

Technology program

Corporate Communications

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
Utility Communication Networks and Services		CIGRE Green

1.3 Document History

Date	Version	Comment	Person
1 August, 2018	V0.1	Initial document	Yuanyuan Zhao
13 August, 2018	V1.0	Issued for Cycle 1 review	Yuanyuan Zhao
27 August, 2018	V2.0	Issued for Cycle 2 review	Yuanyuan Zhao
12 September, 2018	V3.0	2 nd Cut Final Issue	Yuanyuan Zhao
22 February 2019	V3.1	Risk and benefit updates	Geoff Bethune
6 March 2019	V3.2	Minor updates	Janine Perri
11 March 2019	V3.3	Consistency checks	John Hancock
18 March 2019	V3.4	Consistency workshop	John Hancock, Rangana Perera, Samantha Scanlon
22 July 2019	V4.0	Cost updates & Benefits updates	Jackson Shen, Emily Pong
30 July 2019	V4.1	Updates post AN review	Emily Pong
15 Oct 2019	V5.0	Draft version issued	Samantha Scanlon
12 Nov 2019	V5.1	Updated with review comments	Samantha Scanlon

1.4 Approvals

Position	Date
Technology Leadership Team	

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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 this brief.

Table 2-1 – Summary table

Key objective(s) of the program	The objective of the Corporate Communications program is to enable operational efficiency, reliability, safety and growth by connecting employees, customers and applications with a secured, cost-effective communications network. This will then enable the delivery of safe and reliable energy services with the least possible disruption to meet regulatory compliance and strategic business objectives						
Key benefits to customers	<ul style="list-style-type: none"> Improves network resilience to deliver efficient, reliable and safe energy services to customers. Mitigates operational and security risks. Increases AusNet Services’ ability to respond to market demand, technology and regulatory requirements to ensure efficient service delivery of services to customers Delivery of value for money delivery of technology services at an acceptable level of risk over the life of the assets 						
Cost allocation	Electricity Distribution	49%	Electricity Transmission		30%		
	Gas Distribution	21%					
Program type	Recurrent					<input checked="" type="checkbox"/>	
	Non-Recurrent					<input type="checkbox"/>	
	Client Devices					<input type="checkbox"/>	
Program timings	Program duration:	5 years					
Expenditure forecast	(\$m)	FY 2022	FY 2023	FY 2024	FY 2025	FY 2026	Total
	[C-I-C]						

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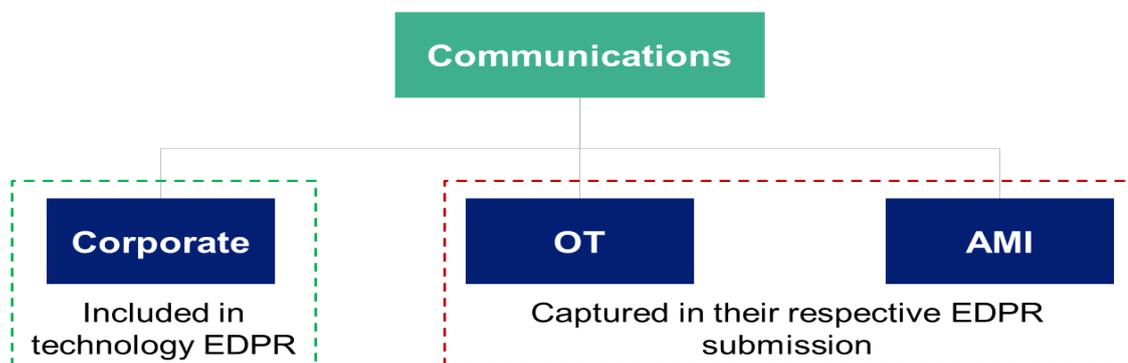
Estimated life of system	The estimated life of the implementation is 5-7 years with a refresh, which is typical for this type of system.
Customer Engagement	<p>As the first DNSP in Australia to trial the New Reg process, AusNet Services held deep dive workshops with stakeholders, including the Customer Panel, on ICT. In that engagement AusNet Services 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.</p> <p>A key theme of our engagement with the Customer Forum was the need for us to provide clarity on what AusNet Services were proposing and what the expected customer benefits were. AusNet Services acknowledge this feedback and have taken it into consideration when proposing the most appropriate option for this business case.</p>

AusNet Services’ communication networks ensures the efficient and timely operation of our business and therefore the efficient and timely delivery of services to our customers.

