



AusNet Transmission Group Pty Ltd

Transmission Revenue Review 2017-2022

Appendix 4H: ICT Strategy 2017-2022 Electricity Transmission Network

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Electricity Transmission Network – ICT Strategy

Documentation Distribution

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1. Executive Summary

This Strategy document outlines the strategic direction and forecast capital expenditure to deliver AusNet Services' information and communication technology (ICT) capabilities for the Electricity Transmission Network for the five years from FY 2018 – FY 2022 TRR regulatory period.

1.1 ICT drivers and priorities

The key drivers of the ICT strategy for FY 2018 – FY 2022 period are:

- Supporting the achievement of corporate, business, network and asset strategies;
- Maturing the capabilities of ICT to better support business operations;
- Reducing ICT Capex requirements while realising the full value of existing investments;
- Controlling ICT Opex and delivering efficient ICT operations.

In conjunction with the above drivers, AusNet Services recognises that significant market trends and uncertainties will impact the business operations of ICT, including both external and technology drivers.

External Drivers include changing regulatory requirements and increased security threats:

- Industry requirements for more granular and specific compliance and regulatory reporting in recent years. For example, the AER requires AusNet Services to provide detailed business operations data, physicals and financial datasets to support benchmarking and regulatory decision making
- The risk of security attacks (both physical and cyber) has been steadily growing over the past decade due to a changing technological and political environment. These threats are of particular concern for corporations tasked with supplying and maintaining critical infrastructure such as electric transmission.

Technology Drivers include the focus on ICT / OT convergence, the rise of cloud services and the utilisation of information management as a key enabler to decision making.

- The convergence of ICT/OT, is a growing trend throughout the electricity transmission industry, allowing information to be unified and developing a 'single source of truth' for all assets and resources in the network.
- The emergence of cloud computing has provided electricity organisations with the flexibility and scalability to determine how they will manage their data services and capital investments. As cloud computing services mature, the risk profile of using these services reduces, in turn increasing the applicability to companies that manage sensitive and confidential data.

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- The utilisation of big data has enabled AusNet Services to synthesise and utilise vast sums of data to generate more actionable insights and make the information more readily available to decision makers, regardless of their location. This allows organisations to extend the useful life of assets, increase utilisation and reduce costs through process optimisation and/or improved management of risks.

In response to these drivers, the priorities for ICT in the FY 2018 - FY 2022 period are:

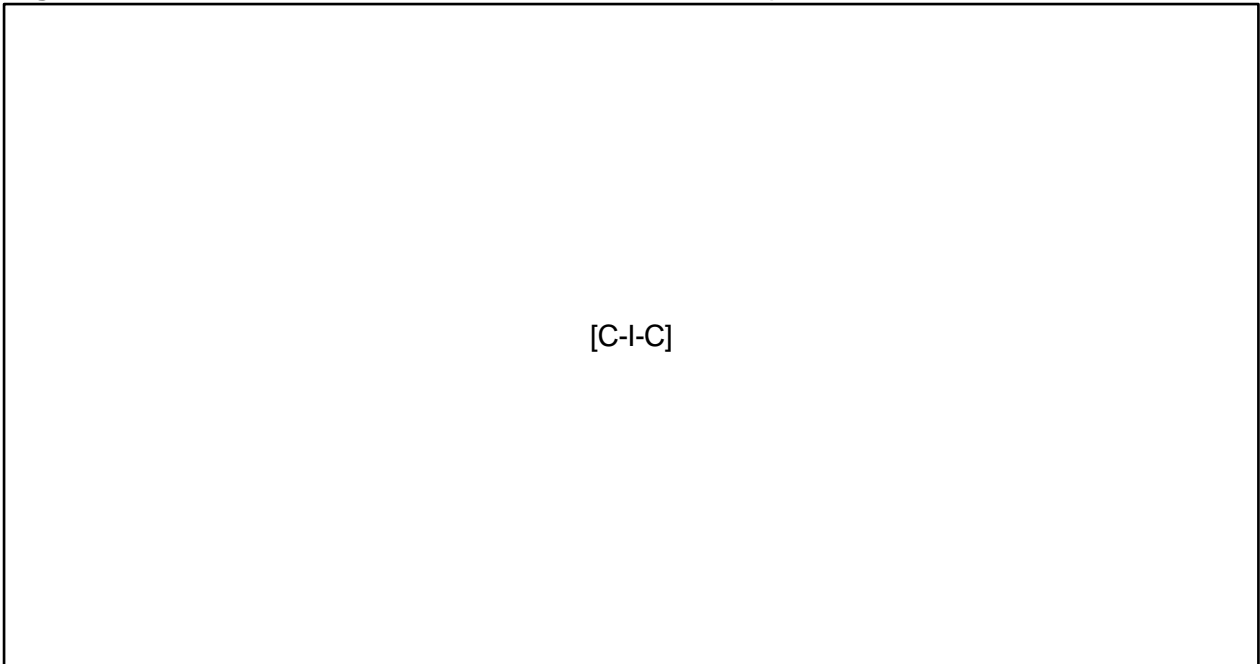
- Leverage Core – simplify the ICT landscape and leverage efficiencies and costs across the distribution (electricity and gas) and transmission networks;
- Information Enablement – build data and analytics capabilities enabling improved business-led and contextual decisions;
- Communications Enablement – build communication capabilities that enable effective management of networks and assets; and
- Security Enablement – protect our customer/business information and revenue.

These are supported by improved capabilities in portfolio and project management and the implementation of an updated project delivery model which features a system integrator panel.

1.2 Current Period Performance

For the TRR regulatory period FY2015 - 2017 AusNet Services' actual (and estimated) capex spend is \$[C-I-C] against an AER determination of \$[C-I-C], representing a forecasted underspend of \$[C-I-C] (\$Mar '17, including overheads). During this period, the focus for capital investment has been on developing enterprise wide capabilities across asset and resource management, consolidating and standardising technologies and supporting business processes to promote a more collaborative and effective operating model. The ICT capital investments have delivered the following capabilities:

- Enterprise Asset Management / Enterprise Resource Planning (EAM / ERP) transformation;
- Replacement, rationalisation and consolidation of ICT infrastructure;
- Enhanced network resilience and safety through improved network management and outage management;
- Establishing enterprise data warehousing and data visualisation; and
- Replacement, consolidation and/or integration of systems to support multiple business functions.

Figure 1: AER Determination vs Actual / Estimated TRR Spend FY 2015 - 2017*

The EAM/ERP program successfully delivered [C-I-C] in FY2015 and constitutes a significant proportion of spending in the current period. In FY2016 ICT capital expenditure will be lower to limit the rate of technology change being placed upon the organisation and concentrate efforts on embedding [C-I-C].

During the period, having bedded down [C-I-C], AusNet Services will revert to more regular capex levels and undertake a number of investments in lifecycle replacement and [C-I-C]-dependent initiatives which were deferred to prioritise the EAM/ERP.

1.3 Forecasted Period Capex

For the FY2018 – 2022 regulatory period, AusNet Services will continue to focus on the modernisation of the ICT landscape, through the continued leveraging of enterprise solutions including EAM / ERP, the adoption of new technologies that utilise data to support network and ICT based decision making, and the replacement of ageing assets as aligned to the technology management lifecycles. AusNet Services has identified seven key domains of work:

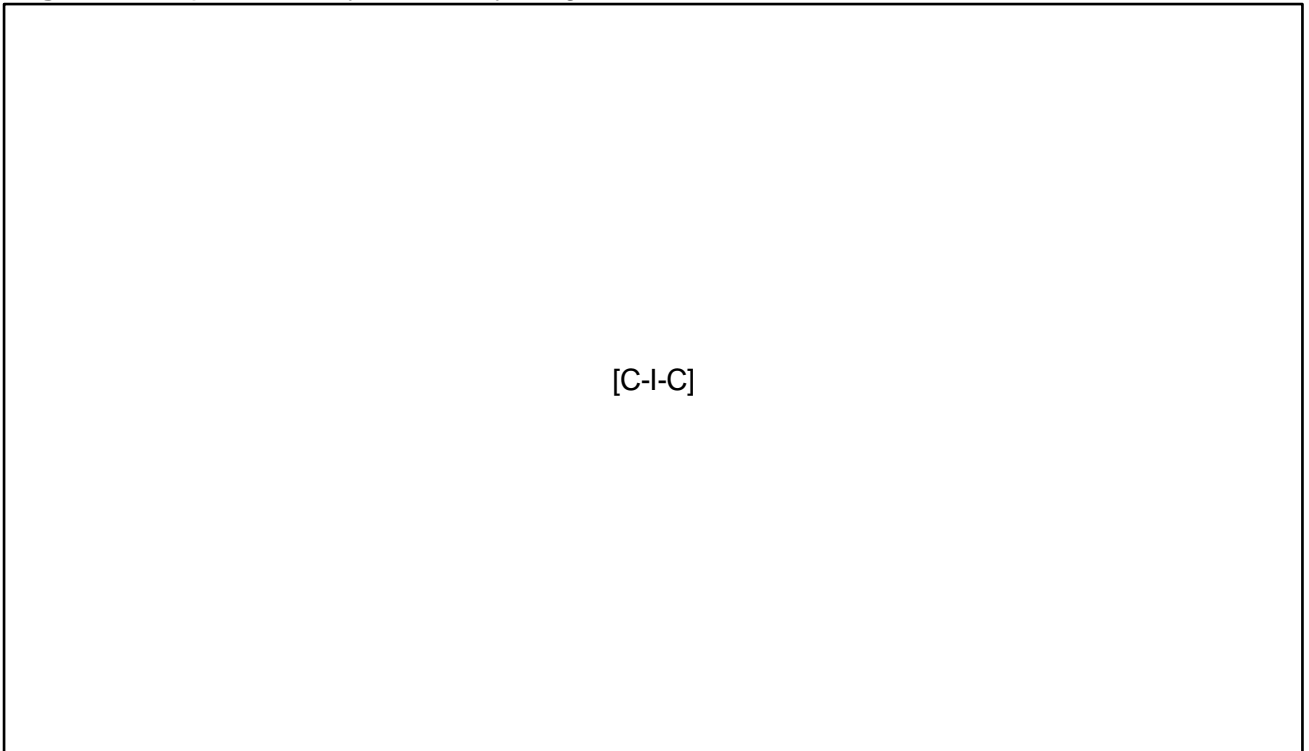
- **Network Management:** This program of works focuses on improving asset, network and service reliability in support of improving operational effectiveness and regulatory obligations. It achieves this by automating network monitoring and outage management processes, and providing improved visualisation of network management to improve timely decision making.
- **Works and Asset Management:** By leveraging the existing enterprise asset and work management (EAM/ERP) solution AusNet Services aims to further consolidate and modernise asset and resource management functions with a focus on extending the scope to remaining back office and field mobility operations. End of life applications are being consolidated and migrated to current platforms, simplifying the ICT landscape and ensuring systems are more robustly supported and extendable with more efficient system backed by automation.

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- **Corporate:** This domain focuses on leveraging existing enterprise solutions (EAM/ERP) and enhancing a number of back office and employee management systems, whilst performing system refreshes in line with the technology lifecycle.
- **Customer and Market Services:** This domain is focused on developing a business wide view of the customer and updating enterprise wide online platforms that interface with the internal and external stakeholders, to promote improved information dissemination and build on the established capabilities at AusNet Services.
- **Information Technology (Infrastructure):** The program of work aims to simplify the current ICT landscape, utilise advancements in cloud computing, and perform prudent refreshes of key infrastructure including storage, enterprise servers, desktop and laptop fleet, corporate network and communications.
- **Information Management:** In an environment where the requirements for volume of data captured are increasing exponentially, this domain focuses on building the relevant data storage and analytics capabilities to store, manipulate and present data to drive intelligent decision making and provide a consistent view of data across the organisation. It also focuses on ensuring the appropriate information standards and governance to underpin data quality.
- **Information Security:** The key initiatives in this domain focus on implementing new technologies and capabilities to address cyber-risks posed to the business, extending the reach and capability of the Information Security Management System (ISMS), and maintaining the effectiveness of existing controls to protect the transmission networks against a dynamic and rapidly changing cyber-threat environment. Central to these objectives is conforming to ISCERT standards for the security framework.

The forecasted cost for the FY2018 – FY2022 capital investment program of work mentioned above is \$[C-I-C] (\$Mar '17, including overheads). The annual forecast, by domain is shown in the figure below. As outlined, AusNet Services expects a reduction in ICT Capital investment year on year through the next regulatory period (FY2018 – FY2022). The major investment in the current period (FY2015 – FY2017) has established the platform for ongoing ICT capabilities and the forecast program of work will leverage these existing capabilities.

Figure 2: Proposed Yearly CAPEX by Program of Work for TRR FY 2018 – FY 2022



1.4 Benefits and Outcomes

Throughout FY2018 – FY2022 ICT will continue to play an increasingly critical role in supporting business at AusNet Services. AusNet Services will invest in a program of ICT capital works to leverage and extend the existing ICT capabilities to fully realise the potential of current ICT investments and deliver an improved network service.

The ICT program of work will focus on extending the scope and maturity of asset management, field services and employee management capabilities, whilst improving data led decision making, and promoting a safe and reliable transmission network. The key benefits are:

- Improved resilience and reliability of the network through enhanced network monitoring and outage management;
- Improved workforce / public safety through more mature field operations and improved safety management;
- Improved regulatory compliance through enhanced data auditing and reporting capabilities.
- Controlled recurrent ICT capital and operational expenditure through prudent ICT lifecycle management;
- Improved field mobility services to support the effectiveness of field operations and support network management;
- Improved ICT security through automated security monitoring and proactive security incident management;

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- Timely and informed decision making based on high quality information and improved analytical and reporting capabilities across the whole business;
- Improved employee management capabilities creating a more effective workforce and improved retention of talent. A more effective workforce supports improved operational process and the retention of talent limits the loss of valuable Intellectual Property (IP) from the organisation; and
- Improved customer service and engagement based on advanced customer relationship management across the whole of the business.

2. Document Overview

2.1 Purpose

The Electricity Transmission Network Information and Communication Technology Strategy (ICT Strategy), sets the direction and defines an actionable ICT program of work to meet the business's requirements for FY 2018 - FY 2022. The ICT strategy has been created to articulate and support the forecast ICT Capex required to manage the AusNet Services Electricity Transmission Network. This document:

- Articulates the key areas of focus for ICT investment, key risks, key programs, costs and service standard outcomes;
- Defines linkages of the ICT Strategy to the overarching Asset Management Strategy (AMS) and underpinning Asset Management Plan; and
- Consolidates existing strategy documentation that may predate this document.

2.2 Scope

The ICT Strategy is aligned to the AusNet Services Asset Management Strategy (AMS) – AMS-01-1 Electricity Transmission – Asset Management System Overview and is supported by the ICT Technology Plan. The scope of this document is limited to:

- ICT solutions required to support the AMS (including information management, ICT applications, and communications technology);
- The Electricity Transmission Revenue Reset (TRR) period FY 2018 - FY 2022; and
- AusNet Services' Regulated Electricity Transmission business.

This document excludes:

- In-field Network Operations infrastructure such as SCADA terminal units and dedicated SCADA serial network (described in the document AMS Electricity Transmission – Network Submission);
- Communications strategy (described in detail in the document AMS 10-81 Electricity Transmission - Communications Systems);
- ICT solely in support of AusNet Services' electricity distribution and gas distribution networks (described in documents: Information and Communication Technology Strategy CY2013 – CY2017 Gas Distribution Network and Electricity Distribution Network: Information and Communication Technology Strategy CY2016 - CY2020); and
- ICT in support of AusNet Services' unregulated business activities.

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All cost and benefit estimates provided in this document are, except where otherwise indicated, restricted to:

- All dollar values represent \$Mar '17 Australian dollars;
- All dollar values refer to direct costs only (and will either include or excludes overheads); and
- All forecasted values are based on current project priorities.

2.3 Structure

This document is structured as follows:

- **ICT Capex in Context:** This section outlines the context for AusNet Services' ICT in CY2015 at the start of the control period. [Appendix A – TRR FY 2018 - FY 2022 – Methodologies and Processes](#) provides further support to this section defining the key processes and frameworks that underpin the development of the ICT Regulatory proposal.
- **2011-15 Historic Capex:** This section provides a high level overview of the projects completed during the current Electricity Transmission Revenue Reset (TRR) period (FY 2015 - FY 2017). [Appendix B – TRR FY 2018 - FY 2022 – Detailed Historical Programs](#) describes in further detail the investments and how they contribute to the strategic direction of AusNet Services, as well as any variances in actual capex against regulatory allowance.
- **Forecasting Methodology:** This section identifies ICT guiding principles and key strategies based on those principles to direct AusNet Services' investment in technology solutions. This section is further supported by [Appendix C - TRR FY 2018 - FY 2022 ICT Strategic Approach](#) that further outlines business and ICT drivers, emerging trends and technologies that inform these ICT strategies and where synergies have been leveraged across the different energy networks and business divisions. It also provides an overview of the challenges and opportunities of AusNet Services' application and technology environments and the gap between current and target future capability.
- **Forecast:** This section provides a blueprint of the future application, information, communication and technology environments and outlines the high level forecast ICT program. It concludes with a summary of ICT Operating Expenditure requirements to support the planned Capital program. [Appendix D – TRR FY 2018 - FY 2022– Detailed Program of Work](#) provides detail pertaining to proposed programs, benefits to the business and customer, and analyses regarding options considered to ensure prudence of ICT expenditure are then set out.
- **Delivery:** This section details the processes and controls that AusNet Services uses to meet its delivery commitments under the current and future ICT Plans given their scale and complexity.
- **Glossary:** This section defines key terminology used to describe the program.
- **Appendix:** Lists further information used to support the proposed program.

2.4 Approach

This ICT Strategy is informed by:

- Enablement of the corporate strategic objectives and relevant business plans;
- Business needs and expectations based on the AMS;
- Customer and community needs and expectations;
- Performance of the current ICT environment;
- Opportunities and implications created by trends and emerging technologies;
- Australian Energy Regulator (AER) assessment criteria; and
- Capital and operating expenditure requirements and the prudence and efficiency of these investments.

AusNet Services performs ICT planning in line with the business planning cycles, which are impacted by:

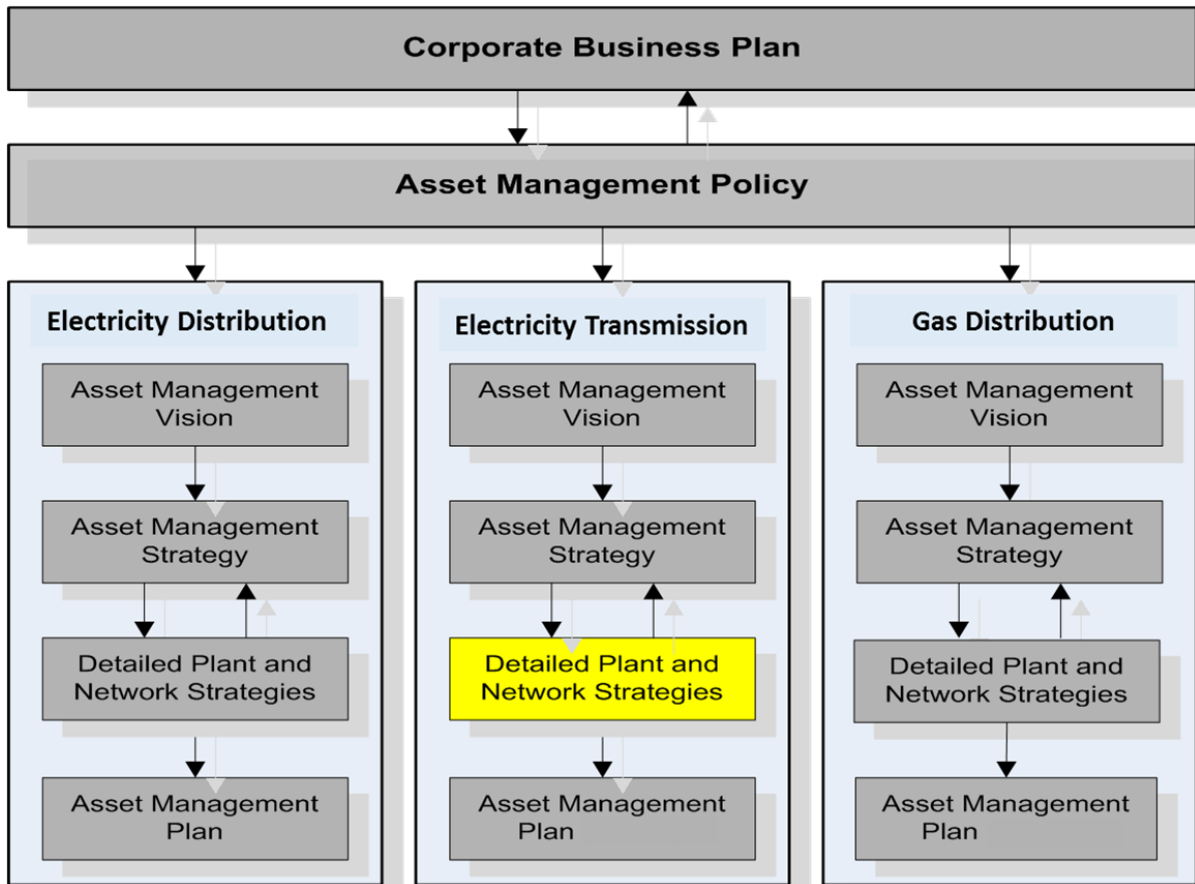
- 5 yearly reviews in line with regulatory periods;
- Yearly reviews in line with yearly business plans; and
- As required to respond to internal or external changes.

ICT consults across all relevant areas of the business to obtain insight into key drivers, trends and strategic direction. External consultants and ICT service providers have also been used to provide industry benchmarks and budget estimates to validate the efficiency of ICT expenditure.

The ICT Strategy is one of a number of asset management related documents developed and published by AusNet Services in relation to its Electricity Transmission network. As indicated in the below figure, detailed plant strategies, in which the ICT Strategy belongs, informs both the AMS and Asset Management Plan (AMP) of the required capital and operational programs needed to achieve the long-term objectives of the Electricity Transmission network.

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Figure 3: AMS Document Interdependencies



3. ICT Capex in Context

3.1 ICT Capex Lifecycle

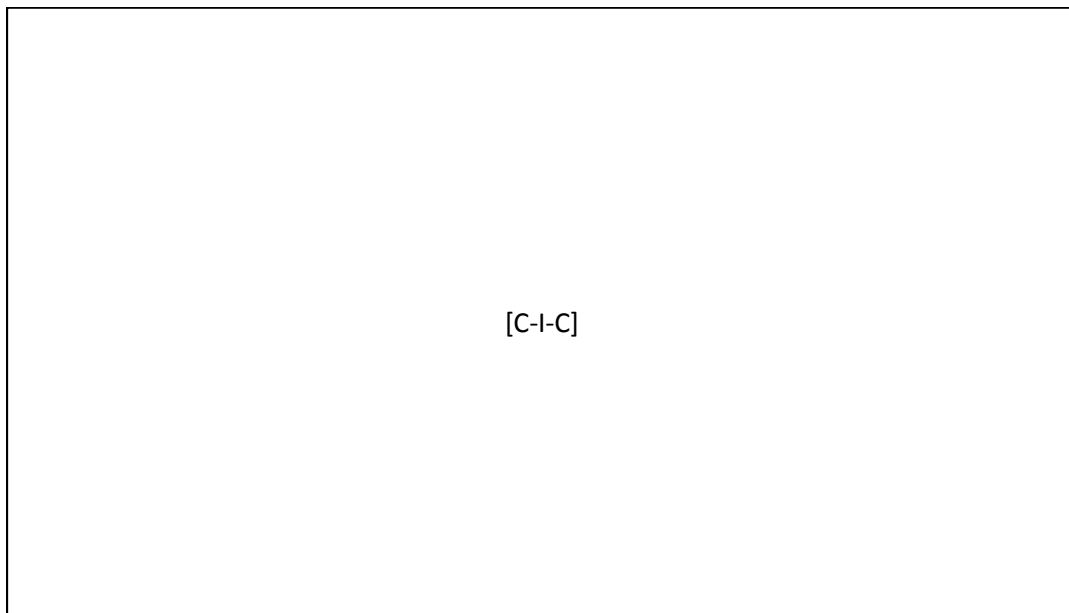
During the current regulatory period FY2015 – 2017, ICT capital investment has focused on modernising and enhancing core ICT capabilities. AusNet Services is forecast to spend \$[C-I-C] against an AER Determination of \$[C-I-C]. This represents an underspend of -[C-I-C] which accounts to [C-I-C] % of the total spend.

A major initiative has been undertaken in the current period to standardise the way in which ICT is managed and introduce new business tools. This has seen AusNet Services invest ICT capex in delivering and implementing an EAM/ERP solution using [C-I-C]. This required an increase in non-recurrent capex to establish this new capability, with total ICT capex peaking in FY 2015. This peak in Capex expenditure is largely complete resulting in the Capex forecast for the next period reducing.

The strategic importance of the enterprise foundation EAM/ERP solution to the business has seen the ICT division focus its effort and resources on achieving a successful implementation of this enterprise program. Given this prioritisation, capex in FY 2016 is expected to be lower than ICT capex in previous years. This prioritisation of the EAM/ERP project has meant that a number of recurrent spend programs are deferred.

A consequence of the above is that in the next period it is important that the business ensure it completes remaining planned programs identified in the IT & Communications asset lifecycle management framework (recurrent capex), continuing to maintain our asset base in a prudent and efficient manner. The completion of deferred programs from the previous submission period leads to a comparatively high recurrent ICT capex forecast for FY 2018 – 2022.

Figure 4: AusNet Services' Spend vs Actual / Estimated



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In conjunction with the EAM / ERP implementation, AusNet Services undertook the following series of ICT Capex projects this period:

- Enhanced network resilience and safety through improved network management and outage management: Ongoing investment has occurred in the maintenance of existing network management and outage management capabilities. A planned technology lifecycle software upgrade of the SCADA network management solution is due to commence in FY2016-FY2017. Investment in outage management reporting tools will allow AusNet Services to reduce dependency on manual processes (and duplicate data entry) for transmission outage planning and management, and provide the appropriate reporting capabilities to conform to associated National Electricity Rules (NER) and AEMO requirements.
- Lifecycle replacement, rationalisation and consolidation/extension of ICT infrastructure: This program of work focused on enabling the ongoing operations of core ICT systems and platforms through the replacement of ageing assets and prudent investment to increase the capacity of existing infrastructure.
- Improved data warehousing and data visualisation: In the current regulatory period a foundation enterprise data warehouse program is being implemented as part of the transition to the EAM / ERP (including ETL and BI functionality) to improve data storage and analysis capabilities for cross functional analysis and reporting. These data warehouse capabilities will be further enhanced during the next period. In conjunction with this, the implementation of a reporting dashboard will provide greater visualisation of network and business data to enable more effective and timely decision making.

The key outcome associated with the above program of work is the ability to modernise and integrate key technology systems. This has enabled AusNet Services to continue to develop a holistic view of the business and develop more effective operational and back office processes, driven by data integration, automation and the use of enhanced reporting and analytic capabilities to support improved information led decision making. Other key outcomes associated with the Transmission program of work are:

- A technology platform that can be scaled to meet the evolving customer, stakeholder and business needs;
- Ability to maintain the quality, reliability and security of electricity supply through proactive management of the network assets and reduced risk of system failure ;
- Sustainable operating cost containment through more efficient and effective asset management and supporting processes ;
- Enhanced decision making driven by intelligent data analysis and reporting capabilities across the enterprise; and
- Improved the Transmission network customer experience through enhanced network reliability and improved engagement across the AusNet Services business.

3.2 Evolution of ICT at AusNet Services

In order to meet the changing demands of the transmission business, AusNet Services has developed a fit for purpose ICT operating model and technology landscape. Underpinned by business and ICT strategies, AusNet Services has continued to pro-actively plan and evolve ICT, aligning investment to customer, network, enhance analytics and key stakeholder drivers. In the current regulatory period FY2015 – FY2017 the focus of investment was on the transformation of ICT from a support network to a key enabler of business operations, through the implementation of enterprise wide technology systems. In the next regulatory period FY2018 – FY2022 the focus of investment is on embedding and extending the scope of these enterprise wide technology systems, ensuring that AusNet Services fully realises the proposed outcomes.

Table 1: AusNet Services' Transformation of ICT Environment

[C-I-C]

3.2.1 Current Regulatory Period (FY2015 – FY2017)

In the current regulatory period (FY2015 – FY2017) the focus of investment has been on the transformation and consolidation of ICT applications, and supporting business processes. This transformation has commenced with the implementation of an Enterprise Asset Management Enterprise Resource Planning (EAM/ERP) solution, and the ongoing integration of this solution into the AusNet Services ICT environment. This solution has allowed AusNet Services to modernise the overall ICT environment, avoid technological obsolescence and achieve economies of scale across the AusNet Services enterprise. This program of work has provided the foundation for AusNet Services to transition to a more efficient, scalable and sustainable delivery model, whilst providing a cost effective platform to better leverage future ICT investments. In conjunction, investment has been made in the strategic consolidation and integration of business systems across the transmission business including the integration of the geo-spatial database platform (GIS), and the telecommunications spatial system ([C-I-C]) to a [C-I-C] solution to support engineering design and asset management processes. Investment has also been made in sustaining the ongoing operations of the core ICT systems through the replacement, upgrade and rationalisation of core ICT infrastructure. During this time, AusNet Services identified a number of opportunities to change the delivery scope of several proposed programs of work therefore reducing overlap and duplication with

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the enterprise EAM / ERP implementation. This included leveraging ERP functionality to avoid the need for some investments (e.g. enterprise portal, analytics and reporting) and reallocating funds to realise benefits of the EAM/ERP solution and capitalise on these opportunities.

Prior to this period the focus for investment in ICT was on maintaining and consolidating the legacy suite of ICT systems, resulting from the merger of TXU and AusNet Services, and the movement from a lease based model to an owner-operate model.

3.2.2 Next Regulatory Period (FY2018 – FY2022)

For the FY2018 – 2022 regulatory period, AusNet Services will continue to focus on the modernisation of the ICT landscape, through the continued embedding of change associated with the deployment of enterprise solutions, and the replacement of ageing assets as aligned to the technology management lifecycles. Building upon the core enterprise capabilities delivered in the current regulatory period, AusNet Services will expand the footprint of the ERP solution through the consolidation and replacement of legacy solutions in Works and Asset Management and Corporate domains. This will lead to integrated and standardised business processes and sustainable operating cost containment. It is expected that through the rationalisation of legacy ICT systems operating costs will also be contained in line with ICT's ongoing focus on total cost of ownership for assets.

With the major investment in [C-I-C] during the current regulatory period, AusNet Services made the conscious decision to change the scope of the ICT technology roadmap. Some programs of work were rationalised, others deferred based on changing business imperatives and risk based prioritisations.

Information Management and the use of enhanced analytics is a key focus of investment in the next regulatory period. Following increased internal business demand for improved data analytics, in conjunction with advancements in available technology, AusNet Services will look to enhance existing capabilities and create opportunities to exploit advancements in the data capture and analysis technology. This will drive improved decision making, in both a corporate and operational capacity, and support more proficient business processes, and the maintenance of a reliable and resilient network.

[C-I-C]

AusNet recognises that the rate and scope of change impacting ICT has been extensive over the current regulatory period. External drivers including advancements in technology and the increased compliance requirements from regulators (including the AER annual benchmarking reporting) have meant that AusNet Services is developing an ICT landscape that is resilient and able to meet changing demands, whilst at the same time leveraging core investments to enable further improvements in business operations. The modernised ICT environment established in the FY2018 – FY2022 period will provide the basis to enable the business to deal with the uncertain future.

4. FY 2015 – FY 2017 Historic CAPEX

4.1 Actual Capex against regulatory allowance

For the current TRR regulatory period FY2015 - 2017 AusNet Services' actual (and estimated capex spend in \$Mar '17 dollars is \$[C-I-C] (including overheads) against an AER determination of \$[C-I-C]. This represents a forecasted underspend of -[\$[C-I-C]].

Detailed accounts of the actual capex spend against AER allocation can be found in [Appendix B – Current Period CAPEX](#).

Table 2: Actual CAPEX against regulatory allowance

	AER Determination	Actual/Estimate	Variance
CAPEX <i>\$Mar '17 including overheads</i>	\$[C-I-C]	\$[C-I-C]	-\$[C-I-C]

AusNet Services delivered its capital investment program across seven domains of work:

- Asset & Works Management;
- Corporate ;
- ICT Infrastructure and Operations;
- Information Management;
- Information Security;
- Network Management;
- Customer Care.

Whilst the majority of projects were delivered within the domains forecasted, a number of key projects (e.g. EAM / ERP implementation mentioned below) are enterprise wide and so straddle multiple domains.

The FY2015 – FY2017 ICT investments enable AusNet Services to increasingly automate and standardise business processes, centralise and integrate information, and provide a sustainable and scalable platform to meet current and strategic business needs. Below we outline the key projects delivered as part of the current regulatory period.

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4.1.1 EAM / ERP

During the current TRR regulatory period of FY2015 – FY2017 the focus of AusNet Services' capital investments was the implementation of the foundational enterprise wide EAM / ERP solution. The purpose of this program was to modernise and simplify the overall ICT environment, avoid technology obsolescence and achieve economies of scale across AusNet Services' transmission business. This has enabled AusNet Services to develop advanced capabilities in asset and resource management, improving business effectiveness and employee and customer engagement. The scope of the foundational EAM / ERP solution focused on Works and Asset Management and Corporate functionalities, with specific reference to:

- Enterprise Asset and Works Management;
- Enterprise Project Management;
- Enterprise HR and Payroll;
- Enterprise Financials; and
- Corporate Risk Management.

The foundation phase of the EAM / ERP solution was completed in May 2015. The key outcomes delivered to the AusNet Services business were:

- Consolidation of legacy systems and the standardised use of a core enterprise wide application. This created integrated business processes and foundations to enable operational efficiency;
- The centralised access to real time business data, creating a single source truth for business information, ensuring greater data integrity and security through advanced user management and access control;
- Enhanced decision making driven by intelligent data analysis and reporting capabilities across the enterprise;
- A flexible technology platform that can be scaled to meet the evolving customer, stakeholder and business needs;
- Sustainable operating cost containment through more efficient and effective asset management and supporting processes ;
- Improved employee engagement by simplification and streamlining of business processes and system to perform tasks; and
- Improved the customer experience in dealing with all aspect of the AusNet Services business portfolio.

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A number of proposed ICT initiatives were rationalised as part of this EAM/ ERP program, allowing AusNet Services to minimise overlaps and duplication of effort across the portfolio.

The EAM / ERP solution consolidated and delivered business objectives from a number of individual projects, allowing AusNet Services to reduce the dependency on disparate legacy systems, standardise key operational processes and introduce new tools to support business capabilities. The list of rationalised projects that now form part of the EAM/ERP solution is shown below.

Table 3: AusNet Services' EAM / ERP Rationalised Projects

Program of Work	Project Name
Asset and Work Management	Enterprise Asset Management
	Enterprise Project Management Upgrade (EPM)
Workforce Collaboration	Enterprise Portal
	Workforce Mobile Computing
Back Office Management	Enterprise HR Consolidation
	Enterprise Financial Consolidation
	Corporate Risk Consolidation
Analytics and Reporting	Reporting Dashboard
ICT Infrastructure and Operations	Unix Management Tools
	Unix Server Hardware Refresh

In the next regulatory period FY2018 – FY2022, investments in the EAM / ERP program will focus on expanding the functionality and scope of the current solution (in areas such as regulatory reporting, risk management and digital platforms), improving employee management capabilities, and enhancing field mobility capabilities to improve customer response and safety.

