

Appendix 4H:

Information and Communication Technology Strategy FY2014/15–FY2016/17 Electricity Transmission Network

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APPENDIX 4H: TRANSMISSION RESET REVIEW – ICT STRATEGY

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1 GLOSSARY

This glossary below identifies a number of key terms and acronyms relevant to this document:

Terms/Acronym	Definition
ABC	Activity Based Costs
AC	Air-Conditioning Unit
AD	Active Directory
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulatory
AHU	Air Handling Unit
AIS	Availability Incentive Scheme
AMI	Advanced Metering Infrastructure
2009 AMI	Advanced Interval Meter Reading Price Proposal 2009-2012
AMS	Asset Management Strategy
BAU	Business As Usual
BI	Business Intelligence
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
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
ECM	Enterprise Content Management
EDMS	Electronic Drawings Management System
2011 EDPR	Electricity Distribution Price Review 2011-2013
EDW	Enterprise Data Warehouse
EMS	Energy Management System
ERP	Enterprise Resource Planning
ESB	Enterprise Service Bus
ETL	Extract Transform Load

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Terms/Acronym	Definition
FAS	F abric A ttached S torage
FTE	F ull T ime E mployee
FY 2009	F inancial Y ear 1 A pril 2008 to 31 M arch 2009
FY 2014	F inancial Y ear 1 A pril 2013 to 31 M arch 2014
FY 2015	F inancial Y ear 1 A pril 2014 to 31 M arch 2015
FY 2020	F inancial Y ear 1 A pril 2019 to 31 M arch 2020
2007 GAAR	G as A ccess A rrangement R eview2008-2012
2012 GAAR	G as A ccess A rrangement R eview2013-2017
GIS	G eographical I nformation S ystem
GPS	G lobal P ositioning 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
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
IT	I nformation T echnology
ICT	I nformation C ommunications T echnology
ITIL	I nformation T echnology I nfrasturcture L ibrary
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
NOS	N etwork O utage S chedule
NER	N ational E lectricity R ules
OMS	O utage M anagement S ystem
OPEX	O perational E xpenditure
O/S	O perating S ystem
OSS	O perational S upport S ystems
PABX	P rivate A utomatic B ranch E xchange
PDU	P ower D istribution U nit
PET	P roject E xecution T racking
POEL	P rivate O verhead E lectric L ine
POMS	P lant O utage M anagement

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Terms/Acronym	Definition
PRINCE	Projects I N C ontrolled E nvironments
PSTN	P ublic S witched T elephone N etwork
QA	Q uality A ssurance
QC	Q uality C ontrol
Qtr	Q uarter
RTS	R eal T ime S ystems
RTU	R eal T erminal U nit
SAN	S torage A rea N etwork
SAAS	S oftware A s A S ervice
SCADA	S upervisory C ontrol A nd D ata A cquisition
SCCM	S ystem C entre C onfiguration M anager
SCOM	S ystem C entre O perations M anager
SIP	S ession I nitiation P rotocol
SLA	S ervice L evel A greement
SMF	S ervice M anagement F ramework
SOA	S ervices O riented A rchitecture
SOCS/OSSCA	S ystem O verload C ontrol S cheme
SOE	S tandard O perating E nvironment
SPA	SP AusNet
SQL	S tructured Q uery L anguage
STEM	S trengthen, T ransform, E xtend A nd M odernise
STPIS	S ervice T arget P erformance I ncentive S chemes
2008 TRR	T ransmission R eset R eview ¹ April 2008 to 31 March 2014
2013 TRR	T ransmission R eset R eview 1 April 2014 to 31 March 2017
TNSP	T ransmission N etwork S ervice P rovider
TOGAF	T he O pen G roup A rchitecture F ramework
TRR	T ransmission R eview R eset
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

2. EXECUTIVE SUMMARY

The focus of SP AusNet's Information and Communication Technology (ICT) Strategy for the Electricity Transmission Network is to support the delivery of the Transmission Network objectives to:

- Maintain and Improve Safety;
- Provide high network reliability to Exceed Customer Expectations; and
- Provide Value for Money through Competitive Prices.

As the owner of three network businesses¹, the SP AusNet Stapled Group is in a position to deliver benefits to customers through the use of common systems and processes across its gas distribution and electricity transmission and distribution businesses. This approach ensures efficient application of capital and lower operating costs than would be the case if individual systems were developed for each network business.

The approach of utilising common systems and processes across the three network businesses was a key foundation of SP AusNet's 2011 Electricity Distribution Price Review (2011 EDPR) submission, 2009 AMI submission and 2012 Gas Access Arrangement Review (2012 GAAR). In the Australian Energy Regulator's (AER's) determinations in both the 2011 EDPR and the 2012 GAAR, ICT programs of work were approved on the basis that the costs will be shared across SP AusNet's three network businesses. The ICT projects approved in the AER's determination for 2009 AMI and the last 2011 EDPR and the projects forecast in the 2012 GAAR form the basis of this submission for our Transmission network and constitute [C-I-C] of the required investment.

During the current regulatory control period (FY2008/09-FY2013/14), SP AusNet sustained transmission network performance through the following ICT programs of work:

- **Asset Management:** Improved safety and maintained network integrity through the delivery of a drawing management system and an upgrade to the Geographic Information System (GIS).
- **Corporate Services:** Introduced "Cloud Technology" for email to provide cost effective workforce collaboration and completed an upgrade of our enterprise financial system.
- **Network Management:** Improved safety and customer service through the delivery of a new Supervisory Control and Data Acquisition (SCADA) system.
- **Infrastructure Services:** To maintain the integrity of our network a new Enterprise Application Integration (EAI) platform was deployed and two new data centre environments were built.

In addition, to maintain capacity of our network, reporting has been upgraded and ICT infrastructure that has reached end of life has been replaced.

It is forecast that at the end of the current regulatory control period \$[C-I-C] (Nominal \$) will be invested against a regulatory allowance of \$[C-I-C] (Nominal \$). Significant Variations to plan include higher infrastructure investment (\$[C-I-C]) due to replacement of data centre infrastructure, server upgrades and Enterprise Application Integration

The capital program of work for the FY2014/15 – FY2016/17 control period builds on those programs that have been previously approved by the AER for electricity distribution in the 2011 EDPR and 2009 AMI and the projects submitted in the 2012 GAAR submission, on the basis of costs being shared by SP AusNet's three network businesses. The programs are focused on further improving safety and maintaining network reliability and integrity and maintaining customer service levels. The programs of work align with our corporate ICT strategy principles of reducing complexity, best fit solutions and capturing data once. The FY2014/15 – FY2016/17 ICT capital investment includes:

- **Asset and Works Management:** [C-I-C]

¹SPI Electricity Pty Ltd, SPI Networks (Gas) Pty Ltd, and SPI Power Net Pty Ltd.

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- **Back Office Management:** [C-I-C]
- **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.
- **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.

In addition to the benefits of improved safety and maintained network integrity and capacity and maintained customer service, the proposed investment in ICT results in the planned customer growth and associated network growth being met without a commensurate increase in business operating costs. The investment required to achieve this outcome is \$[C-I-C] over the FY2014/15 – FY2016/17 regulatory control period.

2 DOCUMENT OVERVIEW

The objective of this section is to:

- Clearly define the purpose, scope and intended audience of this document,
- Outline the structure of the document, and
- Define alignment with SP AusNet's Asset Management Strategy (AMS) and ICT strategy.

2.1 Purpose

The Transmission Information and Communication Technology (ICT) Strategy is one of several strategies developed and maintained for the management of SP AusNet's Transmission Network.

This strategy has the following objectives:

- It articulates the key areas of focus in relation to ICT investment, key risks, key programs, costs and service standard outcomes;
- It defines the linkages of the ICT strategy to the overarching asset management strategy and underpinning asset management plan; and
- Consolidation of existing strategy documentation that predate this strategy.

This strategy is aligned to SP AusNet's AMS and is consistent with the ICT strategy FY12-FY16.

2.2 Scope

The scope of this ICT Strategy is focused solely on the necessary requirements of ICT in support of the AMS for the forthcoming regulatory control period.

The strategy is focussed on the ICT solutions required to support SP AusNet's current and future business environment from an information management, IT applications, and communications technology perspective. The communications strategy is described in detail in the document AMS 10-56 Transmission Network - Communications Systems.

The following ICT assets are considered in this strategy:

- Dedicated ICT systems and infrastructure used to maintain and service the electricity transmission network.
- Shared ICT systems and infrastructure used by the electricity transmission network and at least one more SP AusNet network.

Broadly, the ICT systems incorporated within this strategy span from SCADA master station, asset and works management to back office systems and the underpinning infrastructure.

2.3 Document Structure

The ICT strategy sets out a compressible plan and defines an actionable ICT program of work for the financial years FY2014/15 – FY2016/17.

This document has been structured into the following key components with a summary of what each section aims to achieve:

- **ICT Strategic Approach:** This section identifies SP AusNet's ICT guiding principles and key strategies based on the principles that direct the investment in technology and application solutions. It also outlines the related IT 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 current state of SP AusNet's application and technology environments outlining the current challenges and opportunities.

- **Historical Regulatory Control Period Performance:** This section provides a high level overview of the projects completed during the previous Transmission Review Reset (TRR) period (FY2008/2009-FY2013/2014). A supplementary document entitled **TRR Regulatory Control Period Performance FY2008-FY2013**, describes the variances in the actual capital expenditure spend and the benchmark approved by AER in 2006. This document is provided as an attachment in the Appendices Section.
- **Capital Requirements FY2014/15-FY2016/17:** This section depicts a blueprint of the future application, information, and communication and technology environments and provides an overview of the high level program plan, associated capital expenditure and roadmap to be implemented to enable SP AusNet to transition from the current state to the desired future state.
- **ICT Program of Work:** This section provides details of the proposed program, benefits to the business and customer, including the analysis around the different options considered to ensure prudence of IT expenditure. This section provides a rating table which measures the risk against the current position, the option of 'doing nothing' and the preferred option.
- **Operating Expenditure Requirements FY2014/15 – FY2016/17:** This section describes the proposed incremental Operating Expenditure requirements to support the planned Capital program.
- **Appendix:** Lists the relevant reference documents and the associated links. This also provides a reference to the project justifications that form the basis of the submission.

