

Technology program

Future Distribution Network Management

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	Author
18/11/2019	3.1	Incorporated feedback from review sessions	Samantha Scanlon

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1.4 Approvals

Position	Date
Technology Leadership Team	

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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

Key objective(s) of the program		<ul style="list-style-type: none">• Ensure the continued safe operation of network management assets (maintain current services)• Periodic refresh of network management assets to ensure a supported, risk mitigated, technology solution• Meet customers’ increasing expectations and evolving needs for improved network performance, service delivery, integrated information, and smart control.• Implement core technology platforms capable of supporting, orchestrating, managing and controlling the forecasted growth in DER, residential batteries, and Electric Vehicles.					
Key benefits		<ul style="list-style-type: none">• Reduced outages and customer impact through improved outage management.• Improved connectivity and performance for customer DER.• Deliver reduced network management costs through more efficient predictive and proactive outage management capabilities delivered by an Advanced Distribution Management System (ADMS), delivering more value to customers					
Cost allocation	Electricity Distribution	100%	Electricity Transmission			0%	
	Gas Distribution	0%					
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)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
	CAPEX	\$6.61	\$5.14	\$5.14	\$5.87	\$6.61	\$29.37
	OPEX	\$0.23	\$0.18	\$0.18	\$0.20	\$0.23	\$1.00
	Electricity Distribution cost	\$6.83	\$5.31	\$5.31	\$6.07	\$6.83	\$30.37
	Total program cost	\$6.83	\$5.31	\$5.31	\$6.07	\$6.83	\$30.37

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Estimated life of system	7 – 10 years.
Customer Engagement	<p>As the first DNSP in Australia to trial the New Reg process, we held deep dive workshops with stakeholders, including the Customer Panel, on ICT. In that engagement we described the importance and need for ICT expenditure to meet our customers' evolving needs and to support compliance with regulatory and legal obligations. Material associated with all our deep-dives is available on AusNet Services' website.</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. We acknowledge this feedback and have taken it into consideration when proposing the most appropriate option for this business case.</p>

2.1 Program summary

The Australian energy landscape is undergoing unprecedented change and disruption – the wholesale energy market is being subjected to increasing scrutiny and disruption, transmission and distribution networks are under increasing pressure to maintain service standards while constraining costs to customers. Furthermore, the very nature of networks is changing as customers are choosing to engage with the electricity market differently – for example, the penetration of embedded solar generation and electric vehicles continues to rise at exponential levels.

The impact of these changes on managing a distribution network are profound. Distributed Energy Resources (DER), household storage solutions and electric vehicles are for the first time causing variable bi-directional energy flows. In addition, the ubiquity of technology, smart devices and now, smart home interfaces, mean customers are expecting far more involvement and information in real time on their consumption, electricity production, costs, and service performance.

AusNet Services' DER update forecasts are conservative in comparison to those published by Australian Energy Market Operator (AEMO); however, they still see close to 25% of its customers adopting DER by 2025, an increase of approximately 10% over 2018 numbers. Both residential batteries and electric vehicle growth across the network is also forecasted to rise to approximately 6% and 18% respectively by 2030.

While there is uncertainty on the exact role AusNet Services will play in this rapidly evolving landscape, what is certain is that the network is evolving to become more dynamic with increasing prevalence of DER and we must meet customers' rising expectations and preferences. Managing power quality and voltage regulation in accordance with regulated thresholds is becoming increasingly difficult as DER penetration increases across the network. This is foreseen to become more difficult with time. In addition, it is likely that increasing penetration of DER will result in restrictions being placed on customers adding DER capacity to the network. AusNet Services system landscape that supports these key functions are rapidly reaching end of life and it is estimated that there will be exponential risks, if we do not refresh this technology in the next two to three years.

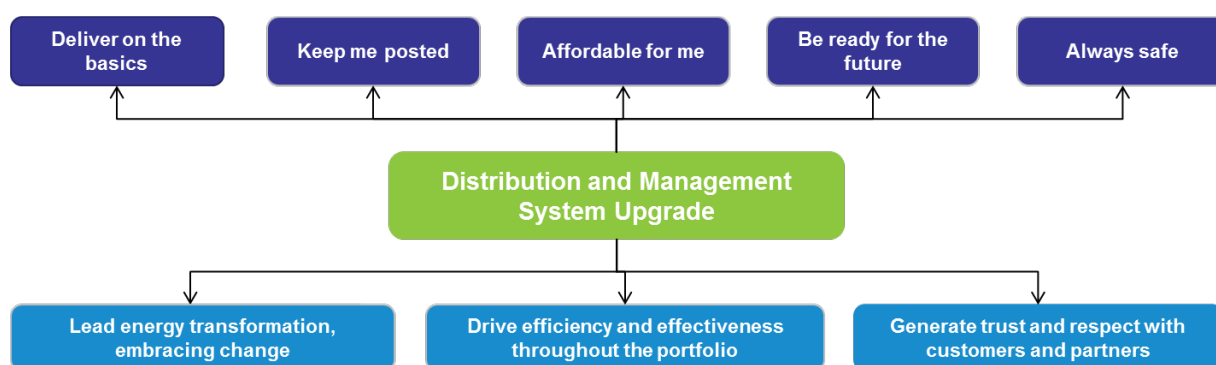
This program of work, looks to provide AusNet Services with the tools, capability, and functionality required to:

- Manage vendor/supplier support of critical network management technology

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- Meet rising customer expectations for improved network performance, service delivery, reduced outages, quicker outage restoration times, and smart control and integration with home automation and information systems.
- Continue to meet changing customer needs by implementing core technology platforms able to support, orchestrate, and manage the forecasted growth in DER, residential batteries, and electric vehicles.
- Support the requirement to integrate, manage and control impact of Distributed Energy Resource Control/Optimisation (DENOP), Demand Response (DR), and facilitate and control (where applicable) Peer to Peer energy trading schemes.

AusNet Services views this program as fundamental to delivering against the customer values established through close consultation with customer focus groups and is closely aligned with the corporate business drivers.



Alignment with AER ICT expenditure assessment framework

In accordance with the framework outlined in the AER's Consultation paper – ICT Expenditure Assessment of May 2019, we have categorised this program as recurrent expenditure, on the basis that it relates to ongoing implementation of core technology platforms infrastructure.