4.1.2 Other Key ICT Capex Projects Delivered

Whilst the EAM / ERP program was a significant ICT Capex undertaking, in the current regulatory period FY2015 – FY2017 AusNet Services' ICT also undertook the following series of initiatives to support the business:

- Replacement, rationalisation and extension of ICT infrastructure: This program of work focused on enabling the ongoing operations of core ICT systems and platforms with minimal disruption to services and mitigation of operational risk. The replacement of aging assets and the extension of the current capacity were mandatory to ensure a robust infrastructure that supports the technology environment. Examples of key programs include the replacement of infrastructure assets in the data centre and the upgrade of key wintel server infrastructure in alignment with technology management lifecycles. This enabled AusNet Services to defer capital spend and supported a reduction in operational spend.

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- Enhanced network resilience and safety through improved network management and outage management: A planned technology lifecycle software upgrade of the SCADA network management solution is due to commence in FY2016-FY2017. Investment in outage management reporting tools is also planned and will allow AusNet Services to reduce the dependency on manual processes (with duplicate data entry) for transmission outage planning and management, and provide the appropriate reporting capabilities to conform to associated National Electricity Rules (NER) and AEMO requirements.
- Improved data warehousing and data visualisation: In the current regulatory period a foundation enterprise data warehouse program will be undertaken as part of the transition to the EAM / ERP (including ETL and BI functionality) to improve data storage and analysis capabilities for cross functional analysis and reporting. These data warehouse capabilities will be further improved during the next regulatory period. In conjunction with this, the implementation of a reporting dashboard will provide greater visualisation of network and business data to enable more effective and timely decision making.
- Replacement, consolidation and/or integration of systems to support multiple business functions: In conjunction with the EAM / ERP implementation AusNet Services has undertaken a program of work to integrate legacy technologies to create a single, holistic view of key areas of the business. This includes an integrated view of all program/project management activities, and real-time, geography-based view and remote management of the network.

Moving forward, AusNet Services will continue to leverage the investments made in core ICT capabilities to meet existing and future customer, regulatory and other stakeholder obligations. Furthermore, AusNet Services will seek to reduce ICT capital requirements and to control ICT operating expenditure in future regulatory periods.

For further information relating to the program delivered as part of the current regulatory period please refer to [Appendix B: Current Period CAPEX](#).

5. Forecasting Methodology

AusNet Services uses a three-stage delivery model for ICT across all its business activities, the first stage of which is the creation of a Technology Master Plan. The allocation of costs in this plan to the regulated electricity transmission business is the basis for the ICT forecast for the TRR. The section below describes the methodology.

5.1 Approach and Process

Figure 5: Development of Technology Master Plan



The figure above outlines the five stages in the development of the Technology Master Plan on which the TRR budgets are based. The sections following describe these processes in further detail.

6. Business Need

The statement of requirements for ICT is derived from an analysis of the strategic drivers on the AusNet Services' business and their implications for risk management. In partnership with the wider AusNet Services business, ICT devised a comprehensive list of requirements and defined the internal and external drivers that influence the future direction of the organisation.

6.1 Objectives

AusNet Services has key network objectives that guide how the Electricity Transmission network is operated and maintained. In a large part this reflects the regulatory obligations and prudent, efficient and sustainable management of the network. Achievement of these objectives ensures the long term health and sustainability of the network.

These objectives are:

- Meet or manage the expected demand for standard control services over that period;
- Comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;
- Maintain the quality, reliability and security of supply of standard control services; and
- Maintain the reliability, safety and security of the transmission system through the supply of standard control services¹.

These objectives are in line with the capital expenditure objective and criteria under the National Electricity Objectives (NEO) which are:

“...to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to –

- *Price, quality, safety, reliability, and security of supply of electricity; and*
- *The reliability, safety and security of the national electricity system.”²*

¹ Australian Energy Market Commission (AEMC), (Feb 2015). National Electricity Rules Version 68 – Section 6.5.6, p. 660.

² Australian Energy Market Operator (AEMO), (1996). National Electricity (South Australia) Act 1996, p. 38, (public version).

6.2 Drivers on the ICT function

The key implications of these objectives on ICT are:

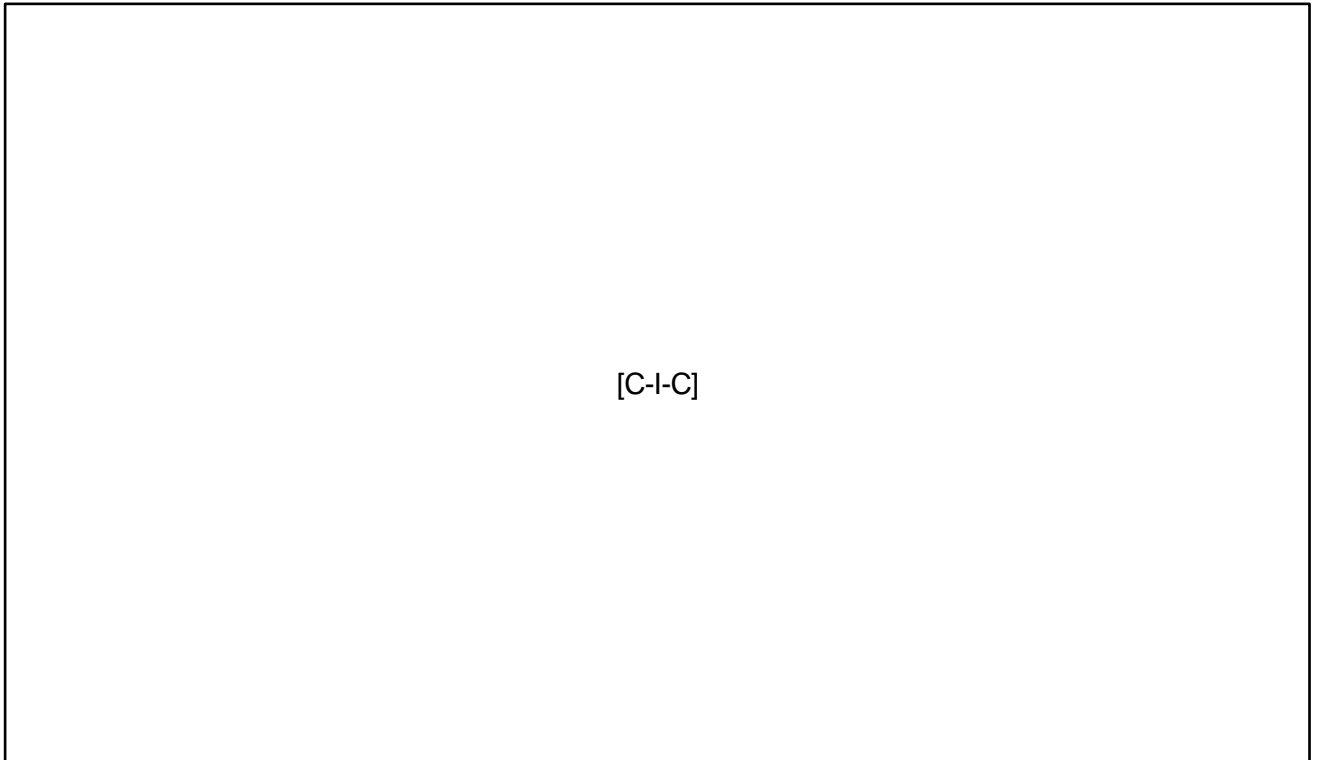
- Supporting the achievement of corporate, business, network and asset strategies;
- Reducing ICT Capex requirements as compared to previous periods while realising the full value of existing investments in terms of performance, resilience, reliability and risk;
- Controlling ICT Opex and delivering an efficient ICT operation while continuing to maintain appropriate standards of delivery and service;
- Managing the risk of ICT changes in the business environment such as increasing customer expectations;
- Adjusting to an environment of lower aggregate consumer demand;
- Technology environment impacts such as increased ICT/OT convergence; and
- Significantly increased data management requirements resulting from smart meters and other sensors.

In addition to these, ICT must also consider external drivers that impact and influence the business. The associated implications and outcomes as a result of external drivers are tabulated below.

6.3 ICT Drivers for AusNet Services

As part of the development of the current ICT strategy submission, AusNet Services engaged external consultants to identify key trends across the electricity business. The review utilised industry subject matter experts with a view of identifying how the trends impact AusNet Services, and can best be utilised to support AusNet Services' ICT strategy. This study is supported by a detailed assessment of the implications of trends on AusNet Services, as well as the constraints, risks and the impact of a move from the current to target state of organisational capability. This analysis is ultimately reflected in the initiatives which AusNet Services have elected to proceed with in the upcoming TRR period. The nine key trends that relate to the AusNet Services organisation are identified in the figure below.

Figure 6: Key Trends in the Electricity Transmission Industry



6.4 ICT Drivers for the Transmission Network

The majority of the trends highlighted above have implication on the transmission business. However, the three key trends that have significantly influence the transmission business are:

- Information Technology / Operational Technology (IT/OT) Convergence;
- Predictive analysis; and
- Information Security.

Each of the above is underpinned by upgrades and enhancements to **sensor technology** which gathers information on the status of assets in the network (e.g. the integration of SCADA real time network monitoring and enterprise asset management systems, to monitor the performance of assets and predict the maintenance and replacement schedules) and the large, complex datasets (e.g. petabytes of data) being collected to support enhanced decision making and insights, commonly referred to as **big data**.

ICT / OT Convergence

The convergence of ICT/OT, represented by utilising the underlying technologies and platforms used in ICT in an OT context, is a growing trend throughout the electricity transmission industry. In the past OT was traditionally limited to proprietary systems. However, current enhancements will allow this technology to leverage commercial operating systems to maximise the utility and ensure prudent expenditure to support all systems within the network. There is an increasing requirement to bring

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asset information into business oriented systems in order to continue to enhance existing platforms and maximise the utilisation of assets and resource.

An urgent need exists for new solutions that can provide more reliability and oversight in the network and that can better manage the cost of replacement. Currently AusNet Services has many disparate technology systems spread across the network, operating on specialised platforms. The convergence of ICT and OT would allow this information to be unified, driving maximum benefit from assets in the network. This can only be achieved through a more sophisticated view of network performance and a comprehensive picture of current asset health.

New substations and transformers that are available in the market are enabled with sensor technology and internal analytics and have the capability to actively report on their own condition and status. Without enhancements to the field monitoring tools and enterprise solutions, AusNet Services will now be in a position to capitalise on these new technologies and optimise their asset's utility. Similarly, new internet protocol interfaces for the current SCADA networks will leverage core capability into the new converging operating environment. By enabling the base of OT already in the network to communicate with new back office platforms, there is the ability to collate big data from disparate sources to drive value for the business. The increased view on the status of assets in the network yields data led decision making to determine whether to repair, refurbish, upgrade or replace equipment.

Predictive Analytics

Predictive analytics continually analyses the network to predict issues with assets and initiates automated responses or triggers notifications, without manual intervention. This can be utilised to predict failure patterns based on historic information or to optimise load across the network. Predictive analytics has the potential to be a key transformational driver in creating new opportunities to increase efficiency and utility of current resources at AusNet Services. Once information has been gathered from the network the challenge is how to harness the information to enable the business to make decisions and drive value.

With quality information from the network and clear business rules, predictive analytics can remove duplicated manual processes caused by disparate tools, linking them through ICT solutions and automation. This increases the quality and accuracy of information and save time. By supporting manual operations with automation, AusNet Services can maximise the value added by workforce with a common capability and consistent way of working. This in turn allows AusNet Services to create a single source of truth and leverage a unified, streamlined process.

To ensure that maximum value is delivered from predictive analytics, there needs to be a shift in focus, valuing data and information as a strategic asset, and this is clearly reflected in the new initiatives over this TRR period. The majority of spending is focused on enhancing the quantity, accuracy and utilisation of information held in the network.

Information Security

[C-I-C]

[C-I-C]

6.5 Key Electricity Industry Trends and Implications for AusNet Services

All investments made in ICT by AusNet Services are underpinned by a need to meet network and stakeholder demand, whilst complying with regulatory and external stakeholder’s requirements. AusNet Services investment supports upholding the quality, reliability of supply, whilst creating a resilient, safe and secure transmission system. There are also external forces both in the market and across the local and global landscape which influence ICT functions across the transmission business. The following table details these factors in detail and what their influence on ICT initiatives at AusNet Services.

Table 4 : AusNet Services ICT External Drivers

External Driver	Trends	Implications and Outcomes
Industry Regulations and Requirements (Regulatory Information)	<ul style="list-style-type: none"> AusNet Services is subject to changing regulatory and legal obligations and requirements. An example is the ‘Shared Asset Guidelines³’ which requires information requirements to support annual forecasts of benefits to customers when a network assets are being shared between unregulated and regulated services. 	<ul style="list-style-type: none"> AusNet Service’s initiatives in the current period are based on creating efficiency and deriving maximum value from the transmission network whilst exercising prudent investment decision making AusNet Services will continue to enhance and upgrade both the quality of data and analytics on the network and in turn create more accurate and timely reporting capabilities, increasing the reliability of the network This simultaneously increases the visibility and in turn reliability of the network The current initiatives being undertaken in the information security domain, have been identified based on new threats within the current and future business initiatives, and to accommodate threat forecast information in addition to providing coverage to the changing legislative environment. These include extensive upgrades to the authentication process to gain access to critical network information and assets, as well as monitoring and incident management/resolution

³ <https://www.aer.gov.au/networks-pipelines/guidelines-schemes-models-reviews/shared-asset-guideline>

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External Driver	Trends	Implications and Outcomes
<p>Business intelligence as a service</p>	<ul style="list-style-type: none"> • As more businesses attempt to capitalise on the data they collect to drive innovation and streamline operations, organisations have emerged that offer business intelligence as a service. These new offerings provide innovative and proprietary ways to analyse and give insights from big data in an outsourced model • The primary challenge in this space is the quality of insight derived from business intelligence based analysis is dictated by the quality of the data used 	<ul style="list-style-type: none"> • By enhancing and expanding the reach and relevance of data gathered on the network AusNet Services is establishing the foundation of a network poised to take full advantage of these advancements • This would allow AusNet Services to focus more on its core business and expertise • AusNet Services remains cognisant of these emerging technologies, whilst they are not yet at a maturity level that is directly applicable to the business
<p>Environmental Climate</p>	<ul style="list-style-type: none"> • In extreme weather conditions, particularly those around bushfires, AusNet Services has a key challenge caused by prolonged interruptions of service and increased risks to the community and employees 	<ul style="list-style-type: none"> • AusNet Services continues to enhance key components in the network to provide a more detailed view of their condition and status. This increased interoperability allows for optimised usage and servicing, increasing the safety and reliability of the network • By upgrading end of life components, AusNet Services is able to control outages and automate response in extreme conditions • By converting cumbersome legacy applications and manual process in to automated workflows with increased accuracy and efficiency, AusNet Services is able to more efficiently and effectively respond to outages in the network • By enhancing public safety and increasing organisational awareness of environmental risks AusNet Services will continue to comply with regulatory requirements, mitigate litigation and class actions, and protect the company’s reputation

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External Driver	Trends	Implications and Outcomes
OT Technology Lifecycle	<ul style="list-style-type: none"> Historical investment has focused on increasing OT investments to build up a base of data and visibility as to the status of the network, with a view of enhanced control. These existing systems have created large costs for minor enhancements to existing infrastructure that is nearing end of life. This includes expensive integration efforts to dated systems on proprietary platforms, and the requirement for specialised, highly trained individuals to understand network and asset interactions. 	<ul style="list-style-type: none"> New initiatives being undertaken in the current period will upgrade and enhance data gathering abilities across the network, with more accurate and detailed data. This will be integrated with the established and enhanced systems to extract relevant information, automating and creating actionable view of the network. New initiatives will focus on systems that not only gather the information but perform detailed analytics, automatically reacting and advising on corrective actions.
Cloud services and vendors	<ul style="list-style-type: none"> The emergence of cloud computing has provided electricity organisations with the flexibility to determine how they will manage data. A number of cloud providers offer managed cloud based database services, shifting the operational management to the vendor. An outsourced agreement limits the business' need to have experts in house and offers the ability to scale infrastructure and resources on a needs basis with a set cost structure. However, the key risks of outsourcing still remain security and a lack of control when issues arise. 	<ul style="list-style-type: none"> AusNet Services are preparing for the increasing volume of cloud technology through targeted pilots and will continue to evolve as time progresses.

For further information pertaining to the strategic approach driving the ICT Program, please refer to [Appendix C: ICT Strategic Approach](#).

7. Risks

AusNet Services uses a formal Risk Management approach to identify and manage risk as a means of providing customers with superior network and energy solutions. Details of the approach are set out in [Appendix A – Methodologies and Process](#).

For the period FY 2018 – FY 2022, the impact of changes to the business environment has been assessed using this approach. Summarising the themes identified yields five “Risk Themes” with implications for ICT.

Table 5: AusNet Services’ ICT Risk Themes

Risk	Consequences
<p>Risk Theme 1: Over-reliance on manual processes and individual Intellectual Property (IP) to support network management and outage management decisions.</p>	<p>Significant effort and subsequent costs required to manage the network and limited speed of response to unforeseen issues with the network and associated assets.</p> <p>An over-reliance on individual IP creates single points of failure for network management and creates a gap in capability if individuals are absent or leave the organisation.</p>
<p>Risk Theme 2: Failure to meet regulatory requirements and standards to meet network availability obligations.</p>	<p>Financial penalties and/or loss of licence, and major increase in customer power quality complaints, damaging corporate brand and customer satisfaction.</p>
<p>Risk Theme 3: Legacy systems reach end of life and maintenance / support costs increase (e.g. extended support arrangements).</p>	<p>A lack of investment in regular maintenance of ICT applications leads to issues where known defects are not addressed and workarounds are required. This increases the risk of performance and reliability issues with the application. When a defect is identified AusNet Services will expect vendors to resolve the issue as per the SLAs of the respective maintenance agreement. However, if AusNet Services does not perform regular refreshes the application may not be covered by the standard support arrangement.</p> <p>AusNet Services would then be required to either purchase extended support (which is costly) or undertake support services and customise the application. If the application fails, recovery could be lengthy and impact business operations.</p>

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Risk	Consequences
<p>Risk Theme 4: Inefficient processes to store, manage and retrieve information, as well as manage governance and risks.</p>	<p>No ‘Single Source of Truth’ to drive intelligent decision making. A lack of data integrity leads to inaccurate data analysis and decisions being made based on either incorrect or no supporting data.</p> <p>The absence of easily accessible data also impacts to the ability to perform internal / external stakeholder auditing and reporting including regulatory compliance reporting.</p>
<p>Risk Theme 5: Increased threat of Information Security breaches due to cyber-security risks.</p>	<p>Cyber intrusion onto the AusNet Services ICT network could lead to malicious activity to access and collect confidential data or cause disruption to the ICT network.</p> <p>A cyber-attack against AusNet Services’ ICT network could impact the operations of the electricity transmission network and therefore the stability of the electricity supply.</p>

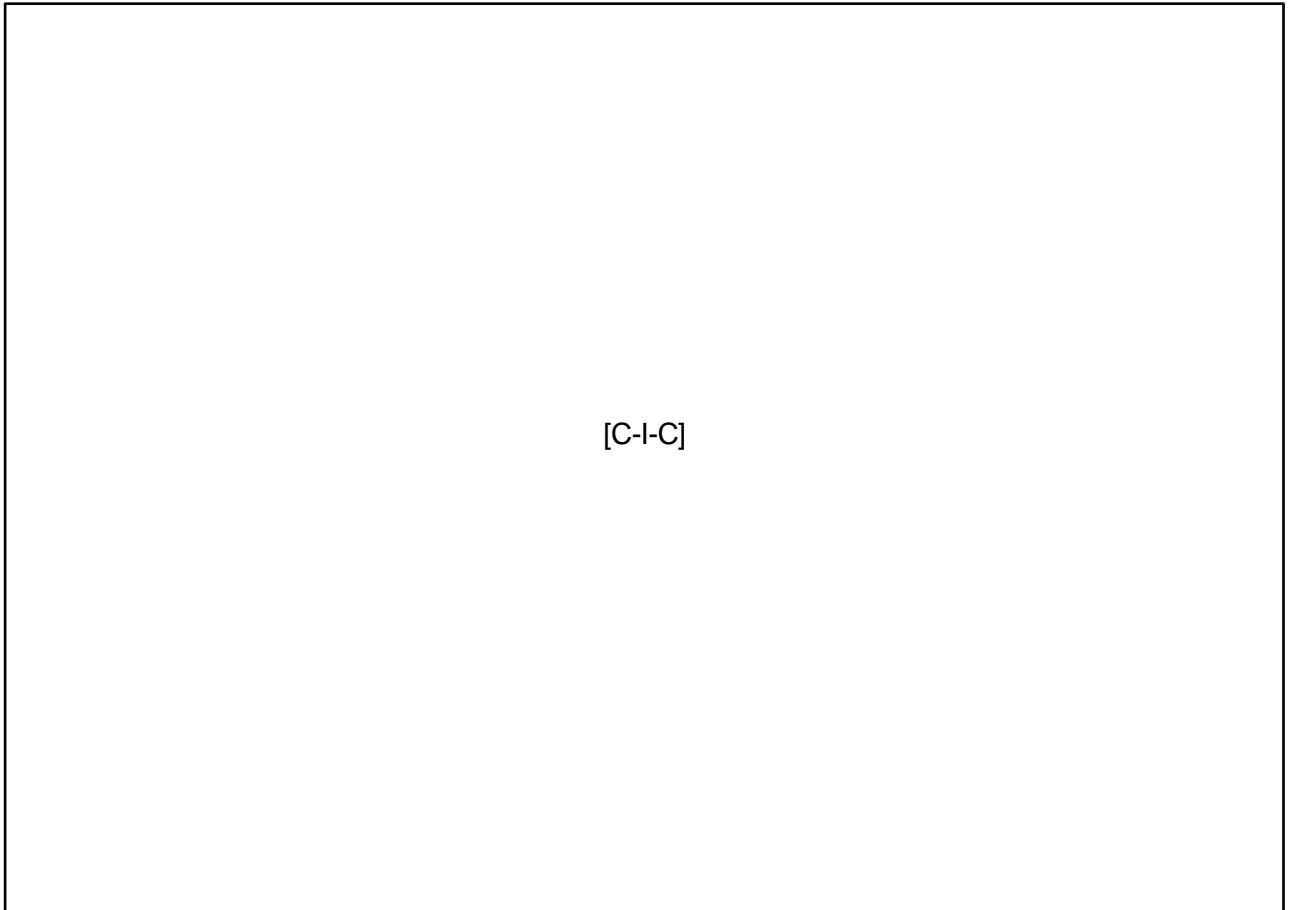
8. Benefits

The AusNet Services Benefits Driver framework enables to identify, assign, and measure the benefits of a particular initiative against strategic objectives. It allows identification of the value drivers that apply to the initiatives and quantification of their contribution and continued alignment. It also forms the basis for ongoing measurement and assessment and assurance that the identified benefits are actually achieved.

The Benefits Driver framework is a forward looking approach to planning, prioritising, and optimising Initiatives that provides ability to measure results in a standard, transparent manner. This enables ICT to assign accountability, maintain alignment of goals, and address changes within the Initiative lifecycle to maximise results.

The ICT proposed program is expected to deliver tangible and intangible benefits to the wider AusNet Services' Electricity Transmission business and its customers as described in the below figure.

Figure 7: ICT Capex Plan FY 2018 - FY 2022- Benefits Drivers ⁴



⁴ AusNet Services (2015), *Technology Plan Summary*, p. 13.

9. Gap Analysis

9.1 Current to Future State Comparison

ICT has undertaken a large body of work within the current TRR regulatory period FY2015 – FY17. The implementation of an enterprise wide EAM / ERP solution, in conjunction with other supporting programs of work, has enabled AusNet Services to have a more integrated and efficient ICT landscape and associated business processes. As AusNet Services progresses to the future regulatory period the focus will be on meeting the evolving internal business and external stakeholder requirements by expanding the footprint of the [C-I-C] platform, and investing in technology that allows AusNet Services to more effectively monitor and manage the network.

Table 6: Current to Future State Gap Analysis

	Current Regulatory Period	Future Regulatory Period
Projects	<ul style="list-style-type: none"> • Core foundation Network Management systems in place during the period integrating outage management, spatial information and SCADA. • Core foundation EAM/ERP platform established during the period. 	<ul style="list-style-type: none"> • Commence enterprise approach to information management, reporting and analytics to derive value from new core platforms. • Additional functionality added to EAM/ERP solution and process commenced to embed platform into the organization. • Implementation of enhanced network security monitoring systems to support secure system access and mitigate malicious cyber activity.
Infrastructure	<ul style="list-style-type: none"> • Retirement of legacy infrastructure. • Rationalisation and virtualisation of servers ([C-I-C] % virtual servers). • Deliberate ageing of infrastructure assets to extend lives and free up ICT organisation capacity to deliver projects. • Formal service management infrastructure established and operational. • Formal lifecycle management policies in place. 	<ul style="list-style-type: none"> • Lifecycle refresh of the corporate network infrastructure. • Continued rationalisation and virtualisation of servers (target [C-I-C] % virtual servers). • Prudent maintenance of data centres' and investment in cloud storage. • Augment Security capabilities to mitigate new threats. • Building Infrastructure as Service capabilities (IaaS) to scale as and when required.

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	Current Regulatory Period	Future Regulatory Period
Applications	<ul style="list-style-type: none"> • Core enterprise application frameworks established for project management, reporting, email, content management and customer information systems. • Planning for enterprise solutions for information management and analytics. 	<ul style="list-style-type: none"> • EAM / ERP extended to include additional functional areas (e.g. e-GRC and BPC, and employee management). • Leveraging the enterprise mobility platform to support field operations. • Supplementary enterprise capability tools deployed for information analytics and decision support. • Implementation of enhanced network security monitoring and access management.

9.2 ICT Challenges and Business Drivers

Over the period of the current TRR regulatory period the role of ICT has evolved considerably. Previously, the focus for ICT was on maintaining the legacy suite of ICT systems, resulting from the merger of TXU and AusNet Services. This focus however created a number of challenges for ICT that needed to be overcome in order to meet the increasing demands of the business and ever changing external influences from technology, the regulator and the customer. These challenges include:

- Fragmented legacy applications and associated data sets across the enterprise;
- Duplicated data storage platforms;
- Inability to leverage data that exists in operational and external systems; and
- Lack of real-time access to asset and network information due to a lack of or degrading mobility solutions.

The implications of these challenges to the wider AusNet Services’ business were:

- A disjointed a disparate topology of ICT applications which makes management and maintenance difficult and costly;
- Lack of appropriate systems, processes, governance and controls for data storage
- Immature data analysis and reporting capabilities, restricting the ability to perform data-led business decision making;
- Reactive management of assets and the network;
- Reliance on manual processes for field operations leading to process inefficiencies;
- Reactive security incident management and limited security threat intelligence; and

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- Increased maintenance costs and operational risks associated with legacy ICT technologies.

With the introduction of a new ICT strategy in 2015 the role of ICT in business change has evolved. ICT is now positioned as a key enabler, providing the platform for AusNet Services to meet the changing demands of the industry including increased security risks impacting the resilience and reliability of the network, increased regulatory compliance requirements and increased enterprise wide customer engagement. In response to these changing demands ICT has identified strategic initiatives to:

- Simplify the ICT landscape, proactively decommissioning aged technology;
- Build data and analytics capabilities enabling integrated management of our customers, networks and assets;
- Build communications capabilities enabling management of our networks and assets; and
- Maintain the security of the network to protect AusNet Services’ customer and business information, revenue and brand.

Below we outline how ICT is responding to key internal drivers for change:

Table 7: Internal Drivers for ICT

Internal Drivers	Requirement	Implications and Outcomes
Enhanced Decision Making	<ul style="list-style-type: none"> • Providing decision makers with enhanced information based on large volumes of disparate data to enable real time assessment and subsequent decision making. • Analytics and reporting are becoming increasingly powerful tools that can enable proactive behaviour and more informed asset management and network operation. 	<ul style="list-style-type: none"> • AusNet Services will extend the current analytics and reporting capabilities to utilise more data, generate more actionable insights and make the information more widely and readily available to decision makers, regardless of their location. • Examples include the use of advanced data analytics to determine the conditions assessment and therefore maintenance schedule for network assets. • This will enable the business to benefit from extending enterprise business decision support tools across a broad spectrum of disciplines, including network planning, system operations, asset management, commercial management, customer relations, compliance and reporting.

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Internal Drivers	Requirement	Implications and Outcomes
<p>Improve Data Quality</p>	<ul style="list-style-type: none"> • Data Quality is crucial to the effectiveness of many ICT applications and is a pre-condition to valuable reporting and analytics. By championing and supporting an enterprise data management initiative, this sets a strategy to support the use of information as a competitive asset in the organisation.⁵ • Asset and network monitoring has significantly increased the amount of data and control options available to the business. However, much of the value of this data lies in the ability to process, integrate and interpret the data to provide meaningful, timely and accurate information to decision-makers. • There is an increasing need to be able to store and access data for compliance and reporting purposes. 	<p>AusNet Services will improve data quality by:</p> <ul style="list-style-type: none"> • Appropriately storing, securing and managing data throughout its lifecycle. This applies to both structured and unstructured data, whether it is used for operational decision making or compliance and reporting purposes. • Integration and consolidation of data sources. • Extending the remediation and cleansing of data beyond the scope of data elements related to current projects and systems to provide quality enterprise wide data sources. • Examples include the integration of current geo-spatial database platform, GIS, and the telecommunications spatial system, SDMt, to the existing Enterprise Asset Management platform (EAM/ERP) to support engineering design and maintenance processes. <p>This will enable the business to:</p> <ul style="list-style-type: none"> • Ensure a consistent, secure and current view of all data through the organisation, and therefore manage large disparate data sources and provide a single source of truth. • Ensure that data, both current and future, is leveraged through new technologies and subsequently used for analysis such as predictive analytics, data profiling and classifications.

⁵ Gartner (July 2011), *Advancing Data Management Maturity Key Initiative Overview. G00214485*, (confidential), p. 2.

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Internal Drivers	Requirement	Implications and Outcomes
Information and ICT Security		[C-I-C]

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Internal Drivers	Requirement	Implications and Outcomes
Enterprise Approach	<ul style="list-style-type: none"> • ERP systems are increasingly used as tools to optimise end-to-end processes across organisations. • This is particularly relevant in Electricity Transmission businesses where the core function of delivering energy reliably and cost-effectively requires a complex integration of back office, asset management, network management, field maintenance and customer service processes. • Integrated systems enable a much greater degree of data acquisition, control, planning, scheduling and coordinating functionality to be realised, resulting in productivity and efficiency gains, improved network reliability and customer service. 	<p>AusNet Services have established a foundational EAM / ERP solution that are shared across the various functional domains, reducing the dependency on functional specific systems. This includes capabilities such as Enterprise Application Integration, Enterprise Project Management, Enterprise Content Management and infrastructure such as data centres and communications platforms.</p> <p>This will enable AusNet Services to:</p> <ul style="list-style-type: none"> • Provide a more modern, integrated, resilient, scalable and flexible platform to support evolving customer, stakeholder and business needs. • Deliver sustainable operating costs through more efficient and effective asset management and supporting processes, thus containing price growth. • Support changes created by data quality and analytics and reporting drivers mentioned above by improving information management and subsequent data quality.
Technology Lifecycle Management	<ul style="list-style-type: none"> • As modern management systems become more highly integrated and complex, legacy ICT assets are increasingly a driver of increased maintenance costs, operational risks and lost productivity. • Efficient organisations are therefore actively assessing and managing both individual applications and the overall application portfolio through its lifecycle to ensure maximum return on investment across whole of life. 	<p>AusNet Services will:</p> <ul style="list-style-type: none"> • Effectively manage asset lifecycles in the context of overall corporate financial resource, including appropriate asset maintenance. This can be done through practical replacement and consolidation of ICT assets. • Examples include lifecycle refreshes to a number of key infrastructure technologies including enterprise server refresh, SQL database refreshes, and desktop / laptop refreshes. • Implement appropriate information, processes and application portfolio management tools to support effective asset lifecycle management. <p>This will enable AusNet Services to avoid increased operational expenditure and risks, and cost-effectively manage the portfolio.</p>

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Internal Drivers	Requirement	Implications and Outcomes
<p>Mobility</p>	<ul style="list-style-type: none"> Without mobility, there is a lack of real-time access to asset and network information resulting in the use of out-of-date information, which has productivity, safety and ultimately customer service implications. Mobile technologies provide tools designed to enhance efficiency and effectiveness of business processes by enabling work in the field. This results in improved data capture and quality; as well as safety and compliance benefits. Mobile technologies promote innovation in line with latest ICT trends and organisational agility, allowing the workforce to access more information in real-time wherever they are. 	<ul style="list-style-type: none"> AusNet Services will take an enterprise-wide platform approach to mobility that leverages common capabilities (such as mobile device management and access management) and provide the flexibility to adapt to different business needs. Examples include the extension of the existing mobility solution to include vehicle location enablement to support field operations scheduling. This will enable workers to access information and functionality relevant to their job regardless of their location or access method, whilst ensuring appropriate safe-guards are in place for secure or sensitive data.

9.3 Future State

Within AusNet Services the role of the ICT business unit is to support the broader business by efficiently delivering cost effective technology solutions that enable achievement of the FY 2018 - FY 2022 objectives; to leverage, extend and improve the enterprise foundation to realise benefits.

The Electricity Transmission energy industry has increasingly developed into an arena of business and technical innovation. These ICT trends and emerging technologies need to be considered and leveraged, where it is cost effective to do so, within the ICT Program where these capabilities can provide benefit to AusNet Services, the customer, community and stakeholders.

In the coming period, therefore the key focus will be to:

- Leverage the foundation elements of the enterprise strategy;
- Extend enterprise solutions across end-to-end processes; and
- Improve enterprise capabilities in line with prudent investment decisions.

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This will allow ICT to:

- Reduce capital expenditure, and control operating expenditure;
- Deliver business outcomes for customers and realise the benefits of the foundational enterprise investments; and
- Optimise the ICT operating model and sourcing strategies, developing capabilities and enhancing maturity as a business enabler.

The planned ICT investments enable business strategies and will therefore build on the foundational enterprise capabilities delivered in FY 2015 - FY 2017, focusing on customer service, customer safety, security of the transmission system, and technology that support the Electricity Transmission Network (assets, work, people, and field mobility). The planned future state will:

- Improved customer centricity and regulatory compliance, enabled by a single view of the customer, with new and enhanced customer communication channels and interactions;
- Information enablement and analytics, utilising enterprise foundational data to enable prudent decision making and efficient business processes;
- Security enablement protecting supply, customer data, processes and core network business systems to mitigate and manage risk, underpinning the security and reliability of the network;
- People Management competencies to ensure greater alignment of the workforce to customer and business outcomes; and
- Field mobility to improve service performance, reliability and to extend asset management capabilities to the field.

10. Plan Formation and Programme Definition

The gap between current and future state ICT defines project requirements for the period. The resources required for each project and their relative timing and dependencies are defined by applying the priorities of mitigations identified with the risk management framework.

AusNet Services' policy for ICT assets is to ensure that they are always being supported by their vendors on standard terms. This applies to both infrastructure and applications and accounts for the majority of the lifecycle management initiatives for the period and the mitigation of the issues that result from changing versions of these technologies.

Discretionary projects are prioritised against their commercial impact and the capacity of the ICT organisation and its suppliers to deliver once risk mitigation projects have been planned.

10.1 Assessment and Review

The final step in the formation of the ICT Strategy is peer assessment and review. The agreed program of work is circulated between key stakeholders in both ICT and business functions to ensure that the plan is fit for purpose, achievable and will realise key business and ICT outcomes.

This process is undertaken using a series of interviews, workshops and formal documentation reviews to formally verify acceptance, buy-in and agreement of the final plan.