2.4 Relationship with other Management documents

The ICT Strategy is but one of a number of asset management related documents developed and published by SP AusNet in relation to its electricity transmission network. As indicated in Figure 1, 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 required to achieve the long-term objectives of the electricity transmission network.

Figure 1 – AMS document interdependencies



2.5 Financials

All cost estimates provided in this document is confined to the following:

- Direct costs only (excludes GST, overheads, and finance charges)
- Real FY 2012-13 Australian dollars

3 ICT STRATEGIC APPROACH

The ICT strategy is focussed on establishing a future state ICT environment that supports the transmission network objectives and is aligned with SP AusNet’s corporate business plan to Strengthen, Transform, Extend and Modernise (STEM) our business and provides the roadmap to achieving this environment.

3.1 Transmission Network Objectives

SP AusNet has established three key network objectives that guide how the transmission network is operated and maintained. In a large part this reflects the regulatory obligations and also reflects prudent, efficient and sustainable management. Achievement of these objectives ensures the long term health and success of the electricity transmission network.

The three objectives are:

- Maintain and Improve Safety;
- Provide high network reliability to Exceed Customer Expectations; and
- Provide Value for Money through Competitive Prices.

These objectives are in line with the capital expenditure objectives and criteria under the National Electricity Rules (NER) which are:

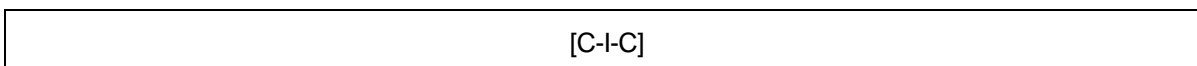
- *Objectives* (rule 6A.6.7a) – meet demand; comply with regulatory obligations and requirements; maintain quality, reliability, security of supply of services; and, maintain reliability, safety and security of the transmission system.
- *Criteria* (6A.6.7c) – efficient costs of achieving the objectives (above), costs of a prudent TNSP in the same circumstances and realistic expectation of demand forecast and cost inputs.

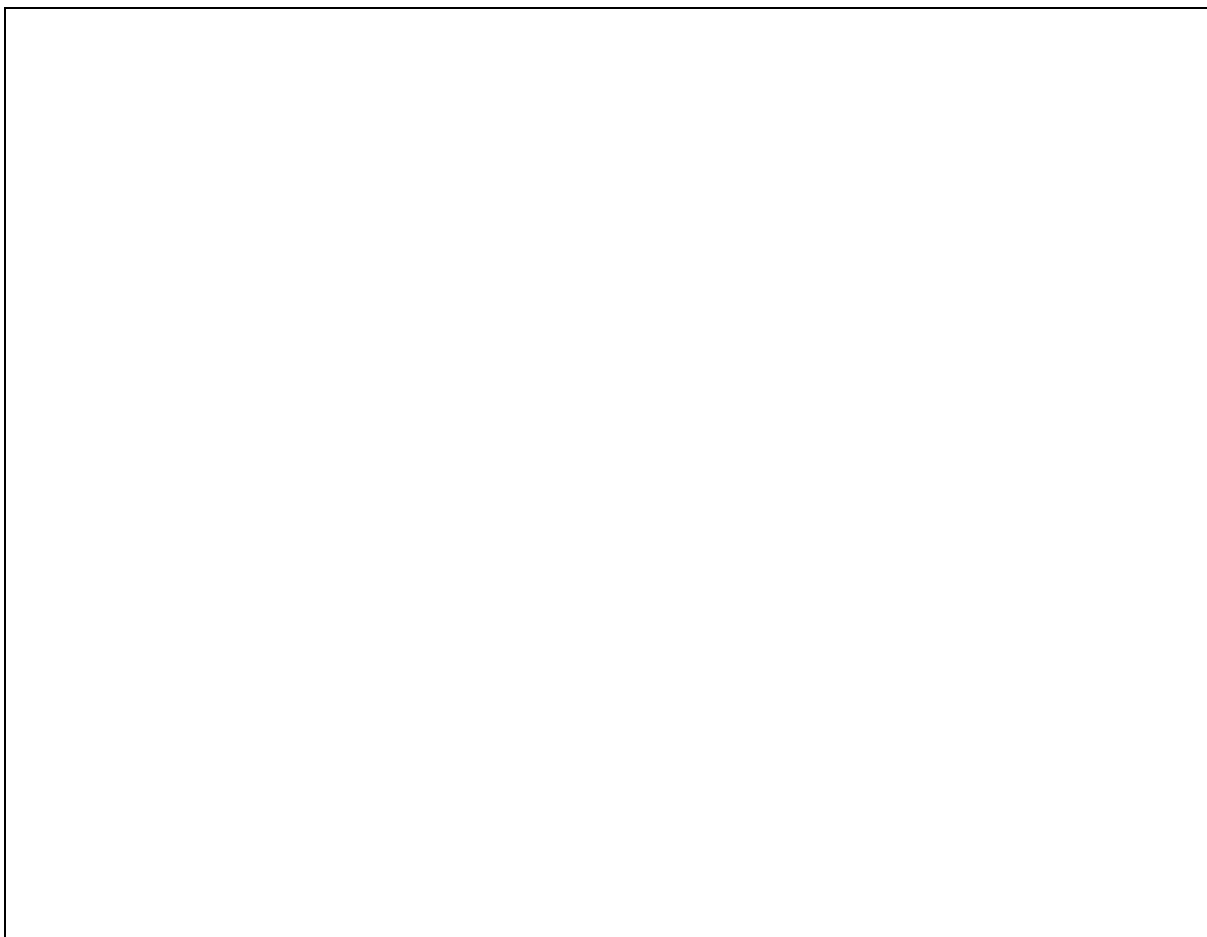
3.2 ICT Principles

The ICT principles are based on leveraging efficiencies and costs across the distribution (electricity and gas) and the transmission networks.

In developing the ICT strategy, the following three principles were formulated with a focus on both continuous improvement from the current state and providing an operating phase which support SP AusNet business strategy and network objectives.

Figure 2 – Guiding ICT Principles





Reduce ICT environment complexity – Less is more

The current state environment is comprised of solutions from an array of vendors, across the end to end ICT environment (applications, infrastructure and communications). Examples include servers from [C-I-C] and business applications from [C-I-C].

Consistent with good industry practices, the less is more principle introduces a focus on strategic relationships with core solution providers to establish “platforms” that address multiple business and / or technical requirements. This enables common platforms to be deployed for SP AusNet’s three network businesses lowering the cost for each business.

Over time, the less is more principle leads to a consolidation of application, information and infrastructure solutions onto these strategic platforms.

The platform approach leads to increased agility and lower costs as it simplifies the process to address identified requirements (by adopting and extending the use of the established platform) rather than entering an extended options analysis phase for each initiative and purchasing additional software and infrastructure for new business requirements. Other benefits include fewer vendors for SP AusNet to manage, a simplified overall support environment and decreased solution complexity.

Best fit solutions rather than best of breed

This objective closely aligns with the “less is more” objective. This aims at solutions that meet the business requirements with a focus on best overall fit to the company rather than adopting best of breed.

This principle means ICT capital expenditure is targeted to meeting business requirements and also puts a focus on the best overall outcome for the business where as best of breed may lead to better outcomes in one area of the business, but an overall reduced position for SP AusNet.

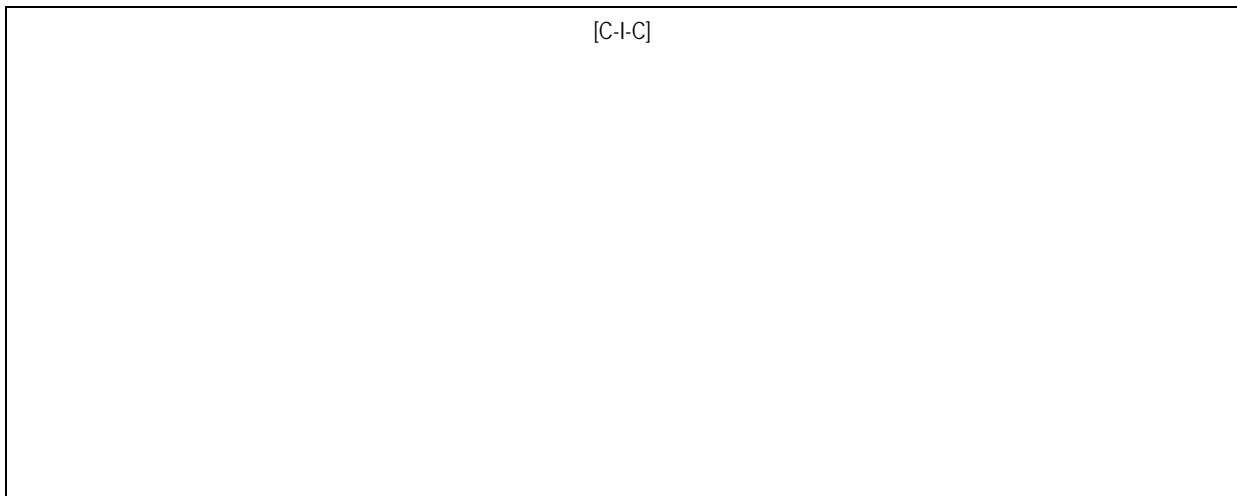
Capture data once

The principle of capture data once is focussed on minimising the multiple handling of data related to a business event or business object. When a business event takes place (for example, a field service is performed), data about the event should be captured at the point where and when it occurred, and information about a business object (for example an asset) should be captured at the same point. The data for both events and objects does not need to be re-captured and/or re-entered.

