

Technology Document ICT Program Brief Corporate Telecommunications

2022-26 Electricity Distribution Price Review

Revised Regulatory Proposal

PUBLIC

Program Brief

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Program Brief

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 submission.

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2 Executive 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

Program overview		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 addresses these requirements by refreshing our corporate telecommunications infrastructure based on its age/condition, which will mitigate risks and address operational issues.					
Key objective(s) of the program		<ul style="list-style-type: none">Improves network resilience to deliver efficient, reliable and safe energy services to customers.Mitigate operational and communication network bottlenecks.Increases AusNet Services' ability to respond to market demand, technology and regulatory requirements to ensure efficient delivery of services to bring on new customer connections quickly and easily.					
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)	FY22	FY23	FY24	FY25	FY26	Total
	Capex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$10.7
	Opex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$0.4
	Step change opex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$0.1
	Electricity distribution cost	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$11.2
Estimated life of system	The estimated life of telecommunications equipment is 5-7 years with a refresh, which is typical for this type of technology.						
Customer Engagement	<p>This program has been proposed as part of AusNet Services Electricity Distribution Price Reset (EDPR) submission and this brief pertains to the EDPR allocation of these costs.</p> <p>As part of the EDPR process, we have 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'</p>						

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	<p>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 we were proposing and what the expected customer benefits were. This information has been also presented to the Customer Advisory Panel (CAP)</p> <p>We acknowledge the feedback received from both sessions and have taken it into consideration when proposing the most appropriate option for this business case.</p>
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Alignment to AER ICT expenditure assessment framework

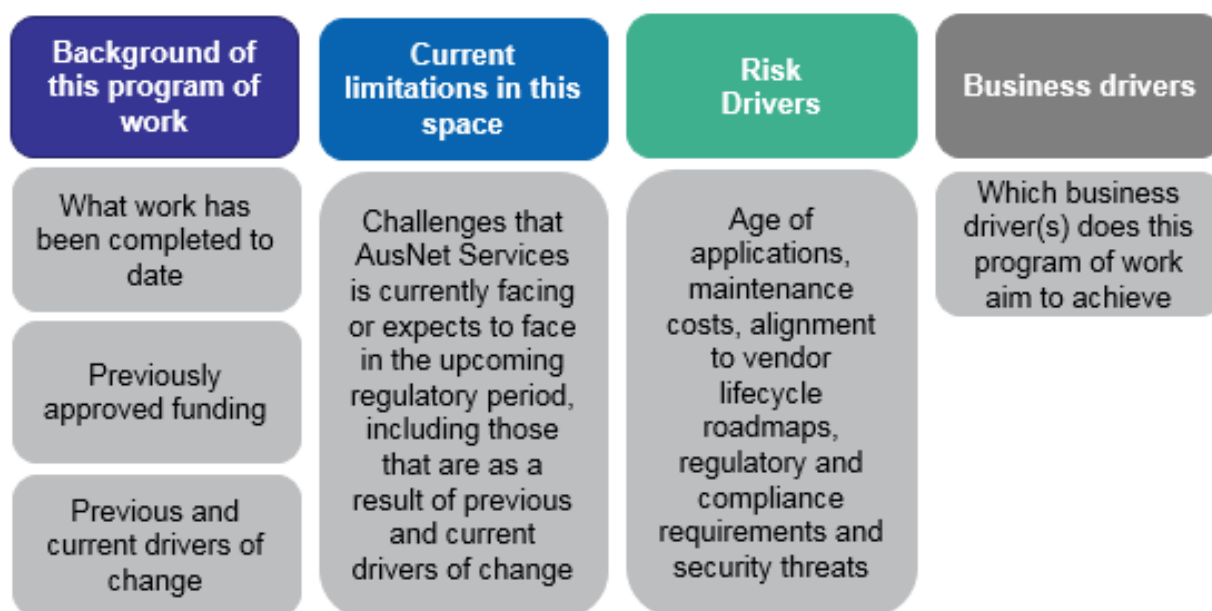
In accordance with the framework outlined in the AER – Guidance Note – Non-network ICT capex assessment approach for electricity distributors (28 November 2019), AusNet Services have categorised this program as recurrent expenditure, on the basis that it relates to ongoing refresh of AusNet Services' corporate telecommunications 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 chapter provides an overview of the context in which this program of work is operating within, and the figure below lists out key areas to be discussed.