10.2 Costing Methodology

The ICT capex forecast was determined from a bottom up costing of individual projects. The cost of these projects were estimated using a detailed cost model developed by Ernst and Young (EY) which covers costs for Planning & Scoping, High Level Design, Detailed Design, Build, Test, Deploy and Support. These estimates were then tested by AusNet Services' subject matter experts. This stage included obtaining supplier/vendor quotations to support the options analysis where feasible. For each initiative, security costs have been estimated by the AusNet Services Risk and Assurance (Security) team. These security costs were subsequently verified by Deloitte.

The ICT Capex forecast in this ICT Strategy is developed from P50 cost estimates (exclude contingency/risk factors) and is in direct terms (exclude corporate overheads and escalation).

For further information relating to methodologies and processes used to develop and manage capital programs please refer to [Appendix A: Methodologies and Process](#).

11. Forecast Capex

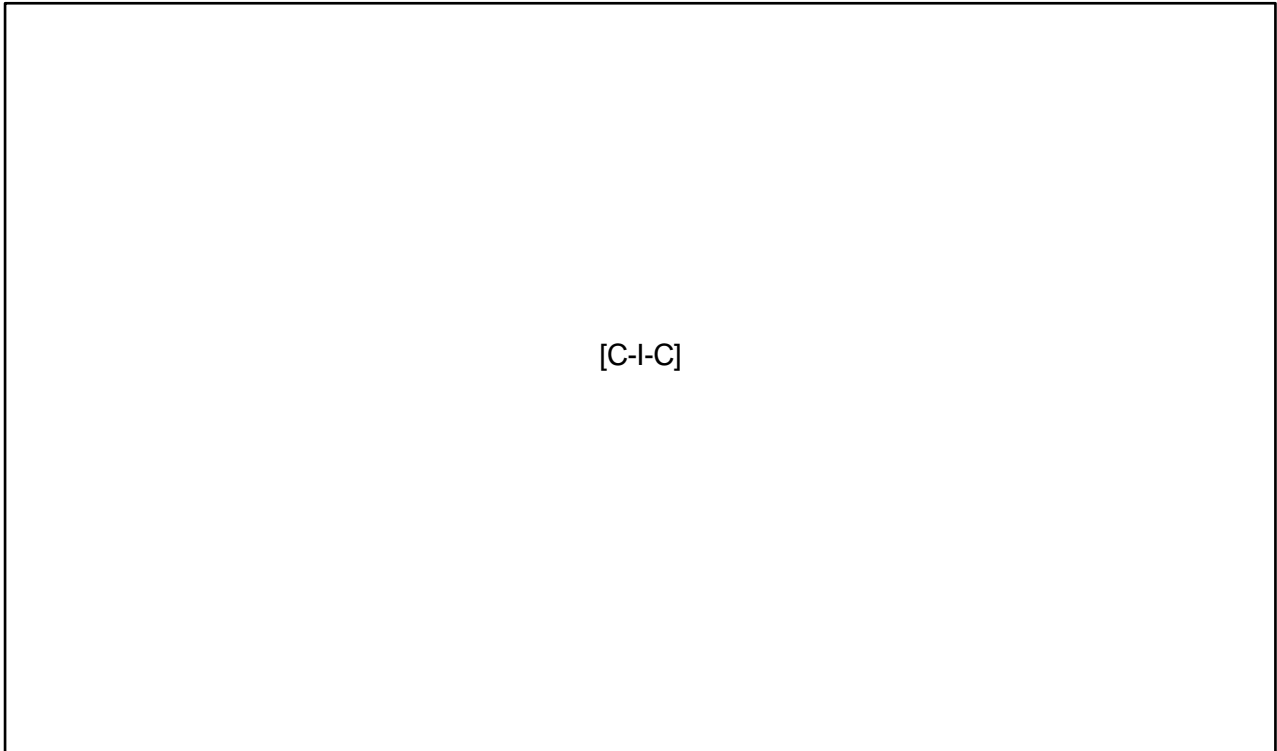
11.1 Focus of Investment

AusNet Services has forecast ICT capex of \$[C-I-C] (\$Mar '17 including overheads) for the FY2018 – FY2022 next TRR regulatory period. The focus for investment during this period is on:

1. Continuing to build on and enhance the foundational capabilities of the enterprise solutions with a view of a more integrated and efficient ICT landscape and associated business processes;
2. Enhancing existing information management and information security capabilities to exploit advancements in the data capture and analysis technology in light of increasing ICT challenges, and to ensure a resilient and safe network; and
3. Ensuring critical business assets are managed in alignment with asset lifecycles.

The current TRR regulatory period spending has focused on building capability and the next period (FY2018 – FY2022) will concentrate on embedding the technology, to leverage, extend and improve the enterprise foundation of the business. Annual ICT capital expenditure is proposed to remain relatively high in the initial phase whilst deferred asset lifecycle maintenance is completed before decreasing to more regular capex expenditure towards the later part of the period.

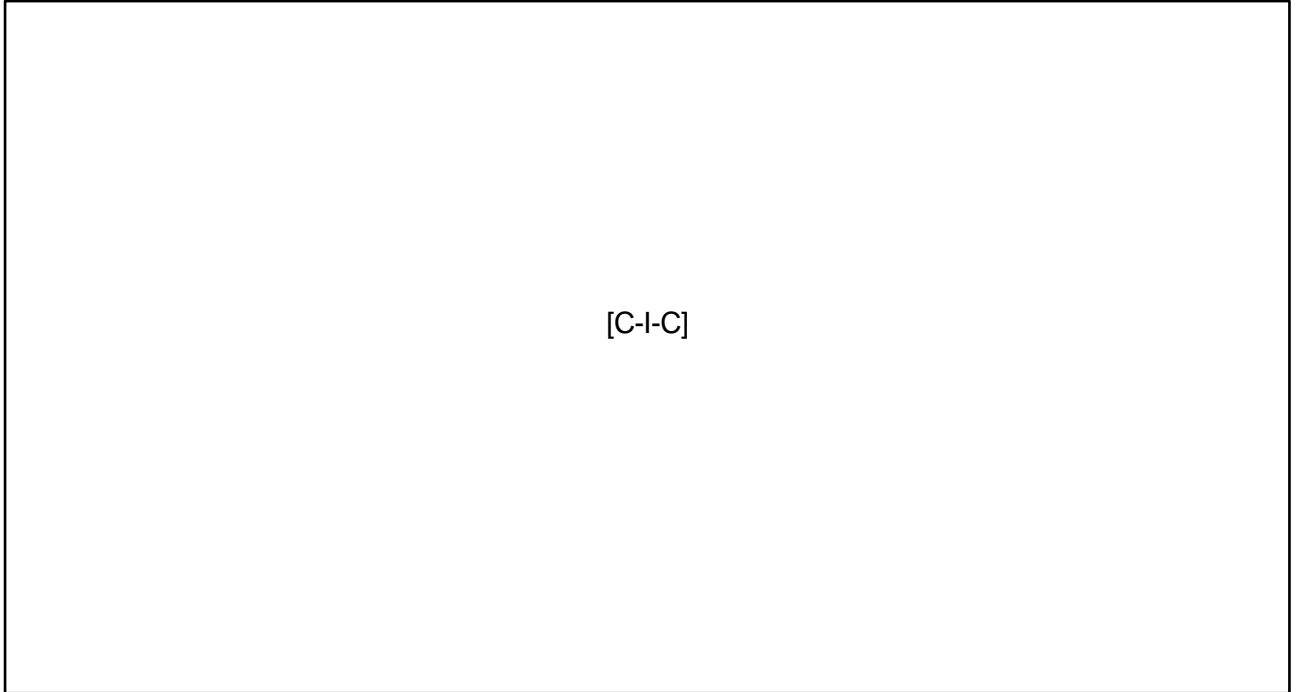
Figure 8: Actual / Forecasted ICT Capex



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The proceeding chart details how this spending is split across each of the primary domains within ICT at AusNet Services.

Figure 9: Distribution of Capex by work domain for TRR FY2018 – FY2022



The majority of ICT capital spend in the next regulatory period is within the Network Management, Information (Infrastructure) and Information Management domains. This aligns with the overall aim for the upcoming TRR period. Each of those domains is integral to gathering accurate and timely information on the network and asset performance and using this data to drive intelligent decision making. This ultimately results in more efficient management of the network that limits down time whilst maximising the utilisation of assets and resources.

The following table breaks down each domain’s expenditure annually, across the upcoming TRR period.

Table 8: Annual ICT Forecast Capex

Programs	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	Total
Information Technology	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Information Management	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Network Management	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Works & Asset Management	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Information Security	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Metering & Customer Services	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Corporate	\$(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)

Amounts are \$Mar '17 direct (excluding overheads)

11.2 Focus of Investment by Domain

The following seven domains represent the ICT investments and maintenance areas required over the next regulatory period to achieve AusNet Services' ICT objectives.

- **Network Management:** This program of works focuses on improving asset, network and service reliability in support of regulatory compliance. It achieves this by improving oversight on the network, through active monitoring and controlling of network assets and through detailed planning and execution of planned outages to support asset maintenance and replacement. The focus of investment in this period is on ensuring AusNet Services will have the capacity to analyse, consolidate and clearly present high volumes of data with limited manual intervention to influence key decision making in asset performance and maintenance. This will include the establishing of alarms and alert systems to perform real time monitoring of asset performance against key performance indicators. In conjunction, AusNet will invest in improved technology to support the planned outage management process, ensuring greater visibility of the inter-dependent work scheduled to occur across the network. ICT Lifecycle management accounts for over half the spending and ensures that critical network monitoring equipment and interfaces are supported in the enterprise environment, operating at the optimum performance and interfacing with new systems. As the quality and availability of information on the network grows so too does the need for network analytics in the FY2018-FY2022 regulatory period.
- **Works and Asset Management:** This domain builds on the successful investment in enterprise asset and works management solutions (EAM/ERP) for the FY2018 – FY 2022 regulatory period. The focus of investment is on improving, streamlining operational processes in the field and back office operations. End of life applications are being consolidated and migrated to current platforms, simplifying the ICT landscape and building improved visibility of the asset cost. Enhancements in field mobility provide accurate real time information to increase the productivity of field work. This ultimately increases the safety of the workforce and optimises their utilisation, whilst limiting outages and downtime. In conjunction with these, investment is being made to improve drawings management and Computer Aided Design (CAD) services to enhance existing design and drawings management capabilities and reduce operating expenditure associated with ongoing maintenance of the current systems.
- **Corporate:** This domain focuses on leveraging the existing enterprise solution (EAM/ERP) and consolidating related legacy end of life applications. The Corporate domain provides a consistent view of all business data throughout the organisation with better analytics and reporting capabilities and support systems, processes and tools yielding to a high performing leadership, capability and culture. Investment is being made in improved regulatory compliance capabilities, improved employee and talent management, and in lifecycle refreshes as aligned to technology lifecycles.
- **Customer and Market Services:** Across the industry there has been renewed engagement by customers and an increased desire to communicate and interact directly with AusNet Services. Whilst the focus of this engagement is around distribution, transmission still plays a valuable role in the supply chain of electricity and therefore is pivotal in providing timely information on outages and other disruptions in supply. This domain is focused on updating digital platforms to interface with customers (e.g. distributors, generators and end customers) and investing in Customer Relationship Management (CRM) capabilities ensuring relevant information gathered across the network is available to customer functions in the

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enterprise environment. If the business is to maintain customer satisfaction, and build on an already established highly developed customer service capability at AusNet Services, it is essential that AusNet Services holds a whole of business view of the customer.

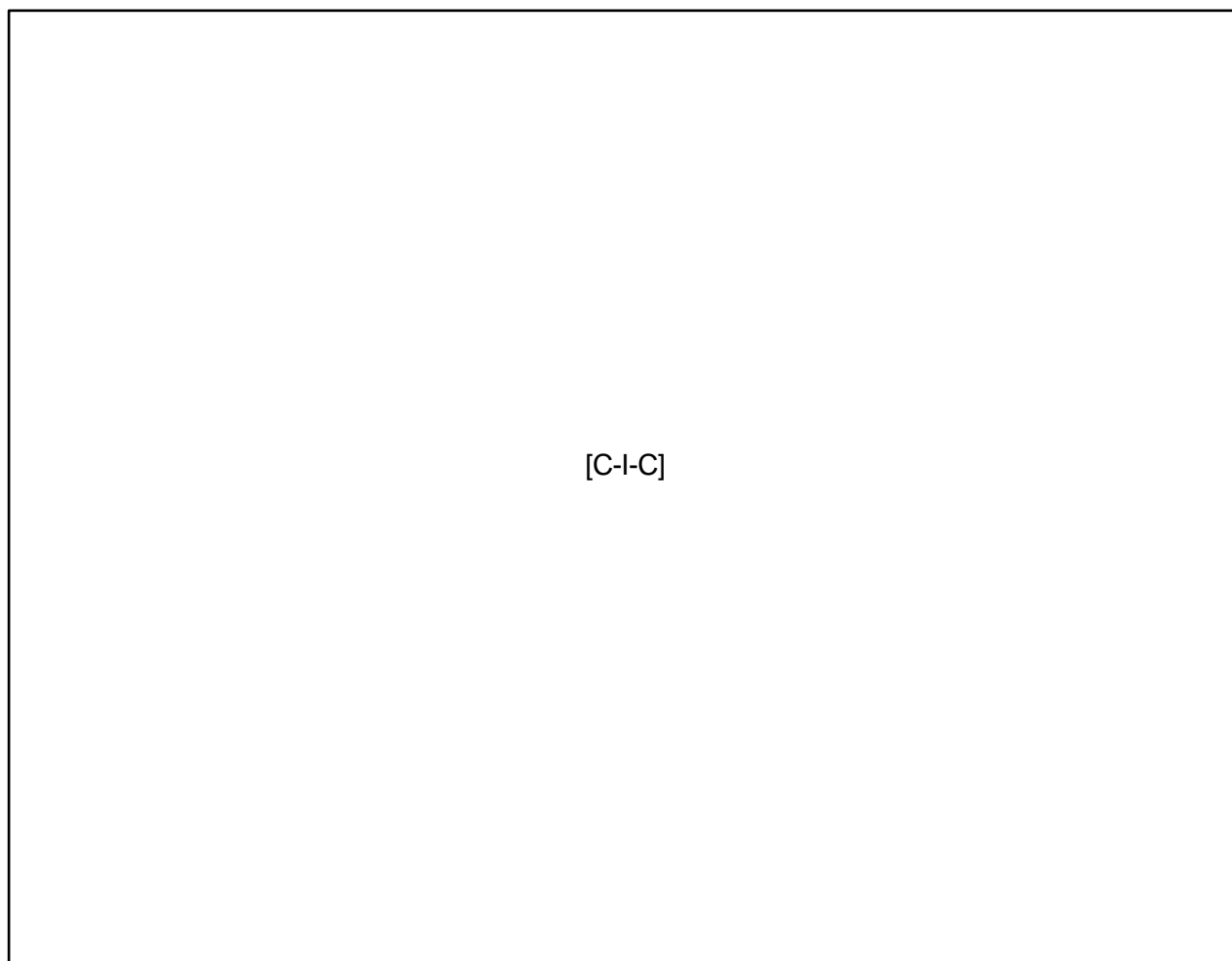
- **Information Technology (Infrastructure):** This program of work aims to support critical business and network systems in alignment with regulatory obligations, and contain ICT OPEX over future periods. This will be achieved through prudent investments to simplify the current ICT landscape and refreshes of key infrastructures including storage, enterprise servers, desktop and laptop fleets and corporate network, cloud technology and communications. In conjunction, investment is being made to create a scalable and agile ICT platform that can support changing market trends including the emerging focus on cloud computing.
- **Information Management:** In the coming TRR period AusNet Services will generate a greater quantity of real time data on network and asset performance. This domain focuses on developing the relevant data storage capabilities to manage these large volumes of data for the purpose of data analysis and transforming it into accurate, actionable insights that drive better decision making. When executed there will be “a single source of truth” with a consistent view of the transmission network, yielding improved network reliability and process efficiency. Lifecycle refreshes taking place in the upcoming TRR period will continue to ensure that current and future needs continue to be met by all systems in the network.

Information Security: As a nationally critical infrastructure it is essential that AusNet Services limit its vulnerability to information security attacks. This TRR program has been developed in alignment with AusNet Services Information Security Strategy. This identified the Information Security control capabilities required to address the current and future business objectives, control gap assessments, and accommodate threat forecast information in addition to providing coverage to the changing legislative environment. The key initiatives in this domain centre on ensuring the security of increased quantities of data linked to assets within the network, as well as ensuring secure authentication of remote access systems remotely controlling the network. The aim for the next regulatory period is to augment and implement new technologies and capabilities to address cyber-risks to the business, extend the reach and capability of the Information Security Management System (ISMS), and maintain the currency and on-going effectiveness of existing controls to protect the transmission networks against a dynamic and rapidly changing cyber-threat environment.

For further details on the proposed ICT program, please refer to [Appendix D – TRR FY 2018 - FY 2022– Detailed Program of Work](#).

The below figure depicts how the ICT capability required to support the Electricity Transmission business will be developed incrementally over the FY 2018 - FY 2022 period.

Figure 10: ICT Business Capability Development Roadmap⁶



The ICT strategy for the current period is focused on reducing expenditure and enabling business capabilities at prudent cost. This will be achieved by transferring capital expenditure to operating expenditure.

- Capital spend, such as traditional expenditure on new hardware or software applications, will be transferred to operational expenditure through programs that aim to virtualise the ICT environment, move applications to cloud services and encourage workforce mobility and flexibility.
- Operational spend will also be reviewed by consolidating hardware and software applications and reducing end user interface complexity, resulting in fewer licensing fees and product roadmap spend requirements.

⁶ AusNet Services (2015) *Technology Plan Summary*. p. 10.

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The FY 2018 - FY 2022 ICT portfolio of work follows the natural enterprise expenditure curve that began with capital expenditure investments in the previous FY 2014 - FY 2017 period. This is characterised by the flattening trend expected through this period in the form of enhancements, enabling AusNet Services to complete the ICT enterprise strategic journey. The FY 2018 - FY 2022 period will represent the descent in capital expense trend, reflected by forecast expenditure lower than the previous period.

12. Operating Expenditure Requirements to Support CAPEX Proposals

It is expected that the forecast ICT capex will bring with it additional ICT Opex requirements due to:

- Mandatory increases in costs caused by the support of regulatory changes and new business capabilities in:
 - network management;
 - field mobility for customer response and public safety;
 - metering and customer services;
 - information management; and
 - corporate and regulatory reporting.
- The ongoing transition to the new EAM/ERP enterprise platform (further rationalising of legacy business systems, including maintenance for interim read only system access);
- Additional operating expenditure to augment and reduce the reliance on traditional capital expenditure e.g. cloud infrastructure as a service (IaaS) and software as a service (SaaS) for data storage (big data):
 - Centralised employee management (SaaS);
 - Supplement on premise storage with use of Cloud technologies to mitigate data growth / big data (IaaS).

However, AusNet Services is not including these step change costs in its forecasts (estimated to be approximately \$[C-I-C] per year). AusNet Services expects to manage overall ICT operating expenditure such that these additional costs can be largely absorbed.

AusNet Services has however identified one further area – Information Security requiring an increase to current operating expenditure and will be referred to as OPEX step changes.

The driver for these projects relates to mitigating risks for security threats to critical infrastructure. When assessing these costs, AusNet Services has considered whether these are consistent with those that a prudent operator in identical circumstances would require to achieve the OPEX objectives as required by Clause 6A6.6(c) of the NER.

12.1 Drivers

This requirement is linked to the Information Security proposal to ensure corporate and IT network security through the implementation of enhanced tools and systems to manage and mitigate risk.

The risk of cyber-security attacks has been steadily growing over the past years and decades with attacks being reported in the media on a regular basis across all industries. These threats are especially severe for corporations tasked with supplying and maintaining critical infrastructure such as power distribution. According to the US National Institute of Standards and Technology (NIST), security threats to critical infrastructure may arise from “hostile governments, terrorist groups, disgruntled employees, malicious intruders, complexities, accidents, natural disasters as well as malicious or accidental actions by insiders”. AusNet Services Transmission network is identified as one of the national critical infrastructure by the Federal Government Attorney General’s team.

[C-I-C]

12.2 OPEX step change – Security

AusNet Services is projecting an opex step change for costs required to support security. The spend relates to but are not limited to areas including:

- Security Operations Centre Monitoring
- Operating Systems and Network Device Software Patching
- Software tools to support security identification, protection, response and recovery activities

12.3 Costs

Table 9: Information Security OPEX forecast

Item \$2016-17	FY 18	FY 19	FY 20	FY 21	FY 22	Total
Security Operations Centre Monitoring	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Operating Systems and Network Device Software Patching Analyst	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Annual Software Maintenance Cost	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)
Total	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)	\$(C-I-C)

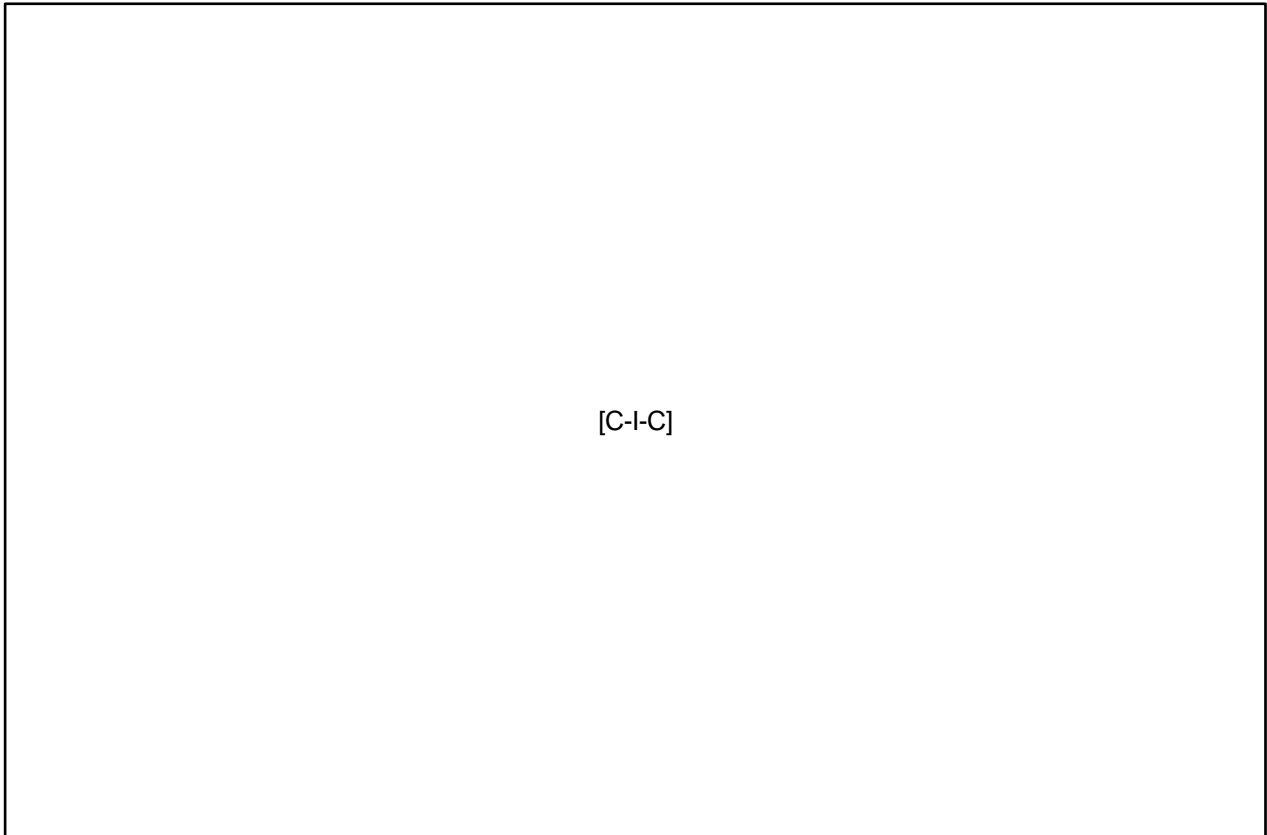
12.4 Benefits

This project is beneficial for the overall business as the projects are integral for the integrity of the transmission network and ensure data security and prevent data and confidentiality breaches.

12.5 Delivery

AusNet Services' three-stage delivery model will ensure cost-effectiveness at every stage of delivery to realise the benefits of the investments made in the previous period. The AusNet Services' delivery model is shown in the figure below.

Figure 11: AusNet Services' ICT Delivery Model



The delivery (“system roll out”) phase will not only be driven by strategic priorities, targeted objectives, the principles of prudence and allocative spend, but also by a stringent evaluation of cost versus price of proposed projects. All investments have been evaluated to ensure that the minimum cost has been obtained to achieve the targeted benefit for individual components, and that the lifetime cost of operation does not exceed the benefits that are to be realised.

Furthermore a detailed options analysis has been completed for each project within the FY 2018 - FY 2022 planned program of work, a summary of which is outlined below for each key focus area. Evaluation of the ‘Do Nothing Option’ forms the baseline for decision making and has been evaluated to understand the risks and impacts associated with simply continuing with current AusNet Services’ business as usual. Despite the option to Do Nothing it is expected that ‘business as usual’ operations and capital projects will continue. This continuation of business as usual will result in significant impacts to the business as detailed.

For further details on the proposed ICT program, please refer to Appendix D – TRR FY 2018 - FY 2022 – Detailed Program of Work.

13. Glossary

Term	Definition
ABC	Activity Based Costs
AC	Air-Conditioning Unit
ACS	Alternative Control Services
AD	Active Directory
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulatory
AIS	Availability Incentive Scheme
AMI	Advanced Metering Infrastructure
AMP	Asset Management Plan
AMS	Asset Management Strategy
API	Application Programming Interface
ATS	Automatic Transfer Switches
BAU	Business As Usual
BI	Business Intelligence
BYOD	Bring Your Own Device
CAPEX	Capital Expenditure
CBD	Central Business Directory
CIS	Customer Information Systems
COTS	Commercial Off The Shelf
CPI	Consumer Price Index
CRACS	Computer Room Air Conditioning
CURA	CURA Enterprise
CY 2011	Calendar Year 1 Jan 2011 to 31 Dec 2011
CY 2015	Calendar Year 1 Jan 2015 to 31 Dec 2015
CY 2016	Calendar Year 1 Jan 2016 to 31 Dec 2016
CY 2020	Calendar Year 1 Jan 2020 to 31 Dec 2020
DB	Database
DBMS	Database Management System
DC	Direct Current
EA	Enterprise Architecture
EAI	Enterprise Application Integration
EAM	Enterprise Asset Management
ECM	Enterprise Content Management
EPM	Enterprise Project Management
EB Services	Enterprise Business Services (Australia) Pty Ltd
EDMS	Electronic Drawings Management System

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Term	Definition
EDPR	E lectricity D istribution P rice R evue
EDW	E nterprise D ata W arehouse
EMS	E nergy M anagement S ystem
ERP	E nterprise R esource P lanning
ESB	E nterprise S ervice B us
ETL	E xtract T ransform L oad
FAS	F abric A ttached S torage
FTE	F ull T ime E mployee
GAAR	G as A ccess A rrangement R evue
GIS	G eographical I nformation S ystem
GRC	G overnance, R isk and C ompliance
GST	G oods and S ervices T ax
HTTPS	H ypertext T ransfer P rotocol S ecure
HR	H uman R esources
ICT	I nformation C ommunications T echnology
IDAM	I ntity a nd A ccess M anagement
IDS	I ntrusion D etection S ervice
IP	I nternet P rotocol
IPv6	I nternet P rotocol v ersion 6
IPS	I ntrusion P rotection S ystem
ICT	I nformation T echnology
ICTIL	I nformation T echnology I nfrastucture L ibrary
ICT/OT	<p>Information Technology / Operational Technology</p> <p>In the context of the electric power industry:</p> <ul style="list-style-type: none"> • Information Technology (ICT): traditionally associated with back-office information systems used for conducting business-type transactions, such as cost and tax accounting, billing and revenue collection, asset tracking and depreciation, human resource records and time-keeping, and customer records. • Operational Technology (OT): typically associated with field-based devices connected to the distribution system, and the infrastructure for monitoring and controlling those devices. This includes control centre based systems such as SCADA and DMS.
ICTSM	I nformation T echnology S ervice M anagement
IVR	I nteractive V oice R esponse
JCAPS	J ava C omposite A pplication P latform S uite
LAN	L ocal A rea N etwork
LCD	L iquid C rystal D isplay
MDM	M eter D ata M anagement
MIC	M arket I mpact C omponent
MMS	M arket M anagement S ystem
NAS	N etwork A ttached S torage

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Term	Definition
NOS	Network Outage Schedule
NER	National Electricity Rules
OMS	Outage Management System
OPEX	Operational Expenditure
O/S	Operating System
OSS	Operational Support Systems
PABX	Private Automatic Branch Exchange
PDU	Power Distribution Unit
PET	Project Execution Tracking
POEL	Private Overhead Electric Line
POMS	Plant Outage Management
PRINCE	Projects IN Controlled Environments
PSTN	Public Switched Telephone Network
QA	Quality Assurance
QC	Quality Control
Qtr.	Quarter
RTS	Real Time Systems
RTU	Real Terminal Unit
SAN	Storage Area Network
SAAS	Software As A Service
SCADA	Supervisory Control And Data Acquisition
SCCM	System Centre Configuration Manager
SCOM	System Centre Operations Manager
SIP	Session Initiation Protocol
SLA	Service Level Agreement
SMF	Service Management Framework
SOA	Services Oriented Architecture
SOCS/OSSCA	System Overload Control Scheme
SOE	Standard Operating Environment
SPA	SP AusNet
SQL	Structured Query Language
STEM	Strengthen, Transform, Extend And Modernise
STPIS	Service Target Performance Incentive Schemes
2008 TRR	Transmission Reset Review 1 April 2008 to 31 March 2014
2013 TRR	Transmission Reset Review 1 April 2014 to 31 March 2017
TNSP	Transmission Network Service Provider
TOGAF	The Open Group Architecture Framework
TRR	Transmission Review Reset

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Term	Definition
UNIX	U Niplexed I nformation and C omputing S ystem
USB	U niversal S erial B us
UPS	U ninterruptible P ower S upply
VAV	V ariable A ir V olume
VoIP	V oice o ver I nternet P rotocol
VPN	V irtual P rivate N etwork
VRF	V irtual R outing & F orwarding
WAN	W ide A rea N etwork
WLAN	W ireless L ocal A rea N etwork

Appendix A: Methodologies and Processes

This document identifies the key processes and frameworks that underpin the development of the ICT Regulatory proposal. The document covers key processes including:

- Program Delivery Planning;
- Project Management Methodologies;
- Enterprise Project Management Office;
- Forecasting, Cost Allocation and Funding methodologies;
- Project Delivery;
- Operational Service Delivery;
- Cost Allocation;
- Risk Management
- ICT Function Operating Model.

These key areas collectively provide governance and management processes that underpin both the development of the regulatory proposal and the prudent operations of the ICT function.

Program Delivery Planning

In planning to deliver successful ICT programs, AusNet Services conducts analysis on key project considerations and methods to ensure the efficient, prudent and successful delivery of agreed programs of works.

Key areas that ICT has considered as part of this planning includes but is not limited to:

- Project Governance
- Project Independencies
- Availability of Resources
- Cost / Risk of Projects relative to Program
- Business Change Management

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Project Governance is the assurance that an operational framework is in place to enable logical and robust processes to deliver successful project outcomes. This framework utilises repeatable tools and methods with the aim of ensuring projects are successfully delivered to time, cost and quality outcomes. Project governance relates to all stages of the lifecycle including; project planning, delivery management and operational service. Governance processes for these areas will be described further in the following sections.

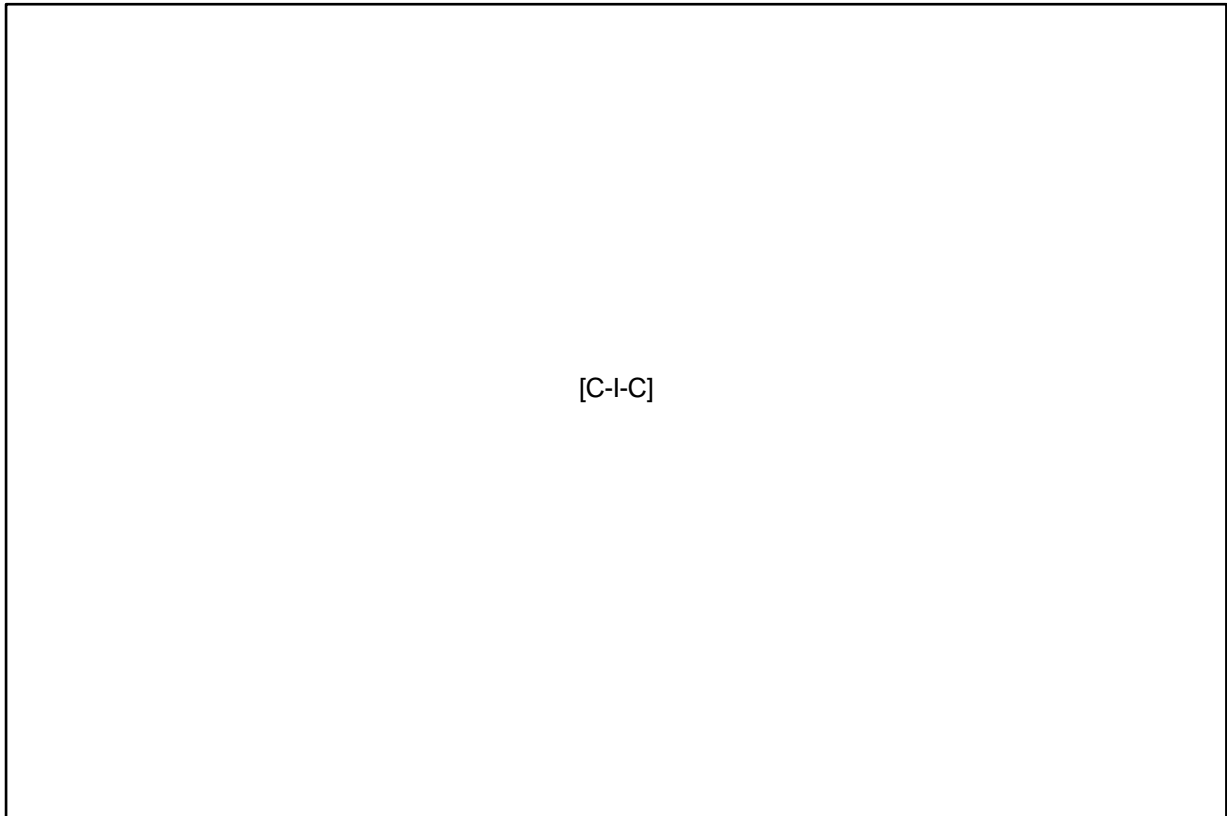
Identifying and managing project dependencies are another important consideration in ensuring the successful outcomes of programs of work. As part of the TRR program development process, individual projects were analysed to identify project interdependencies and ensure alignment across the program. Areas of dependency include process, data, infrastructure resource, and various internal and external drivers. Resource and Infrastructure availability are particularly important issues for consideration in both project delivery and business as usual planning activities. The focus of AusNet Services' ICT new operating model is to build engagement and enhance value through a lean, reliable and disciplined operation which leverages our partners where required.

Resource and infrastructure availability will be therefore sourced and managed through a mix of internal and external providers to ensure flexibility, scalability and prudence in our program.

The Project Delivery section following provides further information pertaining to the method of sourcing and managing resources.

The below diagram demonstrates the proposed breakdown of costs; internal labour, materials and contracts on an annual basis across the program.