The implication of this principle is that there must be tight integration between the business systems that support interrelated business processes, and that the appropriate devices and systems need to be deployed where events are taking place, whether they are in the office, in the field, or in the network itself.

Capture data once leads to increased business efficiency through reduced data handling and by placing the right information in the right person's hands at the right time. It also supports improved data integrity through a consistent view of data about a business object or event. This ensures safety and integrity of networks.

Figure 3 – Alignment of ICT Objectives to AMS Objectives



3.3 Drivers

Asset Lifecycle Management

SP AusNet treats ICT as an asset and manages the asset lifecycle in the context of overall corporate financial resource, including the practices of depreciation, amortisation and maintenance-driven cost of ownership as the asset ages. SP AusNet has applied the same approach to ICT assets as is applied to transmission network assets.

[C-I-C]

The three primary drivers behind technology updates – technical, financial and asset obsolescence, plus the tangential consideration of depreciation are

- Technical obsolescence – Asset updates prompted by software or other technology drivers. In this case, the asset is still functional, but external drivers are forcing an update ([C-I-C]).
- Financial obsolescence – Asset updates based on financially driven factors. Financial obsolescence occurs when an IT asset can be replaced with another asset that reduces operating time, or has such lower operating costs (e.g. lower maintenance or support costs) that it is economically beneficial to replace it. This driver is consistent with Criteria 6A.6.7c) of NER that states that the efficient costs of achieving the objectives is positive.
- Asset obsolescence – Asset updates where the asset itself is near or past its reasonable functional life. This is indicated by an increasing rate of failure, or difficulty finding parts or services. Example when software is termed end of life by the vendor.

In determining the most prudent time to replace an IT asset, SP AusNet follows the good industry practises and evaluates the above drivers and is typically informed by the following information:

- Support Roadmap – IT vendors prescribe a period for which their products are supported. Typically, vendors have an extended support period where during that period their obligation falls to high risk fixes only, such as security threats. It is common for an IT vendor to support their products for between [C-I-C]
- Service Delivery – information with regard to the continued ability to meet the services and service level targets related to the IT assets having consideration to the increased risks attributed to the aging asset. This also incorporates information regarding the number of Service Requests pertaining to the IT asset.
- Technical Dependency – information on dependent IT assets that mandate currency of IT assets to comply with contractual obligations and to reduce operational risks. IT vendors prescribe certified IT systems and hardware that their product co-exists with and this may necessitate SP AusNet to replace an IT asset to maintain compliance.

Enterprise Approach

Enterprise Architecture (EA) is a fundamental design and engineering practice that aims to optimise the utilisation and investment of ICT in SP AusNet. Enterprise architecture aims to assist businesses in dealing with changes through structured planning, design, implementation and management.

An Enterprise Architecture framework is a tool used for developing architectures. It provides:

- A method for designing an information system in terms of a set of building blocks;
- An understanding of how the building blocks interact with one another; and
- A list of recommended standards and compliant products, used to implement the building blocks.

The design of the EA framework for SP AusNet is an integration of a commercial framework “The Open Group Architecture Framework” (TOGAF) and an Energy Transmission and Distribution business model for a large Utility which is then influenced by the demands made from a rapidly changing market and ICT environment.

SP AusNet aims to address the business drivers namely:

- Facilitating business and IT alignment by providing the fundamental technology and process structure for an IT and/or business strategy;
- Managing intellectual capital, by formalising models across architecture domains;
- Improving business / IT effectiveness and efficiency;
- Reducing future investment risk and deriving better return on existing investment; and
- Managing complexity and change.

ICT Trends and Emerging Technologies

The energy and utility market has increasingly developed into an arena of business and technical innovation. These IT trends and emerging technologies need to be considered and leveraged, where it is cost effective to do so, within the IT Program where these IT capabilities can provide benefit to SP AusNet and the customer.

The key IT trends that impact or influence the utility industry are outlined below. These IT trends have in turn been considered in the context of the SP AusNet environment in alignment with the Architecture guiding principles, in the formulation of the ICT program.

- Cloud computing and Software as a Service (SAAS)–SP AusNet is taking a cautious approach to cloud computing. The business has incrementally taken advantage of the benefits of virtualisation and server consolidation and will be well served by the gradual move to a cloud computing model, as software offerings increase and security concerns are addressed. In alignment with their National Electricity Rules obligations, SP AusNet recognises the significance of information security and will only proceed with external solutions where risks can be quantified and mitigated. The current focus is the development of “internal cloud” capabilities in a limited capability. In parallel, the external cloud is being utilised where cost competitive services are provided and security is defined, robust and assured.

- Web, Mobile and Business applications–Innovations in smart phones and rapid enterprise adoption of web capable mobile devices have led to the development of effective mobile enterprise applications.

This capability will allow SP AusNet to better equip its workforce, especially those in the field, with the information that will make their activities quicker and more accurate. There will also be opportunities to improve customer service by utilising these channels to facilitate customer interaction.

- Green IT– [C-I-C]. SP AusNet, will take advantage of opportunities where possible to take steps to reduce energy consumption through initiatives such as e-documents, telecommuting, video communications (to limit travel), web-based customer interactions, server virtualisation and consolidation.

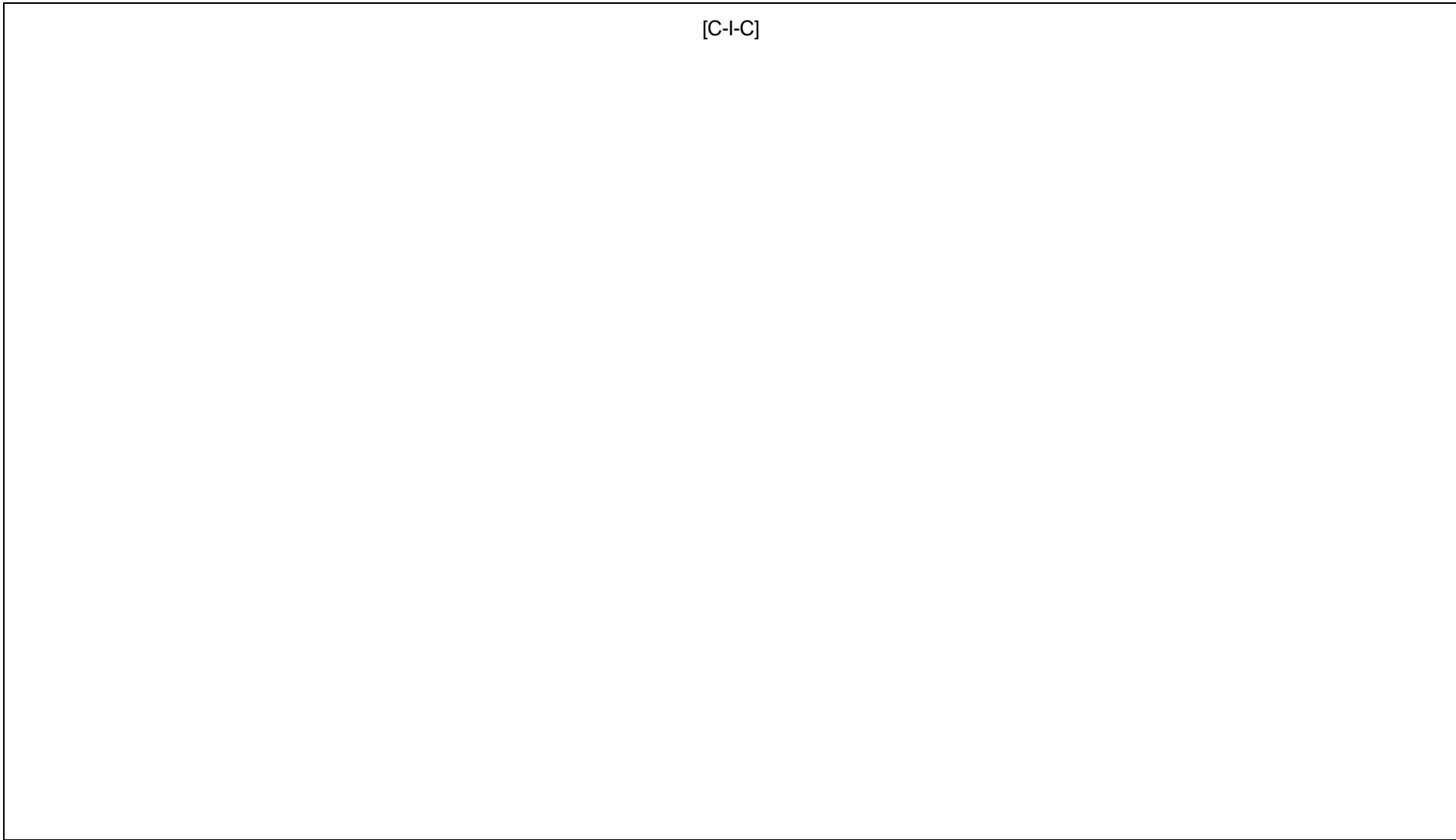
3.4 Current State Summary

The current ICT environment is the product of corporate acquisition, a number of ICT projects across SP AusNet's three networks and changes in program governance.

The work done over the period FY2008/09-FY2013/14 was aimed at reducing the number of obsolete systems and extracting cost efficiencies through consolidation.