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



3.1 Background

AusNet Services' telecommunication networks ensures the efficient and timely operation of our business and therefore the efficient and timely delivery of services to our customers. Our telecommunications include Voice, Corporate, Operational Information Technology (OT) and Advanced Metering Infrastructure (AMI) data networks, which provide wireless and wireline telecommunications capabilities to all areas of the AusNet Services business.

Due to the regulatory obligations set out in the NER, this network has the highest risk profile of any of AusNet Services telecommunications networks. The risk management regime currently in place is dependent on the tele-protection, control (SCADA) and Operational Telephone Network (OTN) services to provide the required levels of safety, resilience and reliability.

AusNet Services' telecommunications network consists of:

- 2,214km of OPGW optical fibre cable as the primary communication infrastructure
- Power Line Carrier between Horsham and Red Cliffs in Victoria's northwest.
- Additional communication bearers are provided via Microwave radio systems in areas where there is no OPGW optical fibre cable or where a diverse telecommunications path is required to support tele-protection systems.
- 589 PDH and SDH legacy devices in service to transfer data over optical fibre cables. These devices are critical in providing the tele-protection service to meet the reliability and performance obligations.
- Primary Operational Telephony, provided through Tadiran PABX's, secondary Operational Telephony is provided through PSTN connected phones (powered from the exchange through the PSTN line).
- The telecommunications network is managed and controlled via the CEOT (Customer Energy Operations Team).

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For clarity, the initiatives in this brief are only concerned with Corporate Information and Technology telecommunication 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). AMI and OT networks are captured in other program briefs.

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

AusNet Services faces several challenges in maintaining its Corporate Telecommunications network during the EDPR period, including:

End-of-life infrastructure. The telecommunications assets and carrier services that AusNet Services relies on, have been flagged as either already obsolete, nearing end of life based on vendor advice or will not be able to support regulatory or market changes. The risk of infrastructure failures rises with the age of the infrastructure requiring spare to be stocked as they are not available from the vendor. AusNet Services where possible, maintains its communications infrastructure to constrain costs or replace assets like-for-like.

New communications requirements from renewables. As the distribution business expands in the South West and North West of Victoria with the installation of wind generated electricity plants, the telecommunications network needs to continue to scale to connect and support the additional distribution network activities. To support this, effort will be required to implement fit-for-purpose communications to meet the capacity requirements for these generation sites through implementation of current network transport / protocol layers. The current SDH / PDH technology is obsolete and a replacement technology will be required in the near term to support network augmentation projects such as renewable energy connections. If the comms infrastructure is not refreshed, it will add complexity; increasing risk of network failure and increase the operational cost of managing the network.

An increase in the amount of data the network is handling. As more connected devices become commercially available and added to the distribution network, integrating them adds complexity in managing the network, with a resulting need for new security capability to manage risks and cyber threats. Current technology has limited ability to support emerging Cyber Security risks.

Changes in supply. The widespread uptake of residential and commercial solar electricity generation is anticipated to continue, with the likelihood that “energy storage” devices (e.g. Tesla batteries) will also become more widespread as the cost to implement is driven down by volume sales. This will fundamentally change the generation profile (outside of the Primary Generators) and is also likely to negate some of the change in demand through self-generation / storage regimes being implemented at a household or community level. It is anticipated that reverse flows of electricity into the Distribution network will create additional monitoring and control applications and requirements that will rely on services provided by telecommunications adding significant complexity to the current environment exceeding the current telecommunications capability.

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.

3.2 Objectives

This initiative aims to address a number of objectives related to the challenges explored in the previous section. The key objectives are:

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Improving network resilience to ensure operational efficiency, reliability and safety to energy supply

- Reduced quantities and diversity of platforms and equipment
- Consistent, standards guiding investments - minimising duplication and rework
- Mitigate performance and communication network bottlenecks
- Align the business units to a common criteria and way of working
- Ability to bring on new customer connections quickly and easily
- Operational management simplified and sparing logistics minimised

Mitigating the operational and security risks to communication networks and resulting impacts on the ability to deliver reliable energy services

- Reduction overtime in unreliable Microwave and radio equipment
- Capability to meet NER obligations for the network

Increase ability to respond to market demand, technology and regulatory changes

- Support the Victorian Renewable Energy Target - 25 per cent by 2020 and 40 per cent by 2025, this initiative will support meeting these targets by providing a robust network for future wind farms

3.3 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:

- **As technology ages, the risk of failure 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.
- **As technology ages the cost of maintenance increases.** Equipment vendors will provide cost effective support until a point is reached where their costs increase.
- **Spare parts become unavailable.** Beyond a certain time, suppliers cease to manufacture spare parts for obsolete equipment, increasing the risk of service disruption caused by equipment failure.
- **Security and other critical patches become unavailable.** Beyond a certain time, suppliers cease to develop firmware and software patches for obsolete equipment, increasing the risk of service disruption caused by cyber-attacks or other firmware/software failures.
- **The price-performance of new 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.