Figure 12: Proposed Yearly CAPEX by Cost Type

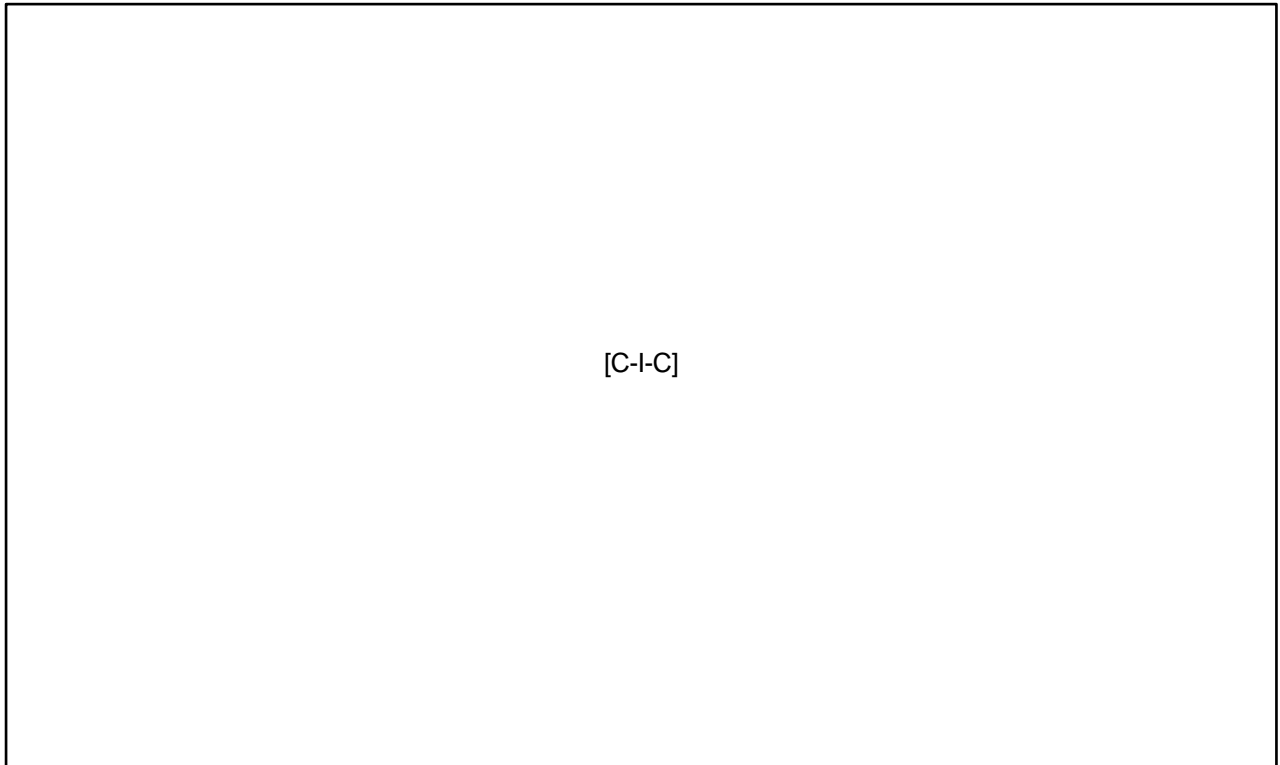


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Another key planning consideration for establishing the ability to deliver a program is cost and timelines for individual project relative to the entire program. This method although being relatively rudimentary, is a standard method of analysing projects to ensure that programs do not derive risk by attempting to undertake too many concurrent projects and/or too many projects with high value or risk.

Based on previous experience of ICT project delivery and especially relative to spend in the previous period, the average planned annual spend of \$[C-I-C] is a portfolio that AusNet Services is confident in delivering successfully.

Figure 13: Proposed Yearly CAPEX by Program of Work



The final consideration in ICTs' program planning is the ability of the AusNet Services' business to not only accept the changes delivered by the ICT program but to be in a position to effectively embed enhanced processes and systems into the organisation to ultimately deliver desired business outcomes.

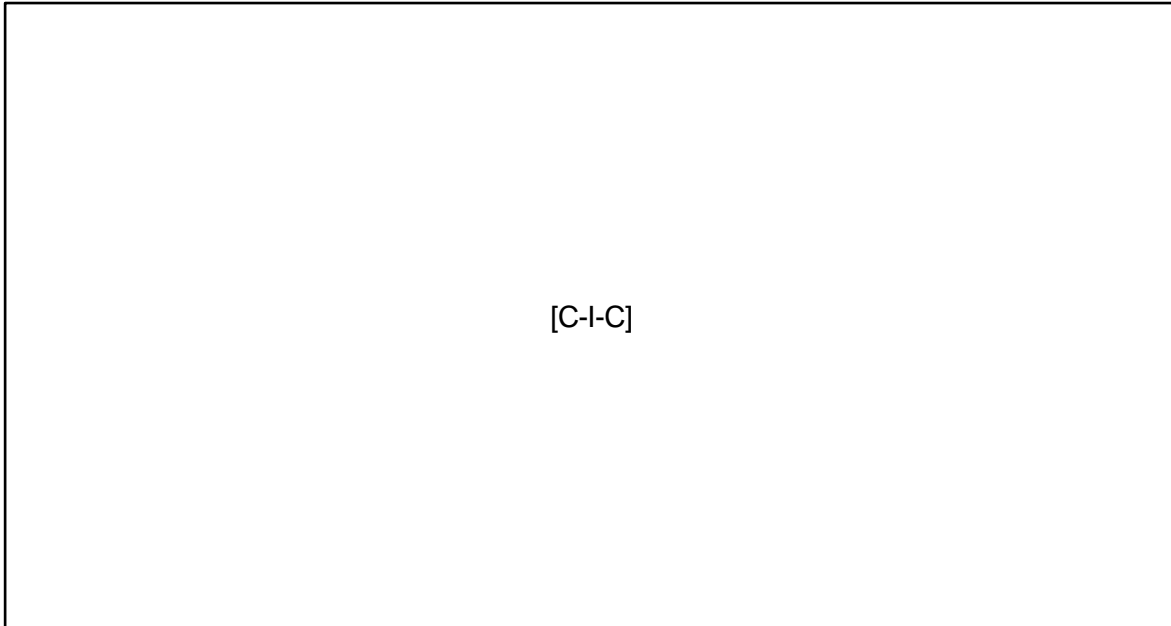
Readiness for change is continually assessed through a mixture of formal and informal stakeholder engagement channels that evaluate key change assessment areas:

- Readiness for change in process, people, system, culture;
- Complexity of impact to engagement, impact assessment and planning, capability; development, change leadership and culture, organisation design and benefits realisation;
- Availability of time and resources;
- Case for ongoing commitment to change.

Project Management Methodology

During the course of the previous period AusNet Services concentrated on reviewing and consolidating project management methodologies and processes through the formation of an enterprise wide Project Management Office (EPMO). This initiative recognises past challenges and seeks to employ more prudent governance in the future. All AusNet Services' capital projects follow a centralised Portfolio Framework which contains a simple four phased lifecycle approach and is governed by five gates, as per the figure below.

Figure 14: AusNet Services' Portfolio Framework



Enterprise Project Management Office (EPMO)

The EPMO governs and reports on projects through their lifecycle from idea through to completion stage, utilising industry standard project planning, justification, tracking, and reporting and governance tools. The purpose of the EPMO and its frameworks is to ensure optimisation and prudence of AusNet Services portfolio of projects; to improve overall coordination and delivery of benefits through enterprise oversight and tracking; and to ensure efficiency and reduction of costing through delivery management and effective selection processes.

The EPMO supports the delivery of AusNet Services' programs through the effective delivery of project planning by:

- Supporting the business functions using prioritisation to maximise the benefits of AusNet Services' investments; and
- Bringing together the business units in an aligned and structured way that delivers a singular AusNet Services' program of works.

⁷ AusNet Services, "How Projects are Managed" <https://spausnet.sharepoint.com/sites/ePMO/How/SitePages/Home.aspx>, (2015)

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Staged Funding of Major Projects

AusNet Services applies a staged funding approach to all major projects (> \$[C-I-C]) and other projects as required. Staged Funding is a control process that requires a project to pass through approved gates prior to funding being released for the next stage in the project's lifecycle. At each gate, a review of the project is undertaken to re-assess how the project has performed up to that stage, both financially (year to date actual and forecast costs) and from a physical deliverables perspective. An assessment that the desired outcomes (and benefits) are still on track will also be made prior to allowing the project to proceed.

The entire project and its cost profile, which can extend over several years, are approved at the Business Case approval stage. The staged funding approach ensures that over the project's lifecycle, check points are established to evaluate progress against lifecycle expectations. A detailed review of actuals and forecast against the approved Business Case values enhances visibility, transparency and accountability. To measure and track staged funding, the Business Case must contain a split of the budget into each of the four key phases i.e. Idea, Plan, Build, Close as described above. These budgets are tracked by phase and cannot exceed agreed levels to ensure ability to deliver to plan.

Forecasting Methodology

In forecasting ICT capex for the forthcoming regulatory control period, AusNet Services has:

- Assessed the current performance of ICT systems and infrastructure to inform to what extent our existing ICT systems and infrastructure can be utilised to support the AMS;
- Engaged business units to understand the AMS and jointly assess requirements of ICT to support deliverability of these strategies;
- Considered alternate options where they are clearly identifiable;
- Considered emerging technologies and trends that can be applied, where it is effective and efficient to do so;
- Engaged experienced independent sources to provide research, benchmarks and/or cost estimates;
- Assessed the risk of preferred options, identifying appropriate mitigation strategies and the resulting residual risk; and
- Completed cost and benefit assessment, incorporating all obtain inputs and key estimating assumptions. This includes the application of AusNet Services' ICT cost allocation methodology, in recognition that AusNet Services is a multi-utility regulated business.

AusNet Services is confident that the forecast ICT capital expenditure is consistent with the CAPEX objectives and criteria set out in Rule 6A.6.7 of the NER.⁸

As part of effective capital optimisation across the business, AusNet Services conducts a capital allocation and prioritisation process that aims to prioritise the following year's capital expenditure to

⁸ Australian Energy Market Commission (AEMC), 1st March 2015, Section 6A.6.7 "Forecast capital expenditure". p. 845.

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projects estimated to deliver the best value, aligned to our corporate and asset strategies. After projects are prioritised, full business cases are completed, that assess in greater detail areas such as; scope, methodology, costs, benefits, risk and timeline. The business owner of the project seeks required approval before project delivery is initiated.

Project Delivery

During FY 2010/2011, a full and comprehensive review was undertaken to both understand the existing delivery framework and further refine the operating model for the delivery of projects and operational services with a view to establishing a more responsive and commercially attractive model.

The core components of this model include:

- AusNet Services' ownership of ICT project delivery;
- AusNet Services' ICT Portfolio Management function established with consistent reporting and governance across all work programs;
- Establishment of a System Integrator panel for ICT project delivery.

In FY 2012/13, a further review was undertaken to identify a competitive vendor selection process to establish a Tier 1 Systems Integrator panel and an alternative Tier 2 – Mid Tier or Niche product panel. The Tier 2 panel is designed to address the current gaps in niche technologies, local capabilities and provide AusNet Services with vendors more appropriate with the size of project engagement.

The selection process involved assessing vendors based on a variety of aptitudes including:

Table 10: Vendor Panel Aptitude Qualities

Vendor Aptitude	
Capabilities Areas	Quality of Service Delivery Model
Industry Vertical Commitment	Local Delivery Strength
Customer References	Delivery Governance
Value Add Overview	Commercial Models

The outcome of this review process identified the Tier 1 and Tier 2 vendors displayed in the Project Delivery Model below. Panel members compete for major projects to ensure AusNet Services delivers the program of work at competitive rates. The following diagram summarises the project delivery model from business initiative, through project delivery, and transition to support:

Figure 15: Project Delivery Model

[C-I-C]

AusNet Services has recently insourced the “Operate” function previously delivered by EB Services. This decision was in line with our goals to promote efficient investment and operations.

Cost Allocation Methodology

AusNet Services is a multi-utility regulated business (Electricity Transmission, Electricity Distribution and Gas Distribution). It is cost effective and efficient for AusNet Services to leverage ICT systems and resources across these utility businesses. Expenditures in these ICT systems and resources must be appropriately allocated to ensure regulated revenues reflect the true cost for each business.

The nature of a multi-utility regulated business is that some allocation of shared investments must occur. The value of the benefits available from this approach is demonstrated by:

- The hardware and software cost savings (economies of scale) which flow from this combined approach; and
- The efficiencies and synergy benefits from having a flexible workforce working across the different networks.

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The allocation of ICT capital expenditure is as follows:

Table 11: ICT Expenditure Allocation⁹

Type	Electricity	Gas	Transmission	Total
Electricity Transmission Only	100%	0%	0%	100%
Gas Only	0%	100%	0%	100%
Transmission Only	0%	0%	100%	100%
Distribution Only	70%	30%	0%	100%
Corporate Wide	49%	21%	30%	100%

AusNet Services allocates its forecast ICT capital expenditure in the same way it has in the past to ensure consistency of forecast and outcome using Activity Based Costing (ABC). This is valuable in a regulatory context because it ensures that those projects, allowed for by the AER, are funded within the regulatory control period by electricity customers, will benefit from those expenditures in the following regulatory control periods.

AusNet Services undertook a review of the drivers of the costs (i.e. the origin of the benefits of the investments) to determine the appropriate allocation rules. AusNet Services ensures the consistency and the integrity of the ABC process by also conducting an annual external review of the survey data to ensure compliance to cost centre allocations.

The drivers are the broad areas under which the benefits of the projects are derived. Therefore, the expenditures incurred are allocated on the basis of broad allocation rules below.

AusNet Services uses several methods to ensure the appropriateness of the ICT allocation rules.

[C-I-C]

⁹ Deloitte Touche Tohmatsu, "ICT Cost Allocation Methodology", (2 April 2009), p. 3.

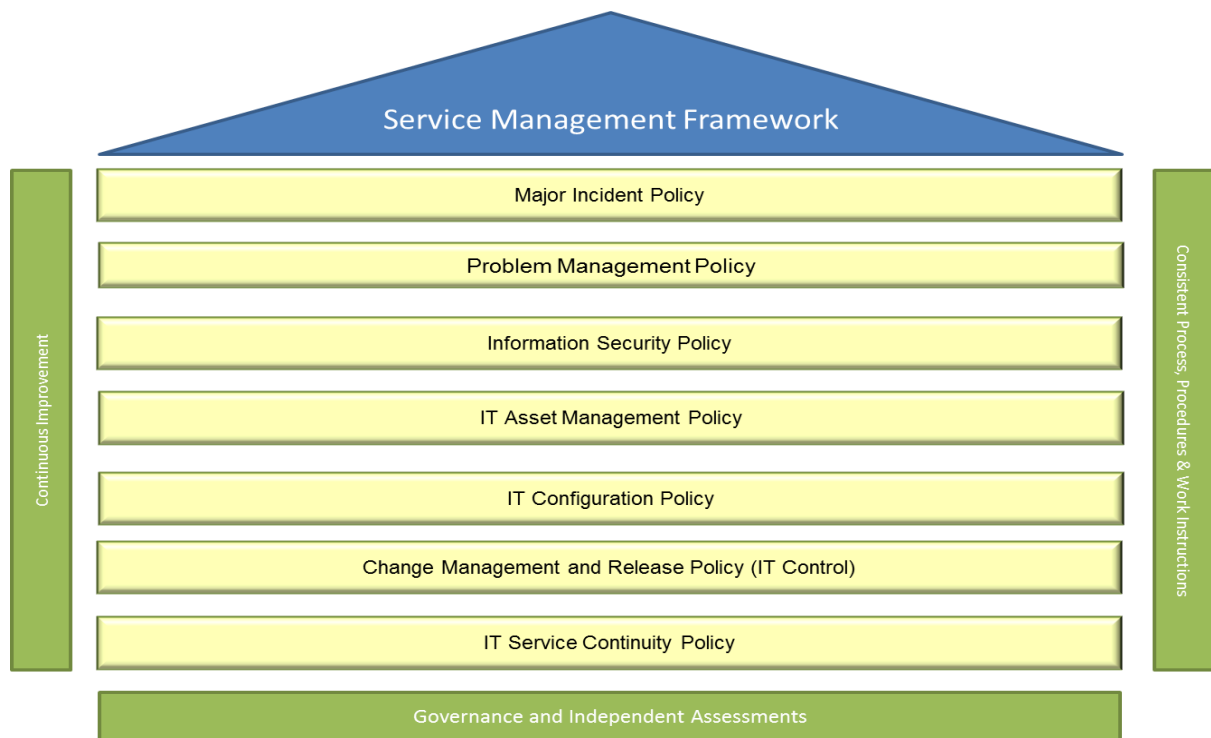
Electricity Transmission Network – ICT Strategy

Overheads: AusNet Services adopts one overhead that relate to internal AusNet Services ICT staff. This includes related accommodation, utility costs and program management overheads. This overhead is calculated by determining the fully absorbed costs of AusNet Services’ ICT staff divided by the forecast capital expenditure of the given year. In the financial year starting 1st January 2014 (CY 2014), AusNet Services’ forecast this overhead at [C-I-C] %. The forecast operating expenditure is net of this capitalised overhead and the forecast capital expenditure assumes that this overhead will remain constant at [C-I-C] %.

Operational Service Delivery

The Service Management Framework (SMF) implemented by AusNet Services based upon the industry standard Information Technology Infrastructure Library (ITIL), underpins the delivery of ICT Services. This framework is illustrated in the figure below:

Figure 16: Service Management Framework



The framework is specific to the needs of the AusNet Services business and provides a consistent set of processes and tools for managing the delivery of ICT services. These have been developed in a manner that supports the AusNet Services business requirements.

The development, agreement and implementation of an SMF for the ongoing delivery of ICT services enables and ensure a consistent set of processes, tools and measures which can be more easily monitored and managed for the delivery of ICT services.

Electricity Transmission Network – ICT Strategy

The benefits of the implemented SMF are:

- Reduced complexity in managing business requests through their lifecycle;
- Improved understanding by AusNet Services on the capability currently available to provide services;
- Defined Service Level agreements – reportable and measurable;
- Increased capability through standards, policies and processes;
- Consistency for AusNet Services' business users when creating requests for work to occur and understanding delivery timeframes;
- Improve operational effectiveness and enhance overall business performance;
- Enhanced ability to leverage cloud computing;
- Lower overall costs for ICT Service Management by common, repeatable, audible processes to increase ICT support effectiveness;
- Ability to deliver more proactive services;
- Improved reporting;
- Introduces consistent level of governances;
- Reduced delays; and
- Ensures Continual Service Improvement program initiatives are planned and implemented.

With the ICTIL based service management framework in place for the management of ICT application and infrastructure, AusNet Services will be able to maintain operational service levels for increased volumes of business activity.

Risk Management

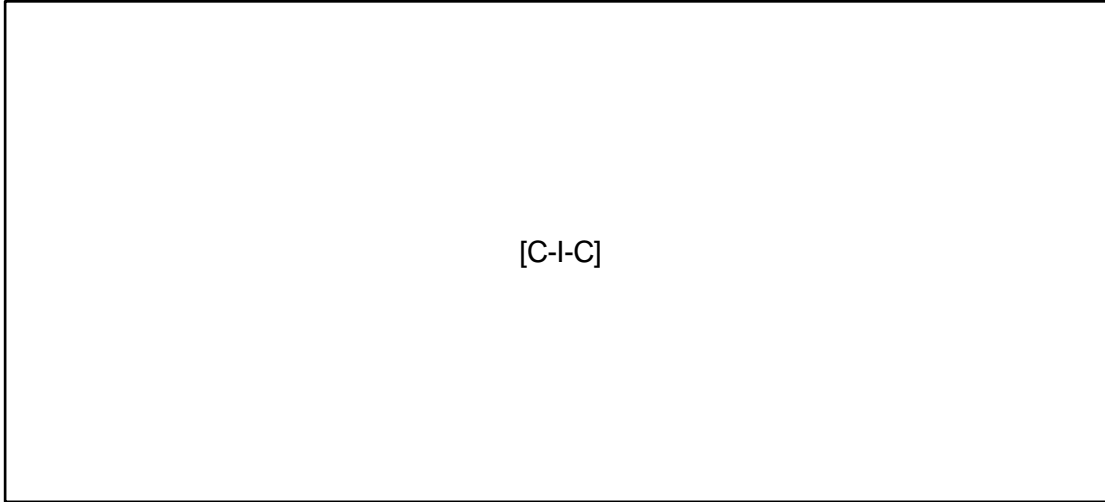
Risk Management is embedded within the culture of AusNet Services, with all employees responsible for the identification and management of risk. Risk Management underpins the Corporate Strategy enabling AusNet Services to identify and manage risk to ultimately achieve the corporate purpose of providing customers with superior network and energy solutions.

The AusNet Services Risk Management Framework is based on AS/NZS 3100:2009 Standards and is documented in the AusNet Services Risk Management Policy & Framework. The framework provides a structured and consistent process to the assessment and management of risk, enabling all business groups to make informed, risk based decisions.

Electricity Transmission Network – ICT Strategy

The AusNet Services Risk Management Process in accordance with AS/NZS 31000 standards is displayed in the figure below:

Figure 17: Risk Management Framework



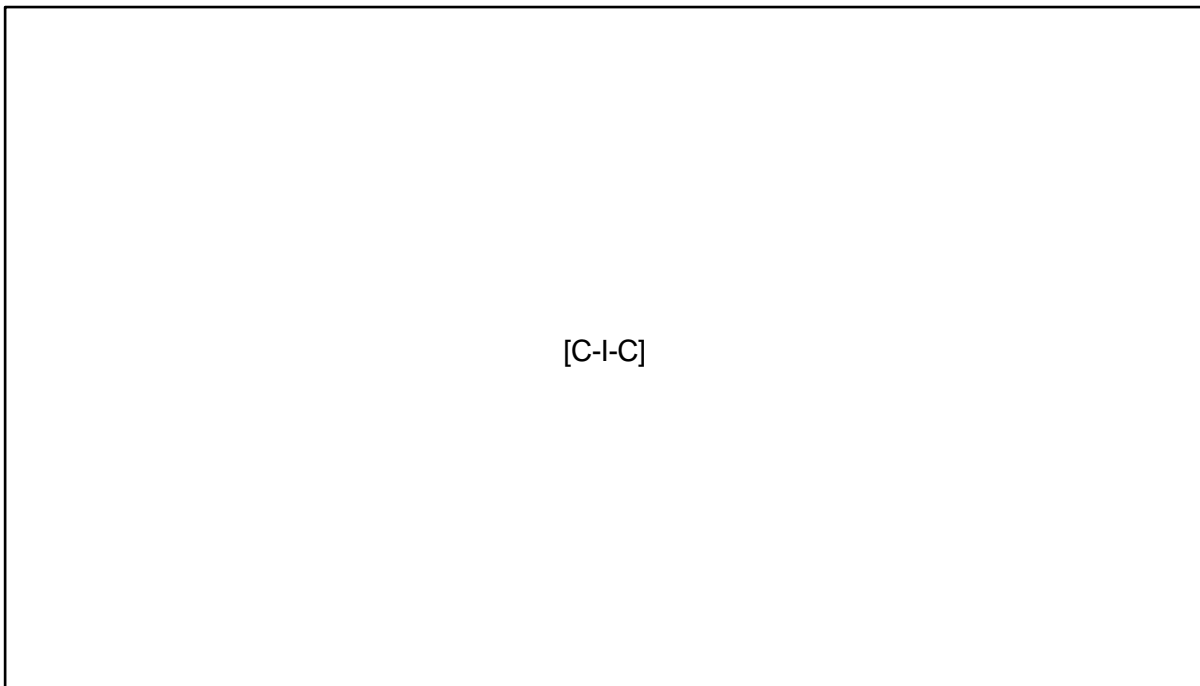
Risk Management Governance is captured within two main components, the first being assurances to the Board, and the second being the management of risk by business divisions.

The Board has ultimate responsibility for oversight for the management of risk, with an established Audit & Risk Management Committee (ARMC) with delegated responsibilities.

Risk is managed and reported to The Board at an Enterprise level by the Risk & Assurance Division, with each AusNet Services' Division responsible for the identification and management of risks within their respective divisions.

The Risk Management Governance model is shown in the figure below:

Figure 18: Risk Management Governance Model



Electricity Transmission Network – ICT Strategy

Within AusNet Services' ICT, the management of risk is multi-layered. At a divisional level risks are managed and reported via the Corporate Risk Management System, [C-I-C].

Within [C-I-C], risks are categorised and reported as follows:

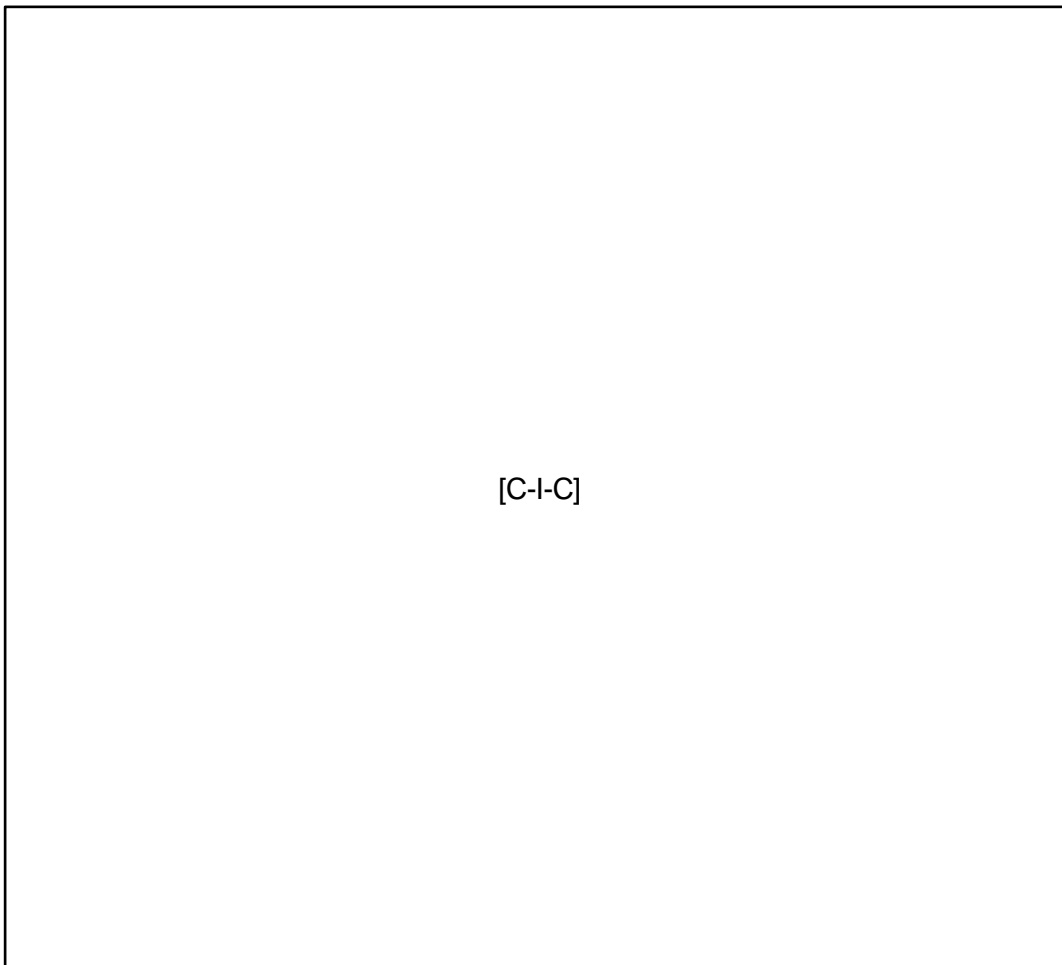
- Business Risk (risks which have a direct material impact on Business Plan Objectives);
- Emerging Risk (Uncertain change with unclear potential for impact and/or uncertain control capacity); and
- Operations Risk (Direct impact on Divisional Plan Objectives, or potential to impact or potential to have an impact on Business Objectives.

At the divisional level, risks are managed and reported via an ICT Risks and Issues SharePoint register. The risks captured in SharePoint comprise ICT Operations (including Infrastructure, Hardware, Software), and ICT Business Systems (including Applications).

A Risk Review Forum is conducted fortnightly, where risks are reviewed and potentially escalated to 'emerging' risks in [C-I-C]. Risk is also captured, managed and reported for ICT Projects and specific SharePoint registers are utilised for Projects and Programs.

The ICT Risk Management Framework is shown in the figure below:

Figure 19: ICT Risk Management Framework



Electricity Transmission Network – ICT Strategy

The AusNet Services' corporate and divisional risk management frameworks enable proactive management of key business risks to protect and provide acceptable returns on our investments and support the provision of high quality energy solutions.

ICT Operating Model

In 2014 AusNet Services commenced the introduction of a new operating model to prepare ICT for the challenges identified and provide the foundation required to support the transition throughout the next period. The new ICT operating model will mature over time into a framework that supports an organisation built on an engagement of shared outcomes with the business, enhancing business value through a lean, reliable and disciplined operation which leverages its partners.

The ICT operating model is centred on the purpose – *“Through our people and partners we enable AusNet Services to deliver energy solutions to the market by providing dependable fit for purpose ICT services”* and comprises of 10 core functions:

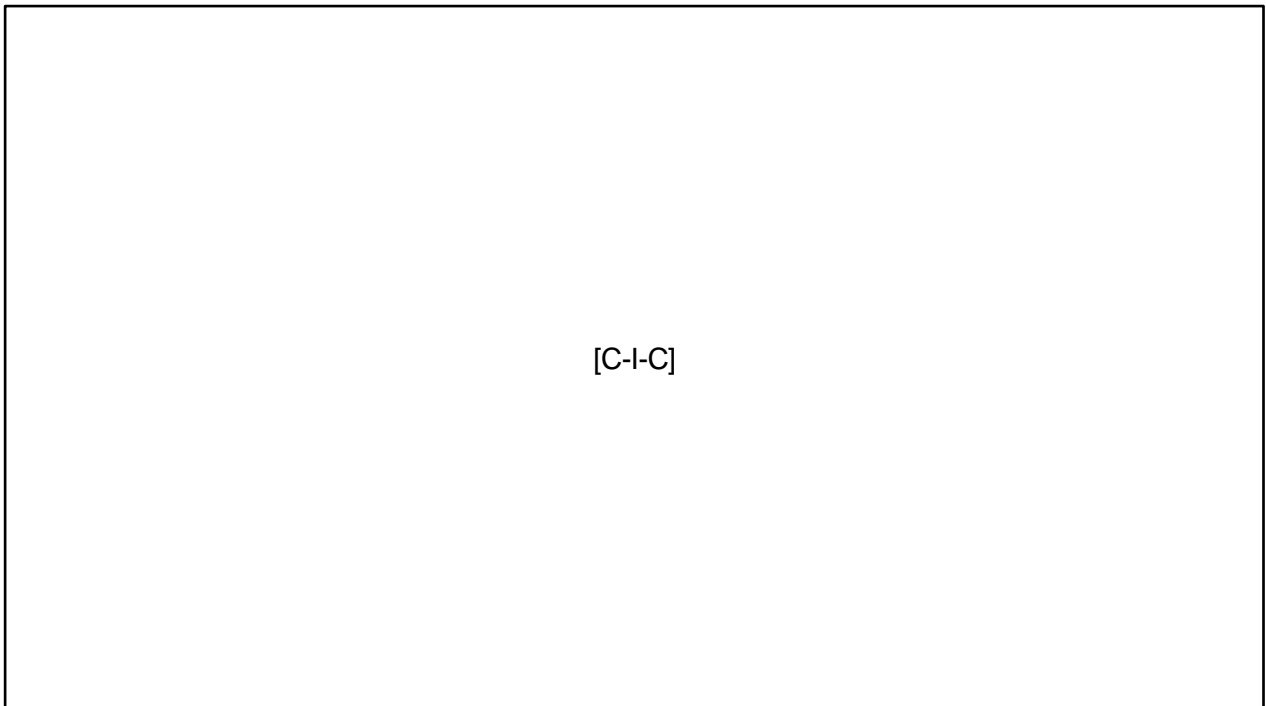
- **People:** We lead and care for our people, continuously improving capabilities and performance ensuring our achievements are rewarded and celebrated.
- **Partners:** We leverage strategic partner capability to effectively deliver dependable, fit for purpose services.
- **Services:** We will align our services to the needs and expectations of the business, accountable in their delivery providing transparency of cost.
- **Engagement:** We are aligned to our business and work with them on shared outcomes driving value for the organisation.
- **Architecture:** We execute against our Business technology roadmaps aligned to the overall AusNet Services strategy.
- **Governance:** Through our actions and processes we will be disciplined in the way we deliver our services and solutions.
- **Idea:** We seek ways to use technology to improve business value and seek ways to do things better.
- **Plan:** We identify and analyse solution options ensuring sound investment decisions are made while working to an agreed timeline.
- **Build:** We will build technology solutions in a cost effective manner bring the right skills to be in the most efficient manner.
- **Operate:** We will run ICT like a business ensuring business needs and expectations are met.

Electricity Transmission Network – ICT Strategy

The ICT Operating model aims to deliver the following key financial and non-financial benefits:

- Enable Cost Out through leveraging partners/vendors more effectively and governing contracts and sourcing across ICT;
- The right level of resource in the right functions with the right skills across the ICT organisation;
- Address existing gaps in capability, full time employee mix and spend compared to peers and industry standards;
- Support the transition of ICT's cost base to a competitive and sustainable level;
- Develop maturity to support industry and business drivers;
- Ensure that ICT is better aligned to the business and its ongoing requirements;
- Establish a more lean, reliable and disciplined operating model which enhances business value
- Ensures single point accountability for dependable fit for purpose ICT services and solutions.

Figure 20: ICT Future Operating Model¹⁰



¹⁰ AusNet Services, "ICT Division Business Plan & Technology Plan", Feb 2015. p. 42.

Appendix B: Current Period Capex

Context and Background

In the current Transmission regulatory period, AusNet Services embarked on a significant change in its approach to ICT aimed at modernising and enhancing core ICT capabilities, based enterprise wide system capabilities, enhanced data capture and analytics, and accurate network management capabilities. The main programs of work were underpinned by the need for ICT investments to drive productivity, integrating traditionally siloed functions. This investment in ICT established a technology platform that could support both the current and strategic needs of the business.

The current period identified the following key objectives for major investment:

- Provide improved asset management capabilities to schedule and execute work on the network more effectively and safely driven by real time data, focusing spending where there is maximum benefit;
- Enable operating effectiveness through increased process automation and collaboration tools;
- Provide capabilities to capture, sort, analyse and present large volumes of accurate data for informed decision-making; and
- Modernise and enhance the base of ICT Assets (through replacement or refresh) to support new network management capabilities underlying the renewed focus for ICT at AusNet Services.

ICT Domains

During the current regulatory period the scope of ICT capital expenditure was categorised into 6 domains of work. The focus of investment was on:

- **Asset and Works Management:** Improve safety and maintain network integrity and capacity through the delivery of a new consolidated and integrated enterprise asset and works management platform to drive efficiencies across end-to-end asset and works management processes.
- **Back Office Management:** Maintain customer service by ensuring back office systems meet the increased volume of business transactions. This will be delivered through the implementation of an integrated enterprise resource planning platform to drive efficiencies across back office functions.
- **Workforce Collaboration:** Improved safety and maintain customer service through the provision of systems to support effective knowledge management. The workforce collaboration solution will also provide efficient scheduling and dispatching of work and subsequent efficient work execution.
- **Analytics and Reporting:** Maintain network capacity through the provision of improved analytics and reporting.

Electricity Transmission Network – ICT Strategy

- Network Management: Improve safety and maintain network integrity and customer service through the delivery of enhanced information, assets, processes and systems to enable effective decision making and management of the electricity network.
- ICT Infrastructure and Operations: Maintain network integrity by ensuring ICT infrastructure is up to date, robust, scalable, and agile to support the changing business needs and ongoing initiatives.