The illustration below summarises the current state of the Transmission IT Systems and allocated Assets, Of the current systems, [C-I-C] systems have reached end of life and [C-I-C] systems are expected to reach obsolescence within the next regulatory control period.

Figure 4 – Current State Summary FY 2012/13



3.4.1 Applications

There are approximately [C-I-C] applications in SP AusNet’s landscape, with an average life of [C-I-C] years. Approximately, [C-I-C] of these applications are [C-I-C] years old or older.

Although there are some major application vendors represented in these applications ([C-I-C]), there has been limited strategic selection of vendors along functional lines, with [C-I-C] different vendors and more than [C-I-C] applications developed internally by SP AusNet, [C-I-C]

72% of SP AusNet’s applications are custom built, with only 23% being Commercial off the Shelf (COTS), and the remainder using the externally hosted Software as a Service (SAAS) model.

The significant applications in the transmission landscape are listed in the following table:

Table 1 – Current Applications

Function	Application	Vendor	Application Age
Asset Management	[C-I-C]	[C-I-C]	[C-I-C]
HR Payroll	[C-I-C]	[C-I-C]	[C-I-C]
HR Time Capture	[C-I-C]	[C-I-C]	[C-I-C]
Drawings Management	[C-I-C]	[C-I-C]	[C-I-C]
Finance and Procurement	[C-I-C]	[C-I-C]	[C-I-C]
Treasury	[C-I-C]	[C-I-C]	[C-I-C]
Reporting – Corporate	[C-I-C]	[C-I-C]	[C-I-C]
Planning	[C-I-C]	[C-I-C]	[C-I-C]
SCADA	[C-I-C]	[C-I-C]	[C-I-C]

Applications introduced by the AMI program include:

Table 2 – Current AMI applications related to Transmission

Function	Application	Vendor
Reporting	[C-I-C]	[C-I-C]

Whilst these applications are currently supporting the business functions of SP AusNet, the duplication of functionality, and the lack of integration between them results in a solution which is poorly suited to supporting business initiatives such as process efficiency and simplification of systems. This environment also places significant challenges on the implementation of solutions such as workforce mobility due to the fragmented data model and the shortcomings in data integrity.

3.4.2 Information

Business Intelligence and Analytics

SP AusNet currently utilise a number of reporting platforms to fulfil their business intelligence requirements.

For Corporate Reporting, SP AusNet utilise [C-I-C] applications whereas [C-I-C] is used for engineering level historic data. There are many reports also generated directly from specific business applications such as [C-I-C].

The predominant reporting platform for the business, however, is [C-I-C] where many manual tasks are involved to link data from different extracts, reconcile across systems, and massage data into a presentable report. This poses the challenge of auditable tracking of information and could also present a safety risk.

Data warehouse tools such as [C-I-C] are also used but there is limited implementation of enterprise wide data models which allow simple ad-hoc and self-service reporting. [C-I-C] is currently implemented in two different versions [C-I-C] which are no longer supported [C-I-C].

The result of the disparate use of systems and information is that SP AusNet lacks enterprise level business analytics to support operational and strategic decision making activities.

Unstructured Data (Documents, spread sheets, etc.)

There are multiple repositories for unstructured data at SP AusNet, with limited or no overall business governance model to store documents in the correct repositories, manage document versions, capture consistent Meta data, and ensure security and access levels are correctly set.

Documents are spread across shared network drives, personal computer hard drives, portable hard drives and USB keys, the Insight intranet, [C-I-C] databases, [C-I-C] (for engineering drawings), externally hosted solutions such as [C-I-C], and many other places.

These disparate locations together with a lack of governance, lead to limited sharing of knowledge, inefficient searching for information, inconsistent versioning, potential security and safety risks, and difficulty to respond to audits, legal proceedings, and disputes.

Application Data

The current application data environment lacks clear “source of truth” data owners which lead to issues with data integrity, and results in manual data handling and data reconciliation between systems.

This can be seen in the area of Asset Management where multiple asset management systems for the different SP AusNet asset businesses have inconsistent views of the same assets.

Company mergers and acquisition have been the main rationale for this concern which has resulted in multiple asset management systems with different naming conventions and identification schemes. The implications are that more manual reconciliations, data integration and consolidation efforts are needed across many areas of business to overcome this.

There is also missing Asset Management data, for example, serial numbers which adversely affects asset inventory management, and missing metadata pertaining to asset data.

Integration

The highly fragmented nature of the application landscape at SP AusNet has led to a large number (over [C-I-C]) of integrations between systems that have been implemented on the Enterprise Application Integration (EAI) platform, [C-I-C]. This platform performs the key integration functions between SP AusNet and the AEMO marketplace gateway.

[C-I-C] was recently acquired by [C-I-C] through its acquisition of [C-I-C], and has become a sunsetted product. This, together with the fact that significant license fees become due in [C-I-C] means that continued use of this application presents commercial and corporate risks.

Data Centres

SP AusNet has two main data centres, a primary data centre [C-I-C] and a secondary data centre [C-I-C]. The [C-I-C] data centre typically hosts business production systems, whilst the [C-I-C] data centre hosts development, test, pre-production, and disaster recovery environments. In addition, other data environments are also located in the [C-I-C].

[C-I-C]

A number of works are being undertaken for the current [C-I-C] data centre environment including:

Equipment	Approx. Age (years)	Normal Est. Equipment Life (years)	Condition
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]

Table 6 - [C-I-C] Data Centre Mechanical Assets

[C-I-C] Mechanical Components			
Equipment	Approx. Age (years)	Normal Est. Equipment Life (years)	Condition
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[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] - Head Office

[C-I-C] IT equipment rooms on these floors are supported by independent air conditioning systems and UPS's.

The following table lists this equipment:

Table 7 - [C-I-C] Mechanical Assets

[C-I-C] Mechanical Assets			
Equipment	Approx. Age (years)	Normal Est. Equipment Life (years)	Condition
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[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] Control Centre

[C-I-C] The control room and IT equipment on these floors is supported by a number of UPS's and air conditioning systems as follows:

Table 8 - [C-I-C] Mechanical Assets

[C-I-C] Mechanical Components			
Equipment	Approx. Age (years)	Normal Est. Equipment Life (years)	Condition
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]

Wintel (Servers, Printers, PCs and Laptops)

The following table lists the number of Wintel Servers, PC's and Laptops, and Printers in the SP AusNet environment sourced from the ICT strategy FY12-FY16 document. These figures have been updated to reflect status as at Sept 2012.

Table 9 – Wintel Infrastructure Assets

Infrastructure Asset	Total	Transmission	Description
Desktops and Laptops	[C-I-C]	[C-I-C]	[C-I-C]
Printers	[C-I-C]	[C-I-C]	[C-I-C]
Physical Servers	[C-I-C]	[C-I-C]	[C-I-C]
Servers & O/S	[C-I-C]	[C-I-C]	[C-I-C]
Total Assets	[C-I-C]	[C-I-C]	[C-I-C]

The Wintel server fleet is aging and in many cases past end of life.

Whilst some [C-I-C] of servers are running virtually, there are multiple virtual environments, and a report from external consultants [C-I-C] suggests that SP AusNet should be seeking to increase this figure closer to [C-I-C]. The project to complete the server transformation is currently in progress and will be completed in [C-I-C] with [C-I-C] of servers expected to be virtualised on its completion. SP AusNet will continue to identify opportunities through asset management life cycles to increase this figure over future regulatory periods.

The Wintel Server Standard Operating Environment (SOE) has also not been consistently applied across the server installations resulting in inconsistent builds, versions, and patch levels, which over time will need to be also rectified.

The operational and management tools are currently in the final stages of being upgraded [C-I-C] and whilst [C-I-C] has been recently upgraded, the [C-I-C] structure still requires significant work to allow for effective setting and deployment of desktops and other policies.

The desktop and laptop environment is based [C-I-C] on the [C-I-C] operating system and the [C-I-C].

UNIX Servers

The following table lists the number of UNIX servers in the SP AusNet environment sourced from the ICT strategy FY12-FY16 document. Note, these figures have been updated to reflect status as at Sept 2012.

Table 10 - UNIX Infrastructure Assets

Infrastructure Asset	Total	Transmission	Description
[C-I-C] Servers	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C] Domains	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C] Containers	[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]

The current UNIX environment includes multiple variations of UNIX including [C-I-C]. Within these UNIX variations, there are also inconsistent levels of patching, so each UNIX installation is effectively unique. There is a strategic intent to evaluate each UNIX environment as it reaches end of asset life to potentially replace the currently [C-I-C] servers with other more efficient server technologies. These initiatives are currently in progress and will continue to be achieved over coming regulatory periods.

Databases

The databases that currently support the production systems are listed in the table below. The table lists the number of [C-I-C] databases in the SP AusNet environment sourced from the ICT strategy FY12-FY16 document. These figures have been updated to reflect status as at Sept 2012.

Table 11 – Current Databases

Infrastructure Asset	Total	Transmission
[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]

Note, there is limited standardisation across the database environment, with multiple versions of [C-I-C], and limited sharing of environments across applications.

Storage

The following table lists the storage equipment in the SP AusNet environment strategy sourced from the ICT FY2012-FY2016 document. The numbers have been updated to reflect status as at Sept. 2012.

Table 12 – Storage Assets

Infrastructure Asset	Total	Transmission
[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]

Components of the NAS and tape storage infrastructure are either at or approaching end of life, whilst data storage continues to grow with the current backup infrastructure requiring constant expansion. A project is currently underway to address these challenges and create a storage environment that will enable SP AusNet’s storage environment for the current period.