Our communications include Voice, Corporate, Operational Information Technology (OT) and Advanced Metering Infrastructure (AMI) data networks, which provide wireless and wireline communications capabilities to all areas of the AusNet Services business.

For clarity, the initiatives in this brief are only concerned with Corporate Information and Technology communication networks. These are the networks that support the enterprise applications and services used by corporate employees, customers and other participants (e.g. contractors, suppliers, and regulators). OT and AMI networks are captured in other EDPR program briefs as illustrated in Figure 2-1 below.

Figure 2-1 Structure of Communications included in this program



AusNet Services has an obligation to deliver safe and reliable energy services with the least possible disruption to meet regulatory compliance and strategic business objectives. This program looks to do this by refreshing our corporate communications infrastructure as it ages, which will mitigate risks and address operational issues.

Specifically, under this program AusNet Services is proposing to:

[C-I-C]

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[C-I-C]

- Three options should be considered to undertake this program. The proposed expenditure on capacity management and like-for-like lifecycle refreshes ensures the network performance requirements are met for both existing and future business growth in the forecast regulatory period. This analysis is discussed further in section 4.

Alignment with AER ICT expenditure assessment framework

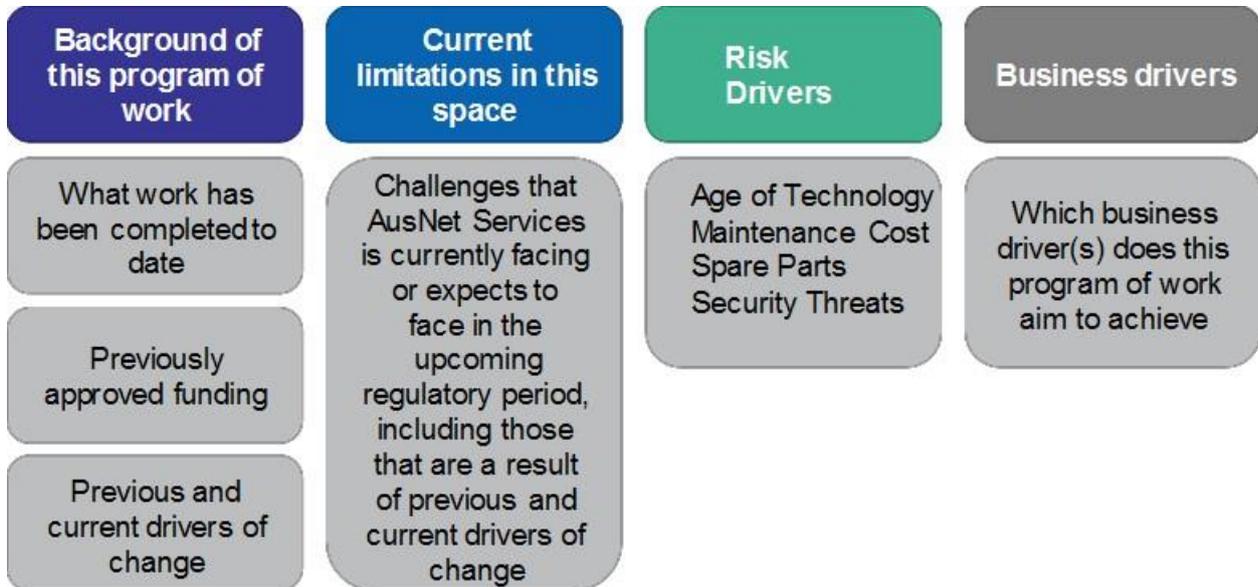
AusNet Services have categorised this program as recurrent expenditure, on the basis that it relates to ongoing refresh of AusNet Services' corporate communications infrastructure, a cost that must be incurred periodically. Consistent with AusNet Services' internal practices, we have developed a detailed business case that supports our 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

There are many drivers and considerations that influence our decisions around technologies changes as outlined below:

- AEMO Data Comms Standard defines the standards which networks, customers, generators and others must use when communicating with AEMO.
- Customers are demanding information, participation and choice, prompting more notifications, monitoring & control.
- As more connected devices become commercially available, integrating them adds complexity to managing the network, with a resulting need for new security capability to manage risks and cyber threats.
- Operational cost reduction and business financial performance is a key driver across all AusNet Services businesses. Capacity Lifecycle and Operational Enhancements (CLCOE) is a proven successful practice at AusNet Services, in the effort of replacing aged assets & obsolescence required by technology spending in a controlled manner.
- Technology maintenance costs increase over time due to hardware and software failure rates increasing when equipment ages beyond vendor end of life recommendation.