Due to the size and scope of work performed a number of key ICT initiatives extend upon multiple domains and these will be discussed below. For example AusNet Services delivered a significant proportion of capital investment plans by implementing a single enterprise-wide EAM/ERP solution, consolidating multiple initiatives and minimising overlaps and duplication of effort across the portfolio.

For the next regulatory period, AusNet Services has amended some of the domains to ensure alignment to the wider AusNet Services’ business. The mappings of current to future domains are shown below.

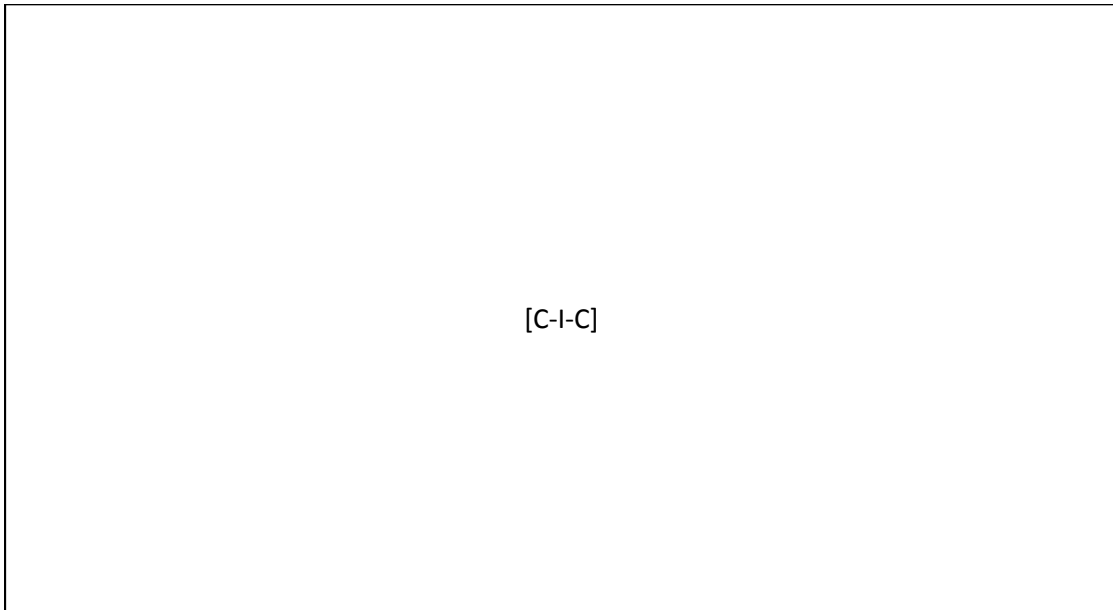
Table 12: Mapping of Current and Future Domains

Current Domain Name	Future Domain Name
Asset and Works Management	Asset and Works Management
Back Office Management	Corporate
Workforce Collaboration	Customer and Market Services
Analytics and Reporting	Information Management
Network Management	Network Management
ICT Infrastructure and Operations	ICT Infrastructure and Operations
	Information Security

Overall ICT Spend

Table 13: AusNet Services’ ICT Spend vs Actual / Estimated

	AER Determination	Actual/Estimate	Variance
Capex <i>\$Mar '17 including overheads</i>	\$[C-I-C]	\$[C-I-C]	-\$[C-I-C]

Figure 21: Annual Spend vs AER Allocation

Over the current Transmission regulatory period AusNet Services is scheduled to spend \$[C-I-C] against an AER Determination of \$[C-I-C]. This represents an underspend of $-\$[C-I-C]$, or $[C-I-C]$ % of total spend. Key points of note for expenditure within the current regulatory period are outlined below:

- This period is marked by significant investment in the delivery of the enterprise wide EAM/ERP solution. The EAM/ERP was successfully delivered in FY2015 and constitutes a significant proportion of upfront spending in the current regulatory period
- In FY2016 ICT capital expenditure is forecasted to reduce due to a conscious decision by AusNet Services to limit the rate of technology change being placed upon the organisation and concentrating efforts on embedding the EAM / ERP solution. This also allowed the commencement of significant capital investments projects to align to the start of the next regulatory period.
- A small number of mandatory ICT capital expenditure projects are underway to support real-time network management operations, information security initiatives to improve user authentication and access management and ICT infrastructure refreshes based on technology lifecycles.
- In FY2017, AusNet Services will undertake a number of deferred initiatives from FY2015. All non-core and dependent investments were deferred to prioritise the EAM/ERP and minimise additional capital requirements during the period. Where spending could be delayed or reappropriated to initiatives which better support the new enterprise environment, this spending was reallocated.
- This results in both cost savings and changes in the schedule of spending across the current regulatory period when assessed against the AER determination. More specifically this occurred as a part of the enterprise portal, analytics and reporting initiatives, which were consumed within the scope of the EAM / ERP.

Electricity Transmission Network – ICT Strategy

Due to the size and scope of work performed across the FY2015 – FY2017 period, a number of key ICT initiatives extend across multiple domains (e.g. EAM / ERP). Many initiatives within the current period are supported by enhancements to data gathering and utilisation capabilities, underpinning the new enterprise environment. As such spending was shifted across domains, with a focus on consolidating multiple initiatives and minimising overlaps and duplication of effort across the portfolio, with minimal net effect on overall spending against forecasts. Therefore, whilst some domains appear to have spent below the AER Determination (e.g. Network Management and ICT Infrastructure) these funds have been re-allocated to enterprise wide initiatives where spend is accounted for in specific domains (e.g. EAM / ERP / Corporate). This leads to a total spend closely aligned to the AER Determination.

During the current Transmission regulatory period AusNet Services tactically managed its operational and capital spend to allow for flexibility to invest in transformation initiatives (e.g. EAM / ERP). This resulted in lower priority projects being deferred to allow for the prioritisation of business critical projects. AusNet Services exercised prudence, waiting until the EAM/ERP solution is fully implemented so deferred projects receive due diligence of full project scope, complexities and dependencies. In doing so AusNet Services is able to extend the useful life of some ICT systems and assets so asset value is fully maximised and capital spend is efficiently managed.

With a clear understanding of the importance of these deferred projects and the need to minimise risks, AusNet Services implemented multiple minor improvements to ensure operational continuity and support of systems that were in need of an refresh as aligned to the technology lifecycle. This enabled AusNet Services to ensure systems are stable and effective, and minimise issues related to performance, stability, support and data quality.

Below we outline the key projects undertaken within each domain, the financials and the outcomes they have / will generate for the AusNet Services transmission business.

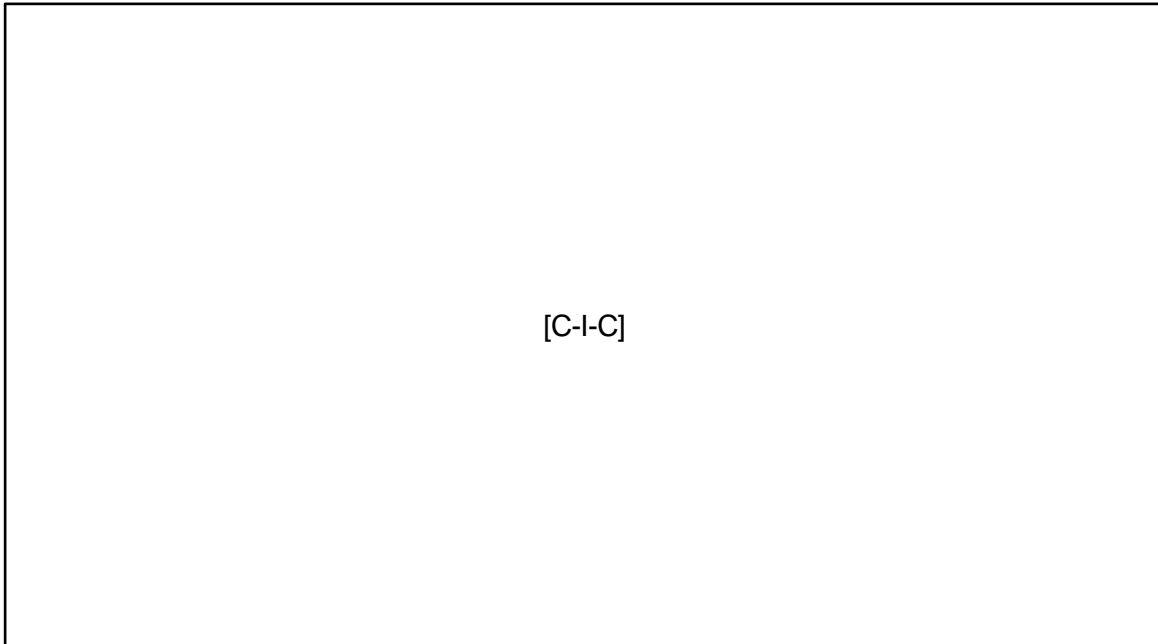
EAM / ERP / Corporate

Table 14: EAM/ERP / Corporate, actual spend against AER determination

	AER Determination	Actual/Estimate	Variance
Capex <i>\$Mar '17 direct (excluding overheads)</i>	\$[C-I-C]	\$[C-I-C]	+\$[C-I-C]

Electricity Transmission Network – ICT Strategy

Figure 22: EAM/ERP / Corporate implemented project timeline



The implementation of the foundational enterprise wide EAM / ERP solution was the most significant ICT capital program in the current regulatory period FY2015 – FY2017. As an organisational wide program the scope of the EAM / ERP program spanned a number of AusNet Services’ domains. The key elements of work are detailed below:

Table 15: Key initiatives by Domain or the EAM/ERP program

Domain	Initiative
Asset and Works Management	[C-I-C]
Back Office	
Workforce Collaboration	
Analytics and Reporting	
ICT Infrastructure and Operations	

Electricity Transmission Network – ICT Strategy

During the current regulatory period spend across the EAM / ERP program was \$[C-I-C], which is \$[C-I-C] above the proposed AER determination. The EAM / ERP was implemented in FY2015. Whilst the EAM / ERP program was delivered to key milestones and program outcomes the scope of the program was greater than the proposed scope when the AER Determination was agreed. AusNet Services identified the opportunity to refresh and consolidate legacy back-office systems and data, provide enterprise foundations for future process and business process improvements, and included this in the scope of the EAM / ERP program. For example, two projects involving the consolidation of HR and payroll systems, and financials and treasury systems were incorporated into the scope of the program. All of these projects facilitated the better utilisation of the EAM / ERP solution, reducing total costs over the aggregated ICT portfolio of work.

Key Outcomes

The following are the key outcomes of implementing the EAM/ERP solution:

- Consolidation of legacy technologies and the standardised use of one enterprise wide application. This created integrated business processes and increased operational efficiency;
- The centralised access to real time business data, creating a single source of business information, ensuring greater data integrity and security through advanced user management and access control;
- Enhanced decision making driven by intelligent data analysis and reporting capabilities across the enterprise;
- A flexible technology platform that can be scaled to meet the evolving customer, stakeholder and business needs;
- Sustainable operating cost containment through more efficient and effective asset management and supporting processes;
- Improved employee engagement by simplification and streamlining of business processes and system to perform daily tasks;
- Improved the customer experience in dealing with all aspect of the AusNet Services business portfolio; and
- Enhanced monitoring and maintenance of assets to underpin network reliability.

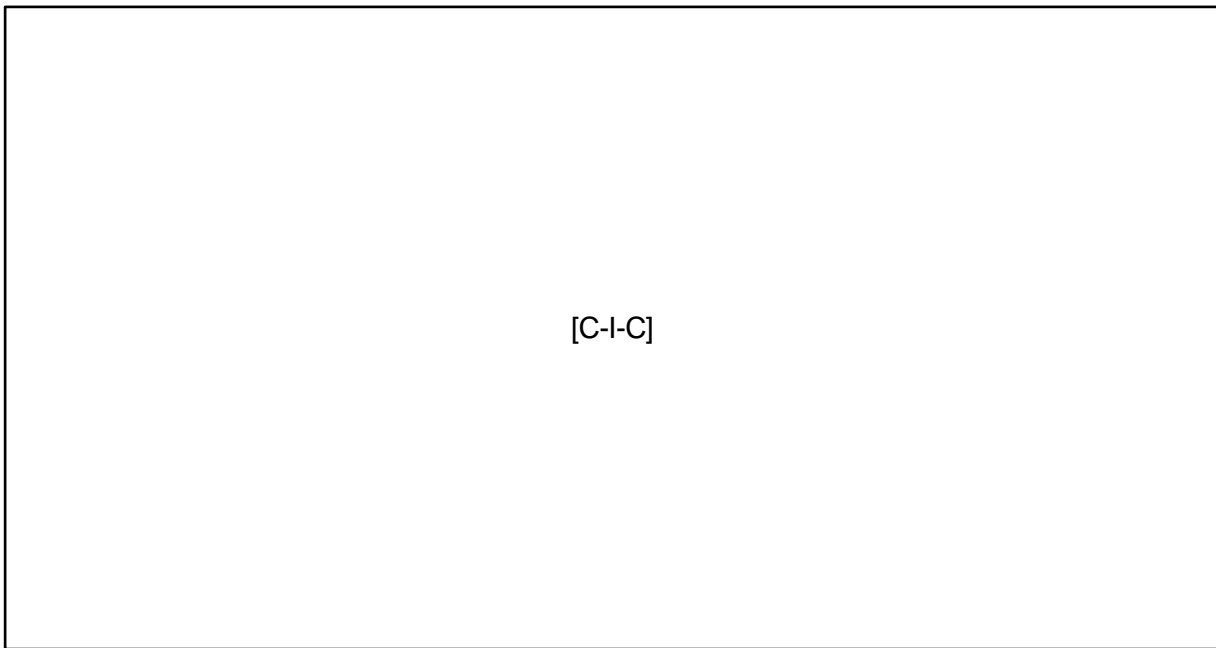
Electricity Transmission Network – ICT Strategy

Network Management

Table 16: Network Management, actual Spend against AER determination

	AER Determination	Actual/Estimate	Variance
Capex <i>\$Mar '17 direct (excluding overheads)</i>	\$[C-I-C]	\$[C-I-C]	-\$[C-I-C]

Figure 23: Network Management implemented project timeline



During the current period the focus of the Network Management program of work has been on performing required maintenance and refreshes to existing network management systems, and performing maintenance to the SCADA real time management system. In FY2015, technology lifecycle refreshes were undertaken on network management assets and systems to ensure continuity of service for control and operations facilities. In FY2016 – FY2017 AusNet Services will undertake a planned software upgrade of the SCADA network management system. This will minimise the risk of failure, ensuring that systems components remain in vendor support. Investment will also be made in outage management reporting tools to allow AusNet Services to reduce the dependency on manual processes (with duplicate data entry) for transmission outage planning and management, and provide the appropriate reporting capabilities to conform to associated National Electricity Rules (NER) and AEMO requirements.

During the current period spend in the Network Management domain was \$[C-I-C], which is \$[C-I-C] below the AER determination. The original estimate did not take into account all of the network management related functionality that the [C-I-C] solution would deliver. The variation in total spend is therefore attributable to funds re-allocated to the enterprise EAM / ERP program or projects that have been deferred until later in the regulatory period. The deferred projects include the Database overhaul, SCADA Link to [C-I-C], [C-I-C] and [C-I-C] Security which are now due to be completed within the next regulatory period.

Electricity Transmission Network – ICT Strategy

Key Outcomes

The key outcomes planned / delivered to AusNet Services from the Network Management program are:

- Ability to maintain the quality, reliability and security of transmission electricity supply through proactive management of the network assets and reduced risk of system failure;
- Demonstration of prudent management of key operational systems and ability to meet AusNet Services’ regulatory obligations through the continued provision of fit for purpose communications, monitoring and control facilities;
- Enhanced data analytics to support responses to network outages;
- Improve system security;
- Timely, more accurate and transparent regulatory reporting on Transmission outage and service performance;
- Maintained customer satisfaction due to better works allocation and more proactive management of a growing network;
- Management of increased asset base without commensurate cost increases by leveraging existing system functionality;
- Effective management of a key operational system by ensuring the computer hardware and software is maintained under extended warranty provisions at minimal cost; and
- Improved software implementations training practices to support improved testing and training procedures.

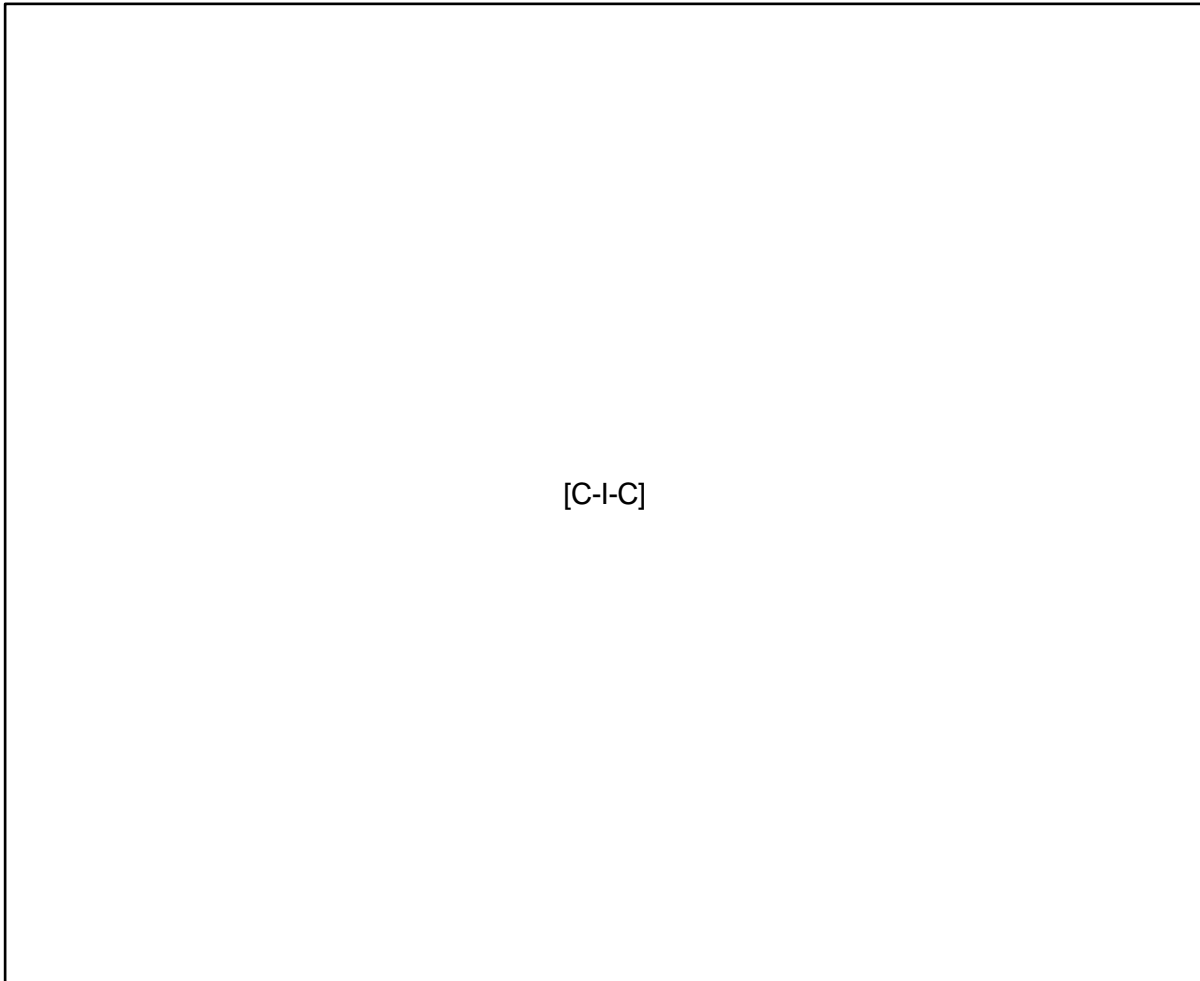
Information Technology (Infrastructure)

Table 17: Information Technology actual spend against AER determination

	AER Determination	Actual/Estimate	Variance
<p>Capex <i>\$Mar '17 direct (excluding overheads)</i></p>	\$[C-I-C]	\$[C-I-C]	-\$[C-I-C]

Electricity Transmission Network – ICT Strategy

Figure 24: Information Technology implemented project timeline



In the current regulatory period a number of key infrastructure systems are nearing end of life therefore the majority of investment in this period is to ensure the stability and dependability of the ICT infrastructure systems. If lifecycle refreshes are not addressed, AusNet Services would be at risk of operating unsupported systems or even systems failures representing a critical risk to the transmission of electricity. In FY2015, AusNet Services successfully completed refreshes for database (SQL and [C-I-C]), replacement of the aging storage infrastructure, and refreshes for ICT network management and support systems. In FY2016 – FY2017 AusNet Services plans to perform Wintel and Unix server hardware refreshes and, and desktop SOE refreshes, which will include both a refresh of the standard operating environment and operating systems for identified desktops.

During the current period, spend in the Infrastructure domain is planned to be \$[C-I-C] against an AER Determination budget of \$[C-I-C], representing a \$[C-I-C] underspend. A significant proportion of this underspend is attributed to projects that have been deferred until later in the current period, with funds re-allocated to the enterprise EAM / ERP program. The Network and Communications Management projects have been deferred to the next regulatory period due to these conflicting business priorities; including Rationalise Voice Networks and [C-I-C], Secure Wireless Solutions in Main Office and Unified Communications Applications.

Electricity Transmission Network – ICT Strategy

Key Outcomes

The following are the key outcomes of implementing the projects in this domain:

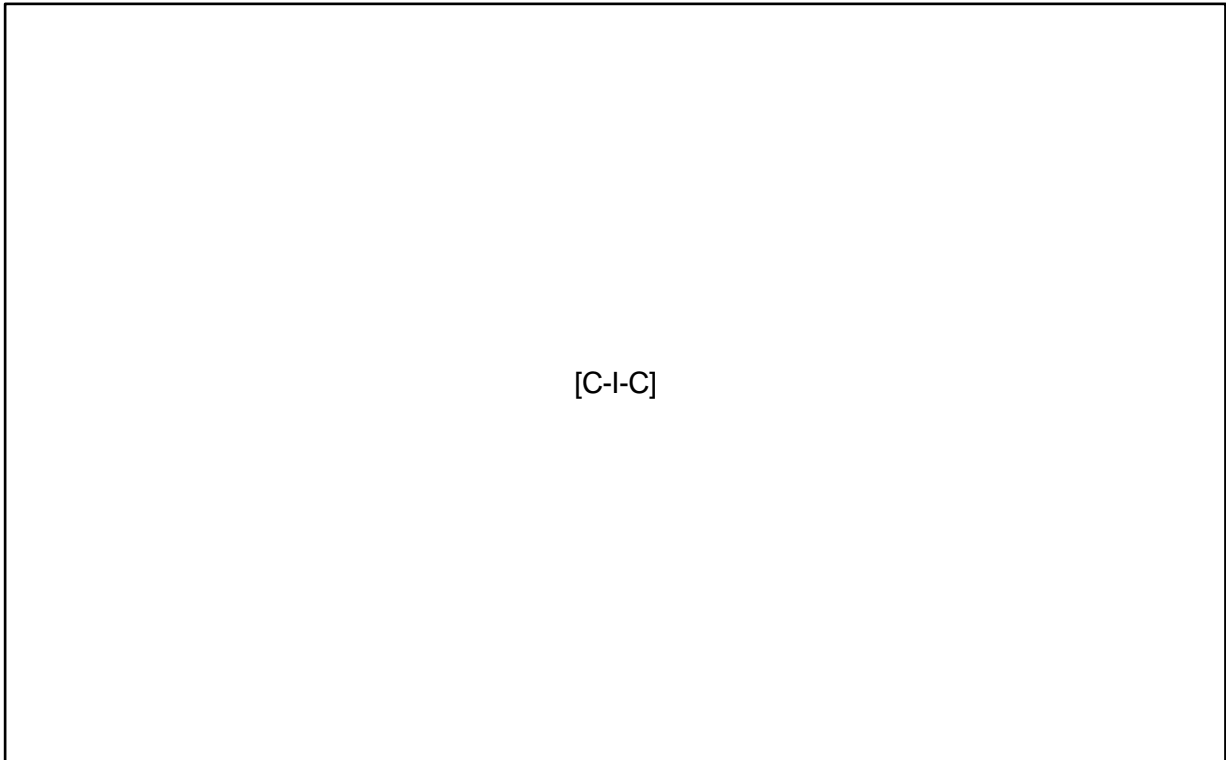
- More robust and scalable ICT infrastructure environment which supports ICT as a core driver of business value;
- Prudent management of a key operational system to limit the risk of system failure by ensuring the system is up to date and supported by the vendor;
- Increased system reliability;
- Controlled capital expenditure through lifecycle management;
- Provide scalability, flexibility to changing business demands on infrastructure;
- Ability to support the systems needed to maintain the quality, reliability of transmission;
- Enhance information displays in order to aid reactive network management processes;
- Leveraging existing capabilities through enhancements to manage the increased in asset base with minimal costs by leveraging existing system functionality; and
- Ensure computer hardware and software is maintained in line with specification and requirements to extend warranty provisions where it is cost effective to do so.

Information Security

Table 18: Information Security actual spend against AER determination

	AER Determination	Actual/Estimate	Variance
<p>Capex <i>\$Mar '17 direct (excluding overheads)</i></p>	\$[C-I-C]	\$[C-I-C]	\$[C-I-C]

Figure 25: Information Security implemented project timeline



For the current regulatory period the Information Security domain aims mitigate ICT security risks and support the network assets and AusNet Services business, by extending the reach of ICT Security, and maintaining the currency of existing ICT security components. This includes the replacement of end of life assets, enhancements to identity and access management procedures, improved network security architecture and enhanced governance and overall network security resilience.

During the current period ICT Capital spend in the Information Security domain has closely aligned to AER determination; with a total spend of \$[C-I-C]. In FY2015, AusNet Services has undertaken a program of work in Identify and Access Management. In FY 2016 – FY 2017 AusNet Services will undertake a number of information security programs including Extranet Security Architecture for Collaboration, and Monitoring and Audit Capacity. The Monitoring and Audit Capacity program was deferred from FY 2015 due to ongoing business restructuring of the Information Security function into ICT.

Key Outcomes

The ICT Security domain will deliver the following outcomes for AusNet Services:

- Reduction of operational and financial risk through enhanced access control;
- Reduction in risk of intrusion / cyber-attacks / malware;
- Operational risk reduction through access based on principle of least privilege;
- Network Reliability through increased accountability and non-repudiation; and
- Immediate alerts on intrusions, attacks, spread of malicious software and attempted misuse of authority by authenticated users.

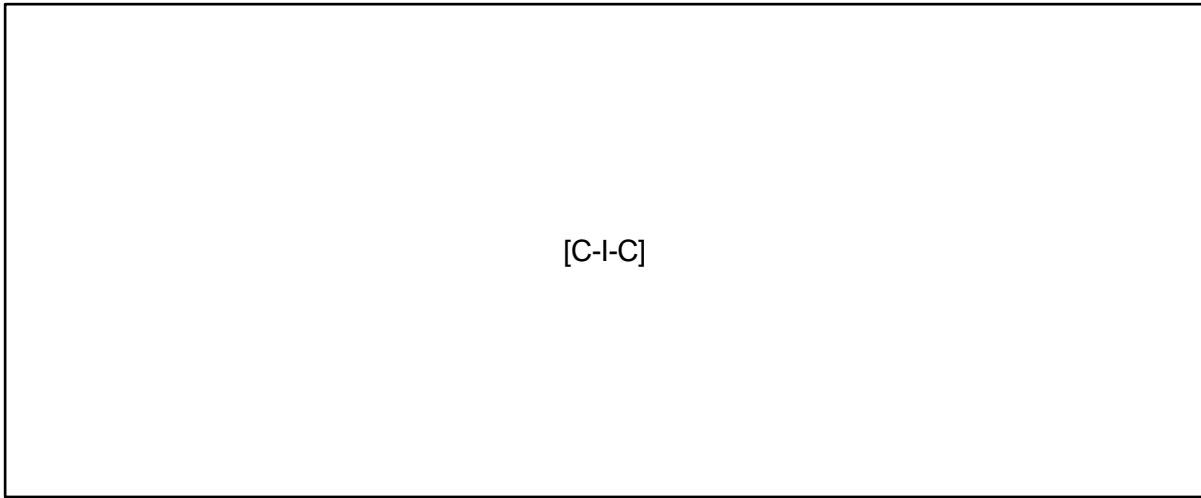
Electricity Transmission Network – ICT Strategy

Customer and Market Services

Table 19: Customer and Market Services actual spend against AER determination

	AER Determination	Actual/Estimate	Variance
Capex <i>\$Mar '17 direct (excluding overheads)</i>	\$[C-I-C]	\$[C-I-C]	+\$[C-I-C]

Figure 26: Customer and Market Services implemented project timeline



In the 2013-17 period no forecast capex was allocated to the Customer and Market Services domain for Transmission ICT capital expenditure, as the engagement with the customer was viewed as the remit of the Distribution business. However, spending has been undertaken in the Customer Services area which includes assets shared with the Transmission business and has benefits to all three AusNet Services businesses. During the current regulatory period spend in the Customer and Market Services domain was \$[C-I-C].

The focus for investment in the Customer and Market Services domain has been on delivering two foundational customer centric projects; the re-branding of the corporate website and the replacement of the legacy CIS system. Both projects are planned for delivery in FY2016 – FY2017. The re-branding of the website is a mandatory investment associated with the enterprise name change from SP AusNet to AusNet Services. The CIS system creates the foundation for future integration of [C-I-C] CIS with the EAM/ERP solution. This enables the integration of key customer information and asset data that will improve service order management, planning and scheduling, and inventory management. This will result in enhanced customer interactions management. AusNet Services will use the CRM system to manage the relationship with electricity distributors. The CRM will host key data including stakeholders, governance / escalation paths, and documentation on engagement and interactions.

Electricity Transmission Network – ICT Strategy

Key Outcomes

The key outcomes delivered to AusNet Services from the Customer and Market program of work are:

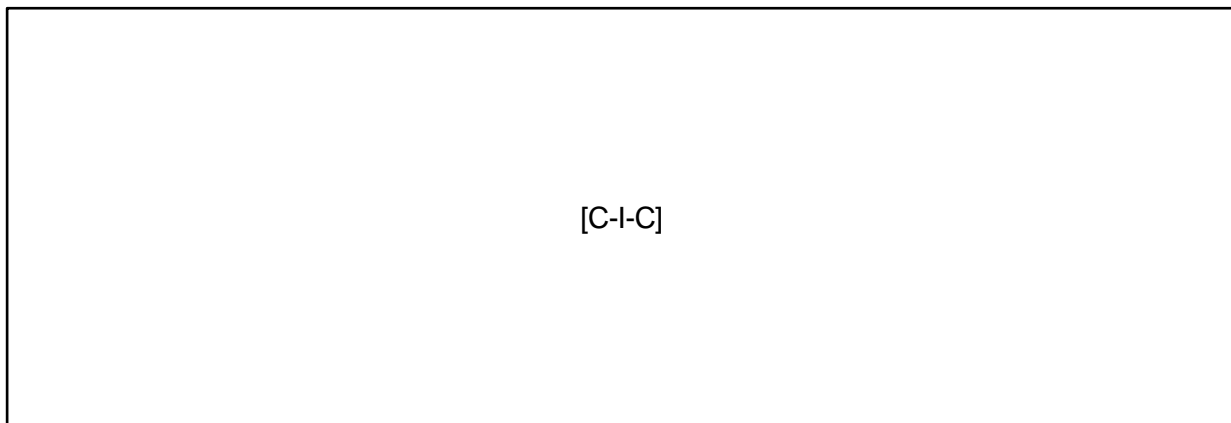
- Supporting future customer relationship management capabilities through enabling integration of the current CIS and EAM / ERP;
- Creating a single source of the truth for customer information across the organisation including the monitoring of customer interaction history;
- Enabled AusNet Services to automate customer interactions and gather relevant information for improved, more tailored customer service and experience;
- Improving corporate branding for AusNet Services; and
- A single repository for all interactions with Distributors and the key points of contact / stakeholders. This will improve relationship management capabilities.

Information Management

Table 20: Information Management actual spend against AER determination

	AER Determination	Actual/Estimate	Variance
<p>Capex <i>\$Mar '17 direct (excluding overheads)</i></p>	\$[C-I-C]	\$[C-I-C]	-\$[C-I-C]

Figure 27: Information Management implemented project timeline



In the current regulatory period the focus of investment in Information Management is on undertaking the rationalisation and / or refresh of systems for data storage, integration and processing. AusNet Services is building an Enterprise Data Warehouse capability that will support integrated enterprise data storage. This will enable AusNet Services to create a central location and permanent storage space for the various data sources needed to support a company’s analysis, reporting and other business intelligence functions. AusNet Services also proposes during this period to implement an

Electricity Transmission Network – ICT Strategy

enterprise information enablement and analytics capability, through the consolidation of current reporting solutions onto a common platform, and providing the appropriate data presentation tools.

During the current period spend in the Information Management domain has aligned closely to AER determination; with a variance in total spend of $-\$[C-I-C]$. The Enterprise Data Warehouse refresh project was initially scheduled to commence in FY2015. However, due to the ongoing implementation of the EAM / ERP solution a decision was made to defer the Enterprise Data Warehouse until FY2016, allowing AusNet Services to focus attentions on the business imperative of successfully implementing the EAM / ERP. The expectation is that the Enterprise Data Warehouse will be further augmented during the next regulatory period. AusNet Services plans to implement the Enterprise Data Warehouse project and the Enterprise Content Management Project will be completed within the current period.

Key Outcomes

The key outcomes planned / delivered to AusNet Services from the Information Management program of work are:

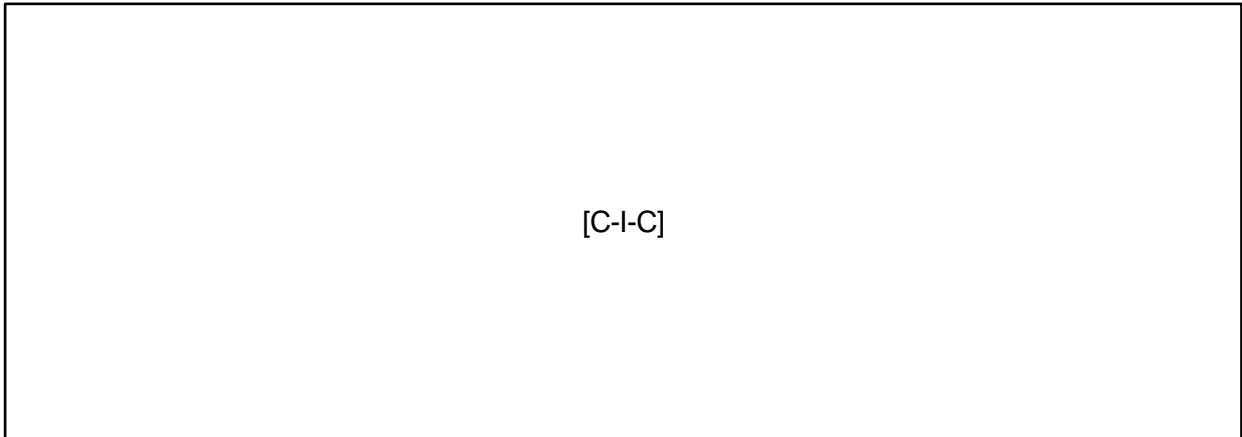
- Better organisational agility by leveraging real-time / near real-time analytical data to make better decisions in response to an increasingly variable network environment;
- Better monitoring of network and workforce performance with the ability to report and analyse historical and forecast performance metrics more effectively and efficiently;
- Better flexibility and capacity to scale to meet frequently changing and increasingly complex regulatory and safety compliance reporting requirements;
- Better flexibility and capacity to scale to meet frequently changing and increasingly complex regulatory and safety compliance reporting requirements;
- More effective and efficient forecasting and scaling of activity in response to the projected AMS capacity requirements for customer and asset works; and
- Improve allocation of capital (including capital deferral) for asset replacement, based on asset condition and reliability centred maintenance, supported by analytical intelligence.