3.4.3 Communications

Wide Area Network (WAN)

The following table lists the WAN equipment in the SP AusNet environment sourced from the ICT FY12-FY16 document. The numbers have been updated to reflect status as at Sept. 2012

Table 13 – Current WAN Assets

Infrastructure Asset	Total	Transmission
Firewalls	[C-I-C]	[C-I-C]
Routers	[C-I-C]	[C-I-C]
Switches	[C-I-C]	[C-I-C]
Voice Gateway	[C-I-C]	[C-I-C]
Packetshaper	[C-I-C]	[C-I-C]
Terminal Server	[C-I-C]	[C-I-C]
Wireless Controller	[C-I-C]	[C-I-C]
Total	[C-I-C]	[C-I-C]

3.5 Project Delivery

In [C-I-C], an agreement was established between [C-I-C] and SP AusNet to deliver all the ICT program of work exclusively for SP AusNet. [C-I-C] was established in [C-I-C] to house the combined IT functions of [C-I-C] to leverage the size and scale of the operations [C-I-C]. [C-I-C] was established to perform both operation of IT systems and delivery of projects.

During [C-I-C], 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:

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

[C-I-C], 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 SP AusNet with vendors more appropriate with the size of project engagement.

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

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

The outcome of this review process was that the following vendors were confirmed for the delivery of Tier-1 System Integrator major projects:

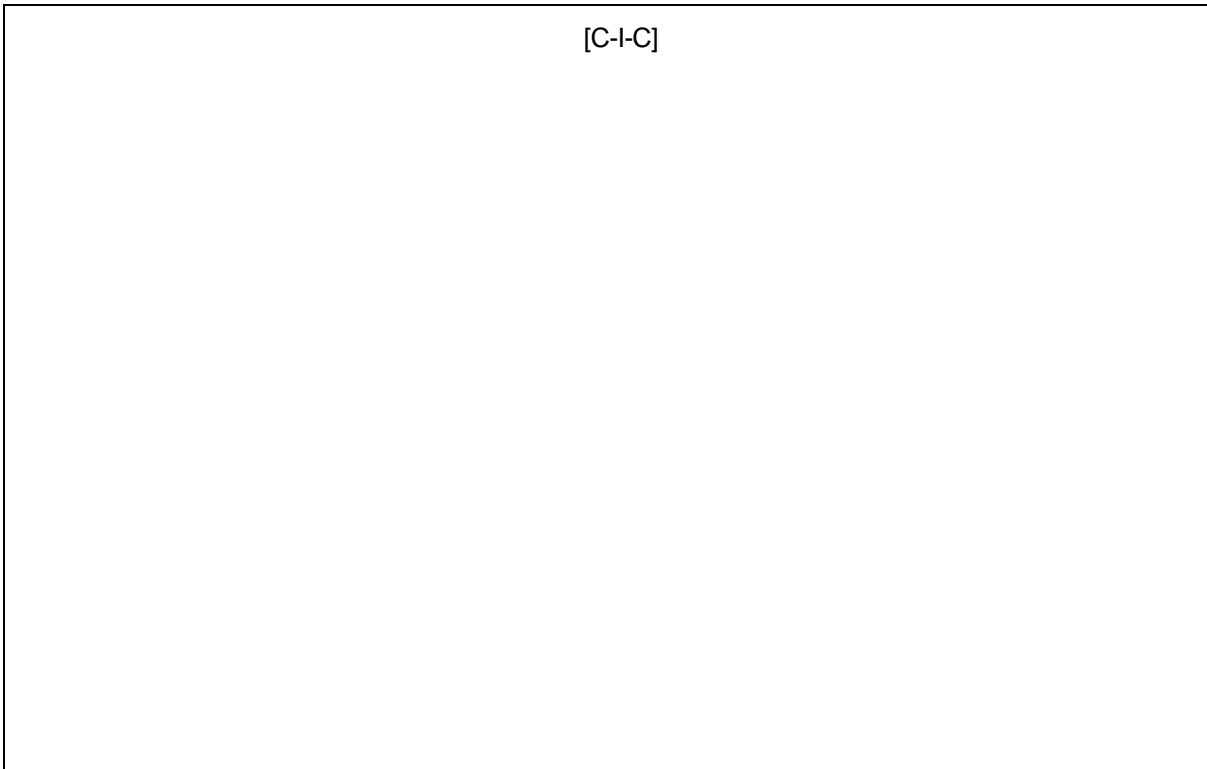
[C-I-C]

The following vendors were chosen as Tier 2 – Niche projects vendors

[C-I-C]

Panel members compete for major projects to ensure SP AusNet 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 5 – Project Delivery model



[C-I-C]

4 PROGRAMS OF WORK DELIVERED FY 2008/2009 – FY 2013/2014

4.1 Overview

In the 2008TRR, AER approved the following programs of work for the current Regulatory control period (1 April 2008 to 31 March 2014):

- Asset Management Automation
- Corporate Services Automation
- Accessibility and Mobility Automation
- Reporting and Interrogation
- Network Management Automation
- IT Infrastructure Services
- IT-PCs, desktops, laptops, printers, plotters, photocopiers and new/upgraded software

The programs of work completed in the current period were in line with the objectives of the Business Systems Strategy proposed in the 2008 TRR submission of:

- Establish & consolidate core systems, via replacement of obsolete business systems to establish a foundation of business systems in terms of authoritative data source and primary process enablers.
- Integrate business systems to further automate business process execution and maintain data quality of critical transmission asset and network information.
- Prevent increases in the cost to support, by provisioning for continuous functional improvement, system and infrastructure upgrades and replacements (both minor and major).

4.2 Program of Work

The programs of work undertaken for the period FY 2008/09 – FY 2013/14 are briefly described in this section.

For further detailed information pertaining to actual expenditure between the control period FY2008/09-FY2013/14 and associated performances please refer to the document - **TRR Regulatory Control Period Performance FY2008-FY2013**.

4.2.1 Asset Management Automation

Asset Management is one of three core operational capabilities that enable SP AusNet to operate and meet its electricity transmission regulation, licence and market obligations.

The projects completed and in progress under this program are:

- **Asset Management Enhancements** – Enhancements to Existing Asset Management platform.
- **Asset Inspection** – Field Mobile Inspection solution for field based asset inspections and information capture.
- **Procurement and Tender Management system** –New application to manage vendors, contracts and associated procurement processes.
- **[C-I-C]**.
- **GIS Upgrade** – Upgrade to maintain existing vendor support and consolidate spatial data forecast for completion in [C-I-C].
- **Enterprise Drawings Management** – Implementation of a Drawing Management system for Transmissions assets is due for completion in [C-I-C].

4.2.2 Corporate Services

Corporate Services IT Systems are those IT systems which support the administrative, back-office functions within SP AusNet, such as Finance, Treasury, Payroll, HR, Email, and Risk Management.

To ensure that the systems reflect periodic changes to the business environment and to ensure continual compliance with supported vendor releases the following projects were completed.

The projects completed and in progress under this program are:

- **Payroll System Upgrade** – Employee and Customer Service Self Service Portal.
- **Enterprise Email Platform** – Upgrade of enterprise Email application.
- **Corporate Financials** – [C-I-C].
- **Human Resource Reporting** – Implemented a Human Resource Reporting Dashboard and Balance Scorecard designed to provide a unified view of human resources initiatives.
- **Treasury Integration & Operations Risk Management** – [C-I-C].
- **Enterprise Project Management** – Project Implementation and Reporting tool implementation is forecast for completion in [C-I-C]**Enterprise Content Management (ECM)** – Implementation of a single platform to facilitate the requirements to centrally store and manage documents in a corporate repository is due for completion in [C-I-C].

4.2.3 Accessibility and Mobility Automation

Field Mobile Computing provides mobile workers with technologies and process designed to enhance their efficiency and effectiveness at mobile locations. Further, it allows for the capture of data at the workplace, greatly improving the quality and currency of our data by capturing information at source.

The projects completed and in progress under this program are:

- **Mobile Computing – Phase 1** – GPS assisted navigation to asset or work locations including enhanced scheduling functionality and location management capability.
- **Mobile Computing – Phase 2 & 4** – Fault Management Capabilities and Functional Extensions to consolidate the earlier capabilities. Solution includes enhanced devices, communications infrastructure, enhanced crew interfaces and unified dispatch protocols. These projects are due for completion in [C-I-C].

4.2.4 Reporting and Data Interrogation

The Reporting and Data Interrogation systems incorporates a data warehousing capability that supports and enables SP AusNet to flexibly respond to changing regulatory reporting demands with a fully automated, auditable reporting capability that inhibits manual intervention in data presentation.

The projects completed and forecast under this program are:

- **Transmission Regulatory Reporting** – Improvements to Transmission Regulatory and Operational Reporting application.
- **Data Warehouse** – Discovery phase initiated to empower the implementation of an Enhanced Data Warehouse.

4.2.5 Network Management Automation

The core system that supports the management of the transmission network is the Supervisory Control and Data Acquisition (SCADA) system and the Plant Outage Management Systems (POMS).

The projects completed and in progress under this program are:

- **SCADA Upgrade** – Upgrade of existing SCADA hardware and software to maintain vendor support is due for completion in [C-I-C].
- **SCADA Enhancements** – Minor modifications to achieve business requirements.
- **SCADA Communications** – Upgrade of WAN and enhanced site redundancy for [C-I-C] Data Centre forecast to be completed in [C-I-C].
- **SCADA Security** – Commenced new testing environment for security patch testing and process roll-out.
- **Security Camera Recording System** – Initiated a system to record, capture and store video surveillance of critical asset infrastructure.
- **Smart Aerial Image Processing** – Testing and validation of Smart Aerial Imaging and Processing System.
- **Safety Regulations** – System changes to comply with Electricity Safety Regulation 2010 procedures associated with Vegetation Management.