3.4 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 four key business drivers which set the direction for the business.

These business drivers are:

- Maintaining current service performance in a disrupted environment where risks are changing due to the increasingly complex nature of the grid;

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- Updating and implementing new technologies to enable AusNet Services to respond to changes within the growing renewable generation market;
- Complying with new obligations; and
- Delivering improvements requested by our customers regarding sustainability and cost.

AusNet services proposes the Corporate Communications will best align to ‘**Maintaining current service performance**’ in a disrupted environment where risks are changing due to the increasingly complex nature of the grid. In addition, ‘**Updating and implementing new technologies**’ to enable AusNet Services to respond to changes within the growing renewable generation market.

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.

3.5 Approach to developing expenditure forecast

For each program brief, a consistent approach is used to develop programs of work and the associated expenditure forecast for the regulatory period FY2022-26.

To develop each program of work and associated expenditure, the following steps were taken:

- Needs analysis to identify areas of the network and business processes that require investment over the upcoming regulatory period,
- Bottom up discussion with business and technology architects and delivery leads to develop options to address the investment need, including scope, key objectives, and drivers influencing the requirement for the programs,
- Consideration of different options to achieve the objectives of the program and analysis of their relative costs, benefits and risks, and
- Top down view to ensure that the Technology Strategy investment portfolio represents prudent and efficient expenditure for the upcoming period, relative to AusNet Services’ previous expenditure and also benchmarked against other comparable businesses.

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4 Options

4.1 Overview

This section provides an overview of a select number of options, which may feasibly address limitations and potential risk to service reliability for consumers. Each option represents a combination of initiatives which fit within the program of work.

Table 4--1 Brief overview of the options

Brief overview of each of the options	
Option 1 Extend life of assets	Extend life of assets and perform mandatory patches. This would encompass: <ul style="list-style-type: none"> • Hardware support & maintenance, e.g. router, switch, wireless infrastructure, voice platform and varies Cisco ASA firewall • Provide support for running the environment
Option 2 Prudent Investment (Recommended)	Perform Capacity Management and Like-for-Like Replacement: <ul style="list-style-type: none"> • Replacing network equipment and voice gateway to mitigate the risk of system failure • Refresh corporate telecommunications (i.e. Skype for Business) • Repurpose 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 Strategic Investment	[C-I-C] <ul style="list-style-type: none"> • [C-I-C] • [C-I-C]

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	<ul style="list-style-type: none"> [C-I-C]
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4.2 Option #1 Minimise investment by extending life of assets

This option would risk extending the operational life of current IT network assets, containing capital costs with a resultant increase in operating costs due to extended maintenance contracts for equipment that is no longer manufactured nor supported under standard warranties.

This initiative would be limited to the refresh of key telecommunication assets including, voice gateways, switches, routers and internet services only. The choice of initiatives driven by condition of assets and prioritised by risk mitigation outcomes.

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

Table 4–2 Objectives analysis of option 1	Outcome
Reduced quantities and diversity of platforms and equipment	✓
Consistent, standards guiding investments - minimizing duplication and rework	✓
Mitigate performance and communication network bottlenecks	
Align the business units to a common criteria and way of working	✓
Ability to bring on new customer connections quickly and easily	
Operational management simplified and sparing logistics minimised	✓
Reduction overtime in unreliable Microwave and radio equipment	
Capability to meet NER obligations for the network	✓
Support the Victorian Renewable Energy Target - 25 per cent by 2020 and 40 per cent by 2025, this initiative will support meeting these targets by providing a robust network for future wind farms	✓

This option **achieves some** of the project objectives.