Works and Asset Management

Table 21: Works and Asset Management actual spend against AER determination

	AER Determination	Actual/Estimate	Variance
Capex <i>\$Mar '17 direct (excluding overheads)</i>	$\$[C-I-C]$	$\$[C-I-C]$	$\$[C-I-C]$

Figure 28: Works and Asset Management implemented project timeline



Over the current period a significant proportion of the Works and Assessment Management ICT capital investment was performed under the scope of the EAM / ERP program (see [Appendix D](#) section 1.2).

During the current regulatory period spend in the Works and Asset Management domain is closely aligned to the AER determination; with a total spend of \$[C-I-C]. The Enterprise Document Management System refresh, specifically the refresh the CAD design solution and migration to a new document management system is planned to be performed in FY2016-FY2017.

Key Outcomes

The following are the key outcomes of implementing the projects in this domain:

- Improved access to and version control of documentation, ensuring consistent information and minimising the time spent administratively sourcing documents;
- Improved collaboration between employees and key stakeholders;
- Increased document security and control ensuring regulatory compliance;
- Improved document archiving and backups, minimising risks of lost documentation;
- Improved quality and access to asset design and drawing management documentation supporting design processes and improving the proactive management of asset lifecycles.

Appendix C: ICT Strategic Approach

[C-I-C]

[C-I-C]

[C-I-C]

[C-I-C]

[C-I-C]

[C-I-C]

[C-I-C]

[C-I-C]

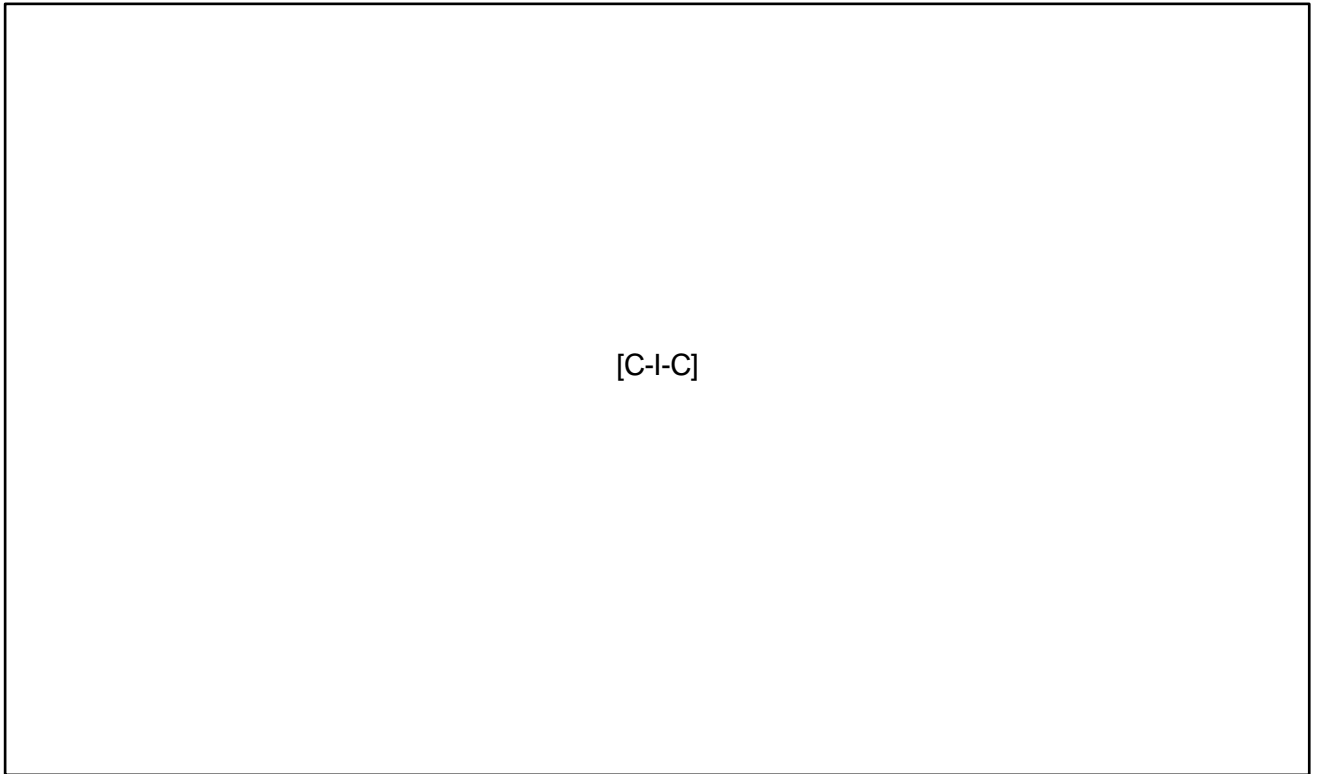
Electricity Transmission Network – ICT Strategy

The planned ICT investments enable business strategies and will therefore build on the foundational enterprise capabilities delivered in FY 2015 - FY 2017, focusing on customer service, customer safety, security of the transmission system, and technology that support the Electricity Transmission Network (assets, work, people, and field mobility). The planned future state will:

- Enhance public safety and power quality by combining “big data” from meters and core network systems with existing network technologies to locate faults and automate controls to protect the public (augmenting tradition protections);
- Improved customer centricity and regulatory compliance, enabled by a single view of the customer, with new and enhanced customer communication channels and interactions;
- Information enablement and analytics, utilising enterprise foundational data to enable prudent decision making and efficient business processes;
- Security enablement protecting supply, customer data, processes and core network business systems to mitigate and manage risk, underpinning the security and reliability of the network;
- People Management competences to ensure greater alignment of the workforce to customer and business outcomes; and
- Field mobility to improve service performance, reliability and to extend asset management capabilities to the field.

The following figures depict the key changes to the ICT capability landscape and the roadmap required to deliver. The method is driven by AusNet Services’ strategic approach to build on the foundational enterprise capabilities, establish single sources of truth, provide enhanced analytics and reporting, and deliver mobility services. The focus is on strategic platforms that support a wider range of business activities.

Figure 34: AusNet Services' Technology Road Map – Business Capability¹¹



¹¹ AusNet Services. (March 2015). *ICT Technology Plan Executive Presentation Overview*. p. 7.

Appendix D: Capital Requirements FY 2018 - FY 2022 – Detailed Program of Work

Network Management

Business Reason

Real time monitoring and management of the Transmission network is essential to ensuring network reliability, and as such is paramount to the successful operation of AusNet Services' business. Real time systems use SCADA (supervisory control and data acquisition) with advanced data collection capabilities to actively report on the performance and status of key assets.

The focus for investment in the next regulatory period will be to leverage previous investment in real time system to streamline business processes in network management and create a more resilient and robust transmission network. This program of work will ensure AusNet Services has the capacity to analyse, consolidate and clearly presented high volumes of data with limited manual intervention. This is achieved through enhanced analytics and automation, providing more accurate and timely feedback on the status of the network to more consistently control and limit outages. Enhancements will also be made to outage management, particularly with respect to the presentation of alarms and alerts, and streamlining the network switching planning process.

ICT Lifecycle management or the refresh of current Network Management systems accounts for over half the Network Management spending, and ensures that critical network monitoring equipment and interfaces are supported, and continue to be supported by vendors. Key real time network monitoring and asset control systems will also be managed in line with their lifecycle to ensure they continue to operate at their optimum levels and receive critical patching and bug fixes. Initiatives will also be undertaken to enhance the integration of relevant information on the location and interconnectivity of key transmission and communication assets with EAM/ERP to create a single source of truth for asset information.

The Network Management programs of work yield enhanced monitoring and outage management, as well as more timely decision making, based on higher quality information, increased process efficiency and utilisation of resources.

Scope

The scope of programs and the respective projects are described below.

Enhancing Network Safety

Investment will be made to improve AusNet Services' responsiveness to events or disruptions to the Transmission network by automating the steps required to analyse and implement prevention or subsequent remediation activities. By increasing automation within these systems AusNet Services increases the accuracy of analytical tools and limits the reliance on manual intervention and validation.

Electricity Transmission Network – ICT Strategy

Table 23: Enhance Network Safety initiatives

Initiative Name	Project Description
Outage Management - Enhance Transmission Switching Instructions Management	This initiative will automate the process of identifying potential routes to switch the transmission of electricity during planned outages, in support of filling out a switching instruction. This not only creates efficiency within the process of compiling a switching instruction, but limits the need for manual checks and the potential for errors leading to unplanned outages.
Alarm Grouping	The purpose of this initiative is to improve the robustness of network performance by automatically grouping alarms with the same root cause, presenting controllers with a single notification to action, as opposed to multiple. This will improve AusNet Services’ responsiveness to unplanned disruptions in the transmission network.
Alarms Management (Limits)	This initiative will improve the mapping of asset limits, which when exceeded will cause a disruption to the transmission network. By improving this mapping the accuracy of alarms is enhanced and in turn so is AusNet Services responsiveness to disruptions in the transmission network.

ICT Lifecycle Management of Network Management

This program of work will perform periodic patching and enhancements to network management systems, as aligned to the standard technology lifecycle and AusNet Services’ strategy to maintain the key technology systems at no worse than version n-1.

Table 24: ICT Lifecycle Management of Network Management initiatives

Initiative Name	Project Description
SOCS Engineering Application Refresh - Phase 2	A critical application which notifies controllers to shed the load on an asset when it is overloaded. This program is written in a coding language that has limited support so therefore this initiative will migrate SOCS to a more supported code base.
Training Simulator Enhancements	Currently AusNet Services’ in house network management training facility only has limited capability to simulate real situations. This initiative will increase the scope of simulations available to better prepare controllers for the actual conditions they will confront operationally.
Cardax Software Upgrades	The Cardax system enables Customer Emergency Operations Team (CEOT) to monitor access control to sites in real time via video feeds. The objective of the project is to perform a refresh of the Cardax system in alignment with asset management lifecycles.

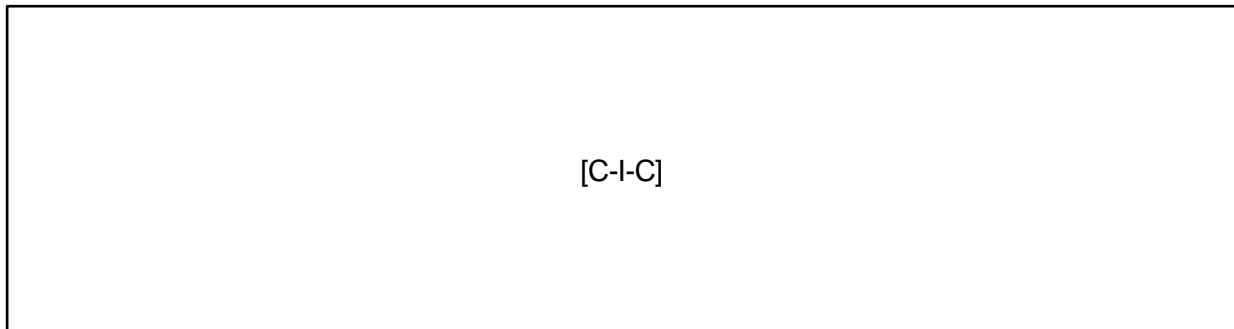
Electricity Transmission Network – ICT Strategy

Initiative Name	Project Description
SDMt and Infrastructure	<p>AusNet Services’ geospatial information for telecommunications assets location and interconnectivity is stored in the SDMt asset management system. The purpose of this initiative is to integrate the dataset and underlying platforms of the current geo-spatial database platform for telecommunications in the transmission network, SDMt, to the existing Enterprise Asset Management platform (EAM/ERP). This integration will allow data on assets in the transmission network, geo-spatial information and data across the entire organisation to be standardised and accessible across the organisation.</p> <p>In conjunction, AusNet Services will perform a lifecycle refresh of the platform underpinning SDMt to ensure it continues to be supported and provide core spatial information which is used across operations, work planning and asset management business functions.</p>
Wallboard	<p>This initiative refreshes the visual display units that are used by controllers to monitor the network to ensure this display continue to operate effectively.</p>
SCADA Growth - Increased Data Points and PI Front End Expansion (Lifecycle)	<p>As more data points are added to the transmission network for real time monitoring, this initiative is responsible for maintaining currency and accuracy of this data to ensure AusNet Services’ real time monitoring systems utilise these additional data points.</p>
Alstom Hardware & Software Upgrade & OSI Pi Upgrades	<p>Alstom is the SCADA platform which gathers and interprets the information from all real time monitoring systems deployed throughout the Transmission network. The objective of this initiative is to patch software for existing applications and tools in alignment with asset management lifecycles.</p>

Timeframes

Indicative timeframes for the implementation of proposed projects are illustrated in the timeline below.

Figure 35: Network Management forecasted implementation timeline



Electricity Transmission Network – ICT Strategy

Table 25: Network Management program forecasted costs

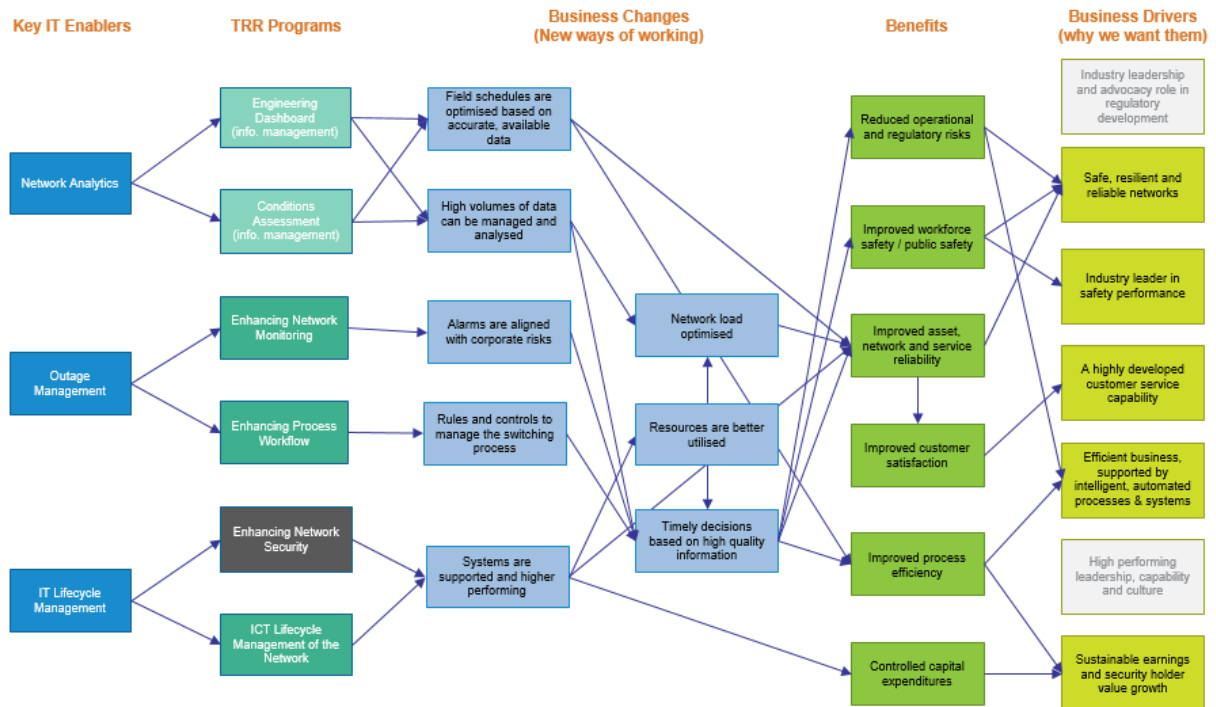
Project Name	Total Capital Spend
Outage Mgmt - Enhance Transmission Switching Instructions Management	\$[C-I-C]
Alarm Grouping	\$[C-I-C]
Alarms Management (Limits)	\$[C-I-C]
SCADA Systems	\$[C-I-C]
ICT Lifecycle Management of Network Management	\$[C-I-C]
Enhance Network Management Security	\$[C-I-C]
Total	\$[C-I-C]

Amounts are \$Mar '17 direct (excluding overheads)

Business Benefits

Benefits expected to be realised from the delivery of this program are illustrated below.

Figure 36: Network Management benefits map



Electricity Transmission Network – ICT Strategy

Options Analysis

The Network Management domain focuses on the implementation of network data analytics and visualisation tools, as well as enhancements and management of existing systems in line with their asset replacement lifecycle. This program will increase insights in to transmission network's performance as well as the ability to reconfigure and control it all in near real time. This insight is supported with detailed automation creating streamlined processes for network controllers, whilst increasing the accuracy of key network management activates.

Therefore, AusNet Services considers this expenditure critical to better monitor and manage the transmission network and support network management activities with reliable and stable systems and integrated, high quality near real time data, ultimately ensuring network safety, resilience and reliability. The consequences of doing nothing are:

- Inability to effectively manage network performance, with reliance on manual processes and assessment of multiple siloed systems, compromising responsiveness to network disturbances limiting resilience and reliability of the transmission network;
- Inability to leverage large volumes of available real time data to improve management of existing network and asset risks and operational response (e.g. the utilisation of Big Data);
- Increased cost of vendor maintenance and support as the current system versions will be out of maintenance, resulting in no patches or upgrades. Specialist technical consulting would need to be engaged to remediate issues at significant expense if a system falls out of a support agreement;
- Increased security vulnerabilities due to a lack of security patching, increasing the susceptibility to cyber intrusion; and
- Increased outage times, safety risks to workforce and the wider community, and continuity of supply to consumers and the community.

Risk Assessment

A risk assessment has been conducted, based on the AusNet Services risk management frameworks, to highlight the risk of doing nothing and not proceeding with this program. Key identified risks and associated consequences have been tabulated below.

Electricity Transmission Network – ICT Strategy

Table 26: Network Management risk assessment

Risk	Consequences
<p>Risk 1: Failure to meet regulatory requirements and standards to meet network up time</p>	<p>If real time network monitoring systems are not sufficiently responsive to disturbances in the transmission network, AusNet Services will be limited in the ability to sufficiently remedy the disruption.</p> <p>This will inevitably result in financial penalties from the regulator and/or loss of licence, and major increase in customer power quality complaints, damaging corporate brand and customer satisfaction.</p>
<p>Risk 2: Inconsistencies in source data used to configure the Transmission network</p>	<p>When the network is reconfigured or switching and outage management plans are generated, engineers and controllers must collate information from disparate sources. This is extremely labour intensive, and increases the reliance on individual's intellectual property.</p> <p>If there is an error in the planning process that is not amended prior to enacting it on the network, the section of the network will either fail, or power will not be isolated in an area where works are being undertaken, with significant HSE impact.</p> <p>This will result in an unplanned outage, carrying substantial costs through fines from the regulator. If not remedied appropriately it could jeopardise AusNet Services' license.</p> <p>Currently this risk of this occurring is very low, but it relies on substantial amount of rigorous manual checks, which are preceded by detailed assessments and users' understanding of the network.</p>
<p>Risk 3: Legacy systems reach end of life and maintenance / support cease being provided by vendors</p>	<p>Unsupported platforms may fail and support services may be difficult and costly to employ. AusNet Services may be forced to customise the respective system in order to address issues or meet business requirements.</p> <p>If a system fails, recovery could be lengthy which leads to business disruption and issues meeting regulatory compliance obligations.</p>
<p>Risk 4: New system enhancements are not made available to support business functions</p>	<p>Periodic systems upgrades allow AusNet Services to take advantage of new system capabilities. These new capabilities may have a significant benefit to the workload automation management processes, especially when they have regulatory or legislative impacts. If AusNet Services does not upgrade the system it will not be in a position to utilise these capabilities and may have to rely on customisations.</p>
<p>Risk 5: Network overload and inability to manage network performance</p>	<p>Failure or damage to the Transmission network infrastructure compromising network safety, resilience and reliability.</p>

Electricity Transmission Network – ICT Strategy

Works and Asset Management

Business Reason

The focus for the Works and Asset Management program is to build on the significant investment AusNet Services has made in the enterprise Assets and Work management solution ([C-I-C]) to enable enterprise-wide asset and works management that supports the reliability and safety of the Transmission network.

AusNet Services will consolidate and modernise asset and resource management functions with a focus on extending the scope to include remaining back office and field mobility operations. AusNet Services plans to invest in initiatives to extend the mobility solution for field services, providing remote real time access to operational information including inventory and planning management. Information relating to vehicle and crew locations will be enabled to optimise planning and scheduling to more efficiently prioritise and manage work crews.

End of life applications are being consolidated and migrated to current platforms, simplifying the ICT landscape. This ensures that these systems to be more robustly supported in to the future and scalable to meet future business demands. Drawings management and Computer Aided Design (CAD) systems used in maintenance and network planning design services will be also refreshed as part of this program.

The increased amount of data generated by new systems represents opportunities to leverage actionable insights that enable preventive works and asset management. This results in more reliable transmission assets and ultimately increased continuity and quality service to the customer.

Scope

The scope of programs and respective projects are described below.

Field Mobility for Customer Response and Public Safety

This program seeks to fully leverage the capabilities being delivered by the enterprise EAM/ERP solution, to extend and embed field mobility across AusNet Services and increase the efficient and effective delivery of maintenance work (faults and planned). This will improve the safety of field crews and network reliability.

Table 27: Field Mobility for Customer Response and Public Safety initiatives

Project Name	Project Description
Automatic Vehicle Location Enablement	Provides the dispatch centre with the location of vehicles to support efficient scheduling of works by locating the nearest vehicle to a given fault.
Project 'Mobile Plant Operating Guides'	Delivers mobile-enabled operations guides to provide detailed work instructions of plant operation to field staff.
Extend Mobility for Field Staff	Provide additional mobile functionalities that enable field staff productivity (e.g. Inventory and planning management, Time capture on jobs).
Fiori mobility	Provides the user interface toolset to deliver standard back office functionality to field staff users (e.g. Timesheet completion, Purchase order approvals).

Electricity Transmission Network – ICT Strategy

ICT Lifecycle Management CAD & Drawing Management Systems

This program seeks to refresh existing drawings and design systems to maintain system performance, capability and reliability. This will improve design quality and drawings management processes.

Table 28: ICT Lifecycle Management CAD & Drawing Management Systems initiatives

Project Name	Project Description
CAD System Refresh	Refresh of the Works and Asset Management systems in alignment with asset replacement lifecycles.
Drawings Management System Refresh	
Plan Optimising and Management System (POMS) Refresh	

Rationalisation of Legacy systems using the EAM/ERP platform

The objective of this program is to leverage the enterprise Works and Asset Management ERP platform to migrate key asset information from standalone applications. This will enable AusNet Services to streamline and automate business processes, improve network reliability and safety, and comply with regulatory obligations. This will be enabled by:

- Extending asset classes and further consolidate systems – public lights, protection, communication and control system data for relay settings, fleet, property;
- Leveraging ERP functions and realise benefits – business rules for work orders and notifications, resource demand planning for maintenance planning, financial planning, capacity planning.

Building Management

[C-I-C]

Table 29: Building Management initiatives

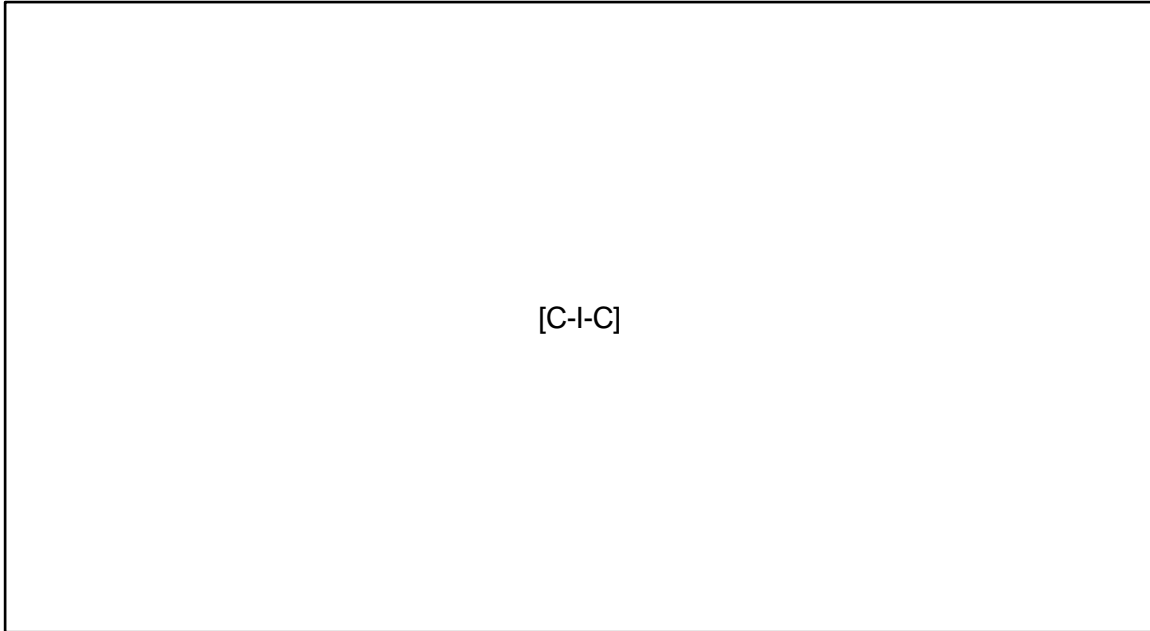
Project Name	Project Description
CEOT Move	[C-I-C]

Electricity Transmission Network – ICT Strategy

Timeframes

Indicative timeframes for the implementation of proposed projects are illustrated in the timeline below.

Figure 37: Asset & Works Management forecasted implementation timeline



Works & Asset Management Program Forecasted Costs

Forecasted capital expenditure for the implementation of proposed projects is tabulated below.

Table 30: Works & Asset Management program forecasted costs

Project Name	Total Capital Spend
Field mobility for customer response and public safety	\$(C-I-C)
Rationalisation of Legacy Systems using EAM/ERP Platform	\$(C-I-C)
Drawing Management	\$(C-I-C)
Transmission Outage Management System	\$(C-I-C)
CEOT Move	\$(C-I-C)
Total	\$(C-I-C)

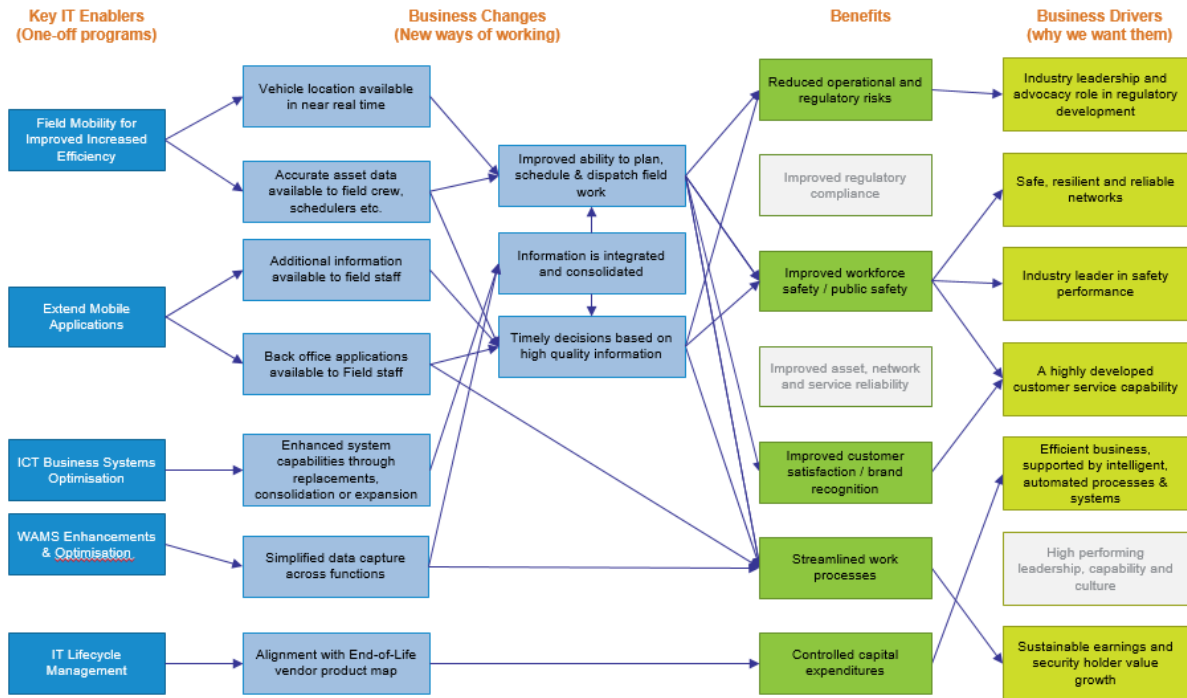
Amounts are \$Mar '17 direct (excluding overheads)

Electricity Transmission Network – ICT Strategy

Business Benefits

Benefits expected to be realised from the delivery of this program are illustrated below.

Figure 38: Works & Asset Management benefits map



Options Analysis

This program of work seeks to extend the new [C-I-C] enterprise platform and consolidate key asset management systems to maximise the value of existing investments and aid in risk mitigation. The consequences of doing nothing would result in missed opportunities to realise the complete value of existing investments, failure to address existing process inadequacies and controls, and exposure to business and operational risks such as:

- Inefficient management of work crews who are restricted by lack of real time information;
- Increased operating expenditure related to ongoing maintenance of the systems, and to fixing and supporting incidents of system failure, especially in the absence of vendor technical support;
- Increased frequency of system failure impacting the availability and reliability of the systems, compromising the ability to meet service levels and deliver required outcomes;
- Increasing issues with data quality, availability and reliability, because of version control issues resulting from maintaining disparate EAM systems and data;
- Increased operating cost related to maintaining disparate EAM systems and data;
- Reduced ability to leverage the value of asset data and analytics (e.g. to support preventive maintenance planning); and
- Lost opportunity to streamline processes by automating and supporting manual processes.

Electricity Transmission Network – ICT Strategy

Risk Assessment

A risk assessment has been conducted, based on the AusNet Services risk management frameworks, to highlight the risk of doing nothing and not proceeding with this program. Key identified risks and associated consequences have been tabulated below.

Table 31: Works & Asset Management risk assesment

Risk	Consequences
<p>Risk 1. Use of unsupported applications / tools to support critical business operations (e.g. Lotus Notes, Excel spreadsheet, MS Access)</p>	<p>Increased dependence on time consuming manual data gathering and analysis to support business operations and rekeying of data into the EAM / ERP solution.</p> <p>A lack of information security, systems robustness and auditability / version control from using unsupported tools.</p> <p>Ultimately these tools do not support automation and are heavily dependent on downstream manual checks to ensure the accuracy of data.</p>
<p>Risk 2: The current drawing management system cannot store 3D drawing or newer versions of CAD drawings.</p>	<p>Drawings will need to be downgraded in order to be storied, decreasing their quality and accuracy as some information / details are removed (e.g. loss of 3D information).</p> <p>This creates additional manual processes to get drawings ready for distribution and limits the ability to leverage new features on more advanced drawing formats.</p>
<p>Risk 3: Unsupported systems may fail and no support or maintenance services will be available to call upon.</p>	<p>Unsupported platforms may fail and support services may be difficult and costly to employ. AusNet Services may be forced to perform support services.</p> <p>If a system fails, recovery could be lengthy which leads to business disruption and issues meeting regulatory compliance obligations.</p>

Corporate

Business Reason

The focus of the corporate program of work is to support all business functions in achieving their required outcomes by developing the capabilities to enable workforce collaboration and development of corporate capabilities. During the current period the Corporate domain will build on the current capabilities of the [C-I-C] solution, extending the scope to include related back office functions, focussing on data management, employee management, and governance and risks management.

Electricity Transmission Network – ICT Strategy

Exponential growth in enterprise data and a centralised [C-I-C] solution provides AusNet Services with an opportunity to harness key information to support the electricity Transmission business, fulfil customer expectations and regulatory obligations. Over the next period, focus will be on the development of robust information governance and well-defined data architecture, supported by adequate tools to leverage and exploit data that drive informed decision-making. AusNet Services is also investing in extending financial management and reporting capabilities through the implementation of [C-I-C] Business Performance and Consolidation management solution. This will provide AusNet Services with an enterprise-level view of financial information with more transparent, accurate and timely external regulatory and compliance reporting, and insightful management reports.

Employee management is paramount to the successful operations of AusNet Services. From talent acquisition through workforce management and into succession. The formal management of employees is vital to ensure that AusNet Services generates the appropriate value from its employee base, recruit skilled candidates and develops and retains high performing individuals. AusNet Services currently uses a combination of bespoke applications, Microsoft Access databases and spreadsheets to support Workforce Management function. AusNet Services will implement Human Capital Performance modules to support employee management. These include Recruitment, Learning and Development, and Performance and Goals. This solution will be fully integrated into the EAM / ERP solution.

As the legal and regulatory landscape for electricity becomes increasingly complex, AusNet Services must ensure that it also has the tools and processes to effectively manage Governance, Risk and Compliance (GRC) and statutory reporting obligations. Therefore, AusNet Services is planning to rationalise the current disparate set of enterprise Governance, Risk and Compliance ([C-I-C]) tools and implement a single [C-I-C] solution integrated into the enterprise [C-I-C] solution. This will provide a consolidated system for management and tracking of all Governance, Risk and Compliance information and the utilisation of system workflows and business rules to support pro-active management of and advanced reporting of Governance, Risk and Compliance across AusNet Services. In conjunction, the EAM / ERP Health Safety Environment (HSE) solution will be implemented to support improved safety management and promote AusNet Services' MissionZero vision for safety management. This involves implementing the appropriate safety measures to promote zero injuries to people, zero tolerance of unsafe behaviours, zero compromise on safety and zero impacts on family and the community.

In order to align with standard technology maintenance lifecycles AusNet Services is undertaking an initial upgrade of the existing solution, and ongoing refreshes of all [C-I-C] modules to ensure access to standard [C-I-C] enhancements and defect resolutions to support the ongoing needs of AusNet Services.

Scope

The scope of programs and respective projects are described below.

Safety Visibility Management

This program focuses on the strategic support of the MissionZERO safety vision through the implementation of people-focused hazards and risk management systems. Currently, identified hazards and risks are managed using disparate systems limited functionality, creating the risk of operational inefficiency in monitoring and management of safety hazards and risks. Moreover, the current solution is not able to leverage more advanced features and functionalities such as trend analysis of safety incidents for their proactive management and prevention.

Electricity Transmission Network – ICT Strategy

Table 32: Safety Visibility Management initiative

Project Name	Project Description
HSEQ Management System	Implement a single system to record, monitor and report on people-focused safety hazards and risks, in a more efficient and automated manner.

Improved Statutory & Regulatory Reporting

This program seeks to leverage [C-I-C] to improve financial, treasury and regulatory reporting functions and enhance corporate modelling functions, to improve decision-making, support regulatory compliance and enhance data integrity and controls.

Table 33: Improved Statutory & Regulatory Reporting initiatives

Project Name	Project Description
Corporate Model (Corporate Modelling in -BPC)	Integrate the five-year corporate modelling capabilities from [C-I-C] Business Planning and Consolidation (BPC) module into EAM/ERP, to enhance and streamline planning, budgeting and forecasting capabilities.

ICT Lifecycle Management Corporate Systems

This program seeks to refresh existing corporate systems that manage program, risk, content management and quality, in alignment with their asset lifecycle and vendor roadmaps to support multiple core corporate business functions.

Table 34: ICT Lifecycle Management Corporate Systems initiatives

Project Name	Project Description
Prudent mandatory upgrades of Corporate Business Systems	Replace various treasury, workload automation, risk, content and environment management platforms to ensure that they are managed in alignment with asset management lifecycles and vendor roadmaps.

