

Technology program

5 Minute and Global Settlements

PUBLIC

Program Brief

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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

1.3 Document History

Date	Version	Comment	Person
20/8/2018	V0.1	Pre SME input	Priya Nellaiappan
22/10/2018	V0.1	Post SME input	
12/03/2019	V0.4	Benefits	Libby Leonard
12/03/2019	V0.5	Doc tidy up	Priya Nellaiappan
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18/03/2019	V0.7	Consistency edits	John Hancock
18/03/2019	V0.8	Consistency workshop	John Hancock, Craig Tooley, Priya Nellaiappan, Mahdi Maleki, Janine Perri
25/03/2019	V0.9	Glossary added, AEMC Rules footnoted, Risks updated	Priya Nellaiappan
28/03/2019	V0.10	Minor updates	Janine Perri
29/07/2019	V0.11	Cost and benefit update, narrative update	Emily Pong, Jackson Shen
15/08/2019	V0.12	Post AN review	Emily Pong

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31/9/2019	V1.0	Issued to Reg team for review	Samantha Scanlon
18/11/2019	V1.2	Incorporated Feedback	Samantha Scanlon

1.4 Approvals

Position	Date
Technology Leadership Team	

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1.5 Glossary

AEMC	Australian Energy Market Commission
NER	National Electricity Rules
Vic AMI	Victorian Advance Metering Infrastructure
NMI	National Meter Identifier
UFE	Unaccounted for Energy
MMS	Meter Management System
MDMS	Meter Data Management Systems
MDFF	Meter Data File Format (detailed)
MDMF	Meter Data Management Format (summary)
FRMP	Financial Responsible Market Participant
MDS	Meter Data Store
CIS	Customer Information System (SAP IS-U)
EAI	Enterprise Application Integration (webMethods)
Kinetiq	Network Billing System

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2 Executive summary

2.1 Program summary

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

Table 2-1 Summary table

<p>Objective(s) of the program</p>	<p><u>5 Minute Settlement:</u></p> <p>The Australian Energy Market Commission (AEMC) recently issued the National Electricity Amendment (Five Minute Settlement) Rule 2017 No. 15 (Five Minute Settlement Rule) by the Australian Energy Market Commission (AEMC). As a NEM participant, AusNet Services is obliged to comply with this change.</p> <p>Compliance with this regulatory obligation will require information technology systems to be updated to capture and transact interval meter data at five minute intervals rather than the current 30 minute intervals.</p> <p><u>Global settlement and market reconciliation:</u></p> <p>Compliance with AEMO's new regulatory global settlement framework which required the "unaccounted for energy" to be borne by all retailers.</p> <p>As a prudent and efficient electricity distribution network service provider, making the minimum changes necessary to achieve compliance with the regulatory obligations of 5 Minute- Settlement and Global Settlement.</p>
<p>Key benefits</p>	
<p>Cost Allocation</p>	<p>[C-I-C]</p>

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Program type	[C-I-C]
Program timings	
Expenditure forecast	
Estimated life of system	
Customer Engagement	

5 Minute Settlement

In the current form of the National Electricity Market (NEM), there is a mismatch between dispatch and settlement - dispatch prices are calculated every five minutes, while the market is settled on the basis of the time-weighted average of the six five-minute dispatch prices over the 30-minute trading interval.

With the current 30 minute pricing calculation, there is little incentive for fast response electricity generation technologies to enter the market, because:

- Generators receive the average price of generation over a full interval. If fast generation is scheduled for one dispatch interval on the basis of a high price bid, it is paid the average dispatch price over the 30 minute trading interval, for the dispatch over the one interval in which it participated. The average price may not be sufficient for investment in fast response generation, or for operation of existing fast response generation.
- Likewise loads pay the average price across the whole trading interval; even if they respond to the price spike to reduce output, they are unable to reduce their output on past dispatch intervals. The overall impact of time weighted 30 minutes pricing, instead of 5 minute actual usages, is that the price changes after consumption and therefore price signals are distorted.

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In response to a request from [C-I-C], the Australian Energy Market Commission¹ (AEMC, or Commission) has amended the NER to align operational dispatch and financial settlement at five minutes. This will reduce the time interval for financial settlement in the NEM from 30 minutes to five minutes. Compliance with the five-minute settlement requirement must be achieved by Thursday, 1 July 2021. There is a transition period of three years and seven months, which is the focus for the expenditure in this brief.