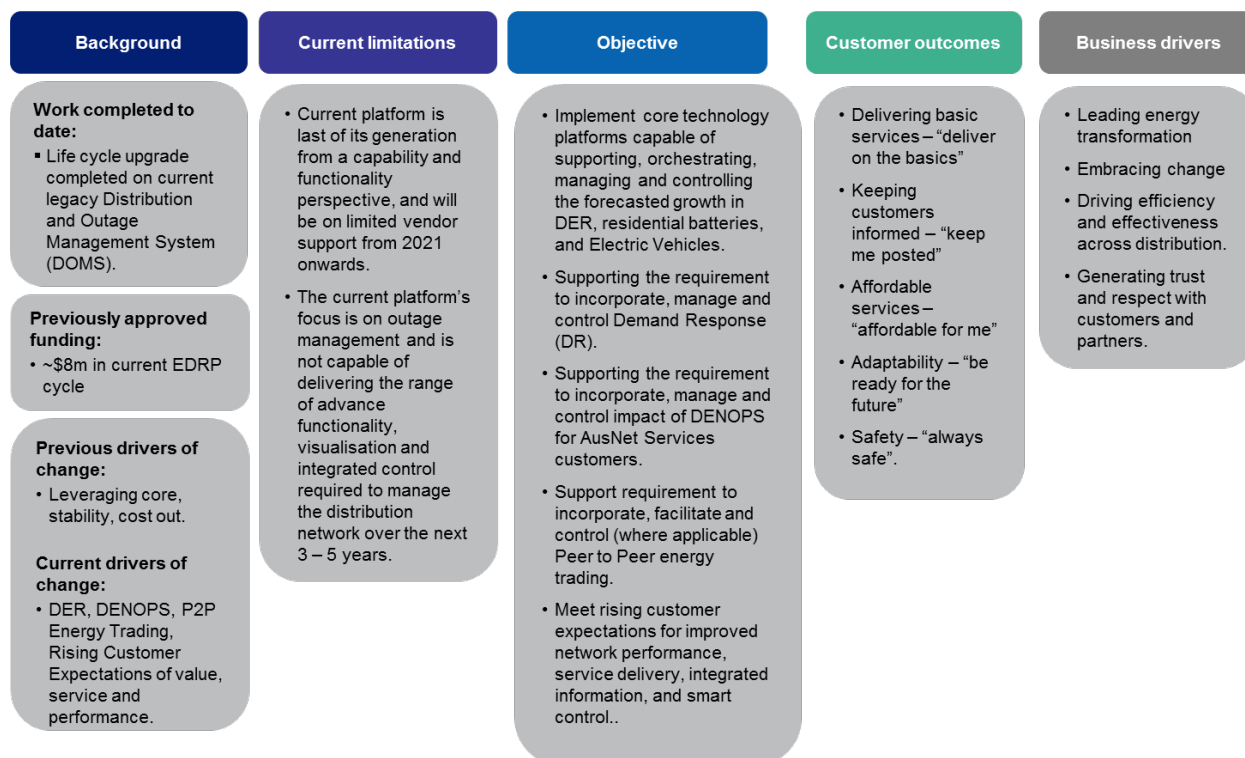
Consistent with AusNet Services' internal practices, we have developed a detailed business case in support of the chosen option.

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3 Context

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

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



3.1 Background

AusNet Services' distribution network is being subjected to change and disruption at an unprecedented scale. Simultaneously, customer expectations on information, services delivered, and control of their electricity supply and consumption are rising at an equally unprecedented level. The key factors driving this change and disruption across the network include:

Technology applications risk increases over time

Application 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 applications after the vendor end of life date increases business risk as the likelihood of failure to business applications increases. Key systems that manage network management capability are reaching end of life, coupled with the increasing complexity of the future networks, AusNet Services' ability to continue to provide a safe, secure and reliable network are reliant on key foundational investment.

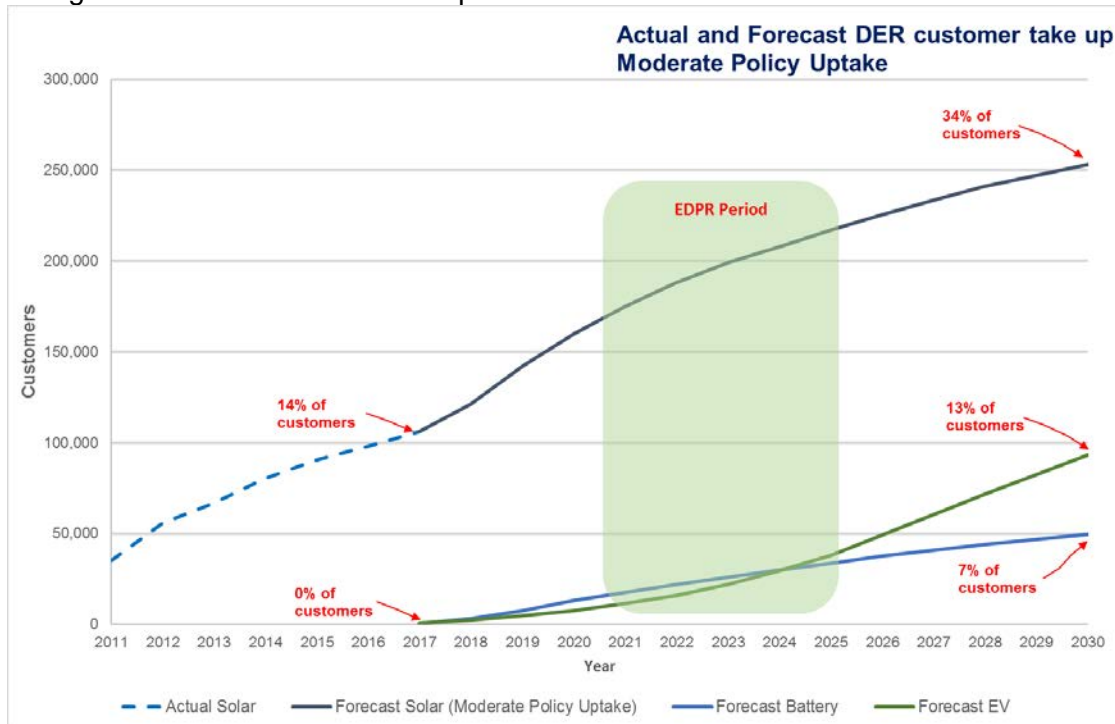
Increasing DER

AusNet Services' distribution network is faced with increasing penetration of DER. While, AusNet Services' is using a moderate forecast for DER uptake based on current policies, this conservative forecast still sees close to [C-I-C] of its customers adopting DER by 2025, an increase 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/

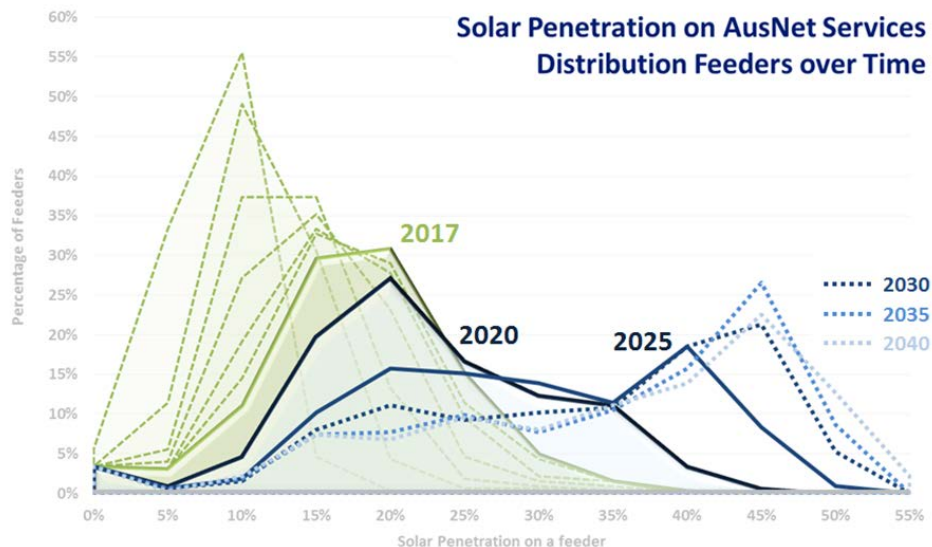
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approximately [C-I-C] over 2018 numbers. Rapidly falling costs of entry, performance, and policy changes could accelerate this take up.