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Costs

Table 4--3 Costs of option 1

(\$m)	FY22	FY23	FY24	FY25	FY26	Total
Capex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$0.7
Opex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$3.4
Step change opex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$0.0
Electricity distribution cost	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$4.0

Benefits

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

Table 4--4 Benefits of option 1

Benefit
Minimal investment compared to recommended option. Although this option has low overall capital cost, as outlined above, it introduces significant risk and potentially additional spend in future periods.

Risks

There are a number of risks associated with this 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

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

		Consequence				
		1	2	3	4	5
L i k e l i h o o d	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

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For additional information on this rating system.

Table 4--5 Risks of option 1

	Risks	Consequence	Likelihood	Risk rating
R1.1	Decreased condition of 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 into the system due to absence of patches and bug fixes on later versions of software	Likely	C
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

We consider that overall, this option is rated high risk.

Alignment to mitigation of key risk drivers

This option will partially mitigate some risk drivers, however, as its scope is limited compared to other options, not all risks will be mitigated. Where we consider that a customer outcome is not directly achievable by this option or irrelevant, 'N/A' is applied.

Risk Driver		Achieved by
As technology ages, the risk of failure increases over time. Hardware failures follow a pattern of fail in the first months of operation, stable operation for a number of years,	✓	By maintaining critical systems in line with their supplier lifecycle maintenance requirements.

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Risk Driver		Achieved by
and exponential increase in failures after the end of life as defined by the manufacturer.		
As technology ages the cost of maintenance increases. Equipment vendors will provide cost effective support until a point is reached where their costs increase.	✓	Staying in Vendor support window is more efficient and cost effective than getting customised vendor support.
Spare parts become unavailable. Technology relies on a supply chain of components and suppliers which are subject to component lifecycle management.	X	This will partially be compliant, however, a large amount of the Radio network, which is not being replaced, will still be at risk.
The price-performance of new 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.	X	Obtain efficiency by replacing obsolete technology.
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.	✓	Critical lifecycle refresh remedies the vulnerabilities and ensure the security and reliability of the network.

This option is moderately aligned to mitigate risk drivers

Alignment to business related drivers of expenditure

As discussed in Section 3.35, there are four 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--6 Business related drivers of option 1

Business drivers	How this program achieves this
Maintaining current service performance in a disrupted environment where risks are changing due to the increasingly complex nature of the grid;	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 and risks contributes to sustainable, quality network services to AusNet Services customers.
Updating and implementing new technologies to enable AusNet Services to respond to changes within the growing renewable generation market;	N/A

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Complying with new obligations;	N/A
Delivering improvements requested by our customers regarding sustainability and cost.	N/A

This option has **low alignment** to the business objectives

4.3 Option #2 Capacity management and like-for-like replacement (Recommended Option)

This option would mitigate the risks by investing a prudent amount of capital to replace obsolete and end of life equipment in the telecommunications network, and to also expand capacity to cater for increases in network traffic from new applications such as desktop video conferencing, as well as the growth in end points being monitored. Equipment would typically be replaced with equivalent equipment and services, except in those cases where newer, more cost effective alternatives are available.

The option looks at the highest priority requirements which include:

Replacement Works

- Obsolete and unsupported optical networking equipment in Richmond and Rowville Data Centres
- Obsolete and end of life IP network equipment to mitigate the risk of system failure, some of which will be consolidated to increase capacity, reduce complexity and lower operational effort
- Obsolete voice gateway equipment to ensure ongoing support for FAX and analogue systems
- Wide area network link optimisation technology assets (WAN accelerators)
- The customer contact centre PABX and interactive voice response (IVR) technology required to service a range of faults, emergencies and enquiries

Capacity Works

- Increase the capacity of the high-speed interconnection between Richmond and Rowville Data Centres to meet the increasing performance requirements driven by an increase in data
- Increasing capacity for carrier Virtual Private Networks (VPNs) to remote offices enhancing productivity and collaboration using video and contemporary collaboration tools
- Increasing the capacity for Internet data services to accommodate forecast traffic demand driven by changing working habits of employees working from home and increasing use of software as a service

Configuration & Optimisation Works

- Develop and implement quality of service (QoS) on all IP networks to efficiently allow the delivery of contemporary voice, video and collaboration service maintaining a consistent and reliable user experience
- Establish role-based access security enhancement to harden network equipment and limit access to authorised personnel

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Alignment to objectives

Objective	Outcome
Reduced quantities and diversity of platforms and equipment	✓
Consistent, standards guiding investments - minimizing duplication and rework	✓
Mitigate performance and communication network bottlenecks	✓
Align the business units to a common criteria and way of working	✓
Ability to bring on new customer connections quickly and easily	✓
Operational management simplified and sparing logistics minimised	✓
Reduction overtime in unreliable Microwave and radio equipment	✓
Capability to meet NER obligations for the network	✓
Support the Victorian Renewable Energy Target - 25 per cent by 2020 and 40 per cent by 2025, this initiative will support meeting these targets by providing a robust network for future wind farms	✓

This option achieves all program objectives.