The AEMC’s rule change also:

- sets out the metering requirements needed to provide five minute resolution data for settlement; and
- changes the resolution for bidding and offering into central dispatch from a 30 minute to a five minute basis.

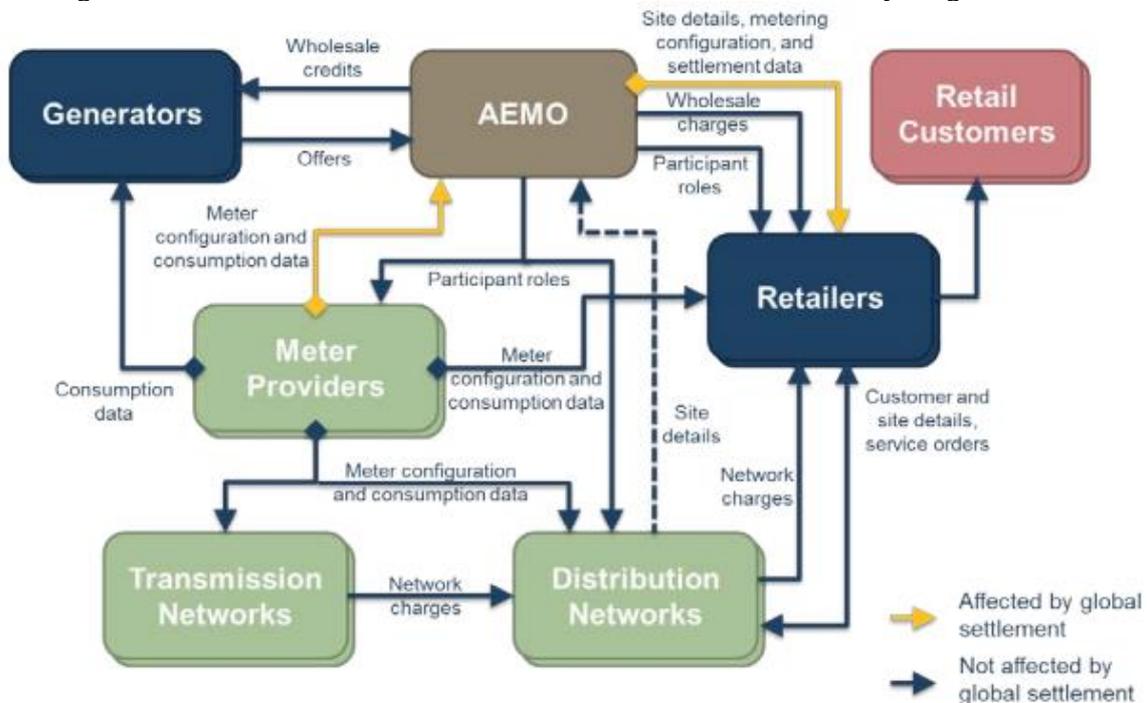
Global settlement and market reconciliation

The current retail settlement framework, known as 'settlement by differencing', has been in place since the start of the NEM. Under this approach, all electricity is billed to the local retailer except for the loss-adjusted metered electricity that is consumed by the customers of independent retailers. This means that the local retailer for an area bears the cost and risk of all residual electricity losses, including unaccounted for technical losses and other retailers’ commercial losses.

AEMO will introduce Global Settlements to manage:

- Type 7 Metering installations that are currently bilaterally settled with Local Retailer.
- Unmetered loads, including traffic lights, bus shelters and road signage lighting that are settled with Local Retailers as bilateral arrangement.

The figure below outlines how data is affected by global settlements.



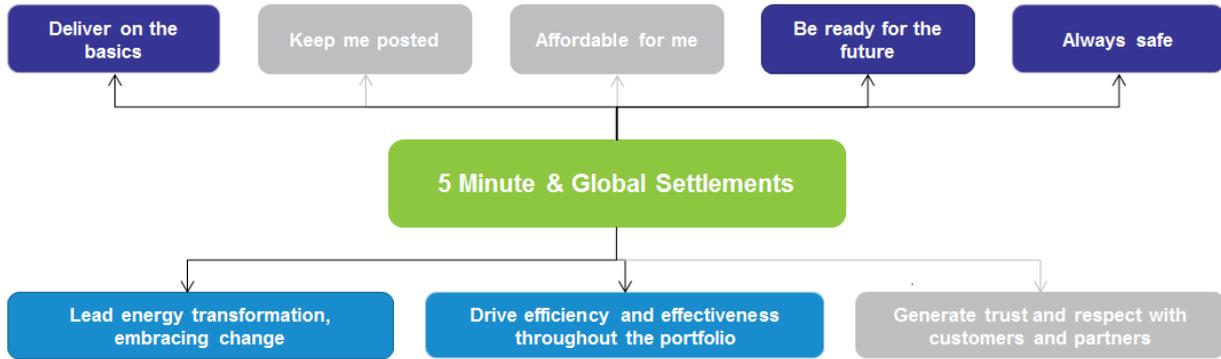
Source: AEMO.