In addition, while residential batteries are not anticipated to have widespread network penetration prior to 2025, it is likely that a cost tipping point will be reached in the five years following the 2022-26 regulatory period. Currently, residential battery penetration is running at approximately 0.02%, but this is forecasted to increase to approximately [C-I-C] of the network by 2030. The potential increase in penetration of electric vehicles is also forecasted to be exponential following the 2022-26 regulatory period, with numbers rising from 0.1% to approximately [C-I-C] of customers by 2030.

Managing power quality and voltage regulation in accordance with regulated thresholds is becoming increasingly difficult as DER, specifically solar, penetration increases across the network. This is foreseen to become more difficult with time, and additionally, it is likely that increasing DER will impose restrictions on customers adding DER capacity to the network.



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The consequence of this is that AusNet Services' conservatively forecasts that by 2021, around [C-I-C] of its distribution substations will require some kind of control or mitigation to manage solar PV impacts.

Reducing outage impact for customers

The current outage management systems rely on customers calling AusNet Services to report outages, and line crews having to be despatched to find, re-energise or repair effected circuits before services can be restored. Customers are also expecting greater reliability, resilience and predictability from a network that is both aging and rapidly changing.

We also anticipate that the frequency of planned maintenance related to outages on an ageing network are likely to increase to prevent an increase in unplanned outages. This is a global trend and there is no evidence to suggest that Australian and Victorian networks will be immune.

In addition, customers are increasingly expecting real-time communications, including information and updates on outages and expected restoration times, significantly improved integration with home automation, information and control systems and reduced outage durations.

Demand response management

Meeting peak demand poses significant network augmentation costs and investing to deliver reductions in peak load through demand management has the potential to avoid material costs.

Demand response management involves providing customers with price signals and rebates that encourage them to use energy, and manage their DER exports, in ways that reduce the cost of running the network. It can also involve AusNet Services undertaking control of load and generation assets at customer sites, through the development of demand response contracts with customers and remote technologies.

AusNet Services expects that it will be required to develop a demand response capability to meet the expectations of customers and policy makers during the next regulatory period. This capability exists for large commercial customers, and AusNet Services plans to develop this capability to provide demand response incentives for residential customers and customers with DER.

Implementing the network control required to orchestrate and operate demand response mechanisms will require integration with the distribution network control and management platforms, so that customer load and energy fed into the grid can be managed and controlled.

Distributed Energy Network Optimisation Platform (DENOP)

In the current regulatory period, AusNet Services is leading the development of two important, award winning trials incorporating customer-based DER into mini-grids. The DENOP (Distributed Energy Network Optimisation Platform), uses power data coming from the web based mini grid control system, combined with power data remotely received from the network at the point where the mini grid connects to the grid, to optimise power flows in the mini grid. These trials are ongoing and while AusNet Services' is continuing to learn from the operation of DENOP, it is clear that the platform will be important in facilitating third parties to provide mini-grid trading services to customers during the 2022-26 regulatory period. AusNet Services plans to operationalise DENOP as part of a flexible DER connection offer to customers over the 2022-26 regulatory period.

A future scenario of high DER is likely to involve multiple DER management platforms serving multiple customer types. AusNet Services can gain value and provide better customer outcomes through integration with these platforms to optimise/orchestrate DER operations against network parameters.

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Extending and facilitating mini-grids and DENOPS will be compromised if these systems are not visible, orchestrated, and controlled via the network control and management system.

Peer to Peer Energy Trading

While there is uncertainty on the extent and penetration of peer to peer trading schemes, it is anticipated that some participation, orchestration, and management of these customers will be required by 2025-26.

This project brief addresses the technical balancing of the network under peer to peer trading whereas the DER enablement brief addresses the facilitation of commercial peer to peer trading.

This program brief proposes three options to addresses these challenges:

- Maintaining the status quo.
- Implementing an ADMS platform.
- Implementing an ADMS platform with progressive integration of DENOPS, Peer to Peer energy trading and potential future demand response schemes.

The program recommends option 3 as best addressing these challenges given the associated costs, benefits, risks, and impacts on customer outcomes and business drivers. This analysis is discussed in sections 4 and 5.

3.2 Current limitations

AusNet Services' response to market, technology and regulatory forces during the current regulatory period has been focused on leveraging its core systems, information enablement, communication enablement, and security enablement.

With the focus on leveraging the core systems, a minor package/software life cycle upgrade was successfully performed on the Distribution and Outage Management System (DOMS) currently used to manage the electricity distribution network. This upgrade, which did not include data centre and infrastructure, ensured that AusNet Services has continued to operate a supported platform for managing the distribution network.

However, the current DOMS platform has been superseded as of 2017 and will be on limited vendor support post 2021. It is also not capable of delivering the functionality and capability required to manage the evolution and disruption foreseen on the distribution network over the next 3 – 5 years (see the table below).

Table 3-1 Current & Future Platform Requirements

Current Platform Capabilities	Capabilities Required (2021 >)
<ul style="list-style-type: none"> • Design focused on traditional outage management on the high voltage network and does not integrate with the low voltage network model or the Geographic Information System (GIS). • User interface is largely tabular and incapable of providing the feature rich visualisation required to manage the future grid. • Multiplicity of systems, information sources, and processes. 	<ul style="list-style-type: none"> • Broader platform focus on operating a dynamic distribution grid. • Centralised information and control platform for distribution network. • Geospatial network integration from zone substation to customer. • Advanced decision support, dashboards and visualisation capabilities. For example, required for effective management of Rapid Earth Fault Current Limiter (REFCL).

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Current Platform Capabilities	Capabilities Required (2021 >)
<ul style="list-style-type: none"> • Easy & timely access to critical information is challenging. • Switch planning is largely manual, time consuming, with limited automation or “smarts” (i.e. no predictive switching). • Outage planning is a manual process with limited automation requiring significant manual input, no automation, or automatic optimisation of customer impact. • Limited power system modelling capability. • Rigid setting and management of LV network (i.e. no dynamic voltage regulation capability). • Issue and fault diagnostics is a significantly manual process dependent on manual extraction and processing of data from multiple sources. • Very limited analytical or decision support capability exist. 	<ul style="list-style-type: none"> • Ability to model power and load flows on a replica of the network to improve predictive outage prevention and load management. • Smart outage job management capabilities to optimise outage planning and minimise customer impact. • Advanced voltage regulation capabilities. • Automated fault diagnostics and network switching capabilities. • Advanced customer focused network work scheduling and outage management capabilities. • Granular level access to network isolation capabilities. (for more localised customer impacts of planned work) • Drives empowerment of field crews with decentralised information and network control. • Decentralised network control via mobility.

These increasing capabilities requirements are not unique to AusNet Services. To remain compliant with regulations and achieve increasing outcomes for their customers, utilities globally are at this very same decision point, or have already begun their migration away from the legacy DOMS platform architecture and towards next generation, Advanced Distribution Management Systems (ADMS) platform architectures able to deliver the range capabilities discussed above.

