the ability to meet service levels and to deliver required business outcomes;
- Inability to deliver a good metering service to the end customer and inability to meet the market compliance outcomes for the metering services
- Increased resolution time for critical system incidents, events; and
- Inability to effectively support asset maintenance and replacement programs of work.

These outcomes would result in significant costs and disruption to the business and customers. This would be both inefficient and drive ineffective working practices, ultimately hampering the business' ability to both serve and meet customer's expectations through the upcoming regulatory period.

4 Options

4.1 Overview

This section provides an overview of a select number of options which may feasibly alleviate the current limitations. Each option represents a combination of initiatives fit within the program of work.

Table 4-1 Brief overview of the options

Brief overview of each of the options	
Option 1	No investment, run as-is allowing the metering systems and technology to run out of support and replace equipment on failure.

Option 2 (Recommended)	Maintaining minimum currency and serviceability of Metering Platform – Perform required maintenance and refreshes. Refresh out of support components.
Option 3	[C-I-C]

4.2 Option #1 Business As Usual

This option proposes not to undertake any lifecycle activities, performing no refreshes across each of the major system groupings.

By not taking any steps to maintain the lifecycle of the metering application and communications systems, they would then exit standard support early in the upcoming regulatory period FY2022-26, resulting in AusNet Services risks of failure, affecting service back to the customer and failure to meet our regulatory compliance obligations.

This option is not recommended due to lack of support and increased likelihood of experiencing system performance, asset stability, data and quality issues. This leads to increased risk of failing to meet business, operational and regulatory requirements. The probable consequences of this option include, growing costs for recovery from failures, limited ability to meet customer service requirements and market regulatory obligations.

Alignment to objectives

We do not consider that this option achieves the intended objectives of this program of work, as shown in the table below.

Table 4-2 Objectives analysis of option 1

Objective		Comments
Perform major version refreshes aligned to vendor roadmap.	✖	This option does not perform recommended vendor recommended refreshes. By not maintaining the lifecycle currency of this system, vendor support will be extremely limited, if not prohibitively costly.
Maintain vendor/supplier support to gain access to their expertise during critical incidents.	✖	As software becomes out of date, technicians and personnel with experience operating it will become increasingly limited, making incident resolution more challenging.
Access patches for security vulnerabilities and bug fixes.	✖	Without refreshes, there will be no access to new patches.
Limit dependence on customisation.	✖	Without patches there will be an ever-increasing dependence on customisations to keep systems running.
Maintain compliance with Metering Regulatory Requirements.	✖	Without maintaining currency of Metering Assets, they are highly unlikely to meet regulatory requirements.
Provide continuous smart metering services to the customer.	✖	Without adequate metering replacement stock, it is highly unlikely AusNet Services will be able to sustain services customers.

Program Brief

Costs

This option allows for operational expenditure to be maintained at current levels while not undertaking any required technology and communication systems lifecycle activities. It proposes to "sweat" the WiMAX assets. Unlike most of the other Technology Program Briefs, all field related costs for the Meter-to-MMS service are allocated to the metering distribution business submission and are captured in the Meter Asset Management strategy. In this option, where the existing technology is deliberately run outside of vendor support windows, all incremental costs would be covered by the metering submission and are not part of this proposal. The risk of centralised system failure would be higher however if the direct costs related to option 1 are zero for consistency of comparison.

Table 4-3 Costs of option 1

($m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
Capex	0	0	0	0	0	0
Opex	0	0	0	0	0	0
Electricity distribution cost	**0**	**0**	**0**	**0**	**0**	**0**
Total program cost	0	0	0	0	0	0

Benefits

The table below summarises the benefits associated with this option and quantifies them where appropriate data is available or reasonable assumptions can be applied.

Table 4-4 Benefits of option 1

Benefit	Annual benefit
Quantifiable benefit	N/A
Qualitative benefit	N/A

Risks

With critical systems affecting customer services and an ageing hardware solution there is a significant risk of failure or prolonged outage due to no software or hardware support options available. This significantly impacts on AusNet Services' license compliance obligations.