Enterprise Risk, Governance and Compliance

This program seeks to leverage the ERP to enhance risk management, governance and compliance capabilities in light of new application data models and systems, designed to monitor and reduce organisation risk.

Electricity Transmission Network – ICT Strategy

Table 35: Enterprise Risk, Governance and Compliance initiative

Project Name	Project Description
Implement E-GRC Solution	Consolidate systems that provide audit, risk management and compliance management into one integrated solution, and extend Governance, Risk and Compliance (GRC) scope beyond ICT.

ICT Lifecycle Management Digital Collaboration

The objective of this program is to support the overall digital capabilities of AusNet Services relating to internal communications and workforce collaboration by performing an upgrade of the existing intranet services, and further exploiting collaboration technologies. This will empower better support and advocacy for the overall business transformation.

Table 36: ICT Lifecycle Management Digital Collaboration initiative

Project Name	Project Description
Intranet Platform Refresh	Performing a systems refresh of the existing end of life intranet platform, integrating it to document management repositories and leveraging collaboration technologies to improve information access and engagement.

ICT Lifecycle Management ([C-I-C])

This program seeks to perform refreshes and patching of all [C-I-C] modules as aligned to the standard technology lifecycle. This will ensure access to standard enhancements and defect resolutions to support the ongoing needs of AusNet Services.

Table 37: ICT Lifecycle Management ([C-I-C]) initiatives

Project Name	Project Description
EAM / ERP Patching and Enhancement Pack	<p>The purpose of this initiative is to perform required lifecycle maintenance and patching of the EAM / ERP solution. Specifically:</p> <ul style="list-style-type: none"> • Initial upgrade of the existing [C-I-C] [C-I-C] module • Ongoing patching of all [C-I-C] modules to ensure access to standard enhancements and defect resolutions to support the ongoing needs of AusNet Services.

Electricity Transmission Network – ICT Strategy

Centralised Employee Management Capabilities

This program seeks to leverage the ERP to implement a centralised employee management solution to provide the systems, processes and tools to support talent acquisition, workforce management and succession.

Table 38: Centralised Employee Management Capabilities initiative

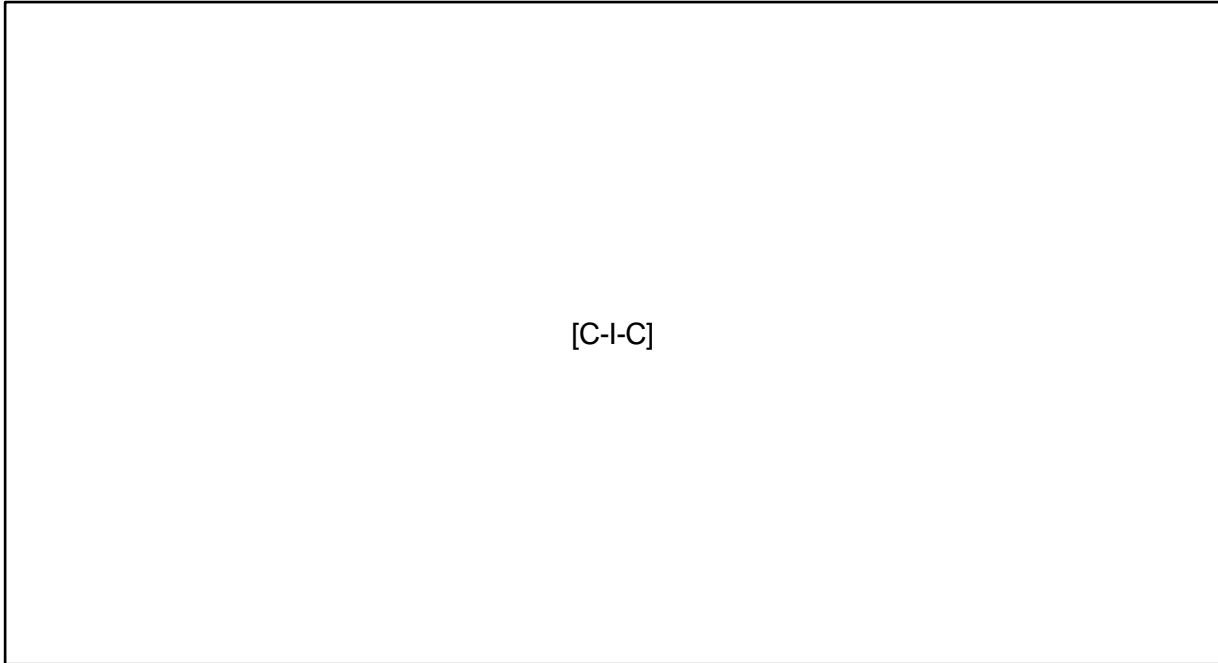
Project Name	Project Description
Centralised Employee Management Capabilities	Deliver employee management capabilities including employee management, learning, performance and goals, succession and development, compensation, recruitment and employee records management. This functionality will be used to cultivate AusNet Services' people and culture, provide functionalities to drive greater employee outcomes and enhanced decision making.

Electricity Transmission Network – ICT Strategy

Timeframes

Indicative timeframes for the implementation of proposed projects are illustrated in the timeline below.

Figure 39: Corporate forecasted implementation timeline



Corporate Program Forecasted Costs

Forecasted capital expenditure for the implementation of proposed projects is tabulated below.

Table 39: Corporate program forecasted costs

Project Name	Total Capital Spend
Safety Management System	\$(C-I-C)
Corporate Model (Corporate Modelling in [C-I-C] -BPC)	\$(C-I-C)
Implement E-GRC Solution	\$(C-I-C)
Centralised Employee Management Capabilities	\$(C-I-C)
ICT Lifecycle Management	\$(C-I-C)
Total	\$(C-I-C)

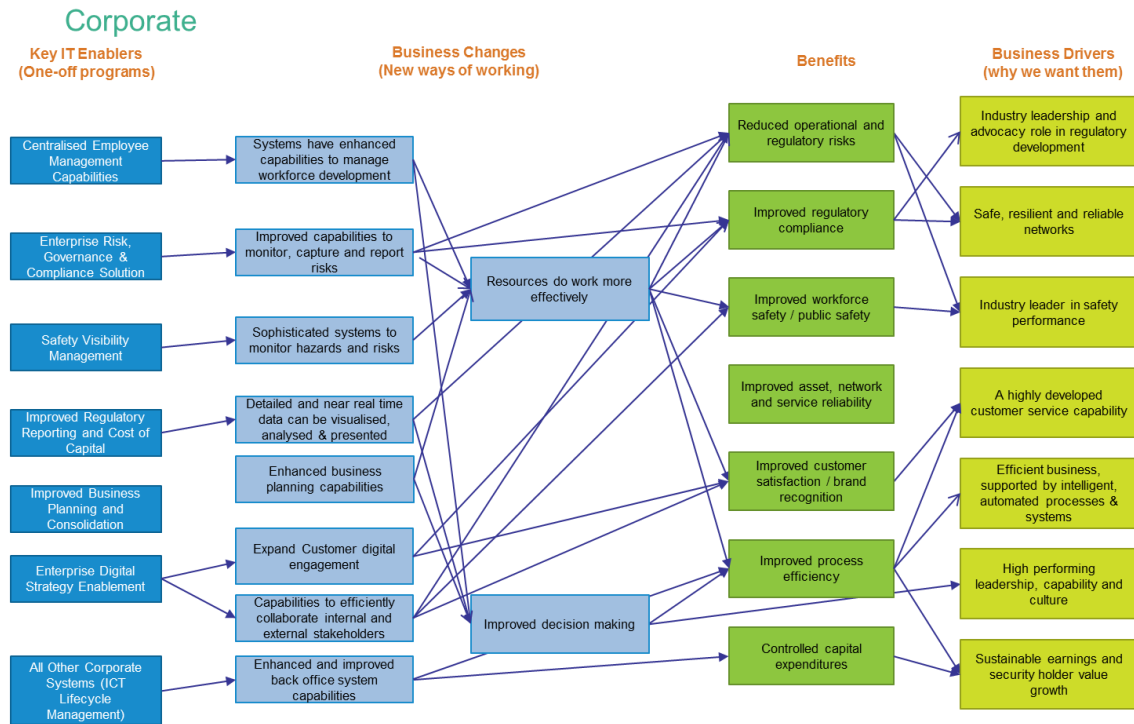
Amounts are \$Mar '17 direct (excluding overheads)

Electricity Transmission Network – ICT Strategy

Business Benefits

Benefits expected to be realised from the delivery of this program are illustrated below.

Figure 40: Corporate benefits map



Options Analysis

The Corporate program focuses on leveraging the enterprise [C-I-C] solution by extending the scope to include related corporate systems, and the replacement of end of life systems. This will address issues associated with disparate, manual processes and systems with limited functionality and visibility, and aging systems nearing end of life and out of vendor support.

Therefore, AusNet Services considers this expenditure critical to increase operational effectiveness, improve workforce development and collaboration and support all business functions with reliable and stable systems, ultimately developing a high performing culture and strong capabilities to serve customers. The consequences of doing nothing are:

- Inability to support corporate activities in a streamlined and cost-effective manner, leading to mismanagement of risks/issues and inefficient capabilities enable business processes;
- Inability to leverage existing capital investments and maximise benefits realisation.
- Increased system failure, leading to prolonged recovery times, un-compliance with Service Level Agreements and impacts to critical business processes;
- Increased operating expenditure related to fixing and supporting incidents of system failure, especially in the absence of vendor technical support. Not replacing the system in alignment with asset lifecycles, increases maintenance and support costs; and
- Limited systems functionality and a lack of system’s enhancements impacting the ability to meet current and future business requirements and processes.

Electricity Transmission Network – ICT Strategy

Risk Assessment

A risk assessment has been conducted, based on the AusNet Services risk management frameworks, to highlight the risk of doing nothing and not proceeding with this program. Key identified risks and associated consequences have been tabulated below.

Table 40: Corporate risk assessment

Risk	Consequences
<p>Risk 1: Legacy systems reach end of life and maintenance / support cease being provided by vendors</p>	<p>Unsupported platforms may fail and support services may be difficult and costly to employ. AusNet Services may be forced to customise the respective system in order to address issues or meet business requirements.</p> <p>If a system fails, recovery could be lengthy which leads to business disruption and issues meeting regulatory compliance obligations.</p>
<p>Risk 2: New system enhancements are not made available to support business functions</p>	<p>Periodic systems upgrades allow AusNet Services to take advantage of new system capabilities. These new capabilities may have a significant benefit to the workload automation management processes, especially when they have regulatory or legislative impacts. If AusNet Services does not upgrade the system it will not be in a position to utilise these capabilities and may have to rely on customisations.</p>
<p>Risk 3: Non-compliance with regulatory requirements for employee management (e.g. learning, safety)</p>	<p>Inefficient monitoring impacts AusNet Services’ ability to pro-actively manage safety risks and hazards. This may compromise workforce and community safety</p> <p>Significant effort required to manage the scope of audit and compliance obligations, increasing the risk of breaches and extending the time required to perform reporting.</p> <p>Any failure to meet compliance obligations could result in sanctions including a financial penalty or loss of license.</p>
<p>Risk 4: Process inefficiencies, poor data integrity and manual errors associated with business processes (e.g. planning and budgeting processes).</p>	<p>Operating a number of disparate systems leads to inconsistent and delayed information flow, compromising data quality and informed decision-making. This would lead to delays in the completion of the business planning and budgeting processes, with key decisions being made based on either incorrect or no supporting data.</p>

Customer and Metering Services

Business Reason

The AusNet Services Customer program of work focuses on improving customer service and engagement to ensure the business is equipped with the appropriate systems and tools to meet increasing regulatory and customer requirements. Whilst the focus of this engagement is around distribution, transmission still plays a valuable role in the supply chain of electricity and therefore is pivotal in providing timely information on outages and other disruptions in supply. Customer expectations are evolving and as such there is higher demand for information around outages and an expectation on AusNet Services to communicate and respond to requests for information via multiple channels.

AusNet Services is implementing a business strategy focused on evolving into a ‘Customer Centric Utility’. This period provides the opportunity to leverage core enterprise foundations to further enhance existing customer related capabilities and improve the customer experience using integrated Customer Relationship Management (CRM) applications. Investment in the upcoming transmission period will implement a CRM tool using enterprise technology solution leveraging key systems and processes. This will enhance AusNet Services ability to effectively and efficiently manage customer, regulatory and stakeholder obligations via a central customer information system. The program seeks to leverage the enterprise foundation processes and systems by creating a single view of the customer which will be used to improve customer service levels and meet the increasing information needs of customers. AusNet Services will use the CRM system to manage the relationship with electricity Distributors and Generators. The CRM will host key data including stakeholders, governance / escalation paths, and documentation on engagement and interactions.

Scope

The scope of programs and respective projects are described below.

Develop a Customer Centric Utility

The program seeks to create a single view of the customer which will be used to improve customer service levels and meet the increasing information needs of customers.

Table 41: Develop a Customer Centric Utility initiative

Project Name	Project Description
Implement Enterprise Wide CRM	This program will establish an enterprise-wide Customer Relationship Management (CRM) system that will capture key customer information to enhance customer service, interactions and customer experience. The system will also improve safety by enabling visibility (e.g. life support customers), improving outage notifications and faults handling, and ensure workforce safety by identifying site hazard locations.

Electricity Transmission Network – ICT Strategy

Customer Digital Enablement

This program seeks to engage customers via mobile and digital technologies to improve information dissemination regarding network operations and outages.

Table 42: Customer Digital Enablement initiative

Project Name	Project Description
Customer Internet Re-platform	This initiative will develop the internet website to service customer requests for information (e.g. outage notifications) and deliver mobile content, providing relevant network information to our key stakeholders including electricity Generators and Distributors.

Customer and Market Systems (ICT Lifecycle)

The purpose of this initiative is for AusNet Services to perform periodic patching and enhancements to the CRM solution, as aligned to the standard technology lifecycle and AusNet Services’ strategy to maintain the key technology systems at no worse than version n-1.

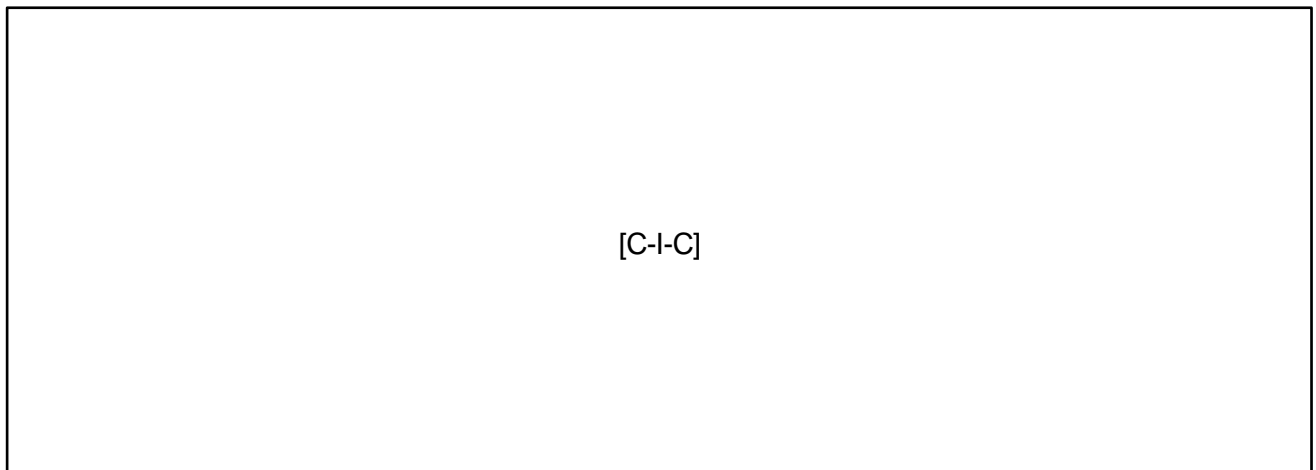
Table 43: Customer and Market Systems (ICT Lifecycle) initiative

Project Name	Project Description
CRM Software Upgrade (CRM Maintenance)	This initiative is a lifecycle refresh of the customer relationship management (CRM) applications ensuring it continues to be supported by vendors and receive all the latest patches and bug fixes.

Timeframes

Indicative timeframes for the implementation of proposed projects are illustrated in the timeline below.

Figure 41: Customer and Metering Services forecasted implementation timeline



Electricity Transmission Network – ICT Strategy

Customer and Metering Services Program Forecasted Costs

Forecasted capital expenditure for the implementation of proposed projects is tabulated below.

Table 44: Customer and Metering Services program forecasted costs

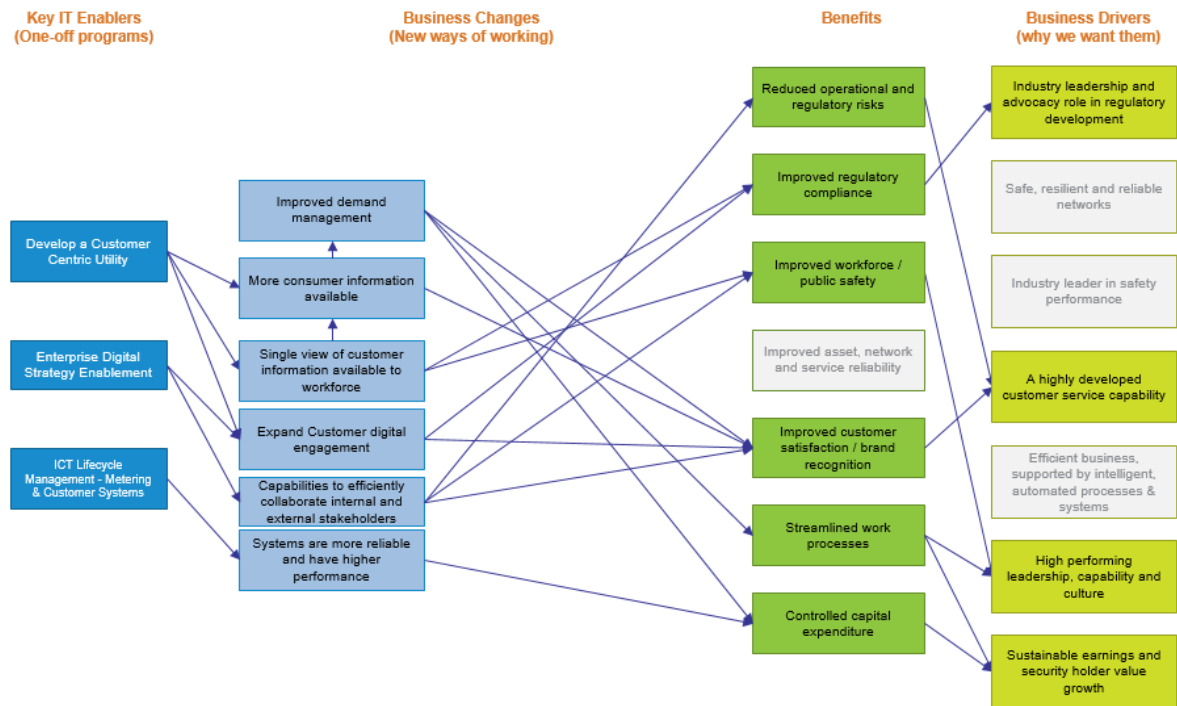
Project Name	Total Capital Spend
Implement Enterprise Wide CRM	\$(C-I-C)
CRM Software Upgrade (Lifecycle)	\$(C-I-C)
Customer Internet re-platform	\$(C-I-C)
Total	\$(C-I-C)

Amounts are \$Mar '17 direct (excluding overheads)

Business Benefits

Benefits expected to be realised from the delivery of this program are illustrated below.

Figure 42: Customer and Metering Services benefits map



Electricity Transmission Network – ICT Strategy

Options Analysis

The Customer program is focused on updating digital platforms to interface with customers (e.g. distributors, generators and ultimately end customers) and investing in Customer Relationship Management (CRM) capabilities ensuring relevant information gathered across the network is available to customer functions in the enterprise environment at AusNet Services. Therefore, AusNet Services considers this expenditure critical to achieving the benefits stated above and has considered the consequences of doing nothing as:

- Inability to meet customer demands for more readily available and timely information;
- Lack of integrated view of customer and asset information to field staff, resulting in sub-optimal internal management of network jobs and service orders;
- Inability to reap the benefits of additional technology designed to improve the information flow between field and office and consequently customer;
- Inability to manage safety risks for site visits and life support customers.

Risk Assessment

A risk assessment has been conducted, based on the AusNet Services risk management frameworks, to highlight the risk of doing nothing and not proceeding with this program. Key identified risks and associated consequences have been tabulated below.

Table 45: Customer and Metering Services risk assessment

Risk	Consequences
Risk 1: Safety hazards are not managed appropriately	Without appropriate dissemination of network incident and network safety information to customers there is a risk that customers could place themselves in unnecessary risk of health and safety incidents.
Risk 2: Deteriorating reputation due to poor customer experience	If AusNet Services does not have the requisite systems in place to respond to customer queries and requests (e.g. regarding network outages or planned work), the customer will ultimately be dissatisfied with the company as a whole. This will then lead to loss of customer trust and support for future capital investment.
Risk 3: Market customer data quality is not reliable	Although the implementation of a CRM will significantly improve the ability to manage customers, if the underpinning data is unreliable it will result in incorrect or inaccurate market data, increased manual processes and unfulfilled corporate and/or regulatory obligations (As a part of the new enterprise EAM/ERP CRM these key data sets will be thoroughly validated).

Information Technology (Infrastructure)

Business Reason

The focus of the Infrastructure program of work will be to continue building the ICT infrastructure to support current and future critical business and network systems, whilst controlling ICT operating expenditure. This will be achieved through prudent investments to simplify the current ICT landscape and refreshes of key infrastructures including storage, enterprise servers, desktop and laptop fleets and corporate network, cloud technology and communications.

These initiatives will ensure that AusNet Services has sufficient capacity to securely host core service delivery systems and relevant data. Investments will be made to ensure storage of critical business data is scalable in line with business requirements and fit for purpose. Additionally, unified communication will be implemented to increase workforce productivity and safety. Desktop virtualisation will also continue to increase desktop asset lifecycle, delaying the need for future investment.

Containment of ICT operating expenditure is required to ensure AusNet Services continues to operate a cost effective business. Over the current period there will be a focus on simplifying the ICT landscape and initiating preparations to progressively migrate to cloud based services. This would enable AusNet Services to leverage more cost effective delivery and sourcing models.

Scope

The scope of programs and respective projects are described below.

Data Storage (Lifecycle Refresh, Big Data storage growth and Cloud)

This program refreshes end of life hardware and augments storage capacity with a view to a future prudent mix of on premise and cloud storage capabilities. The program builds on the current investment in the rationalisation and virtualisation of servers, whilst prudently meeting the increased storage requirements of customer and regulatory data.

The program includes the following initiatives:

- Continue the rationalisation and virtualisation of servers (from [C-I-C] % to [C-I-C] % virtual servers - "virtual" cost as small fraction relative to "physical" servers);
- Prudent maintenance of the data centres to leverage prior period investments;
- Lifecycle refresh of storage and back-up hardware;
- Storage growth to allow for the large increase in customer and regulatory data (anticipated [C-I-C] % yearly growth of data); and
- The establishment of cloud storage to mitigate the large increase in customer and regulatory data.

Electricity Transmission Network – ICT Strategy

Table 46: Data Storage (Lifecycle Refresh, Big Data storage growth and Cloud) initiatives

Project Name	Project Description
Storage Growth (organic and project growth)	Provision of an organic storage and processing growth capacity for the storage solution, following the replacement of a storage array. This results in the ability to maintain current performance levels and cater for organic future data growth.
Platform consolidation (incl. Lotus Notes retirement)	Consolidation of hardware and operating system platforms to deliver a [C-I-C] %-complete lean virtualisation infrastructure, to provide a decrease in CAPEX and OPEX for aged infrastructure. This will also provide a reduction in risks associated with end of life and out of support applications, and an improvement in visibility and traceability of virtualisation transactions.
Cloud Service Orchestrator	Build upon the Private Cloud orchestration using selected orchestration technology to tie into prospective cloud providers.
Cloud Readiness	The selection of an appropriate Cloud Provider that caters for Infrastructure/Platform/Software as a service. The outcome will be the migration and storage of data in a cloud solution.
Data Centre Facilities and Systems	Refresh of end of life infrastructure in data centres and regional offices including computer room cooling systems, no longer compliant switchboards and obsolete data cabling. This will reduce operating expenditure by consolidating the number of vendors and reduce risk of outages with new compliant equipment.
Storage and Backup Hardware Refresh	Refresh of storage arrays, migration of data from existing systems to new storage, and the implementation and integration of new backup infrastructure, to improve data management capabilities and reduce OPEX maintenance costs.
SPARC Hardware Refresh	Refresh of end of life infrastructure with new infrastructure and the implementation of standards and tools for the management of [C-I-C] Solaris SPARC infrastructure. This will address current risks associated with aged hardware, and the current support and business impacts associated with disparate monitoring and management systems.
Tape Library – Cloud Strategy	Refresh of the existing Tape Library infrastructure with the most appropriate Long Term on and offsite data protection infrastructure. This will maintain and refresh the backup infrastructure for data from ICT systems.
Storage Fabric Refresh	Determine the most appropriate SAN Fabric solution for current and future infrastructure needs. The new SAN Fabric solution will, at the very least, meet current SAN Fabric capabilities/capacities as well as provide any new beneficial Fabric capabilities.

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Lifecycle refresh of other enterprise enablement technologies (customer contact centre, integration layer, databases)

This program refreshes end of life enterprise enablement technologies (hardware and software) that supports business critical capabilities. During the refresh, consolidation of technologies is assessed to reduce future capex.

Table 47: Lifecycle refresh of other enterprise enablement technologies initiatives

Project Name	Project Description
Enterprise Service Monitoring	Enterprise Wide extension of the Enterprise Service Monitoring solution to ensure to ensure SLA's and time to market regulatory requirements are monitored and reported against.
Integration Platform Lifecycle Management	Replacement of the enterprise application integration platform to a version that is currently supported by the vendor, resulting in cost avoidance of increased vendor support costs for a previous version and improvements in platform features.
Lifecycle Printer Server Refresh	Implementation of a 'follow me' printing style solution in order to leverage more efficient, cost-effective, flexible and secure printing facilities. The solution uses a virtual print queue infrastructure, where print jobs are held on a server and released at any printing equipment after users authenticate themselves with their unique security cards, regardless of location.
[C-I-C] Database SOE Refresh (Incl. Consolidation)	Standardise and consolidate all databases to two versions of [C-I-C] – this will result in a reduction of environment complexity.
SQL Database SOE Refresh (Incl. Consolidation)	Replace the SQL database engine (software) to ensure alignment to the software vendor's product and support roadmaps. This will maintain a supportable landscape which reduces operational risk to the organisation and develop a new standard operating environment (SOE).

Electricity Transmission Network – ICT Strategy

Lifecycle refresh of corporate network and communications

The prudent lifecycle replacements of network and communications hardware in alignment of asset lifecycle management and ensuring compliance to business and vendor support requirements. This ensures that systems continue to receive relevant patches and bug fixes from vendors and maintains their stability and reliability, as well as limiting the need to rely on costly customisation and purchasing extended support to maintain applications.

Table 48: Lifecycle refresh of corporate network and communications initiatives

Project Name	Project Description
Network – IT Router refresh	Refresh of end of life routers at DC and Remote Sites (excluding the ones overlapping with OMN initiative; encompassing all the WAN routers, VOIP gateways and tunnel termination routers), multilayer core switches for CBD sites and Data Centre Internet and DMZ Routers.
Network – IT Switch refresh	Refresh of end of life switches, redesign and implement next generation Data Centre Switching infrastructure and interconnectivity.
Network – IT WAN optimiser refresh	Refresh of end of life WAN devices and cater for future WAN traffic growth at Branch offices, and analyse, design and implement appropriate WAN optimisation capability to cater for future high speed Cloud partner uplink connectivity.
Network – IT Wireless Infrastructure	Refresh of WLAN network to ensure that the wireless infrastructure continues to be fit-for-purpose and deliver cost-effective, optimal performance to the business.
Lifecycle Refresh of Gateways incl. Consolidation (Telstra to MPLS) [ex Communications Network Gateway Consolidation]	Refresh of end of life hardware and associated software and roll out a consolidated solution that collapses multiple physical gateways into domain based consolidated gateways. Domains will be grouped by application type initially through the implementation of the dedicated gateway domains including an inter-DC link.
Lifecycle Refresh of Networks incl. Convergence (OMN) [ex Operational Management (HiSec) Network Replacement]	Refresh of end of life networks equipment and converge 2 separate comms networks (i.e. Corporate and HiSec) into one, to continue to support existing networks, improve network performance, resilience and availability and cater for new requirements including additional networks.
Lifecycle Refresh Enterprise UC and Telephony	Refresh of end of life of unified communications and telephony equipment (e.g. enterprise VoIP telephony assets, meeting room projectors and audio components) and integrate workforce mobility and collaboration features that work seamlessly, reliably and intuitively with telephony/VoIP platform(s).

Electricity Transmission Network – ICT Strategy

Lifecycle refresh of enterprise server and standard operating environment (SOE)

This program of works focuses on creating the virtual infrastructure required to support an ICT capital expenditure reduction. This is achieved by enabling information to be stored in virtual infrastructure rather than personal devices and maintaining the software and hardware currency of critical assets including both computers and enterprise servers, increasing ICT asset lifecycle and reducing operational risks.

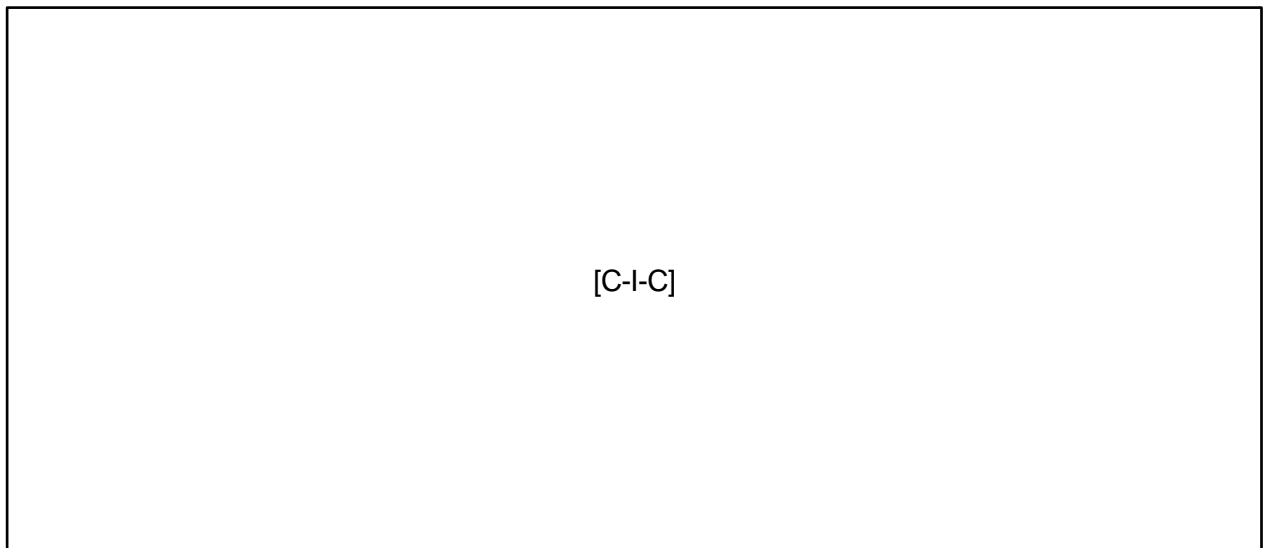
Table 49: Lifecycle refresh of enterprise server and standard operating environment (SOE) initiatives

Project Name	Project Description
Desktop / Laptop refresh (incl. Thin Client)	Move to a Thin Client device model to reduce the client landscape complexity and decrease reliance on the client, enabling user flexibility and ability to use a more cost effective platform without being restricted to a standard operating environment.
Enterprise Server Refresh including (inc VDI Enhancement)	Virtual Infrastructure (VI) hardware platform refresh to enable Virtual Desktop Infrastructure (VDI) and to facilitate cloud services, server-based computing (Thin Client) and BYOD capability for end users. The VDI solution provides improvements in data security by storing client systems' data in data centres.

Timeframes

Indicative timeframes for the implementation of proposed projects are illustrated in the timeline below.

Figure 43: Information Technology forecasted implementation timeline



Electricity Transmission Network – ICT Strategy

Information Technology Program Forecasted Costs

Forecasted capital expenditure for the implementation of proposed projects is tabulated below.

Table 50: Information Technology program forecasted costs

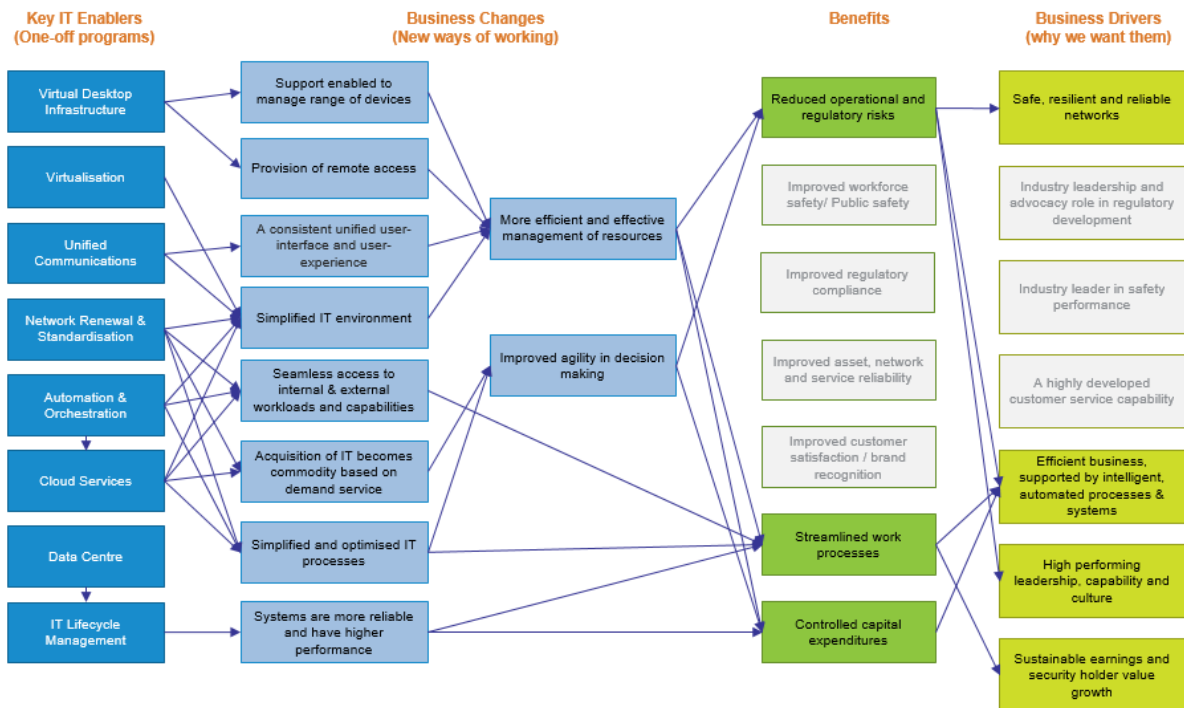
Project Name	Total Capital Spend
ICT Lifecycle Refresh of Storage Technology	\$(C-I-C)
ICT Lifecycle Refresh of Servers and Standard Operating Environment	\$(C-I-C)
ICT Lifecycle Refresh of Communications Network	\$(C-I-C)
ICT Lifecycle Refresh of Database Management	\$(C-I-C)
Total	\$(C-I-C)

Amounts are \$Mar '17 direct (excluding overheads)

Business Benefits

Benefits expected to be realised from the delivery of this program are illustrated below.