For AusNet Services to meet existing requirements and prepare for the future, the distribution network relies on availability of our IT Network, which also plays a critical role in supporting the OT Networks. High reliability and availability drive the need of a flexible and healthily maintained communication platform and components, with adequate levels of vendor support.

In the coming regulatory period, AusNet Services will be continuing the success track record of like-for-like replacement approach to refresh the associated hardware and software assets related to IT communication networks.

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3.2 Proposal Drivers

Our policy is to refresh for network and communication assets on average every 5-7 years in order to manage risks to the business caused on by ageing assets in alignment with our asset and capacity policies. Without such lifecycle refreshes, the recovery time from hardware, firmware and software failures are likely to increase, with the result that Service Level Agreements may not be met.

In line with global ICT industry norms and vendor recommendations, the life span of IT networking infrastructure (Routers and Switches) is 5 to 7 years. Equipment is expected to require replacement across ~130 service sites while the expected life of the appliances is 5 years, which AusNet Services plan to refresh around 2026. This continues the lifecycle refresh practice described in the regulatory proposal for the 2016-2020 EDPR.

AusNet Services currently has multiple gateways for various applications and services. The network equipment and devices compromising these gateways will reach their end of life and require a replacement. The aim of this program is also to utilise the replacement opportunity to consolidate and upgrade the capability to ensure both existing and growing capacity, performance and service levels can be maintained through the next period.

3.3 Objective(s)

The objectives of this program include:

- Mitigating operational and security risks to communication networks and resulting impacts on the ability to deliver reliable energy services
- Improved network resilience to ensure operational efficiency, reliability, safety to energy supply
- Controlling cost of maintaining corporate communications services at an acceptable risk to the business
- Increase ability to respond to market demand, technology and regulatory change

3.4 Technology risk drivers

All expenditure initiatives identified and proposed by AusNet Services will have linkages to cost avoidance benefits, and enable a safe and reliable network, by mitigating one or more of these identified risk drivers:

1. **Technology risk increases over time.** Hardware failures follow a pattern of fail in the first months of operation, stable operation for a number of years, and exponential increase in failures after the end of life as defined by the manufacturer. This failure curve is known as the 'bathtub curve'¹. Extending the life of technology after the vendor end of life date increases business risk, as the likelihood of failure increases, and in turn can impact on AusNet Services' ability to operate and maintain a safe and reliable network.
2. **As technology ages the cost of maintenance increases.** Equipment vendors will provide cost effective support until a point is reached where their costs increase. Vendors need to provide internal capability to support both old and new products where the old products are used by a decreasing customer base. This cost is passed on to the customer and often exceeds the cost of

¹ *Basic terms and models used for reliability evaluation*, National Institute of Standards and Technology at <https://itl.nist.gov/div898/handbook/apr/section1/apr124.htm> and

Software Reliability, Jiantao Pan (Carnegie Mellon University) at https://users.ece.cmu.edu/~koopman/des_s99/sw_reliability/

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deploying and maintaining new technology.

3. **Spare parts become unavailable.** Technology relies on a supply chain of components and suppliers which are subject to component lifecycle management. After a number of years, a manufacturer will be unable to source component parts making it impossible to produce spare parts. Reliable access to spare parts is then compromised and the risk of unserviceable outages increases.
4. **The price-performance of communications technology continues to improve over time, lowering the total cost of delivering like-for-like services.** Failing to refresh infrastructure locks in higher costs and lower service capabilities.
5. **Security.** Technology is under ongoing attack from hackers. Ongoing patching is required to remove vulnerabilities which allow for unauthorised access leading to major business disruption or loss of critical information. When technology is no longer supported by a manufacturer no new patches are made available to address security vulnerabilities. The risk of unauthorised access leading to data loss, loss of service, or non-compliance with regulatory requirements, increases over time.