Table 4-5 Risks of option 1

	Risks	Consequence	Likelihood	Risk rating
R1.1	Inability to meet the regulatory requirements	Level 5. Lack of lifecycle updates to maintain currency	Likely	A

R1.2	Inability to respond quickly to market disruptions	Level 3. Limited ability to respond without timely maintenance updates	Likely	B
R1.3	Supportability and Serviceability of the Metering Solution will be compromised	Level 4. Lifecycle updates are required to maintain expected performance	Almost Certain	A
R1.4	Ability to recover from catastrophic technology failures and cyber security threats	Level 5. Due to lack of lifecycle updates to maintain currency	Possible	A

As we have identified number of critical risks, we consider that overall, this option is rated Extreme risk.

Alignment to customer related drivers of expenditure

As discussed in Section 3.6, five key customer outcomes have been identified through discussions with customers. The table below highlights the how this option will achieve these outcomes. Where we consider that a customer outcome is not directly achievable by the option or irrelevant, 'N/A' is applied.

Table 4-6 Customer related drivers of option 1

Customer outcome	How this program achieves this
Deliver on the basics	N/A
Keep me posted	N/A
Affordable for me	Capital investment in this option is zero; however, it increases the risk and operational costs due to attempts to resolve issues through other external third party providers, or to investigate bespoke solutions to develop in house aged assets.
Be ready for the future	N/A
Always safe	N/A

Alignment to business related drivers of expenditure

As discussed in Section 3.7, there are three business drivers that AusNet Services has identified and is focussing on over the next regulatory period. The table below highlights how this option will input into the initiatives where relevant. Where we consider that a business driver is not directly relevant to the option, 'N/A' is applied.

Table 4-7 Business related drivers of option 1

Business drivers	How this program achieves this
Lead energy transformation, embracing change	N/A
Drive efficiency and effectiveness throughout the portfolio	N/A
Generate trust and respect with customers and partners	N/A

4.3 Option #2 Maintaining currency and serviceability (RECOMMENDED)

Alignment to objectives

This option achieves all the intended objectives of this program of work, as shown in the table **Table 4-8**below..

Table 4-8 Objectives analysis of option 2

Objective		Comments
Perform major version refreshes aligned to vendor roadmap.	✔ (Partial)	This will only apply the minimum required.
Maintain vendor/supplier support to gain access to their expertise during critical incidents.	✔	Major refreshes will be performed as part of this option so we will be able to draw on vendor expertise during critical incidents.
Access patches for security vulnerabilities and bug fixes.	✔	As currency is maintained, vendor will supply all security patches.
Limit dependence on customisation.	✔	Some level of customisations may be required to maintain healthy operational systems.
Maintain compliance with Metering Regulatory Requirements.	✔	Ensures systems are supported and continue to deliver Metering services.
Provide continuous smart metering services to the customer.	✔	Maintain the current VIC AMI Compliance & Service Level Procedure delivering metering data and remote services to customers.

Costs

This option allows for a sustainable operational expenditure while investing capital on required technology and communication systems. It proposes to sweat the WiMAX assets, simultaneously investing in critical and mandatory refreshes on technology systems to provide a reliable metering service. Expenditure relates to:

Applications Systems

- Replacement of Head End Infrastructure and Network components reaching end of life to a supported platform
- Refresh for head end systems in accordance with the minimum product lifecycle
- Reporting & Operational Management enhancement due to Information Management Platform lifecycle

Backhaul Communications Lifecycle management and Security Enhancements

- End of life routers, batteries, and major firmware refreshes, PolicyNet database and OS refreshes
- Enabling security uplift of field service units to address potential vulnerabilities with communication network

Table 4-9 Costs of option 2

($m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
Capex	[C-I-C]					
Opex						
Electricity distribution cost						
Total program cost						
ACS program cost*						

* CNMS lifecycle refresh and reporting refactoring includes both Standard Control Services (SCS) and Alternate Control Services (ACS) costs. The ACS costs are an additional $2.5M as shown in the table above, which have been included in the ACS forecasts.