¹ Five-minute settlement will start on 1 July 2021. Refer <https://www.aemc.gov.au/rule-changes/five-minute-settlement> for AEMC Rule Change details

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AusNet Services will begin implementation of global settlement on July 1 2021, with full commencement of global settlement on [C-I-C].

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



Alignment with AER ICT expenditure assessment framework

In accordance with the framework outlined in the AER’s Consultation paper – ICT Expenditure Assessment of [C-I-C], we have categorised this program of work as non-recurrent expenditure, on the basis that it relates to a compliance requirement.

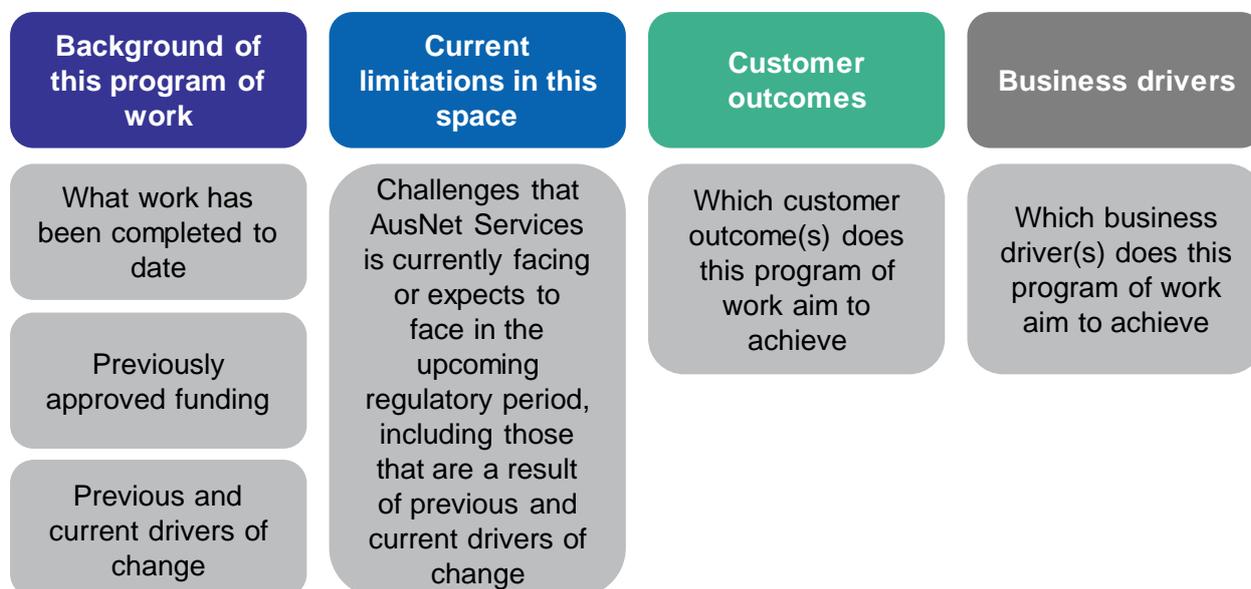
We have also undertaken an NPV analysis to weigh the costs and benefits of our proposed options to address the need for investment, and consistent with AusNet Services’ internal practices, we have also developed a detailed business case in support of the chosen option.

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3 Context

This section provides some contextual information and the key areas to be discussed within this brief.

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



3.1 Background

A physical requirement of power systems is that demand and supply must always be instantaneously balanced. Ideally, as demand and supply vary continuously, the price signal would also vary continuously. A market where the price signals provide incentives to respond to supply and demand changes over the shortest timeframe practicable, will provide more efficient wholesale market outcomes.