3.5 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 three 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 research has been also further validated through the ICT deep drive presented to the customer forum.

AusNet Services consider that this program of work will be most relevant to lead energy transformation, embracing change and drive efficiency and effectiveness throughout the portfolio. This will be further explored 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 that may alleviate current limitations.

Table 4-1 Brief overview of the options

Brief overview of each of the options	
Option 1	<p>BAU: Sweat IT Network Assets and Perform Mandatory Patches. This would encompass:</p> <ul style="list-style-type: none"> • Hardware support & maintenance, e.g. router, switch, wireless infrastructure, voice platform and various Cisco ASA firewall • Provide support for running the environment
Option 2 (Recommended)	<p>Perform Capacity Management and Like-for-Like Replacement:</p> <ul style="list-style-type: none"> • Replacing network equipment and voice gateway to mitigate the risk of system failure • Simplify corporate communications, moving to Skype for Business • Repurpose Cisco Voice Platform to OT, including hardware, software and licenses • Refresh Riverbed asset and link (WAN accelerators) • Increase capacity for carrier Virtual Private Networks (VPNs) for remote offices due to increased demand for video services • Increase capacity for internet services to accommodate the forecasted traffic demand • Replace IP Core routers • Formalise gateway consolidation with business and replace consolidated gateway IP routers • Implement QoS strategy • Lifecycle and capacity increase for high speed interconnection between Richmond and Rowville Data Centres • Role based access security enhancement • Replacing the contact centre replacement • Type approval, Reference Designs and New Technology Integration Development.
Option 3	<ul style="list-style-type: none"> • [C-I-C]

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4.2 Option #1 Sweat Network Assets

This option proposes AusNet Services to sweat current IT network assets with mandatory patches only provided where security or high priority risks are being mitigated. There is no improvement made to the network. This option is not recommended due to increased customer and business risks associated with ageing assets and lack of technical vendor support.

The probable consequences of this option include:

- increasing frequency of IT communication network outages and downtime, resulting in increased costs
- limited ability to communicate with customers and meet end user service requirements, and
- growing resolution times when system faults ultimately occur.

As a result, there is increased likelihood of experiencing system performance, stability, data and quality issues. This leads to increased risk of failing to meet business, operational and regulatory requirements. This option is not recommended because the price-performance of technology infrastructure continues to improve over time, lowering the total cost of delivering like-for-like services. Failing to refresh infrastructure locks in higher costs and lower service capabilities, leading to potentially higher prices to customers.

Alignment to objectives

AusNet Services do not consider that option 1 achieves all of the intended objectives of this program of work, as shown in Table 4-2 below.

Table 4-2 Objectives analysis of option 1

Objective		Comments
Mitigate operational and security risks to communication networks impacting the ability to deliver reliable energy services	X	<ul style="list-style-type: none"> • Risk of running aged or unsupported end-of-life (EOL) equipment that could impact the communication capabilities. • Do not gain access to the expertise required from vendor to resolve incidents
Improved network resilience to ensure operational efficiency, reliability, safety to energy supply	X	<ul style="list-style-type: none"> • Reliance of cyber threats to network, business and customer data is not improved.
Reduce cost and increase effectiveness of business decision making to utility	X	<ul style="list-style-type: none"> • Continuing sweating assets represents a cost saving in an upfront investment. However, assets due for lifecycle refresh presents a risk to communication networks which could lead to significant risk in increasing OPEX costs related to safety obligations, regulatory, compliance and/or reputational costs.
Increase ability to respond to market demand, technology and regulatory change	X	

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Costs

Table 4-3 Costs of option 1

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

Benefits

While the option to only do mandatory patches without network hardware refresh is cheaper than options 2 & 3, it significantly increases the risk of the communication operations, especially in an event of hardware failure. Therefore, this is not a recommended option.

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
Minimal investment compared to recommended option. Although this reduces initial cost, as outlined above it introduces significant risk and potentially additional spend down the line to resolve issues, as such it is not a recommended option.