4.2.6 IT - PCs, desktops, laptops, printers, plotters, photocopiers and new/upgraded software

This program includes PCs, desktops, laptops, printers, phones and other workforce IT hardware for the staff required to manage and maintain our transmission network.

The projects completed and forecast under this program are:

- **Hardware Refresh** – Replacing end of life hardware equipment.

- **Standard Operating Environment and Desktop Hardware Replacement** – Upgrade desktop operating system to maintain vendor support to complete in [C-I-C] introduced Single Sign On Business Applications and implementation of a secure Wireless Network.
- **[C-I-C] Software Upgrade** – Upgrade to latest [C-I-C] version.

4.2.7 IT Infrastructure services

IT Infrastructure Services incorporates Data Centres, Servers, Local Area and Wide Area Networks, communications infrastructure and IT tools required to manage and maintain our transmission network.

The projects completed and forecast under this program are:

- **Server Infrastructure** – Replacing Server Infrastructure and replacing with Virtualisation Technology due to complete in [C-I-C].
- **Data Centres** – Upgrade End of Life Data Centre Infrastructure and provide additional data centre capacity due for completion in [C-I-C].
- **EAI Upgrade and Integration**–Upgrade EAI to maintain vendor support is forecast to complete in [C-I-C]
- **Wide Area Network Renewal** – Detection & prevention Management software implementation and upgrade of Corporate firewall.
- **ITIL** – Upgrade to latest ITIL service methodology.
- **Storage** – Initiation of a phased approach to increase storage capacity. This project will seek to replace ICT storage systems which are end of life and out of support and seek to create new capabilities in storage service delivery through use of cloud technologies which are now available for use. This project is forecast to complete in [C-I-C].

5 CAPITAL REQUIREMENTS FY2014/2015 – FY2016/2017SUMMARY

This section outlines the identified ICT program of work proposed for the FY 2014/15-FY 2016/17regulatory control period.

Table 14– ICT Forecast Capital Expenditure

[C-I-C]

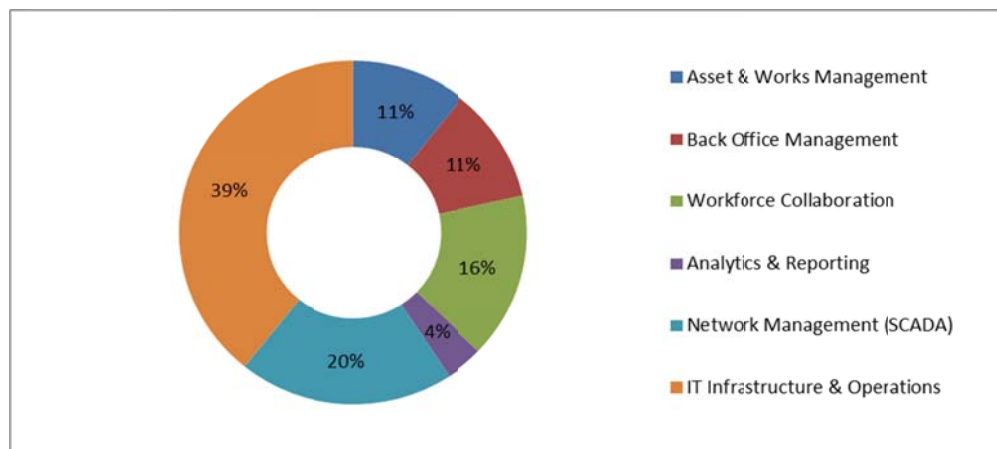
The **ICT Program of Work** has been categorised into six inter-related programs as illustrated in Figure 6 below. These programs are further divided into 45 projects. This structure has been adopted as it:

- Provides the best segregation of business capabilities, processes, ICT systems, and organisation context around sponsorship, ownership, accountability and change management, to maximise the effective governance of the overall ICT Program; and
- Correlates to the strategic requirements of ICT focus needed to support the delivery of the transmission network asset management strategy and SP AusNet’s corporate business.

The Programs of work are consistent with the 2011 EDPR submission and 2012 GAAR Submission where 29projects were proposed and approved on the basis that the work supports our Electricity Distribution, Gas Distribution and Electricity Transmission networks. For a full list of projects previously submitted refer to [Table 16 – ICT Projects approved in 2011 EDPR, submitted in 2012 GAAR and 2013 TRR.](#)

The forecast capital expenditure associated with the ICT program of work consists of six inter-related programs. Figure 6 illustrates the breakdown of forecast capital expenditure to each program.

Figure 6 – ICT Forecast Capital Expenditure breakdown



5.1.1 ICT Programme of Work

SP AusNet forecasts ICT capital expenditure at [C-I-C] over the forthcoming regulatory control period. The ICT program of capital work is summarised below.

Asset & Works Management

The Asset and Works Management Program is focused on delivering improved safety, maintaining network integrity and capacity and maintaining customer service by improving data quality, consolidation and modernising of ICT systems, and assurance of compliance and regulatory obligations through repeatable, transparent and auditable processes. The projects set out in this program will:

- [C-I-C]
- Functional upgrades to the Enterprise Project Management and Drawings Management systems to ensure vendor support. These projects are corporate wide and have been approved by the AER in the 2011 EDPR and 2012 GAAR submission on the basis of [C-I-C] allocation to the Transmission Network.

Back Office Management

[C-I-C]

These programs are corporate wide and have been approved by the AER in the 2011 EDPR and 2012 GAAR submission on the basis of [C-I-C] allocation to the Transmission Network.

Workforce Collaboration

The key drivers of the Workforce Collaboration Program is to provide enhanced information management for all SP AusNet's workforce by the implementation of a unified approach to information capture, management and presentation. The aim of this program is to provide a single source of truth for information and where feasible one time information capture to reduce inconsistencies. The projects set out in this program will

- Establish a platform that will consolidate internet and intranet portals to provide a single view of spatial, analytical, reporting and content management sources.
- Implement an Enterprise Content Management platform that will manage content presentation and delivery from various sources in the organisation to all users including the field workforce; and
- [C-I-C]

These programs are corporate wide and have been approved by the AER in the 2011 EDPR and 2012 GAAR submission on the basis of [C-I-C] allocation to the Transmission Network.

Analytics and Reporting

The key drivers for this program are poor data quality; lack of actionable intelligent analytical data; increasing data volumes through major business activities like asset replacement and obsolete reporting platforms and systems. In response to the above, SP AusNet has developed an Information Management strategy that evolves around master data management, data standards, reporting and information capture across all activities in the organisation. The projects set out in this program will:

- Upgrade existing reporting, integration and analytics infrastructure to a modern, integrated and consolidated platform in alignment with vendor road map;
- Define and implement data standards and processes (i.e. common data model, authoritative data sources, and data governance) to improve data integrity, which will enable more effective and efficient reporting and analytics capabilities in the form of a reporting dashboard.

These programs are corporate wide and have been approved by the AER in the 2011 EDPR and 2012 GAAR submission on the basis of [C-I-C] allocation to the Transmission Network.

Network Management

Network Management systems are critical to maintaining network integrity and customer service. The projects in this program are focused on ensuring these critical systems continue to meet the business needs:

- Upgrade the SCADA system to minimise the risk of failure (one software upgrade) by ensuring the system and its components remain in vendor support. This is a previously submitted and approved project.
- Implementation of enhanced Software Quality Control and Assurance Environment and Software Patch regime to minimise external security threats and provide the business with an objective, independent view of the software quality before implementation in a production environment.
- Upgrade to communications infrastructure to maintain secure access to remote terminal units and remove requirement for non-controlled testing.
- Increase of SCADA data points to support augmented data in PI Data Warehouse and SCADA systems enabling compliance to vendor software contractual agreements.
- Expansion of existing historian user interface used to record, analyse, and monitor real-time information in order to maintain visibility of data in an environment of increasing assets and business growth.
- Training Simulator to manage coordinated, repeatable training programmes to new and existing SCADA controllers.
- Implementation of business rules to manage the abridged display of alarms to Network Controllers. This enhanced display will provide situational awareness to decision makers providing increased visibility and removing the duplications of current alarms.
- Enhanced database functionality to support increasing data volumes and requirements to be smarter about the use of information provided such as alarms.
- Upgrade of existing network management assets and systems that have reach end of life to enable information for enhanced decision making.
- Enable more accurate, timely and relevant Outage Management information and report generation for internal and external stakeholders. Provide flexible reporting capabilities to address specific organisational, regulatory and compliance reporting requirements.