As a Distributor and Metering Provider, AusNet Services must ensure:

- compliance with the five-minute settlement requirement that commences from Thursday, 1 July 2021; and
- types 1, 2 and 3 meters can record and provide five minute data from the commencement date of the rule.

AusNet Services must also ensure that:

- All new and replacement type 4 metering installations can record five minute data. These meters must be configured to record and provide five minute data by [C-I-C] at the latest.
- From [C-I-C], all new and replacement type 4A metering installations can record five minute data. These meters must be configured to record and provide five minute data by [C-I-C] at the latest.
- Existing meters that are capable of recording and storing five minute data are prevented from being replaced with a meter of a lower functionality.

This program brief considers three different options by which AusNet Services can meet these requirements and recommends the option which best addresses these challenges, given the expected costs, benefits, risks, and impacts on customer outcomes and business drivers. This analysis is further discussed in sections 4 and 5.

In the current regulatory period (2016-20), AusNet Services will be undertaking lifecycle upgrades to ensure our systems are in a position to be easily scalable and modifiable to commence the new compliance requirements. This includes lifecycle management of the Meter Data Management

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platform which will be capable of processing 5 Minute data. However, there will be some expenditure required in the 6 month period prior to the new financial year regulatory period of the next EDPR 2022-26. This expenditure is required, as it relates to specific changes that need to be undertaken as close as possible to [C-I-C] to support market readiness and transition to go live.

3.2 Current limitations

There are a number of limitations to our current capabilities that will not allow us to be compliance with the 5 Minute Settlement requirements and these are outlined below:

- [C-I-C].

The limitations to our current Global Settlement systems include:

- [C-I-C].
- [C-I-C].

The diagram below outlines the current limitations of AusNet Services systems' ability to meet the new Regulatory requirements.

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[C-I-C]

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3.3 Objective(s)

The purpose of this initiative to drive the following key benefits

- **Ability to meet regulatory obligations:** Ensure AusNet Services is able to currently meet the new regulatory obligations around 5 Minute and Global Settlement
- **Cost efficient:** Implement changes to technology systems in a prudent, cost effective way and to leverage the existing technology solutions currently in place where possible.
- **Fit-for-purpose, based on business needs:** The changes reflect what is required by the business to meet the new regulatory obligations specific to AusNet Services' operating environment and existing infrastructure
- **Re-use, before buy, before build:** Ensures AusNet Services prioritises using existing solutions and infrastructure to meet the new regulatory obligations, which complements the 'cost efficient' objective
- **Adaptive, responsive and scalable:** The changes enhance the scalability of AusNet Services' existing solution and/or allow AusNet Services to easily incorporate changes in the future based of new regulatory requirements or changing business working environment

3.4 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 have regard to the customer outcomes and can be directly linked to at least one of these five outcomes.

This program of work aligns to “**deliver on the basics**” as it is required to meet our new base regulatory compliance obligations, and “**be ready for the future**” as it supports the gathering and publication of increased granular information to better manage the market in a more efficient manner.

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3.5 Business drivers

In the face of significant industry disruption resulting in a period of substantial uncertainty, increasing complexity and ever evolving customer needs, AusNet Services has identified three key business drivers that set the direction for our business. These business drivers are:

- lead energy transformation, embracing change;
- drive efficiency and effectiveness throughout the portfolio; and
- 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.

We consider that this program of work will be most relevant to “**Lead energy transformation, embracing change**”, as the market reforms are focussed on rewarding customers who respond to demand peaks, and “**Drive efficiency and effectiveness throughout the portfolio**” by enhancing the existing solution and using existing investments and assets where possible. We will further explore these in the discussions of each of the options.

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4 Options

4.1 Overview

This section provides an overview of the options we have considered to address current limitations with our systems. Each option represents a combination of initiatives required to complete the program of work.

Table 4-1 Brief overview of the options

Brief overview of each of the options	
Option 1	Use current systems without change. Defer any capital expenditure - resulting in non-compliance.
Option 2 (Recommended)	Extend existing systems to meet regulatory obligations.
Option 3	Replace MDMS and Enhance Core systems.

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4.2 Option #1 Use current systems without change

With the limitations to existing systems outlined in section 3.2, AusNet Services will be unable to meet the new Regulatory requirements for 5 minute and Global Settlements without additional expenditure in the next regulatory control period. Work underway in the current period to prepare for these Regulatory changes will not be sufficient to meet the new regulatory requirements. Therefore, this option has not been pursued further.