Costs

Table 4--7 Costs of option 2

(\$m)	FY22	FY23	FY24	FY25	FY26	Total
Capex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$10.7
Opex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$0.4
Step change opex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$0.1
Electricity distribution cost	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$11.2

This solution involves a small increase to our ongoing telecommunications costs which results in a step change in opex. This is included in the “Opex” total above.

Benefits

Benefit
Cost Avoidance – avoiding the costs of refreshing aging communications infrastructure using modern communications technologies and simplified configuration.
Risk of System Failure – as the generation mix transitions, complexity to operator and maintain the network increases. More sophisticated systems are thereby required to operate the network.

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Minimised Impact of Network Constraints – minimising the number and duration of network element outages, leading to a decrease in constraints on the network. Benefit to consumers may be considered as optimal market outcomes may occur more frequently with a decrease in constraints.

Reduction in ongoing maintenance works – more efficient planning processes drive a reduction in cancelled or rescheduled maintenance works, leading to cost savings to maintenance crews.

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

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

		Consequence				
		1	2	3	4	5
L i k e l i h o o d	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

For additional information on this rating system.

Table 4--8 Risks of option 2

	Risks	Consequence	Likelihood	Risk rating
R2.1	Increased frequency of energy network outages due to telecommunications network system failure (protection)	Reduced possibility of system failures, outages and downtime causing delays, inefficiencies and inability to operate and meet customers' expectations from the business.	Possible	C
R2.2	Not able to introduce new capabilities due to limited capacity	Delay in the development of new technology may negatively impact our revenue or require	Likely	C

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	Risks	Consequence	Likelihood	Risk rating
		unforeseen capital investment to replace obsolete technology.		

As we have identified low risks, we consider that overall this option is rated moderate.

Alignment to mitigation of key risk drivers

This option is fully aligned in respect to reducing technology risk and providing a stable environment.

Risk Driver		Achieved by
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.	✓	By maintaining critical systems in line with their supplier lifecycle maintenance requirements.
As technology ages the cost of maintenance increases. Equipment vendors will provide cost effective support until a point is reached where their costs increase.	✓	Staying in Vendor support window is more efficient and cost effective than getting customised vendor support.
Spare parts become unavailable. Technology relies on a supply chain of components and suppliers which are subject to component lifecycle management.	✓	Maintain spare parts suppliers and look to new technologies if equipment becomes redundant.
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.	✓	Obtain efficiency by replacing obsolete technology
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.	✓	Critical lifecycle refresh remedies the vulnerabilities and ensure the security and reliability of the network

This option has **high** alignment to mitigating risk drivers.

Alignment to business related drivers of expenditure

As discussed in Section 3.35, 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.

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Table 4--9 Business related drivers of option 2

Business drivers	How this program achieves this
Maintaining current service performance in a disrupted environment where risks are changing due to the increasingly complex nature of the grid;	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 and risks contributes to sustainable, quality network services to AusNet Services customers.
Updating and implementing new technologies to enable AusNet Services to respond to changes within the growing renewable generation market;	Maintain services through like-for-like replacement and refresh were prudent as technology requires an uplift.
Complying with new obligations	N/A
Delivering improvements requested by our customers regarding sustainability and cost.	N/A

This option has **moderate alignment to** business drivers

4.4 Option #3 Implement the Telecommunications Strategy

Telecommunications has been, and always will be critical in the operation, maintenance and protection of AusNet Services' core networks, including mission critical applications such as Teleprotection, SCADA and Emergency Voice.

Today's telecommunication networks can be characterised as a collection of independent technologies performing discrete functions. A Teleprotection network, a SCADA network, an Operational Telephony network, an Advanced Metering Infrastructure network etc. Each built at a point in time to serve a specific purpose, using the technology available at that time that has been extended and maintained as the energy networks have expanded into new geographical areas.

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[C-I-C].

[C-I-C].