Of the overall Metering Lifecycle capex costs, only the technology assets that reside within the perimeter of the data centre are covered in this program brief. The table above reflects only these costs.

Benefits

The table below summarises the benefits associated with this option and quantifies them where appropriate data is available or reasonable assumptions can be applied.

Table 4-10 Benefits of option 2

Benefit	Annual benefit
Continued VIC AMI services compliance by sweating assets and gradually moving from WiMAX to Mesh.	Risks managed
Compliant AMI Metering solutions enable AusNet Services to deliver Remote Services voiding the costs of local service order management.	$1.7 mil (included in the Program Brief for Metering Asset Management Strategy)

Risks

The risks associated with this option are highlighted in the table below. Based on the consequence and likelihood of each risk, we have rated each of the individual risks blue, green, yellow, orange or red (order of severity). See Attachment 1 – Risk level matrix for additional information on this rating system.

Table 4-11 Risks of option 2

	Risks	Consequence	Likelihood	Risk rating
R2.1	Inability to meet the regulatory requirements	Level 4. Reduced when compared to Option 1 but as future regulatory requirements are unknown it remains high	Unlikely	C
R2.2	Inability to respond quickly to market disruptions	Level 3. Remains to be moderate depending on the type of market disruption	Possible	C
R2.3	Supportability and Serviceability of the Metering Solution will be compromised	Level 3. Reduced when compared to Option 1 but still moderate due to customer impact levels	Possible	C
R2.4	Ability to recover from catastrophic technology/communication failures and cyber security threats	Level 4. Reduced when compared to Option 1 but consequence of failure is still high	Unlikely	C

As we have identified 4 Medium risks, we consider that overall this option is rated Medium risk.

Alignment to customer related drivers of expenditure

As discussed in Section 3.6, five key customer outcomes have been identified through discussions with customers. The table below highlights the how this option will achieve these outcomes. Where we consider that a customer outcome is not directly achievable by the option or irrelevant, 'N/A' is applied.

Table 4-12 Customer related drivers of option 2

Customer outcome	How this program achieves this
Deliver on the basics	This option enables AusNet Services to meet the minimum required to provide a consistent service. Without updates to the metering system, AusNet Services may encounter situations that are disruptive to services provided to our customers. Potential warranties and support services included within this option will ensure that our customers can continue to have reliable services. Furthermore, to maintain customer trust and transparency, the lifecycle updates are required for regulatory reporting needs.
Keep me posted	N/A
Affordable for me	Of the options considered this enables a consistent and cost effective service to the end customer. This option only has costs for required metering system/application updates. Without this option, customers can experience increased costs with no added value as ad-hoc support of downed systems will increase cost to serve. In the long-term, customers may experience increased costs due to running an outdated system, as it will cost more to integrate with adjacent or external systems.
Be ready for the future	N/A

Always safe	By continuously providing smart metering remote services capability we are providing a safe service to our customers and employees (remotely vs onsite). Having reliable metering usage data and reports through metering monitoring systems will provide insight into potential safety hazards. Having up-to-date systems means better data interoperability, providing more transparent and accurate information for safer decision making.

Alignment to business related drivers of expenditure

As discussed in Section 3.7, there are three business drivers that AusNet Services has identified and is focussing on over the next regulatory period. The table below highlights how this option will input into the initiatives where relevant. Where we consider that a business driver is not directly relevant to the option, 'N/A' is applied.

Table 4-13 Business related drivers of option 2

Business drivers	How this program achieves this
Lead energy transformation, embracing change	N/A
Drive efficiency and effectiveness throughout the portfolio	By maximising the investment on WiMAX and performing what is required to operate a reliable metering services.
Generate trust and respect with customers and partners	Taking a prudent investment approach whilst minimising impacts to customers fosters trust and respect with customers and partners.