IT Infrastructure and Operations

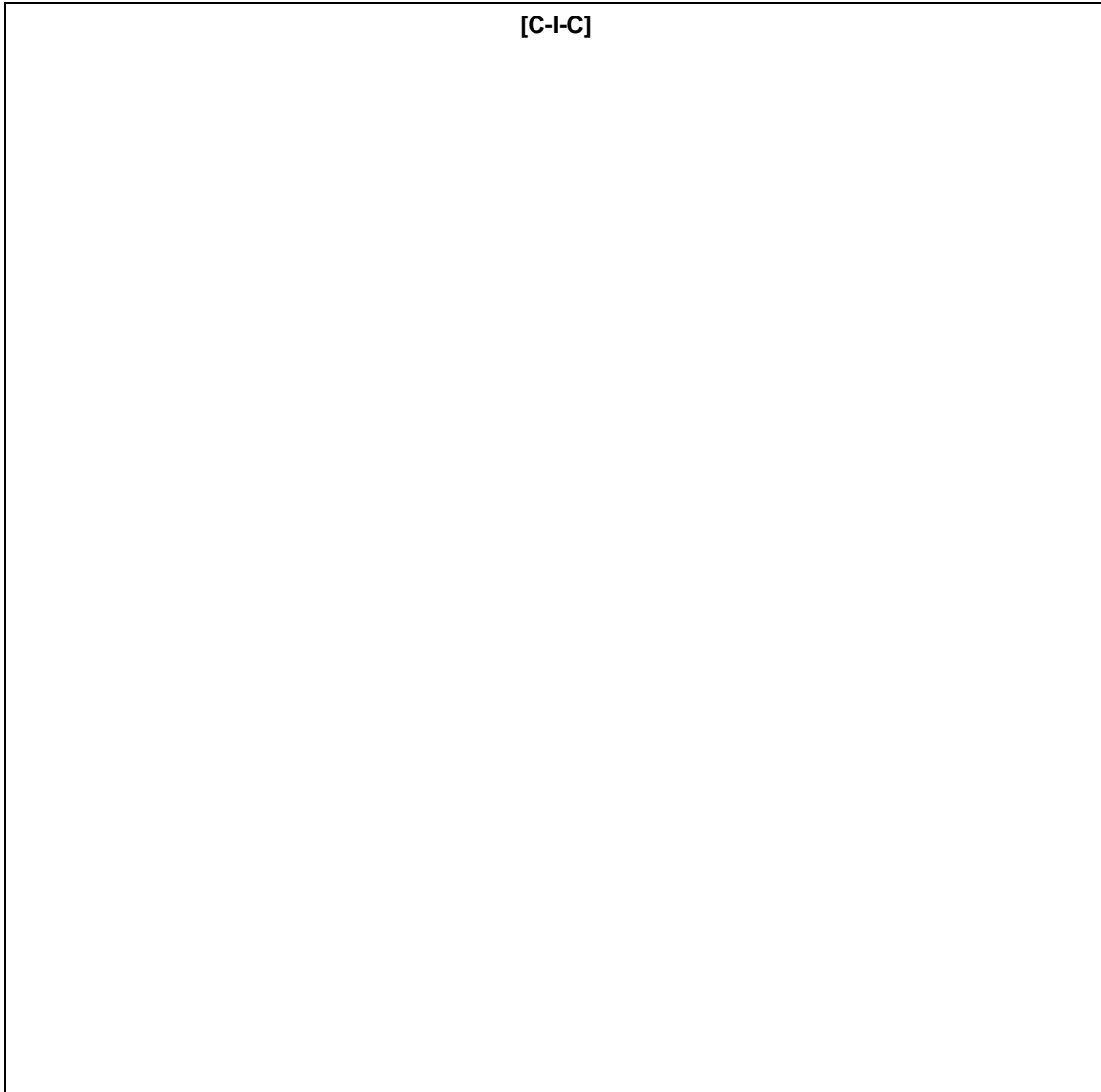
SP AusNet has IT infrastructure assets and communications assets that are or near end of life, at a point where they are no longer supported by vendors, or operating beyond their economical asset life. The projects in this program aim to ensure that the IT infrastructure is up to date, robust, scalable, and agile to support the changing business needs and ongoing initiatives. The IT Infrastructure and Operations program will:

- Refresh of Server hardware and software that has exceeded the asset life principles, and where relevant these upgrades may utilise more efficient technology models, including virtualisation, cloud and/or service based technologies.
- Replace end of life desktop and laptop equipment to maintain staff efficiency.
- Replace aging assets and implement new management of data to enable business and operational requirements.
- Implement robust security and intrusion prevention and Identity and access management capabilities.
- Upgrade Server and Storage platforms to improve reliability and support management of business and data systems.
- Replace and/or upgrade network and communications infrastructure to support both existing (legacy) and future requirements, including IPv6 protocol migration, and secure wireless access; and
- Maintain and enhance operational support systems to support security and operational requirements.

5.2 Future State

The following diagram depicts the key platforms of the target future state ICT architecture for SP AusNet. The approach is driven by our strategic approach to application consolidation and where feasible the minimisation of complexity. The focus is on strategic platforms that support a wider range of business activities.

Figure 7– ICT Future State

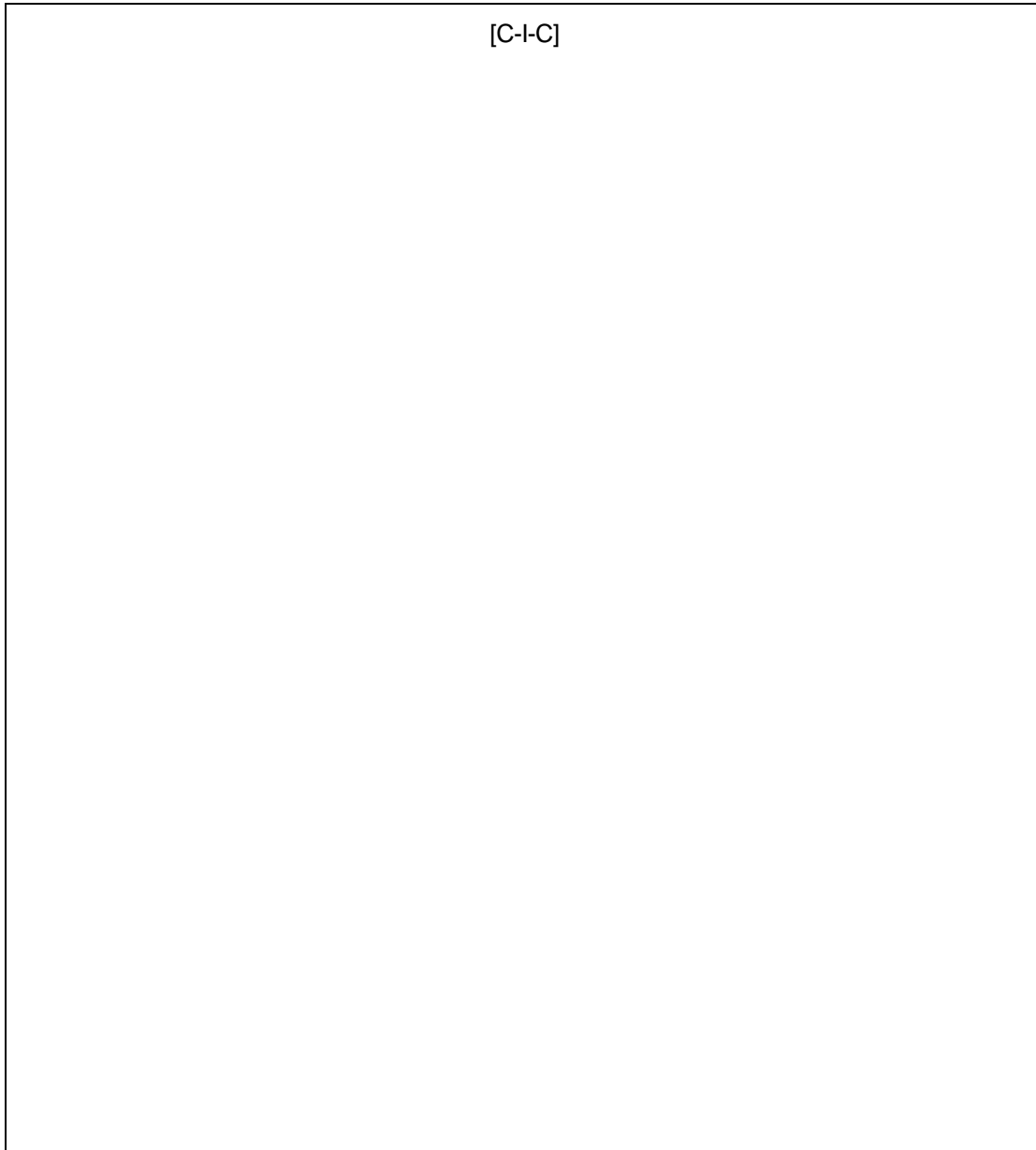


APPENDIX 4H - TRANSMISSION RESET REVIEW – ICT STRATEGY

The establishment and/or extension of these platforms following the defined roadmap is a core component of the ICT strategy. Billing, CIS, MMS and MDM platforms are used for electricity distribution and are not relevant to the transmission network.

The transition from the current state described in [Section 3.4 Current State Summary](#) to the above future state is depicted in the Figure 8 diagram below. The current applications are overlaid by the functional architecture they will be replaced with.

Figure 8 – ICT Future State Transition from Current State



5.3 Cost Allocation Methodology

SP AusNet is a multi-utility regulated business (Electricity Transmission, Electricity Distribution and Gas Distribution). It is cost effective and efficient for SP AusNet to leverage ICT systems and resources across these utility businesses. Expenditures in these ICT systems and resources

APPENDIX 4H - TRANSMISSION RESET REVIEW – ICT STRATEGY

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. The allocation of IT capital expenditure adheres to the following table:

Table 15 – ICT Expenditure

Type	Electricity	Gas	Transmission	Total
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
[C-I-C]	[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]

SP AusNet allocates its forecast ICT capital expenditure in a similar way to its historical ICT capital expenditure 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.

SP AusNet 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. SP AusNet 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.

SP AusNet uses several methods to ensure the appropriateness of the IT allocation rules.