Risks

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

Table 4-5 Risks of option 1

	Risks	Consequence	Likelihood	Risk rating
R1.1	Aging assets causing increased business risk e.g. CISCO Switches & Routers	Level 3. Increases system failures, outages and downtime causing delays, inefficiencies and inability to operate and meet customers' expectations from the business Potential increases in maintenance/support cost	Likely	B
R1.2	The performance of the network may degrade, introducing risk to the business	Level 2. Security intrusion in to the system due to absence of patches and bug fixes on later versions of software	Likely	C

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R1.3	The capacity of the internet may become insufficient due to data volume growth around it	Level 1. Reduced network performance and productivity otherwise would have been optimized	Likely	D
R1.4	Not able to introduce new capabilities due to old technologies being in place	Level 1. Delay in the development of new technology, this may negatively impact our revenue or require unforeseen capital investment to replace obsolete technology. In addition, as with all new business solutions, there are risks associated with solution design, implementation, budgeting, planning, integration, future maintenance, upgrades and support	Possible	E

Overall AusNet Services consider this option is rated High.

Alignment to mitigation of key risk drivers

As discussed in Section 3.4, there would no material reduction in risk profile as the key risks are not addressed by this option.

Table 4-6 Risks drivers of option 1

Risk Driver		Achieved by
Technology risk increases over time	X	N/A
Cost of maintenance increases as technology ages	X	N/A
Spare parts unavailable	X	N/A
Availability of new technology	X	N/A
Security	X	Only partial alignment by implementing mandatory security patches. Does not fully mitigate risk as some patches will not be available for equipment at end of support.

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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 AusNet Services 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 Capacity management and like-for-like replacement (RECOMMENDED)

This option aims to manage capacity while replacing the existing IT assets in a 'like-for-like' (to the maximum extent possible given changes in technology) approach.

Alignment to objectives

AusNet Services consider that this option achieves all of the intended objectives of this program of work, as shown in Table 4-8 below.

Table 4-8 Objectives analysis of option 2

Objective		Comments
Mitigate operational and security risks to communication networks impacting the ability to deliver reliable energy services	✓	Risk of running aged or unsupported EOL equipment that could affect the communication capabilities is mitigated. Expertise required to resolve incidents in security vulnerabilities is regained.
Improved network resilience to ensure operational efficiency, reliability, safety to energy supply	✓	Enhanced reliance of cyber threats to network, business and customer data.
Reduce cost and increase effectiveness of business decision making to utility	✓	Like-for-Like replacement controls the profile of technology expenditure.
Increase ability to respond to market demand, technology and regulatory change	✓	Additional internet data transfer capacity supports increased bandwidth demand in the communication network, driven by service capability and an increased amount of connected devices, e.g. video capability.

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Costs

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						

This solution involves a small increase to our ongoing telecommunications costs which results in a \$28,900 per annum step change in opex.

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

Benefits
<ul style="list-style-type: none"> • The price-performance of technology infrastructure continues to improve over time, lowering the total cost of delivering like-for-like services, and therefore, translating to efficient prices for customers. This is an important consideration in an environment which has increasingly complex and challenging requirements with increasing and evolving customer demands to maintain sustainable costs. • Customers can experience increased grid stability and reliability through increased communications network reliability at efficient costs. • Customer data is safe and secure from exploitation as a result of having a secure IT communication networks AusNet Services will be ready for future cloud based technology architectures, ensuring future integration/migration disruptions are minimised.

Risks

There are risks associated with the implementation of this option, as highlighted in the table below. Based on the consequence and likelihood of each risk, AusNet Services have rated each of the individual risks blue, green, yellow, orange or red (order of severity). See Appendices 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	Lower operational risk due to system failure	Level 3. Reduced possibility of system failures, outages and downtime causing delays, inefficiencies and inability to operate and meet customers’ expectations from the business.	Possible	C

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R2.2	Not able to introduce new capabilities due to limited capacity	Level 2. Delay in the development of new technology may negatively impact our revenue or require unforeseen capital investment to replace obsolete technology.	Likely	C
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AusNet Services consider overall this option is rated Medium.

Alignment to mitigation of key risk drivers

As discussed in Section 3.4, this option is fully aligned to reducing technology risk and providing a stable network for AusNet Services customers.