3.3 Objective(s)

This program of work will deliver the following by 2026;

- A refresh to the core distribution network management platform that will progressively deliver the core capabilities required to operate the future dynamic grid on a supported, risk mitigated technology platform.
- Capability to allow AusNet Services to deliver on rising customer expectations for improved network performance, improved service delivery, and integration of information, and smart controls.
- The ability to incorporate, manage and effectively control the impact of DER on the AusNet Services network.
- A distribution network platform capable of integrating, managing, and controlling the introduction of DENOPS, demand response, and peer to peer energy trading schemes.
- New data centre solution for mission critical services that improves security, availability and performance.

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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”.

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

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

We consider that this program of work is a cornerstone to delivering all of these customer outcomes, for example, FDNM “**delivers on the basics**” as it delivers on the core competencies and functionality required to manage the distribution network in the future, it “**keeps me posted**” by providing customers with new avenues of communication with AusNet Services, it is “**affordable for me**” as the capabilities delivered will lead to reduction in operational costs over time, it is “**ready for the future**” as this program of work positions AusNet Services with a distribution network management capability that is future proof and has functional flexibility as the network and industry evolves, and it achieves “**always safe**” as the greater visibility associated with this program of work allows AusNet Services to retain safety of its customers and employees. We will further explore this in the discussions of each of the options.

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.

We consider that this program of work is relevant to all of the business drivers as it allows AusNet Services to remain at the forefront of energy transformation, it delivers the tools and capabilities required to drive meaningful efficiency improvements across its network, and will deliver a step change in improved customer services.

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4 Options

4.1 Overview

This section provides an overview of the options which may alleviate the current limitations.

Table 4-1 Brief overview of the options

Brief overview of each of the options	
Option 1	Maintain the status quo. Limited option that delivers only short term viability, imposes significant risk, and which requires complex development and integration to support network management post 2021.
Option 2	Implement an ADMS platform. Industry aligned migration away from legacy outage management focused platforms and on to next generation network and outage management focused platform.
Option 3 (Recommended)	Implement an ADMS platform and progressively integrate DENOPS, Peer to Peer energy trading and potential future demand response schemes.

4.2 Option #1 Maintain the status quo

This option is viable only for a limited period of 2 - 3 years. The consequence of adopting this option is that AusNet Services will be required to operate its distribution network on a legacy platform that is obsolete and outside of standard vendor support. This is not aligned with AusNet Services' core strategy or risk appetite. Customers are likely to be negatively impacted from both a system failure risk perspective and an inability to proactively manage outages and services in this increasingly dynamic network.

More critically, this option will not deliver the new capabilities and functions required to manage and control the distribution network post 2021. It will leave AusNet Services increasingly compromised in its ability to manage, control, and integrate the forecasted revolutionary changes to the network (for example DER, DENOPS, Peer to Peer Energy Trading, and increasing customer service expectations).

Proving the basic capability to support DER, DENOPS, Peer to Peer Energy Trading, etc., will require AusNet Services to deliver point solutions that will lead to increasing complex integration across disparate systems. Developing these "islands" of functionality will not deliver the integration, visibility, and control required to deliver the complex functionality and capability required to manage the network post 2021. Over time there is an increasing risk that this will lead to declining network reliability, increasing operational cost, reducing service levels, declining customer satisfaction, increasing customer impact, and potentially reduced safety for customers and field staff.

Accordingly, this option is considered as non-viable.

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Alignment to objectives

This option only partially achieves the intended objectives of this program of work, as shown in the table below.

Table 4-2 Objectives analysis of option 1

Objective		Alignment
Implement core technology platforms capable of supporting, orchestrating, managing and controlling the forecasted growth in DER, residential batteries, and Electric Vehicles	Partial	Limited. Will require development of point solutions that will require complex integration. Cost, risk and complexity will increase over time. Does not address platform end of life issues and will leave AusNet Services operating its distribution network on a platform with limited vendor support post 2021.
Supporting the requirement to incorporate, manage and control Demand Response (DR).	Partial	Limited. Will require development of point solutions once DR schemes mature. Will require complex integration to facilitate response control via network management system.
Supporting the requirement to incorporate, manage and control impact of DENOPS for AusNet Services customers.	Partial	Limited. Will require development of point solutions once DENOPS matures.
Support need to incorporate, facilitate and control (where applicable) Peer to Peer energy trading schemes.	Partial	Limited. Likely to require development of point solutions once Peer to Peer energy trading schemes matures.
Meet rising customer expectations for improved network performance, service delivery, integrated information, and smart control.	Partial	Some of these expectations can be met via current capabilities but as complexity on the network rises the cost to serve will increase and service performance diminish.

Costs

The following assumptions and drivers have been used when estimating the costs for this option.

Projects costs are based on delivering:

- A mandatory lifecycle hardware and operating system upgrade required to support the platform, address technology risk and security, and deliver the required high availability infrastructure solution required.
- Incorporating / retrofitting switching control (SCADA integration), Geographic Information System (GIS) model integration of the LV network.
- Development and incorporation of DENOPS / DER management and control within the AusNet Services network management platform and control room (refer DER initiative brief). Note costs to develop / purchase and integrate a range of point solutions in support of P2P Energy Trading are excluded from this option.

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Table 4-3 Costs - Option 1

(\$m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
Capex	\$3.92	\$1.96	\$1.96	\$0.98	\$0.98	\$9.81
Opex	\$1.16	\$0.58	\$0.58	\$0.29	\$0.29	\$2.90
Electricity distribution cost	\$5.09	\$2.54	\$2.54	\$1.27	\$1.27	\$12.71
Total program cost	\$5.09	\$2.54	\$2.54	\$1.27	\$1.27	\$12.71

Benefits

There are no quantifiable benefits over the status quo delivered by this option.

Risks

There are a number of risks associated with this particular option. Based on the consequence and likelihood of each risk, each of the individual risks have been rated as either blue, green, yellow, orange or red (order of severity). Attachment 1 – Risk level matrix for additional information on this rating system.

Table 4-4 Risks - Option 1

#	Risks	Consequence	Likelihood	Risk rating
R1.1	AusNet Services will be operating its distribution network on an obsolete platform on extended support, with no vendor commitment to resolve any faults or bugs rated by the vendor as lower than severity 2.	Level 4. The vendor will determine the severity and if lower than severity 2 there is no commitment from the vendor to resolve the issue.	Almost Certain	A
R1.2	AusNet Services' network distribution management processes unable to react to and evolve with rapidly evolving industry and network demands.	Level 3. Operational limitations, Increased safety risks to field staff and customers, decreased customer satisfaction	Likely	B
R1.3	Functional limitations within DOMS platform limit AusNet Services ability to integrate increasing DER.	Level 3: Decreased customer satisfaction & operational limitations	Likely	B

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R1.4	Functional limitations within DOMS platform limit AusNet Services ability to integrate and orchestrate DENOPS.	Level 3: Decreased customer satisfaction & operational limitations	Likely	B
R1.5	Functional limitations within DOMS platform limit AusNet Services ability to integrate and control and orchestrate P2P Energy trading schemes.	Level 3: Decreased customer satisfaction & operational limitations	Likely	B
R1.6	Functional limitations within DOMS platform result in outage management deteriorating as complexity increases across distribution network.	Level 3: Decreased customer satisfaction & operational limitations	Likely	B
R1.7	Customer impact increases and service performance is impacted as complexity increases across distribution network and DOMS platform is incapable of providing advanced management and control functionality required.	Level 3: Decreased customer satisfaction	Likely	B

As we have identified high risks and one extreme risk, overall we have rated this option Extreme.