4.4 Option #3 [C-I-C]

Alignment to objectives

[C-I-C]

Table 4-14 Objectives analysis of option 3

[C-I-C]

Costs

[C-I-C]

Benefits

[C-I-C]

Table 4-15 Benefits of option 3

[C-I-C]

Risks

[C-I-C]

Alignment to customer related drivers of expenditure

[C-I-C]

Table 4-16 Customer related drivers of option 3

[C-I-C]

Alignment to business related drivers of expenditure

[C-I-C]

Table 4-17 Business related drivers of option 3

[C-I-C]

5 Assessment and recommended option

5.1 Assessment of the options

To identify a recommended option for this program of work, we have selected a number of criteria to assess each of the options. We consider that these criteria represent a comprehensive view of each option, in achieving AusNet Services' business and customer objectives as well as requirements of the AER in ensuring that any expenditure is both prudent and efficient.

The table below summarises our assessment of each of the options against the criteria.

Table 5-1 Summary table of the assessment of the options

	Option 1	Option 2	Option 3
Alignment to objective	[C-I-C]		
Costs			
Overall risk rating			
Alignment to customer related drivers of expenditure			
Alignment to business related drivers of expenditure			

Based on this assessment, Option 2 is the recommended option as it delivers the right balance of capital investment and risk mitigation versus customer and business drivers. While Option 3 has a higher alignment to customer drivers it comes at a higher risk and much higher cost. Option 3 is more expensive in the long term than Option 2 because it requires existing metering assets to be decommissioned before the end of their economic life.

5.2 Recommended option

Option 2, Maintaining currency and Serviceability, is the recommended option for AusNet Services for the Metering Lifecycle program of work. **Table 5-2** confirms what is in scope and out of scope for this program of work, as well as the other programs of work on which the successful delivery of this program is dependent on.

Table 5-2 Confirmation of scope of recommended option

In scope	Out of scope	Dependencies
Reporting Refactoring	Implementation of Information Management Platform	Information Management Platform
CNMS Lifecycle Refresh	Infrastructure asset lifecycle	
PolicyNet Application and Perimeter Equipment Life Cycle	Assets outside the data-centre	
UIQ Application and Backend Lifecycle	UIQ patching for 5-min compliance	

Below in **Table 5-3**, we have identified techniques or actions to mitigate the risks identified for this option.

Table 5-3 Option 2 risks and mitigation actions

	Risk	Rating	Mitigation
R2.1	Inability to meet the regulatory requirements	C	The WIMAX Asset Management strategy details the way in which we manage the risk of this solution. It is reviewed formally every 6 months via the Failure Mode & Effects Analysis (FMECA) review. In addition standard lifecycle management of the Mesh Solution coupled with lifecycle management of our Reporting and Monitoring Solutions will mitigate this.
R2.2	Inability to respond quickly to market disruptions	C	The WIMAX Asset Management strategy details the way in which we manage the risk of this solution. It is reviewed formally every 6 months via the Failure Mode & Effects Analysis (FMECA) review.
R2.3	Supportability and Serviceability of the Metering Solution will be compromised.	C	The WIMAX Asset Management strategy details the way in which we manage the risk of this solution. It is reviewed formally every 6 months via the Failure Mode & Effects Analysis (FMECA) review.
R2.4	Ability to recover from catastrophic technology/communication failures	C	The WIMAX Asset Management strategy details the way in which we manage the risk of this solution. It is reviewed formally every 6 months via the Failure Mode & Effects Analysis (FMECA) review

6 Attachment 1 – Risk level matrix

The figure below shows the risk level matrix to which we have assessed each of risks within the options. Risks of highest concern are rated red, whereas those of lowest concern are rated blue.

Figure 6-1

Likelihood	Consequence 1	2	3	4	5
Almost Certain	C	C	B	A	A
Likely	D	C	B	B	A
Possible	E	D	C	B	A
Unlikely	E	D	D	C	B
Rare	E	E	D	C	C

Consequence Rating	
5	Catastrophic
4	Major
3	Moderate
2	Minor
1	Insignificant

Overall Risk Rating	
A	Extreme
B	High
C	Medium
D	Low
E	Very Low