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These would require additional strategic investment in addition to the high priority works called out in Option 2.

Program Work Streams – Option 3

Replacement Works

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

Capacity Works

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

Configuration & Optimisation Works

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

Alignment to objectives

AusNet Services consider that this option achieves all the intended objectives of this program of work, shown in the table below. However, implementation risks are high due to major design changes and adoption of new technology. This option does minimise the risk that aging equipment will create, such as issues with the quality, reliability, and security of the network.

Objective	Outcome
Reduced quantities and diversity of platforms and equipment	✓
Consistent, standards guiding investments - minimizing duplication and rework	✓
Mitigate performance and communication network bottlenecks	✓
Align the business units to a common criteria and way of working	✓
Ability to bring on new customer connections quickly and easily	✓
Operational management simplified and sparing logistics minimised	✓
Reduction overtime in unreliable Microwave and radio equipment	✓
Capability to meet NER obligations for the network	✓

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Objective	Outcome
Support the Victorian Renewable Energy Target - 25 per cent by 2020 and 40 per cent by 2025, this initiative will support meeting these targets by providing a robust network for future wind farms	✓

This option has high alignment to the program objectives.

Costs

Table 4--10 Costs of option 3

(\$m)	FY22	FY23	FY24	FY25	FY26	Total
Capex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$6.3
Opex						\$0.3
Step change opex	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$0.1
Electricity distribution cost	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	\$6.7

As in Option 2, this option involves a small increase to our ongoing telecommunications costs which results in a step change in opex. This is included in the "Opex" total above.

Risks

There are a number of 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. 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

		Consequence				
		1	2	3	4	5
L i k e l i h o o d	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

For additional information on this rating system.

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Table 4--11 Risks of option 3

Alignment to mitigation of key risk drivers

	Risks	Consequence	Likelihood	Risk rating
R3.1	Lower operational risk due to system failure	[C-I-C]	[C-I-C]	B
R3.2	Risks associated with new capability requirement	[C-I-C]	Likely	C
R3.3	New solution implementation may not be compatible to the topology, e.g. limited degree of overall consolidation due to geographic alignment of service delivery points		Likely	C

As discussed in Section 3.4, this option is fully aligned in respect to reducing technology risk and providing a stable environment.

Risk Driver		Achieved by
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.	✓	[C-I-C]
As technology ages the cost of maintenance increases. Equipment vendors will provide cost effective support until a point is reached where their costs increase.	✓	[C-I-C]

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Risk Driver		Achieved by
Spare parts become unavailable. Technology relies on a supply chain of components and suppliers which are subject to component lifecycle management.	✓	[C-I-C]
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.	✓	[C-I-C]
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.	✓	[C-I-C]

This option has **high** alignment to mitigation key risk drivers

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 FY2022-26. 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--12 Business related drivers of option 3

Business drivers	How this program achieves this
Maintaining current service performance in a disrupted environment where risks are changing due to the increasingly complex nature of the grid;	[C-I-C]
Updating and implementing new technologies to enable AusNet Services to respond to changes within the growing renewable generation market;	[C-I-C] [C-I-C]
Complying with new obligations	[C-I-C]
Delivering improvements requested by our customers regarding sustainability and cost.	[C-I-C]

This option has Moderate alignment to business related drivers of expenditure.

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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, 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' objectives as well as requirements of the AER in ensuring that 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 objectives	Achieves most (6/9)	Achieves all (9/9)	Achieves all (9/9)
Costs	\$4.0	\$11.2	\$6.7
Overall risk rating	High risk	Moderate Risk	High risk
Alignment to technology risk drivers	Moderate alignment (3/5)	High alignment (5/5)	High alignment (5/5)
Alignment to business related drivers of expenditure	Low alignment (1/4)	Moderate alignment (2/4)	Moderate alignment (2/4)

Option 1 has a lower cost than option 2, however it has 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.

Option 3 has a much higher cost than option 2 and AusNet Services is commencing a project to complete a "References Design for Telecommunication Architecture", which will provide a design for the target state of the Telecommunications Network.

AusNet Services would expect to transition to the target state of the Telecommunications Network and the objectives outlined in the Telecommunications Strategy in the future after completion of the above project and this is likely to form the basis of our proposal for the FY2028-32 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.

The table below 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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[C-I-C]

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

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

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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

		Consequence				
		1	2	3	4	5
L i k e l i h o o d	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