Alignment to customer related drivers of expenditure

As discussed in Section 3.4, five key customer outcomes have been identified through discussions with customers. The table below highlights 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 4-5 Customer related drivers of option 1

Customer outcome	How this program achieves this
Deliver on the basics	Yes, over a limited time frame. Longer term the risk of running on unsupported platform outweighs any short term alignment to customer drivers or benefits.
Keep me posted	N/A
Affordable for me	Yes, over the medium term, but at the likelihood of significant costs over the longer term.
Be ready for the future	N/A
Always safe	N/A

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

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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 - 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 Implement an Advanced Distribution Management System (ADMS) platform

This option is about investing in the technology that delivers capabilities fundamental to managing the distribution network in a rapidly evolving landscape. It is a common sense and conservative approach that delivers a modern, industry standard foundational step while providing the time to fully consider the rapidly changing network and network management system landscape in the 2022-26 timeframe.

Like utilities globally, AusNet Services considers that investing in an ADMS is imperative as it is fundamental to remotely monitoring, operating and optimizing the distribution network in the 2022-26 regulatory period and beyond. Functions that AusNet Services view as being imperative and is indicative of a contemporary ADMS include automation of outage management, fault isolation and restoration, network fault location, voltage monitoring and management, peak demand management, improving service performance for customers, reducing outage impact, and reducing network operation costs.

The key operational capabilities and functionality to be delivered are as summarised below.

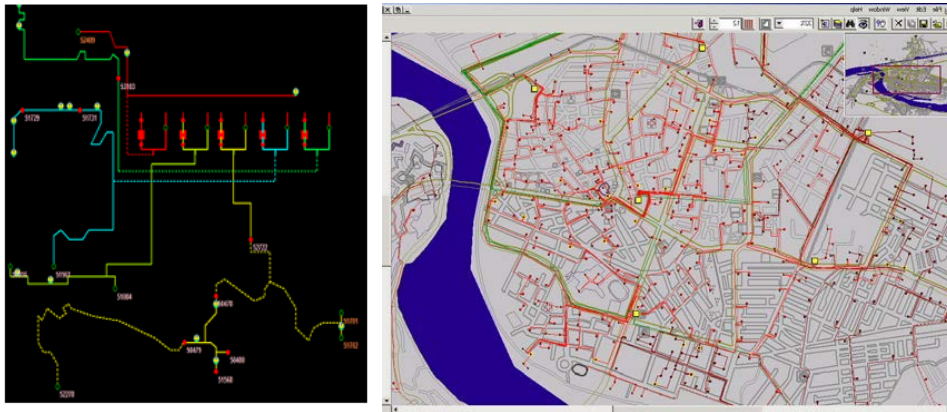
A supported Technology platform that will provide critical network management, monitoring, control and optimisation technology to enable the safe, secure and reliable support of the Electricity Distribution network.

A single consolidated network model:

The ability to view the AusNet Services Distribution network as a consolidated model that fully represents both the high (HV) and low (LV) voltage networks is a fundamental capability required to manage the network post 2021.

This consolidated network model must allow for both schematic and geographic representations of the network.

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Visualisation:

The tabular and largely textual information displays prevalent with current technology will not be effective for management of networks that have bi-direction energy flows, DER, significantly increased expectations of customer service delivery, and service performance (i.e. outage and restoration time minimisation). Advanced graphic displays that consolidate data and deliver real time insights to the operator are critical requirements for network operations in this new environment. Key candidates for visualisation include;

- Visibility of all customers (including critical care, life support, unmetered connections, essential services, and critical loads) at both the schematic and geographic level.
- Real-time visibility of customer supply status.
- Network faults (cause, impact, restoration times), threats (weather, traffic, etc.), operational conditions (supply, demand, volts, etc.).

Predictive network analytics, network modelling and load forecasting:

Effectively controlling and managing the distribution network in the face of the anticipated changes and disruptions will be extremely difficult and inefficient without the ability to both model load scenarios and perform predictive analytics on the network. The capabilities vital to managing the network include;

- The ability to incorporate near real-time to real-time visibility of HV-LV network modelling, including the ability to dynamically manage voltage fluctuations.
- The ability to predict network failures and faults through network condition monitoring, maintenance and condition alerting systems.
- The ability to perform comprehensive load flow modelling, what-if analysis, and forecasting on a near real time replica of the network.

Network control, management and automation:

The increasing penetration of DER, electric vehicles, and residential storage will demand new management capabilities. Implementing an ADMS will allow AusNet Services to;

- More easily integrate DER (consumption and generation) across the LV network.
- Visualise the impact of DER on network operations in near, or close to real time.
- Implement proactive demand management practices that may include configuration of network parameters at HV and constrained LV locations (e.g. tap changer positioning, voltage control parameters, phase shifting, etc.).

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- The ability to remotely manage customer supply either in response to demand response initiatives, planned/unplanned outages, load management, emergencies, etc.
- Provide visibility of real time data (such as load flow, consumption, maximum loads, etc.) in to the external systems used to manage DENOP, DR, and Peer to Peer energy trading platforms.
- Implement Automatic Fault Detection, Isolation, and Restoration required to deliver on the rising service expectations of customers.
- Implement intelligent switch planning that will create and validate increasingly complex switching orders that will be optimised to reduce both network and customer impact.
- Active voltage regulation is likely to become a requirement within the FY2022-26 regulatory period timeframe. While it is unclear how low voltage regulation will be implemented; the most likely scenario is for a fleet of embedded IOT devices that will require integration with the ADMS for visibility, orchestration and control.

Outage and works management:

Optimising and improving management of works and planned outage scheduling, and unplanned outage management are critical capabilities required to manage the increasing expectations of AusNet Services' customers. Key capabilities AusNet Services intend to implement include;

- Network condition monitoring to allow for predictive and proactive outage planning.
- Centralising work management and crew management using visualisation capabilities delivered by this platform. Visibility of progress and restoration time updates will be visible online and in real time.
- Field crews will be connected to the centralised network management platform, and will have ability to view network status online and in real time.
- Field crews will have a range of remote capabilities, including the ability to perform simple network functions remotely, as well as communicate updates on restoration times online from the field.
- Improved insight to customer connections at the low voltage level to better understand and manage impact (i.e. connected phase).

Proposed implementation approach:

AusNet Services is proposing a staggered approach to implementing ADMS capability and functions across the distribution network. The approach is designed to initially mitigate end of life risk with the current platform, and once this is complete, progressively implement the advanced capabilities and functionality available.

The proposed approach allows AusNet Services to take a measured approach to addressing risk, and defining and implementing its distribution network management and control platform strategy.

The proposed approach is as outlined below.

Table 4-7 Implementation Phases – Option 2

Component	Major Deliverables
Infrastructure Platform Refresh (Prerequisite)	Refresh and uplift of core infrastructure and services within data centre and supporting infrastructure to deliver a high performance, secure, and high availability platform.