Table 4-12 Risks drivers of option 2

Risk Driver		Achieved by
Technology risk increases over time	✓	By maintaining critical systems in line with their supplier lifecycle maintenance requirements.
Cost of maintenance increases as technology ages	✓	Staying in Vendor support window is more efficient and cost effective than getting customised vendor support.
Spare parts unavailable	✓	Maintaining infrastructure assets in line with its lifecycle ensures spare parts availability reducing down time.
Availability of new technology	✓	Obtain efficiency by replacing obsolete technology
Security	✓	Critical lifecycle refresh remedies the vulnerabilities and ensure the security and reliability of the network

Alignment to 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 AusNet Services 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	✓	Increased capacity supporting new corporate tools e.g. collaboration
Drive efficiency and effectiveness throughout the portfolio	✓	Maintaining infrastructure assets in line with its lifecycle allows the business to continue to operate efficiently and limit communications network failure. Network failures cause delays and increase the cost of operating the business. Managing and addressing network issues

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		and risks contributes to sustainable, quality network services to AusNet Services customers.
Generate trust and respect with customers and partners	✓	Enhanced risk management capability enables the organization to be compliant with AEMO and an industry safety leader to advocate regulatory development

4.4 Option #3 Strategically implement the consolidation of multiple IP networks

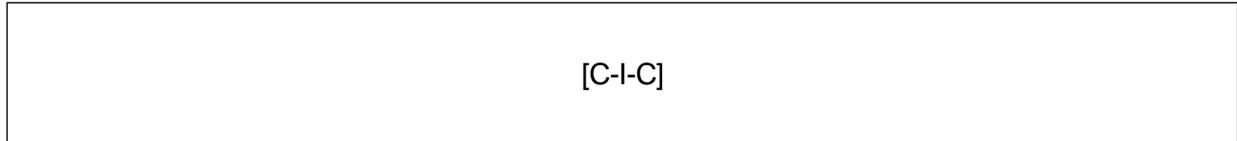
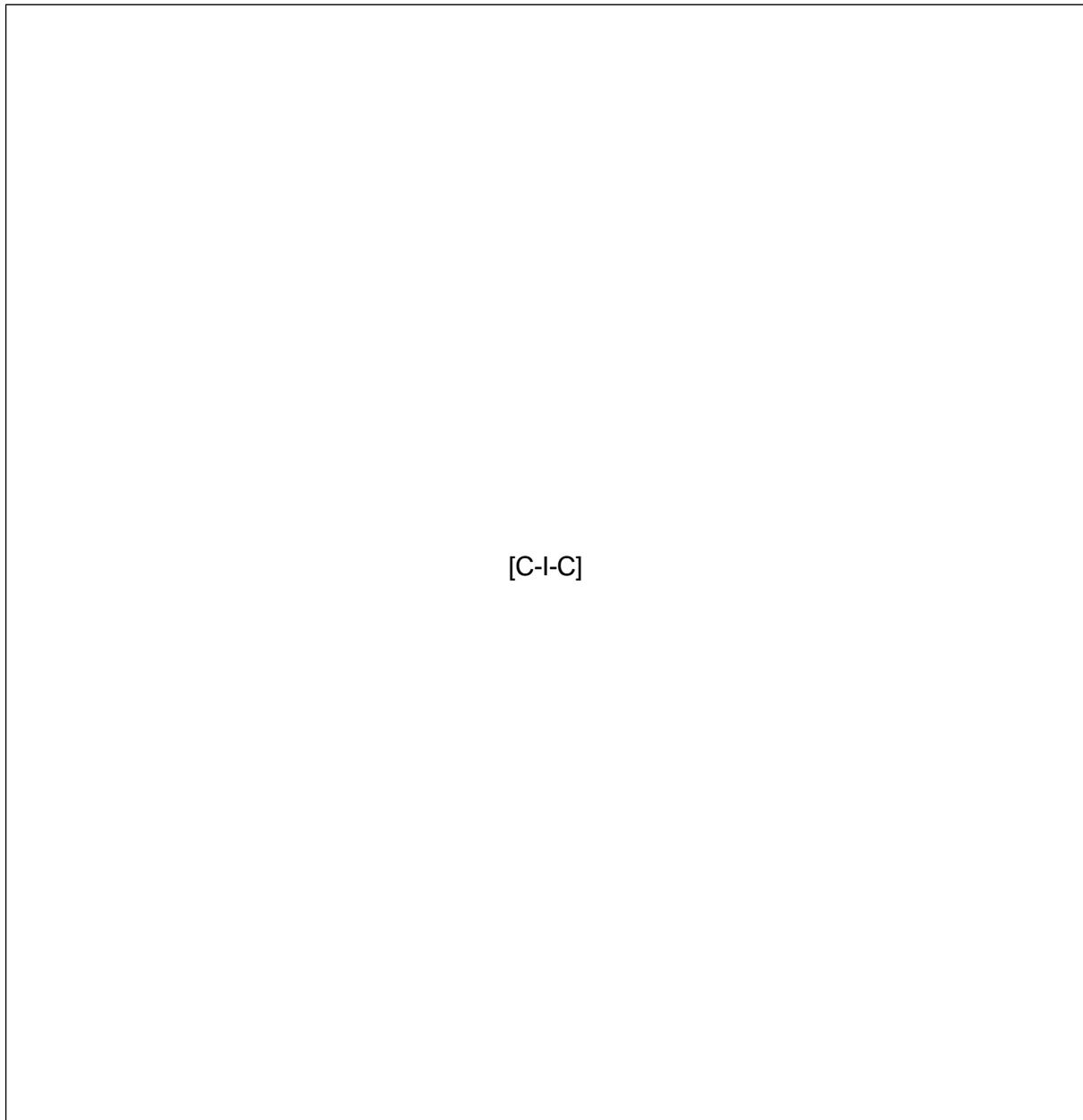