4.3 Option #2 Extend existing systems (RECOMMENDED)

Option 2 involves extending existing systems to ensure compliance with the 5 minute and global settlement requirements by the beginning of the next regulatory control period.

Work that we currently envisage will be undertaken to ensure compliance is outlined below.

5 Minute Settlement

- The Meter Management System (MMS) currently is configured to receive regulated non contestable Type 5 meter data on 30-minute data intervals. This will need to be reconfigured to support the collection of 6-times increase in data volume as it shifts to 5 minute blocks. The MMS will need to be upgraded to the next version along with Server processing and storage capacity increase to manage this data increase.
- The Meter Data Management system (MDMS) will need to be configured to process this increased data and publish the metering data to the market, aligned with data validation Regulatory requirements. This includes changes to support the transition 30 minute interval data to 5 minute Interval data.
- The current Meter Data Store (DMS core) system receives, validates and network bills contestable meters including Type 1-4 and Type 7. This will need to be upgraded to process 5-minute interval data.
- Changes to the current Connection Point Management system (CIS) will be necessary to support the logical conversion of 30 minute to 5-minute interval data which is provided to the market through the gateway as each meter is converted.
- Changes to the market gateway will need to occur to support 5-minute business to business transactions. This includes the transfer of the 5 Minute data and support 30 Minute transition.
- Changes to the network billing system to support new 5 minute tariffs which will be restructured to support 5-minute interval data.
- Changes to compliance and operational reporting systems to align to the new 5 minute regulatory reporting requirements.

Global Settlement

In order to ensure soft commencement of global settlement on [C-I-C] and full commencement [C-I-C]:

- The MDMS system currently provides aggregated data to the market and AEMO. This will need to be enhanced to provide detailed meter data to AEMO. This data is currently available to the local retailer only.

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- Unaccounted For Energy (UFE) is currently billed to the local retailer. The Network Billing System ([C-I-C]) needs to be enhanced to apportion the network costs associated with the UFE to all retailers based on the Global Settlement rules and obligations.

Alignment to objectives

We consider that option 2 achieves most of the intended objectives of this program of work, as shown in the table below.

Table 4-2 Objectives analysis of option 2

Objective		Comments
Ability to meet regulatory obligations	✓	This option ensures that AusNet Services has the infrastructure and capability required to meet the 5 minute and global settlement obligations by the date required
Cost efficient	✓	This option leverages the lifecycle management events to deliver the minimum compliant solution in a cost effective way.
Fit-for-purpose, based on business needs	✓	This will deliver the minimum changes necessary to support the know compliance requirements
Re-use, before buy, before build	✓	This option re-uses the exiting solution blocks and enhances these to meet the new compliance requirements.
Adaptive, responsive and scalable	✗	This option does not enhance the scalability of the existing solution or add any additional future capability

Costs

Implementation of work required to achieve compliance is almost underway, and the majority of expenditure to achieve compliance will be incurred in the current period CY2016-20 and the additional 6 month period before the next regulatory period in FY2022-26. This proposal is only for the remaining activities which will be undertaken in the FY2022-26 period.

Table 4-3 Costs of option 2

[C-I-C]

As this option involves a new function it requires new support costs and the ongoing opex step change is \$[C-I-C] total from 2022-26, this is in addition to the opex required to implement the new systems, of \$ C-I-C] million, so the total step change is \$ C-I-C] million in the 2022-26 regulatory period

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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 2

Benefit	Annual benefit
The benefits from 5 Minute and Global Settlement are largely market and public benefits. This is a regulatory compliance initiative.	Standard Control Service compliance with new regulatory obligations. Failure to comply with these regulations represents risks to standard control services.
Better delivery of services to customers through enhanced demand management and network planning activities as AusNet Services will have access to more granular energy consumption data.	
Reducing the overall implementation cost for the compliance program by leveraging the current lifecycle plan/ management of applications.	