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Component	Major Deliverables
Implement new ADMS platform	Refresh current DOMS on to next generation ADMS platform.
Model alignment, new capability delivery Program and implementation sequence to be determined	<ul style="list-style-type: none"> • Implementation of low voltage network on ADMS platform. Includes substation to customer mapping (model alignment between DMS and Geographic Information System (GIS)). Delivers; <ul style="list-style-type: none"> ✓ Delivers functional and data alignment between GIS and DMS platform ✓ Enhanced network visualisation capabilities ✓ Control and management of the end to end distribution network ✓ Visualisation and enhanced management of customers. • Implementation of network control functionality within ADMS platform (model alignment between ADMS and SCADA switching and control platforms. Delivers; <ul style="list-style-type: none"> ✓ Functional and data alignment between SCADA and new DMS platform ✓ Advanced distribution network control functionality required to manage a dynamic grid. • Decentralisation of switching operations. <ul style="list-style-type: none"> ✓ Delivers functionality and capability to allow local field control of the network to significantly improve customer response, and reduce outage durations.

Alignment to objectives

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

Table 4-8 Objectives analysis of Option 2

Objective	Alignment
Implement core technology platforms capable of supporting, orchestrating, managing and controlling the forecasted growth in DER, residential batteries, and Electric Vehicles	<p>✓</p> <p>This option fully supports the increasing penetration of DER across the distribution network.</p> <p>It provides the control tools and visibility to integrate and manage DER on the AusNet Services network.</p> <p>Supports opportunity to integrate additional low voltage sensors on the grid as required.</p>
Supporting the requirement to incorporate, manage and control Demand Response (DR).	<p>✓</p> <p>This option sets the capability framework to deliver the functionality required to adequately integrate, manage, and control customers subscribing to future DR schemes.</p>

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Objective		Alignment
Supporting the requirement to incorporate, manage and control impact of DENOPS for AusNet Services customers.	✓	This option sets the capability framework to deliver the functionality required to adequately integrate, manage, and control customers subscribing to future DENOPS programs.
Support need to incorporate, facilitate and control (where applicable) Peer to Peer energy trading schemes.	✓	This option sets the capability framework to deliver the functionality required to adequately integrate, manage, and control customers subscribing to future peer to peer energy trading schemes.
Meet rising customer expectations for improved network performance, service delivery, integrated information, and smart control.	✓	This option fully supports and delivers the capabilities and functionality required by AusNet Services to meet rising customer expectations of service, network performance, reducing costs, reduced outages, and improved communication and integration.

Costs

Table 4-9 Costs - Option 2

(\$m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
Capex	\$6.20	\$4.95	\$3.71	\$4.95	\$4.95	\$24.80
Opex	\$0.93	\$0.74	\$0.56	\$0.74	\$0.74	\$3.70
Electricity distribution cost	\$7.13	\$5.70	\$4.27	\$5.70	\$5.70	\$28.50
Total program cost	\$7.13	\$5.70	\$4.27	\$5.70	\$5.70	\$28.50

Note costs to develop / purchase and integrate point solutions in support of DENOP, P2P Energy Trading and DR are excluded as this is captured in option 3.

Benefits

The benefits of implementing an ADMS solution are summarised below. Note that the benefits of this program are interdependent with the program of work outlined in the *Integration of Distributed Energy Resources* program brief.

- Reduced unplanned outages through improved asset management and outage planning
- Improved customer satisfaction, asset, network and service reliability by reducing network events and incidents
- Improved connectivity and performance for customer DER.

Risks

There are a number of risks associated with this particular option. Based on the consequence and likelihood of each risk, each of the individual risks have been rated as either blue, green, yellow, orange or red (order of severity). Attachment 1 – Risk level matrix for additional information on this rating system.

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Table 4-10 Risks – Option 2

#	Risks	Consequence	Likelihood	Risk rating
R2.1	AusNet Services' network distribution management processes unable to react to and evolve with rapidly evolving industry and network demands.	Level 3. Operational limitations, Increased safety risks to field staff and customers, decreased customer satisfaction	Unlikely	D
R2.2	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate increasing DER.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C
R2.3	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate and orchestrate DENOPS.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C
R2.4	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate and control and orchestrate P2P Energy trading schemes.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C
R2.5	Customer impact increases and service performance is impacted as complexity increases across distribution network and ADMS and associated platform are incapable of providing advanced management and control functionality required.	Level 3: Decreased customer satisfaction & operational limitations	Unlikely	D
R2.6	Customer demand for improved service performance, greater visibility and integration outpaces ADMS delivery program.	Level 3. Decreased customer satisfaction	Unlikely	D

We consider that overall this option is rated medium risk.

Alignment to customer related drivers of expenditure

As discussed in Section 3.4, five key customer outcomes have been identified through discussions with customers. The table below highlights the how this option will achieve these outcomes.

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Table 4-11 Customer related drivers – Option 2

Customer outcome	How this program achieves this
Deliver on the basics	The fundamental aims of this option are to deliver the core competencies and functionality required to manage the distribution network beyond 2021. It is aimed at delivering network management that delivers safety, predictable service delivery to customers, improved service levels and reduced costs.
Keep me posted	The greater visibility and visualisation capabilities delivered by an ADMS will allow for significantly improved visibility of customer impact. This will lead to reduced outage times and for new avenues of communication with customers to be developed.
Affordable for me	The capabilities delivered by an ADMS will over time lead to reduction in operational costs as efficiencies and savings are realised across a range of technology and operational capabilities.
Be ready for the future	In addition to delivering on the basis, this option is all about positioning AusNet Services with a distribution network management capability that is future proof over the foreseeable future. It provides a modern ADMS platform that is extensible and has the functional flexibility to evolve as the distribution network and industry evolves.
Always safe	The greater visibility, visualisation, network control, enhanced outage planning, and eventually distribution network switching will allow AusNet Services to retain safety of its customers and employees as a key driver.

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.

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Table 4-12 Business related drivers – Option 2

Business drivers	How this program achieves this
Lead energy transformation, embracing change	This option allows AusNet Services to embrace and effectively react to the disruption and evolution foreseen to occur across the distribution network and industry.
Drive efficiency and effectiveness throughout the portfolio	The program of work outlined delivers a range of capabilities vital for driving efficiency and effectiveness. It delivers the tools and platforms required to integrate, manage, control a range of evolutionary products and services such as increasing DER, DENOPS, demand response, and peer to peer energy trading.
Generate trust and respect with customers and partners	This program is fundamental to AusNet Services continuing to be able to deliver a level of service performance that meets customer and partner expectations.

4.4 Option #3 – Implement an ADMS and progressively integrate DENOPS, Peer to Peer energy trading and potential future demand response schemes (RECOMMENDED)

This option is based on implementing an ADMS as outlined in option 2, but with scope extended to include progressive integration with DENOPS, Peer to Peer energy trading and DR schemes anticipated to be prevalent by 2023.

While it is unclear exactly how AusNet Services' network control platforms will be required to interact with these emerging technologies and platforms, it is assumed that integration will be required as these technologies mature, and orchestration, management and control of DER either transitions over to, or becomes more tightly coupled with, the ADMS. Key integration points are foreseen to include:

- Integration of distribution demand planning (i.e. forecasting, network sensing, modelling, and demand management planning) with the real time operational view of the network.
- Network operations that incorporates embedded DER and provides dynamic orchestration and control.
- Dynamic configuration of network parameters across the MV and LV networks, for example including voltage control through transformer tap changes, phase shifting.