Figure 4-13 AusNet Services' Communications Network Vision



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[C-I-C]

Alignment to objectives

[C-I-C]

Table 4-143 Objectives analysis of option 3

[C-I-C]

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Costs

Table 4-154 Costs of option 3

[C-I-C]

Benefits

[C-I-C]

Table 4-165 Benefits of option 3

[C-I-C]

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Risks

[C-I-C]

Table 4-176 Risks of option 3

[C-I-C]

Alignment to mitigation of key risk drivers

[C-I-C]

Table 4-18 Risks drivers of option 3

[C-I-C]

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Alignment to business related drivers of expenditure

[C-I-C]

Table 4-19 Business related drivers of option 3

[C-I-C]

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5. Assessment and recommended option

5.1 Assessment of the options

For this recurrent ICT expenditure, AusNet Services have selected a number of criteria to assess each of our identified options. AusNet Services consider that these criteria represent a comprehensive view of each option, in achieving AusNet Services’ customer and business 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 technology risk cost avoidance drivers			
Alignment to business related drivers of expenditure			

Although option 3 and option 1 both have lower costs than option 2, both have significant risks.

Option 1 has a much higher likelihood of experiencing system performance, stability, data and quality issues than option 2. This leads to increased risk of failing to meet business, operational and regulatory requirements.

In relation to option 3, currently the transition risk and lower reliability of IP based communications makes it an unacceptably risky path for a mission critical service such as corporate communications. AusNet Services would expect to transition to this type of communication solution as the technology matures which is likely to be part of our proposal for the 2027-31 regulatory period.

5.2 Recommended option

Based on this assessment, Option 2 is the recommended option as it is highly aligned with objectives in a cost effective and risk controlled manner.

Table 5 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.

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Table 5-3 Confirmation of scope of recommended option

In scope	Out of scope	Dependencies
Comms hardware (including associated software) such as Routers, Switches, IT Wireless Infrastructure	Excluding hardware refresh associated with OT and AMI networks (captured in respective EDPR),	Customer Information Management
	User Role based Access System security appliances	Security

In Table 5-4 below, AusNet Services have identified techniques or actions to mitigate the risks identified for this option.

Table 5-4 Option 2 risks and mitigating actions

	Risk	Rating	Mitigation
R2.1	Lower operational risk due to system failure	C	Refresh device fleet and upgrade firmware
R2.2	Not able to introduce new capabilities due to old technologies being in place	C	Hardware replacement and capacity increase

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6. Appendices

6.1 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