Risks

There are risks associated with this particular option, as 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 4-5 Risks of option 2

	Risks	Consequence	Likelihood	Risk rating
R2.1	Market procedures are yet to be finalised; the magnitude of change estimates may not be viable.	Level 3. The amount of change required to systems may be underestimated	Possible	C
R2.2	Inability to meet the market obligation as the systems are currently built to comply for Victorian AMI Obligations.	Level 3. AusNet Services systems do not adequately comply with 5 Minute obligations	Possible	C
R2.3	Current application vendors may not be able to comply to the market timelines.	Level 3. AusNet Services systems do not adequately comply with 5 Minute obligations in the required timelines	Possible	C

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

Customer related drivers of expenditure

As discussed in Section 3.4, five key customer outcomes have been identified. 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 2

Customer outcome	How this program achieves this
Deliver on the basics	By delivering to minimum compliance AusNet Services is able to provide a stable service back to the customer. The increase frequency of metering data will provide AusNet Services and customers clearer information in regards to usage that can make existing services more efficient.
Keep me posted	N/A
Affordable for me	N/A
Be ready for the future	This is to support wider market reforms to support distributed energy resources and reduce demand during peak times. Implementing this option would mean that AusNet Services is ready for AEMOs future metering data requirements.
Always safe	N/A

Business related drivers of expenditure

As discussed in Section 3.5, 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 2

Business drivers	How this program achieves this
Lead energy transformation, embracing change	Supports the market reforms for energy industry transformation.
Drive efficiency and effectiveness throughout the portfolio	By enhancing the existing solution, we are using the existing investments and assets where possible and minimising costs and changes.

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Generate trust and respect with customers and partners	N/A
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4.4 Option #3 [C-I-C] and enhance core systems

[C-I-C]

Alignment to objectives

[C-I-C].

Table 4-8 Objectives analysis of option 3

[C-I-C]

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Costs

Table 4-9 Costs of option 3

[C-I-C]

Benefits

[C-I-C].

Table 4-10 Benefits of option 3

[C-I-C]

Risks

[C-I-C].

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Table 4-11 Risks of option 3

[C-I-C]

[C-I-C].

Alignment to customer related drivers of expenditure

[C-I-C].

Table 4-12 Customer related drivers of option 3

[C-I-C]

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Alignment to business related drivers of expenditure

[C-I-C].

Table 4-13 Business related drivers of option 3

[C-I-C]

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5 Assessment and recommended option

5.1 Assessment of the options

To identify a recommended option for this program of work, AusNet Services have selected a number of criteria to assess each of the options. AusNet Services 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

[C-I-C]

Based on our assessment, Option 2 is the recommended option because it is prudent and efficient, as it delivers the minimum compliance solution at the lowest cost and risk and also leverages existing investment.

NPV analysis

As this program includes 100% non-recurrent expenditure, Table 5-2, below shows the NPV analysis results for this program, further demonstrating the cost effectiveness of Option 2, the recommended option.

Table 5-2 NPV analysis (\$FY21m)

[C-I-C]

We have captured one primary benefit for this program: Lost revenue due to the inability to bill meters in alignment with regulatory obligations.

The risks associated with failing to implement this program are that AusNet Services would not meet our regulatory obligations and we lose significant revenue from not being able to bill meters

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appropriately. This loss would represent an estimated \$[C-I-C] per month to AusNet Services and also impact customers significantly with an inability to provide compliant meter data to the market.

5.2 Recommended option

Option 2 is the recommended option for AusNet Services to meet its 5 Minute and Global Settlements obligations. **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
5 Minute Compliant Solution required post July 2021	5 Minute Compliant Solution required pre July 2021	Vendor readiness including Meter Providers and Software Vendors.
Global Settlements	Any additional enhancement and features	Decision to align the Global Settlement with 5 Minute
Meter Data Store remediation	Meter Data Management reconfiguration	

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Table 5-3 identifies 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	Market procedures are yet to be finalised; the magnitude of change estimates may not be viable.	C	AusNet Services is fully involved in the industry procedures finalisation. Active participation in various working groups and to support AEMO delivering the necessary rule and system changes.
R2.2	Inability to meet the market obligation as the systems are currently built to comply for Victorian AMI Obligations.	C	<ul style="list-style-type: none"> • Assessment on the impacts and options should this risk be realised. • Decision on action to take in response to the VIC Amendment Order • Early Engagement with Victorian Government on impact on existing AMI Metering installations
R2.3	Current application vendors may not be able to comply to the market timelines.	C	Early engagement with meter vendor on metering roadmap and Application vendors on their resource and product availability.

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6 Attachment 1 – Risk level matrix

The figure below shows the risk level matrix to which AusNet Services 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

		Consequence				
		1	2	3	4	5
Likelihood	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