It is foreseen that DENOP, Peer to Peer, and DR functionality will continue to evolve over the FY2022-26 regulatory period. It is foreseen that components of the DSO framework will operate external to the ADMS environment, and that functional integration will become more complex as products and systems mature.

This option is recommended as it deliver the ADMS capabilities fundamental to managing the future grid, and also allows AusNet Services take a flexible and considered approach to integrating DENOP, Peer to Peer and Demand Response as market forces and technology maturity dictate.

Proposed Implementation Approach:

AusNet Services is proposing that the integration of DENOPS, etc., occur after the implementation of the ADMS outlined in option 2.

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Table 4-13 Implementation Phases – Option 3

Component	Major Deliverables
Infrastructure Platform Upgrade (Prerequisite)	Upgrade and uplift of core infrastructure and services within data centre and supporting infrastructure to deliver a high performance, secure, and high availability platform.
Implement new ADMS platform	Upgrade current DOMS on to next generation ADMS platform.
Model alignment, new capability delivery Program and implementation sequence to be determined	<ul style="list-style-type: none"> • Implementation of low voltage network on ADMS platform. Includes substation to customer mapping (model alignment between DMS and GIS). Delivers; <ul style="list-style-type: none"> ✓ Delivers functional and data alignment between GIS and DMS platform ✓ Enhanced network visualisation capabilities ✓ Control and management of the end to end distribution network ✓ Visualisation and enhanced management of customers. • Implementation of network control functionality within ADMS platform (model alignment between ADMS and SCADA switching and control platforms. Delivers; <ul style="list-style-type: none"> ✓ Functional and data alignment between SCADA and new DMS platform ✓ Advanced distribution network control functionality required to manage a dynamic grid. • Decentralisation of switching operations. <ul style="list-style-type: none"> ✓ Delivers functionality and capability to allow local field control of the network to significantly improve customer response, and reduce outage durations. • Implementation of integration with external DENOPS, Peer to Peer, and DR platforms with ADMS platform. <ul style="list-style-type: none"> ✓ Delivers two-way data flows, and centralised orchestration, control and management of all aspects of the distribution network.

Alignment to objectives

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

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Table 4-14 Objectives analysis of option 3

Objective		Alignment
Implement core technology platforms capable of supporting, orchestrating, managing and controlling the forecasted growth in DER, residential batteries, and Electric Vehicles	✓	This option fully supports the increasing penetration of DER across the distribution network. It provides the control tools and visibility to integrate and manage DER on the AusNet Services network. Supports opportunity to integrate additional low voltage sensors on the grid as and when they come along.
Supporting the requirement to incorporate, manage and control Demand Response (DR).	✓	This option sets the capability framework to deliver the functionality required to adequately integrate, manage, and control customers subscribing to future DR schemes.
Supporting the requirement to incorporate, manage and control impact of DENOPS for AusNet Services customers.	✓	Fully supports and integration of DENOPS with the centralised ADMS.
Support need to incorporate, facilitate and control (where applicable) Peer to Peer energy trading schemes.	✓	Fully supports and integration of Peer to Peer and DR with the centralised ADMS.
Meet rising customer expectations for improved network performance, service delivery, integrated information, and smart control.	✓	This option fully supports and delivers the capabilities and functionality required by AusNet Services to meet rising customer expectations of service, network performance, reducing costs, reduced outages, and improved communication and integration.

Costs

Table 4-15 Costs – Option 3

(\$m)	FY2022	FY2023	FY2024	FY2025	FY2026	Total
Capex	\$6.61	\$5.14	\$5.14	\$5.87	\$6.61	\$29.37
Opex	\$0.23	\$0.18	\$0.18	\$0.20	\$0.23	\$1.00
Electricity distribution cost	\$6.83	\$5.31	\$5.31	\$6.07	\$6.83	\$30.37
Total program cost	\$6.83	\$5.31	\$5.31	\$6.07	\$6.83	\$30.37

- Capex costs are based on delivering the phased work program outlined in *Table 4-9*
- Costs for integration of DENOPS, Peer to Peer, and DR schemes have been included (refer supporting briefs covering these programs).

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Benefits

The benefits of implementing an ADMS solution are summarised below. Note that the benefits of this program are interdependent with the program of work outlined in the *Integration of Distributed Energy Resources* program brief.

Ability to better integrate customer DER across the AusNet Services network and reduction in rejected DER connection applications

- Improved customer satisfaction, asset, network and service reliability by reducing network events and incidents

Improved voltage compliance across network

Reduced risk of damage to customer equipment caused by thermal overload resulting from poorly integrated or visible DER

- Improved access to timely and accurate service information (supply, incidents, outages and restoration times) for customers
- Reduced unplanned outages through improved asset management and outage planning
- Reduced customer outages through improved situational awareness allowing network controllers to make more informed and proactive decisions on day-to-day operation of the network
- Visibility of critical care, life support, unmetered connections, critical loads and essential services when making operational decisions
- Reduced risk of customer impact through supply voltage variations caused by poorly integrated DER (flickering lights, damaged equipment, etc.)
- Improved connectivity and performance for customer DER
- Reduced peak demand on network by introducing technology solutions to orchestrate, manage, and integrate demand response capabilities
- Improved network planning and operating tools required to cater for community parameters such as Total Fire Ban (TFB), Heat Health Days, and Rapid Earth Fault Current Limiting (REFCL)
- Simplification of ICT landscape supporting network operations, planning and design.

Risks

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

Table 4-16 Risks – Option 3

#	Risks	Consequence	Likelihood	Risk rating
R3.1	AusNet Services' network distribution management processes unable to react to and evolve with rapidly evolving	Level 3. Operational limitations, Increased safety risks to field staff and customers,	Unlikely	D

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	industry and network demands.	decreased customer satisfaction		
R3.2	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate increasing DER.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C
R3.3	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate and orchestrate DENOPS.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C
R3.4	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate and control and orchestrate P2P Energy trading schemes.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C
R3.5	Customer impact increases and service performance is impacted as complexity increases across distribution network and ADMS and associated platform are incapable of providing advanced management and control functionality required.	Level 3: Decreased customer satisfaction & operational limitations	Unlikely	D
R3.6	Customer demand for improved service performance, greater visibility and integration outpaces ADMS delivery program.	Level 3. Decreased customer satisfaction	Unlikely	D

We consider that overall this option is rated medium risk.

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Alignment to customer related drivers of expenditure

As discussed in Section 3.4, five key customer outcomes have been identified through discussions with customers. The table below highlights the how this option will achieve these outcomes.