Figure 44: Information Technology benefits map



Electricity Transmission Network – ICT Strategy

Options Analysis

The Infrastructure program focuses on upgrading core systems and technologies to create a scalable and agile ICT platform that can support current business demands and changing market trends including the emerging focus on cloud computing. Therefore, AusNet Services considers this expenditure critical to achieving the benefits stated above and has considered the consequences of doing nothing as follows:

- Increased operating expenditure related to ongoing maintenance of the systems, and to fixing and supporting incidents of system failure, especially in the absence of vendor technical support;
- Increased vulnerabilities (including cyber-attacks) and expensive customisation to meet business needs without ensuring applications receive necessary patches and bug fixes as they move out of vendor support;
- Inability for systems and infrastructure to cater for future requirements, especially data storage growth; and
- Reduced systems performance and business efficiency and agility with limited capacity and outdated systems.

Risk Assessment

A risk assessment has been conducted, based on the AusNet Services risk management frameworks, to highlight the risk of doing nothing and not proceeding with this program. Key identified risks and associated consequences have been tabulated below.

Table 51: Information Technology risk assessment

Risk	Consequences
<p>Risk 1: Larger data sets are gathered across the organisation to support new systems and applications but there is insufficient capacity to store the data.</p>	<p>As AusNet Services continues to increase the automation and reach of existing systems they will depend on larger data sets and more complex applications and platforms, that then also require additional storage capacity. If the capacity of existing infrastructure is not managed in line with this growth in storage requirements then these systems will not only malfunction but none of the benefits from the investment will be achieved.</p>
<p>Risk 2: Non upgraded systems may limit alignment to future requirements and data growth.</p>	<p>Systems become non fit for purpose and cannot adequately support the organisation. As the organisation continues to gather more data and expand the reach of existing systems if there isn't sufficient infrastructure to support and store the additional information. This growth will be stalled and will not recognise the full benefits of investment across the business.</p>

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Risk	Consequences
<p>Risk 3: Unsupported systems may fail and no support or maintenance services will be available to call upon.</p>	<p>Unsupported platforms may fail and support services may be difficult and costly to employ. AusNet Services may be forced to perform support services.</p> <p>If a system fails, recovery could be lengthy which leads to business disruption and issues meeting regulatory compliance obligations.</p>

Information Management

Business Reason

The focus of the Information Management program of work is to augment existing foundational data storage, management and analytical capabilities to improve the management of AusNet Services’ networks and assets. AusNet Services faces challenges in accommodating the increasing volume of data flowing through the organisation and the requirement to improve the capabilities to derive actionable intelligence from data captured regarding operational and business processes and the management of assets.

A key objective for AusNet Services is the establishment of a ‘single source of truth’ for the organisation, ensuring a consistent view of data. At present, a number of key datasets are held in disparate systems without comprehensive data governance, or validation of data quality. Therefore, AusNet Services is undertaking a program of work to integrate these system and tools. This includes projects such as Enterprise Data Creation, Storage, Integration and Information Management Augmentation. These projects will establish foundational capabilities to create, store and move data in a consistent way and it will consolidate the separate systems into a single entity.

As the volume of data and requirements for decision making capability become increasingly complex, AusNet services has a growing need to improve its information management tools and capabilities. AusNet Services is investing in a set of projects such as Enhanced Decision Making, Engineering Dashboard, Condition Assessment and Improve Data Quality to increase data storage, remediate data quality issues and improve the application of data to support effective decision making with real-time and predictive analytics.

In order to align with standard technology maintenance lifecycles, AusNet Services is undertaking ongoing refreshes of key information management tools to ensure access to standard enhancements and defect resolutions and to support ongoing needs of AusNet Services. The refresh projects include data quality monitoring and remediation platform lifecycle refresh; data lake lifecycle refresh and integrated data warehouse lifecycle refresh.

The business objectives of this program of work are to augment AusNet Services’ Information Management Capabilities as follows:

- To have the assurance that common data reconciles across all systems;
- To have the ability to trace the flow of information;
- To improve data integrity and quality across the entire enterprise environment;
- To reduce the complexity in information management through enterprise wide data standards;

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- To have sufficient capacity to meet data growth projections (structured and unstructured); and
- To have the right tools that is able to meet business information, access and analytical needs.

Scope

The scope of programs and respective projects are described below.

Enterprise Data Creation, Storage and Integration

This strategic initiative focuses on the delivery of the necessary standards, processes and governance to ensure that AusNet Services has a consistent data structure that enables accuracy and interoperability across various data source systems. This strategic initiative will deliver the foundational capabilities that are required to create, store and move the data in a consistent way across the entire organisation.

Table 52: Enterprise Data Creation, Storage and Integration initiative

Project Name	Project Description
Business Information Model Adoption	Adoption of Common Information Model to future proof integration capability with standards based approach. Deploy core interfaces to Network Management Systems.

Improve Data Quality

This strategic initiative focuses on monitoring data quality to ensure consistency on how data is entered, stored managed and governed. Data quality monitoring through data profiling and remediation is crucial to gather actionable and measurable information about data quality to safeguard the success of business processes.

Table 53: Improve Data Quality initiative

Project Name	Project Description
Automated Data Quality Remediation	The expansion of existing data quality remediation solution to automatically profile data based on established quality criteria and the remediation of non-conform data that failed quality test to improve quality and make data usable.

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Enhanced Decision Making

This strategic initiative focuses on expanding the span of AusNet Services’ information delivery capabilities to ensure that enterprise wide business problem supporting effective decision making.

Table 54: Enhanced Decision Making initiatives

Project Name	Project Description
Real-time Analytics & Predictive Analytics	The augmentation of network management capability with advanced analytics platforms and toolsets to enable real-time and predictive analytics that will support enhanced network management.
Data Lake / Advanced Analytics Platform Implementation	Creation of an Enterprise Data lake and integration layer with source systems to enable and manage enterprise data.

Information Management Augmentation

This strategic initiative focuses on expanding existing information management capabilities to ensure that current systems are fit for purpose and can continuously meet AusNet Services’ information management requirements while controlling costs.

Table 55: Information Management Augmentation initiatives

Project Name	Project Description
Data Lifecycle Management Deployment	The development and the implementation of data classification framework and policies based on internal and external data priority, security, retention and destruction requirements to store, secure, archive and delete data.
Consolidate Enterprise Content and Document Management	The rationalisation and consolidation of content and document management systems to cast a better control over stored unstructured and structured document.
Consolidate Data Warehousing and Reporting Systems	The rationalisation and consolidation of data warehousing and reporting systems to reduce the likelihood of analytics discrepancies and cast a better control over warehousing and reporting environments.

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Information Management ICT Lifecycle Management

The prudent lifecycle refreshes of information management applications in alignment of asset life cycles and ensuring compliance to business and vendor support requirements.

Table 56: Information Management ICT Lifecycle Management initiatives

Project Name	Project Description
Enterprise Model Repository Lifecycle Refresh	These initiatives performs lifecycle refreshes of Information Management systems nearing end of life and requiring refreshes to a version that is supported and aligned to the vendor’s product roadmap. This replacement will involve not just the software but the hardware that the upgraded software runs on.
Data Quality Monitoring and Remediation Platform Lifecycle Refresh	
Data Lake Lifecycle Refresh	
ETL, Metadata Management, and Advanced Analytics Platform Lifecycle Refresh	
Integrated Data Warehouse Lifecycle Refresh	
Business Intelligence Platform Lifecycle Refresh	

Engineering Dashboard Program

This program of work is responsible for implementing a new engineering dashboard within AusNet Services. The dashboard will display consolidated information that will help the engineers to rectify the problems in the field. This will provide a time-saving benefit for AusNet Service’ engineers to diagnose the problem.

Table 57: Engineering Dashboard initiative

Project Name	Project Description
Engineering Dashboard	This initiative will enhance AusNet Services’ ability to resolve unplanned outages to the transmission network. It achieves this by automatically locating all relevant information from protection systems and standardising their presentation in an engineering dashboard for use by engineers in defining remediation activities.

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Conditions Assessment

This program of work is responsible for implementing a proactive assessment of the condition of devices on the transmission network. This will provide a streamline AusNet Service’s asset management activities as it will enable equipment repair and replacement on as need basis instead of the specified basis.

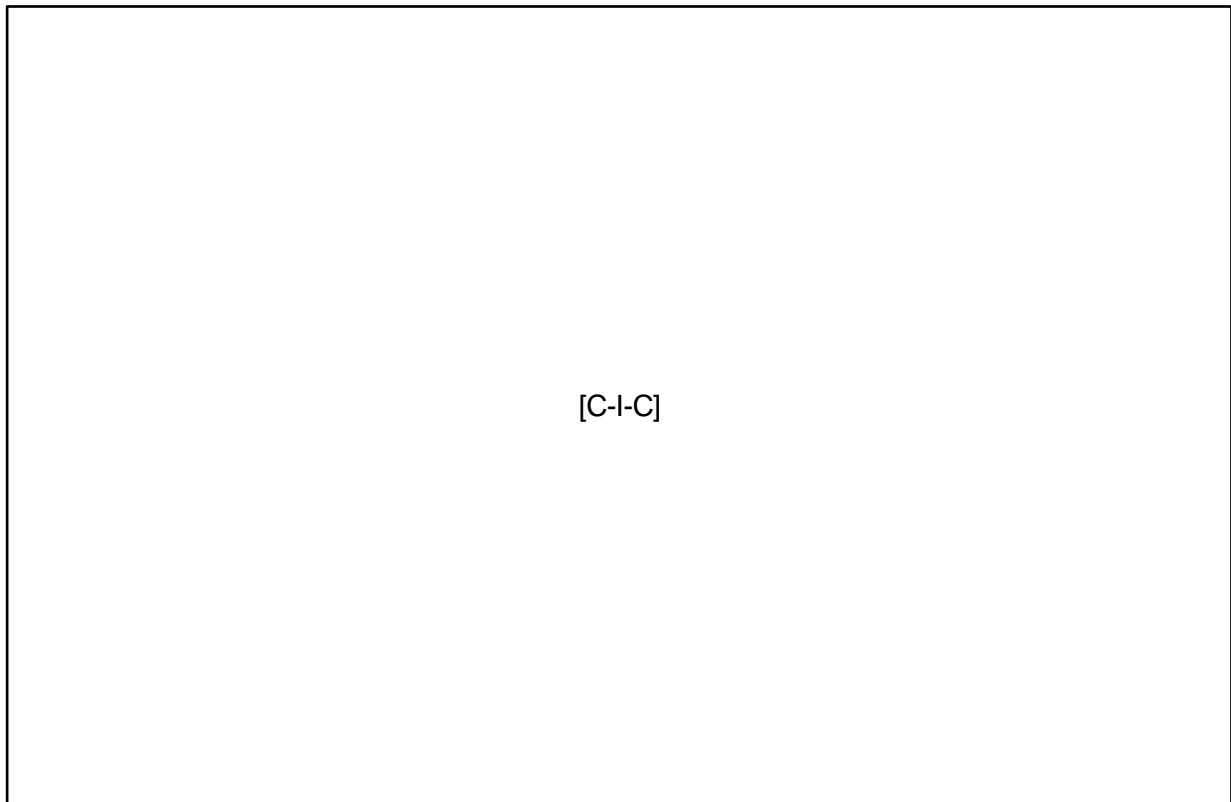
Table 58: Conditions Assessment initiative

Project Name	Project Description
Conditions Assessment	This initiative will utilise the data already available on the performance of assets in the transmission network to automate a comparison of their historic performance and the specifications. This analysis forms the basis of a conditions assessment which will allow AusNet Services to proactively manage its assets on a needs basis as opposed to periodically or as elements cause faults in the transmission network.

Timeframes

Indicative timeframes for the implementation of proposed projects are illustrated in the timeline below.

Figure 45: Information Technology forecasted implementation timeline



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Information Management Program Forecasted Costs

Forecasted capital expenditure for the implementation of proposed projects is tabulated below.

Table 59: Information Technology program forecasted costs

Project Name	Total Capital Spend
Enterprise Data Creation, Storage and Integration	\$(C-I-C)
Enhanced Decision Making	\$(C-I-C)
Improve Data Quality	\$(C-I-C)
Information Management Augmentation	\$(C-I-C)
ICT Lifecycle Management of Information Management Systems	\$(C-I-C)
Engineering Dashboard	\$(C-I-C)
Condition Assessment	\$(C-I-C)
Total	\$(C-I-C)

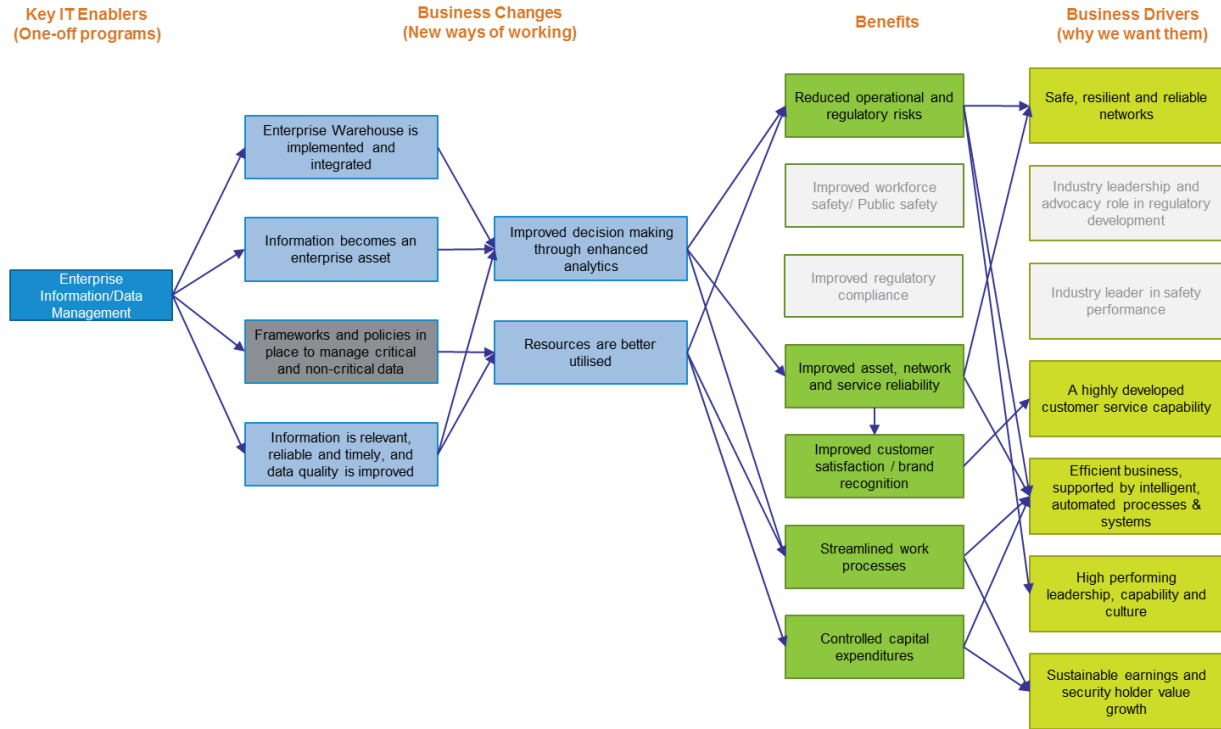
Amounts are \$Mar '17 direct (excluding overheads)

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Business Benefits

Benefits expected to be realised from the delivery of this program are illustrated below.

Figure 46: Information Technology benefits map



Options Analysis

The information management program focuses on the need to deliver enterprise wide information management capability through a focus on improved information governance, structures and tools. This will enable AusNet Services to benefit from enhanced data storage, manipulation and analytical capabilities to facilitate accurate information that drives key decision making (both operational and management) and reporting functions (for both internal and external stakeholders). Market trends including the utilisation of ‘Big Data’ demonstrate the growing importance of information management in the successful operations of the electricity transmission industry. The continuation of business as usual operations would result in an inability to exploit these opportunities. The probable consequences of this option include:

- Excessive time spent sourcing and preparing data for management and reporting purposes;
- Limited ability to use information management to drive whole of business decision making as data stored across siloed systems;
- Increased costs associated with inefficient processes to store, manage and retrieve information;
- Reduced data integrity as information is held in a number of disparate systems and tools without the appropriate data structures and governance;
- Inability to store and manipulate ‘big data’ to support decision making;
- Reduced systems performance and business efficiency due to inefficient data manipulation processes ; and

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- Inability to respond accurately to external stakeholder reporting requirements including AER regulatory compliance obligations.

Risk Assessment

A risk assessment has been conducted, based on the AusNet Services risk management frameworks, to highlight the risk of doing nothing and not proceeding with this program. Key identified risks and associated consequences have been tabulated below.

Table 60: Information Technology risk assessment

Risk	Consequences
<p>Risk 1 : Constraints in implementing real-time and predictive analytics processes</p>	<p>A lack real-time and predictive analysis tools inhibits the ability to pro-actively manage the network and therefore increases the risk of performance issues and disruption to services. A lack of real time alerting will impact AusNet Services ability to identify risks to network and operational performance and undertake mitigating actions before an issue arises.</p>
<p>Risk 2: Information is held in a number of disparate systems</p>	<p>Hosting information in disparate systems increases the risk of inconsistencies in data. This reduces the integrity of data that is used in analytics and reporting, limiting the reliance on data to drive decision making</p>
<p>Risk 3: Inability to respond to external reporting requirements in a timely and accurate manner</p>	<p>Excessive time spent manually collecting and analysing data for reporting purposes.</p> <p>Potential for final penalties and failure to comply with regulatory obligations.</p>
<p>Risk 4: Reduced systems performance due to inefficient data storage and analytical capabilities</p>	<p>Increased amount of time and effort required to perform data analytical and reporting functions. In conjunction this could lead to systems failure when performing detailed analysis.</p>
<p>Risk 5: Inability to meet data storage requirements due to increased datasets captured (e.g. 'big data')</p>	<p>Inability of ICT to meet requirements for data storage, therefore a lack of agility to employ new technologies and practices to utilise data.</p> <p>Significant investment in infrastructure required to store additional data.</p>
<p>Risk 6: Increased operational risk of data loss and security breaches</p>	<p>Unauthorised access to confidential data and potential misuse resulting in financial penalties and damage to the corporate brand.</p>
<p>Risk 7: Engineers lack the visibility of the root cause issue during unplanned outage.</p>	<p>If the incorrect root cause issue is presented to protection engineers, it is likely that they will assign the incorrect remediation activities. This will not resolve the outage but may exacerbate the underlying problem.</p>

Information Security

Business Reason

The focus of Information Security program of work is to build the ICT security capabilities required to protect AusNet Service's ICT network from cyber-intrusion. As a critical component of national infrastructure cyber threats to AusNet Services transmission network pose a significant risk to the energy sector. Cyber security threats have been steadily increasing over the past decade. Therefore it is paramount that AusNet Services invests in strengthening the security of ICT network and maintaining the currency of existing ICT security solution. The AusNet Services Information Security framework consists of four work streams which are aligned to the NIST Cybersecurity Framework. There are entitled 'identify', 'protect', 'detect' and 'respond'.

The 'Identify' work stream ensures that sufficient governance is applied to protective technologies, and risks are appropriately managed across the organisation. The identify function provides a critical foundation for the cybersecurity framework, that allows the business to better focus its time and resources. The key outcomes of the identify capability includes asset management, governance, risk assessment and risk management strategy. AusNet Services has identified several projects to enhance their current 'Identity' capability such as Information Security Governance Risk and Compliance (IT-GRC) and Industrial Control Systems (ICS) Asset Security Testing. This will improve the governance and decision making for Information Security and support the identification of security weaknesses of ICS assets.

The 'Protect' work stream provides processes and technologies that can be deployed to limit or contain the impact of an identified cyber-security threat. The key outcomes of the protect capabilities includes asset control, awareness training, data security, information protection and processes and procedures. AusNet Services has identified the following projects to enhance their current 'Identity' capability: Enterprise Gateway Security Refresh, Enterprise Identity and Access Management (IDAM), Cryptographic Controls Refresh & Augmentation, Remote systems test bed, Secure engineering devices. These projects will protect AusNet Service's ICT network by streamlining the user lifecycle and access management processes, allowing more stable patches installation and creating a secure network for field devices.

The 'Detect' work stream provides the process and tools to enable ICT Security staff to detect cyber-threats and attacks in a timely manner. The key outcomes of the detect capabilities includes anomalies and events detection and continuous security monitoring. AusNet Services has identified the following projects to enhance their current 'Identity' capability: Security Information and Event Management (SIEM) Augmentation, Continuous Monitoring and Diagnostics (CDM), Database Security Controls, Implement Network Security Monitoring (NSM), Implement authentication proxy and Integrate authentication-proxy to SIEM. These projects will improve authentication and access permissions to AusNet Service's database and Industrial Control System (ICS) devices, enable attack pattern detection and automatically alert the security administrator if there is an intrusion attempt.

The 'Respond' work stream provides response technologies that allow AusNet Services to take action against a detected cyber-security event. As cyber-intrusion techniques become more advanced preventative ICT security measures must be supplemented with measures to respond to intrusion and malicious activity. AusNet Services has identified enhancements to the Security Operations Centre (SOC) toolset capability to integrate disparate information for decision making.

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The key scope and outcomes of each work stream are outlined below:

Information Security Work Streams and Desired Outcomes

Table 61: Information Security Work Streams and Desired Outcomes

Work stream	Scope	Key Outcomes
Identify	Develop the organisational understanding to manage cybersecurity risk to systems, assets, data, and capabilities	Asset Management; Business Environment; Governance; Risk Assessment; and Risk Management Strategy
Protect	Develop and implement the appropriate safeguards to ensure delivery of critical infrastructure services	Access Control; Awareness and Training; Data Security; Information Protection Processes and Procedures; Maintenance; and Protective Technology
Detect	Develop and implement the appropriate activities to identify the occurrence of a cybersecurity event	Anomalies and Events; Security Continuous Monitoring; and Detection Processes
Respond	Develop and implement the appropriate activities to take action regarding a detected cybersecurity event	Response Planning; Communications; Analysis; Mitigation; and Improvements

Scope

The scope of programs and respective projects are described below.

Enterprise Information Security Enablement

This program seeks to improve the ICT security capabilities of AusNet Services by implementing new technologies and capabilities to address cyber-risks to the business, extending the reach and capability of the Information Security Management System (ISMS), and maintaining the effectiveness of existing controls to protect the transmission networks against a dynamic and rapidly changing cyber-threat environment. Central to these objectives is conforming to ISCERT standards for the AusNet Services ICT security framework.

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Table 62: Enterprise Information Security Enablement initiatives

Project Name	Project Description
Enterprise Identity and Access Management (IDAM)	Procure and implement a new Enterprise Identity and Access Management (IDAM) solution that integrates all relevant applications. Perform activities over users and devices to restrict access based on privileges and implement segregation of duties (SoD). Directory Consolidation & clean-up of account information. Integrate Enterprise [C-I-C] with the enterprise IDAM solution.
Enterprise Gateway Security Refresh	Uplift functionality and consolidate services into a centrally managed, integrated set of security control systems.
Continuous Monitoring and Diagnostics (CDM)	Extend monitoring capabilities for vulnerability assessment. Extend OS and system hardening audit compliance capabilities. Improve virtual system security controls, governance and compliance, specifically: <ol style="list-style-type: none"> 1. Develop governance toolset to monitor and manage virtual system management and compliance integration with SIEM and GRC tools 2. Implement workflow management and segregation of duties for virtual system management and administration access
Security Information and Event Management (SIEM) Augmentation	Provide further integration and augmentation to existing SIEM system. Leverage existing ICS / SCADA management system to collect, store and compare configuration of ICS devices (OSI-Pi). Update, enhance and integrate ICS Management System with SIEM to perform additional security services. Extend collection of events by integration of the SIEM to corporate and operational environment management systems not in scope for initial deployment, including: <ol style="list-style-type: none"> 1. [C-I-C]EAM/ERM/GRC; 2. Database Access Management (DAM); 3. Any new technologies implemented in this reset period (in this document).
Information Security Governance, Risk & Compliance (IT-GRC)	Increase value and coverage of Security Governance, Risk and Compliance (GRC) functionality covering internal assets and operations as well as vendor delivered services. Consolidate outputs and reporting to organisation wide SIEM and security related management reporting, and extend licensing.
Cryptographic Control Refresh & Augmentation	Enable two-factor authentication for remote and local access to HMIs. Deploy certificate based smart keys for ICS engineers and staff.
Database Security Controls	Provide preventative measures to deny un-authorized administrators or escalated privileges to access database content. Provide Data Loss Prevention (DLP) capabilities to protected database instances.

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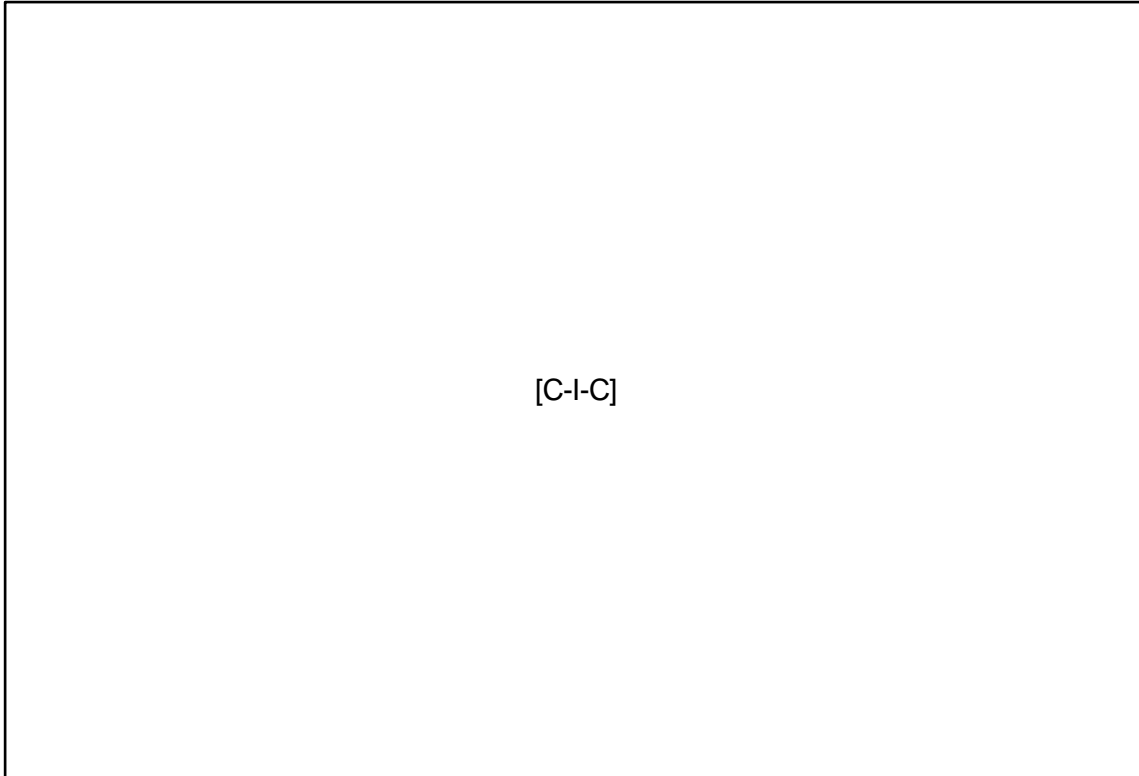
Project Name	Project Description
Security Operation Centre (SOC)	Enhance SOC capabilities to interpret alerts and escalate to incident response team. Supplement capabilities not covered through continuous monitoring and SIEM initiatives.
Implement Network Security Monitoring (NSM)	The following initiative creates a Network Security Monitoring (NSM) system that detects potential intrusion attempts by unauthorized perpetrators either internal or external, on the ICT network. The deployed system will then alerts the security analyst/administrator who is monitoring the network activities to take action against the potential alerted threat.
Implement authentication proxy	This initiative creates the authentication proxy to enforce authentication to new or legacy ICS device, incorporating lockout policies to reduce risk of brute force attempts.
Integrate auth-proxy to SIEM	The following initiative creates integration from the Authentication Proxy to SIEM (Security Information and Event Management.) a software product that provides real-time analysis of security alerts generated by network hardware and applications. This will enable the rationalisation of security events data from the Authentication Proxy to SIEM, ensuring that the security administrator only receives critical security data to analyse.
Remote systems test bed	The remote system test bed is a collection of virtual servers that are pre-configured as a duplicate of the production environment remote system's applications and operating systems. The purpose of this initiative is to allow critical patch and operating system to be tested prior to going into production systems and thus increase the security of the AusNet Service's network.
ICS Asset Security Testing	The following initiative creates a testing platform to safely test and investigate new ICT assets and associated software for ICT security vulnerabilities prior to their deployment into the AusNet Services ICT Network. This testing platform will support the identification security and identify security requirements for the procurement of future Industrial Control System (ICS) devices.
Secure engineering devices	The purpose of this initiative is to create a secure network for field devices. There are several sub-projects within this initiative, including enforcing of authenticated devices, NAC (Network Access Control), OS and app whitelisting and file integrity monitoring.

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Timeframes

Indicative timeframes for the implementation of proposed projects are illustrated in the timeline below.

Figure 47: Information Security forecasted implementation timeline



Information Security Forecasted Costs

Forecasted capital expenditure for the implementation of proposed projects is tabulated below.

Table 63: Information Security program forecasted costs

Project Name	Total Capital Spend
Enterprise Information Security Enablement – Protect	\$(C-I-C)
Enterprise Information Security Enablement – Detect	\$(C-I-C)
Enterprise Information Security Enablement – Identify	\$(C-I-C)
Enterprise Information Security Enablement – Respond	\$(C-I-C)
Total	\$(C-I-C)

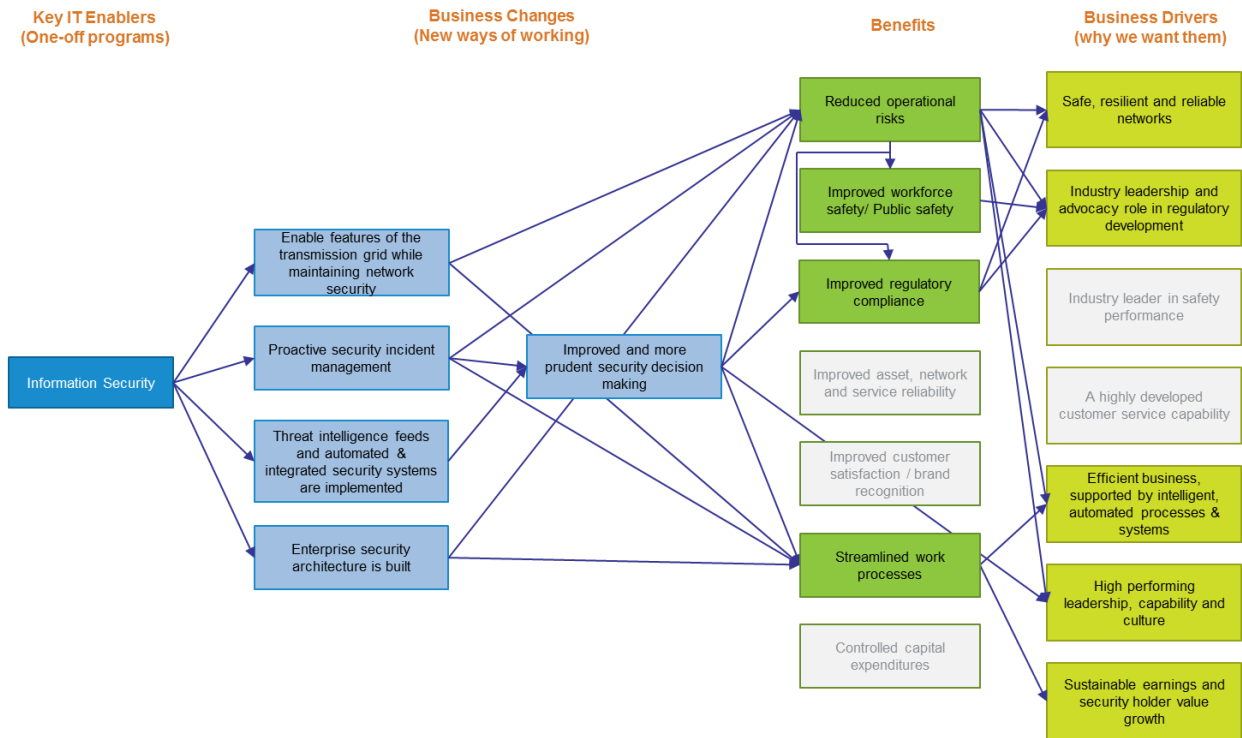
Amounts are \$Mar '17 direct (excluding overheads)

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Business Benefits

Benefits expected to be realised from the delivery of this program are illustrated below.

Figure 48: Information Security benefits map



Options Analysis

The Information Security program focuses on reducing the cyber security risk and strengthened the ICT network security. This is necessary to protect the ICT and transmission network and will be beneficial to its customers, regulators and AusNet Service’s business as a whole. Ultimately, the Information security program will deliver a reduction of cyber security risks, improved regulatory compliance and efficient business, supported by intelligent automated processes and system. Therefore, AusNet Services considers the consequences of doing nothing as follows:

- Increased cyber-attack risk on SCADA infrastructure with the potential to interrupt business critical network management processes;
- No visibility on service impacts resulting in undetected interruptions and delayed resolution
- Increased risk for misuse of confidential information;
- Increased costs associated with rectification activities post attack particularly in the context of business continuity and disaster recovery;
- Increased risk of systems disruption due to deployment and testing of security patches in the production environment; and
- Incurring large fine due to disruption from Cyber-Attack that switched off the transmission network.

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Risk Assessment

A risk assessment has been conducted, based on the AusNet Services risk management frameworks, to highlight the risk of doing nothing and not proceeding with this program. Key identified risks and associated consequences have been tabulated below.

Table 64: Information Security risk assessment

Risk	Consequences
<p>Risk 1: Unauthorised systems access that may lead to cyber-attack on the SCADA infrastructure</p>	<p>Malicious intrusion on AusNet Services’ systems through a security weakness in the ICT network. This intrusion may lead to a disruption to ICT systems and network services and a loss of confidential data.</p>
<p>Risk 2: No dedicated ability to detect cyber-intrusion</p>	<p>Cyber-intrusion is not identified due to a lack of Information Security detection capabilities. The implication is an intruder can gain access to computers, network and devices and perform malicious activity.</p>
<p>Risk 3: ICT systems are not up-to-date with the most recent ICT Security patches</p>	<p>Each ICT security patch contains critical security fixes that improve the resilience of the respective system. Failure to deploy the security patch leads to gaps and loopholes in the security of the application, increasing the propensity for cyber intrusion. A security loophole may introduce a cyber-disruption. Examples of disruption of services or network includes activities such as denial of service, web defacement and electronic graffiti to disrupt AusNet services business lines</p> <p>In conjunction, a reduced success rate of patch deployment will also reduce the confidence of security administrators to deploy more patches to the production environment.</p>
<p>Risk 4: Installation of programs that contains malware or virus</p>	<p>Malware or viruses can infiltrate a specific systems and spread across the network causing disruption of service and a loss of confidential data. The collection, dissemination and use of this data by unsolicited parties can have significant operational and reputational impacts to AusNet Services.</p>
<p>Risk 5: Security weakness due to a lack of security governance</p>	<p>A lack of security governance (e.g. the management of permissions and user-authentication) may cause a security loophole. If password resets are managed manually, the cancelling of access rights may be overlooked by the security administrator due to time constraints or human error. This might lead to unauthorised users accessing systems they no longer have permissions for, or cause an intruder to successfully brute force the password and gain access to the system.</p>