Table 4-17 Customer related drivers – Option 3

Customer outcome	How this program achieves this
Deliver on the basics	The fundamental aims of this option are to deliver the core competencies and functionality required to manage the distribution network beyond 2021. It is aimed at delivering network management that delivers safety, predictable service delivery to customers, improved service levels and reduced costs.
Keep me posted	The greater visibility and visualisation capabilities delivered by an ADMS will allow for significantly improved visibility of customer impact. This will lead to reduced outage times and for new avenues of communication with customers to be developed. Customers will have access to more on-demand insightful information
Affordable for me	The capabilities delivered by an ADMS will over time lead to reduction in operational costs as efficiencies and savings are realised across a range of technology and operational capabilities. Furthermore, ADMS will support and allow for the possibility of peer-to-peer trading, generating more value to customers.
Be ready for the future	In addition to delivering on the basic, this option is all about positioning AusNet Services with a distribution network management capability that is future proof over the foreseeable future. It provides a modern ADMS platform that is extensible and has the functional flexibility to evolve as the distribution network and industry evolves. This will also include delivery of additional benefits and operational efficiencies relating to integration of DENOPS, peer to peer trading and reduction in outages by moving switching to the field.
Always safe	The greater visibility, visualisation, network control, enhanced outage planning, and eventually distributed network switching will allow AusNet Services to retain safety of its customers and employees as a key driver.

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.

Program Brief**Table 4-18 Business related drivers – Option 3**

Business drivers	How this program achieves this
Lead energy transformation, embracing change	This option allows AusNet Services to embrace and effectively react to the disruption and evolution foreseen to occur across the distribution network and industry.
Drive efficiency and effectiveness throughout the portfolio	The program of work outlined delivers a range of capabilities vital for driving efficiency and effectiveness. It delivers the tools and platforms required to integrate, manage, control a range of evolutionary products and services such as increasing DER, DENOPS, demand response, and peer to peer energy trading.
Generate trust and respect with customers and partners	This program is fundamental to AusNet Services continuing to be able to deliver a level of service performance that meets customer and partner expectations.

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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' 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 Option Assessment

	Option 1	Option 2	Option 3 (Recommended)
Alignment to objective	Poor alignment to program objectives and introduces significant technology and operational risks.	Aligned to all program objectives.	Fully aligned to objectives and allows for progressive, flexible and considered approach to integrating DENOP, Peer to Peer and Demand Response as market forces and technology maturity dictate.
Costs	\$12.71M	\$28.50M	\$30.37M
Overall risk rating	Extreme	Medium	Medium
Alignment to customer related drivers of expenditure	Low alignment (2/5)	High alignment (5/5)	High alignment (5/5)
Alignment to business related drivers of expenditure	No alignment (0/3)	High alignment (3/3)	High alignment (3/3)

Based on this assessment, Option 3 is the recommended option as it delivers the range of capabilities and functionality required to manage the future grid. It reduces AusNet Services risk exposure.

Option 1 must be considered non-viable as it does not deliver the fundamental uplift in network management capability demanded by the rapid changes occurring across the energy industry and distribution network. It is the lowest cost but leaves AusNet Services exposed to significant technology and operational risks.

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Option 2 can be viewed as the minimum viable option. This option will still deliver the ADMS capability required to manage the rapidly evolving distribution network, but without the integration of DENOPS, Peer to Peer, and Demand Response schemes.

The principle difference between options 2 and 3 is the integration between distribution management and DENOPS and that provides AusNet Services with the ability to balance the network under very high levels of DER penetration rather than relying on customer's tripping off the network. So in technical terms, option 2 and 3 are equivalent but in customer experience terms option 3 would be much closer to what customers have told us they want under higher penetration of DER.

5.2 Recommended option

Option 3 is the recommended option for the reason outlined in section 5.1 above. It reflects a prudent and efficient program of work. The recommended option delivers strong alignment to objectives and allows for a progressive, flexible and market driven approach to integrating DENOP, Peer to Peer and DR.

The program of work associated with Option 3 is as outlined below:

New Platform / Core Capabilities:

- New core infrastructure and services within the data centre to deliver a high performance, secure, and highly available platform.
- Either an upgrade to AusNet Services' current DOMS platform, or a new implementation of a next generation ADMS platform.

New Operational Functionality & Integration:

- Implementation of low voltage network on ADMS platform. Includes substation to customer mapping (model alignment between DMS and GIS).
- Implementation of network control functionality within ADMS platform (model alignment between ADMS and SCADA switching and control platforms)
- Decentralisation of switching operations.

Integration with Associated and Dependent Programs/Projects:

- Future Ready Forecasting Model – integration of forecasting with near real time replica of operational network.
- HV LV Modelling (full) - integration of HV/LV network load flow modelling and analytics with near real time network replica and ADMS platform.
- GIS Network Data Quality Improvements - Work to improve the quality of data in the GIS. Dependency to allow implementation of LV model in ADMS.
- Demand Response Management Enablement – Integration of orchestration and control of demand response incentives for residential and DER customers.
- Distributed Energy Resource Control/Optimisation (DENOP) – Integration of orchestration and control to expand and productionise the DENOP platform under trial in the current period
- Peer to Peer trading – Integration of orchestration and control (if and where required) with third party trading platforms.

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The risks associated with the delivery of this program are outlined in the following table (referring to the Risk Matrix in Attachment 1) and a mitigation approach is described for each one.

Table 5-3 Option 3 risks and mitigation actions

#	Risks	Consequence	Likelihood	Risk rating	Mitigation
R3.1	AusNet Services' network distribution management processes unable to react to and evolve with rapidly evolving industry and network demands.	Level 3. Operational limitations, Increased safety risks to field staff and customers, decreased customer satisfaction	Unlikely	D	Improve forecasting and modelling capabilities outlined in this and the associated Integration of Distributed Energy Resources (DER) brief to ensure that AusNet Services monitors and manages the integration of DER on its network. Ensure that inter-dependencies are understood and managed.
R3.2	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate increasing DER.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C	Robust requirements tracking, change management, and program governance to ensure DER integration is managed in accordance with standard AusNet Services project and program governance methodologies.
R3.3	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate and orchestrate DENOPS.	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C	Robust requirements tracking, change management, and program governance to ensure DENOP integration is managed in accordance with standard AusNet Services project and program governance methodologies.
R3.4	Functional and integration limitations across ADMS and associated platforms limit AusNet Services ability to integrate and control and orchestrate Peer	Level 4: Decreased customer satisfaction & operational limitations	Unlikely	C	Robust requirements tracking, change management, and program governance to ensure peer to peer trading scheme integration is managed in accordance with standard AusNet Services project and program governance methodologies.

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#	Risks	Consequence	Likelihood	Risk rating	Mitigation
	To Peer Energy trading schemes.				
R3.5	Customer impact increases and service performance is impacted as complexity increases across distribution network and ADMS and associated platform are incapable of providing advanced management and control functionality required.	Level 3: Decreased customer satisfaction & operational limitations	Unlikely	D	<p>Continue engagement with customer forums to ensure that potential impact is identified, understood and managed.</p> <p>Implement monitoring and alerting tools aimed at emerging trends.</p>
R3.6	Customer demand for improved service performance, greater visibility and integration outpaces ADMS delivery program.	Level 3. Decreased customer satisfaction	Unlikely	D	<p>Work with industry peers and customer focus groups to ensure that emerging customer demand is identified early.</p> <p>Improve forecasting and modelling capabilities outlined in this and the associated Integration of Distributed Energy Resources (DER) brief to ensure that AusNet Services monitors and understands the operational impact of a rapidly evolving network.</p>

Table 5-4 Confirmation of scope of recommended option

In scope	Out of scope	Dependencies
Initiatives listed in Recommended option.	To be defined.	Future Ready Forecasting Model
		HV LV Modelling (full)
		GIS Network Data Quality Improvements

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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