- **Revenue:** Those IT systems that are shared and relate to revenue should be allocated on the [C-I-C] basis between Transmission and Distribution. Within Distribution, the revenue cost relativities are between Electricity ([C-I-C]%) and Gas ([C-I-C]%).
- **Operating Costs:** Those IT systems that are shared and relate to operating costs should be allocated on a [C-I-C] basis between Transmission ([C-I-C]%) and Distribution ([C-I-C]%). Within Distribution, the operating cost relativities are between Electricity ([C-I-C]%) and Gas ([C-I-C]%).
- **Effort:** Those IT expenditures that are shared and will provide benefit, in terms of reduced effort or increased efficiency of work practices, should be allocated on a [C-I-C] basis between Transmission ([C-I-C]) and Distribution ([C-I-C]%), and within Distribution between Gas ([C-I-C]%) and Electricity ([C-I-C]%). This is borne out by the ABC surveys that have been undertaken. It is forecast that the level of works and effort will be similar in the future as they are today. This delivers confidence that the results of recent ABC surveys will be appropriate to allocate future IT expenditure where these projects provide direct benefit to the Electricity and Gas Distribution and Transmission customers.
- **Overheads:** SP AusNet adopts one overhead that relate to internal SP AusNet IT staff. This includes related accommodation, utility costs and program management overheads. This overhead is calculated by determining the fully absorbed costs of

SP AusNet IT staff divided by the forecast capital expenditure of the given year. In the financial year starting 1st April 2012 (FY 2012/13), SP AusNet forecasts 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]%.

5.4 Forecasting Methodology

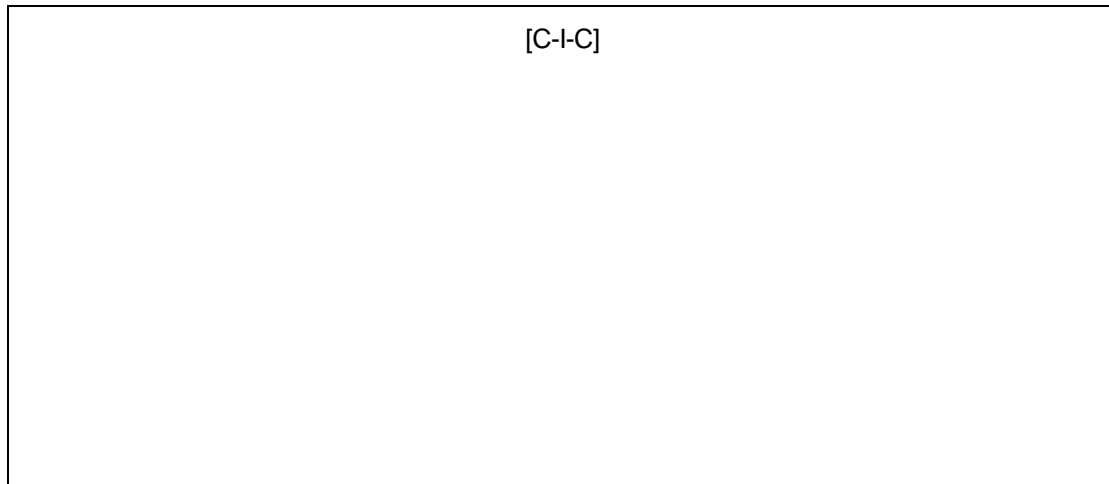
SP AusNet recognises the challenges in forecasting costs and benefits of each IT program, given the short life of IT assets. SP AusNet is confident that the forecast ICT capital expenditure is consistent with the CAPEX objectives and criteria set out in Rule 6A.6.7 of the NER. In forecasting capital expenditure for the forthcoming regulatory control period, SP AusNet has adhered to the following key steps to determine an efficient IT capital expenditure forecast:

- Assess the current performance of IT systems and infrastructure to inform to what extent our existing IT systems and infrastructure can be utilised to support the AMS.
- Engage business units to understand the AMS and jointly assess requirements of IT to support deliverability of these strategies.
- Consider alternate options where they are clearly identifiable.
- Consider emerging technologies and trends that can be applied, where it is effective and efficient to do so.
- Engage experienced independent sources to provide research, benchmarks and/or cost estimates.
- Assess the risk of preferred options, identifying appropriate mitigation strategies and the resulting residual risk.
- Complete cost and benefit assessment, incorporating all obtain inputs and key estimating assumptions. This includes the application of SP AusNet's IT cost allocation methodology, in recognition that SP AusNet is a multi-utility regulated business.
- As part of effective capital optimisation across the business, SP AusNet conducts a capital allocation and prioritisation process that aims to prioritise the following year's capital expenditure to 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.

5.5 Operational Service Delivery

The Service Management Framework (SMF) implemented by SP AusNet based upon the industry standard Information Technology Infrastructure Library (ITIL), underpins the delivery of IT Services. This framework is illustrated by Figure 9 below.

Figure 9 – Service Management Framework



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

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

The benefits of the implemented SMF are:

- Reduced complexity in managing business requests through their lifecycle.
- Improved understanding by SP AusNet on the capability currently available to provide services.
- Defined Service Level agreements – reportable and measurable.
- Increased capability through standards, policies and processes.
- Consistency for SP AusNet business users when creating requests for work to occur and understanding delivery timeframes.
- Improve operational effectiveness and enhance overall business performance.
- Lower overall costs for IT Service Management by common, repeatable, audible processes to increase IT 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 ITIL based service management framework in place for the management of ICT application and infrastructure, SP AusNet will be able to maintain operational service levels for increased volumes of business activity.

6 ICT PROGRAM OF WORK

6.1 Introduction

This section outlines the capital projects for the period 1 April 2014 to 31 March 2017. Consistent with our strategy to deploy common systems for gas and electricity business, much of the projects below have been previously submitted to the AER and approved on the basis of an allocation of costs across SP AusNet’s network businesses in the 2011 EDPR and 2012 GAAR submissions. This approach delivers transmission outcome at a lower cost than implementing a standalone system for transmission. The summary table below includes 29 initiatives that have been previously approved in the 2011 EDPR submission and included as part of the 2012 GAAR Submission

Table 16 – ICT Projects approved in 2011 EDPR, submitted in 2012 GAAR and 2013 TRR.

		Allocation			REAL FY 2012/13 \$000
Program of Work	Projects	Elec	Gas	Trans	Trans \$
Asset and Works Management	[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]
Back Office Management	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
Workforce Collaboration	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
Analytics and Reporting	[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]
Network Management	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
IT Infrastructure & Operations	[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]

APPENDIX 4H - TRANSMISSION RESET REVIEW – ICT STRATEGY

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

6.2 Asset and Works Management

6.2.1 Background

Asset and Work Management improves asset use, ensures equipment readiness and safety, and increases productivity. The failure rates of deteriorating assets and their consequent replacements impose a commercial risk if not managed effectively.

SP AusNet has approximately [C-I-C] IT systems used to manage transmission assets and the execution of work with an average age of [C-I-C] years. Many of these systems have been custom developed for SP AusNet.

Effective management of network assets is core to SP AusNet's business. As asset volumes grow in line with customer and asset growth, effective systems will enable safety and customer service to be maintained without commensurate increases in relative business costs.

[C-I-C]

6.2.2 Objectives

The objective of the ICT asset and works management system program of work is to support the network asset management strategies to maintain and improve safety and provide high network reliability to exceed customer expectations.

This initiative must be implemented in the context of an ever changing environment and in addition to the planned replacement of existing assets, it is also expected that additional assets to support an anticipated customer growth over the planning period will also be added to the network asset systems.

The Asset and Works Management Program aims to enable management capabilities by leveraging the collaboration, planning and analytics capabilities delivered by related programs of work. The program will enable SP AusNet to scale and efficiently manage greater volumes of work and asset activities in the forthcoming period.

Significantly, with the numerous obsolete Asset and Works Management systems there is significant risk that these systems will not reliably and cost effectively support the management of work in the forthcoming regulatory control period. Through rationalisation of these systems, SP AusNet aims to deliver cost efficiencies in ICT operating expenditures related to software maintenance of decommissioned systems.

6.2.3 Scope

The scope of projects within the program is described below.

Enterprise Asset Management (EAM)

[C-I-C]

Enterprise Project Management Upgrade (EPM)

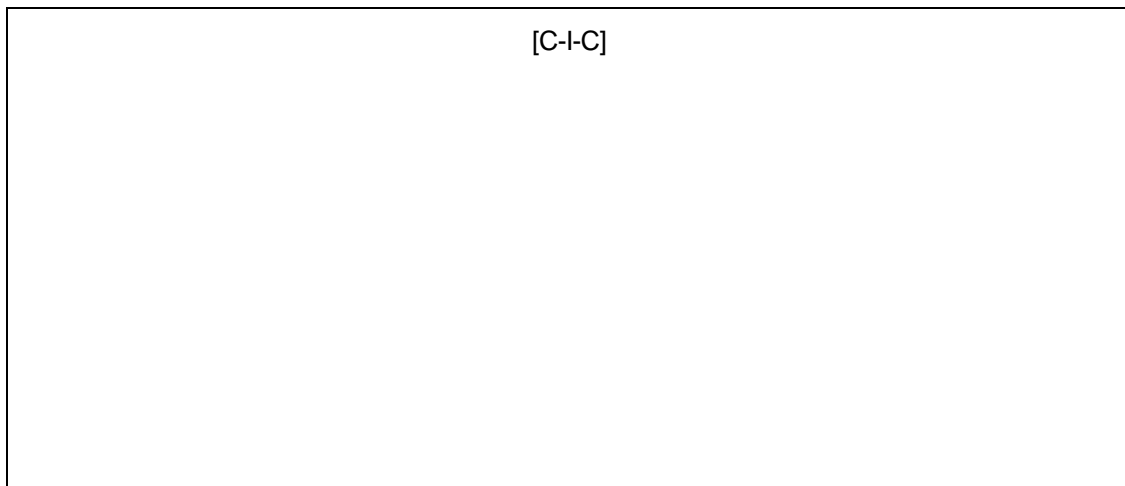
Upgrade the Enterprise Project Management system to minimise risk of failure before the product reaches the end of life during the forthcoming regulatory control period. This is a corporate wide project approved by the AER in the 2011 EDPR determination on the basis of a [C-I-C]% allocated to the transmission network and is consistent with the 2012 GAAR submission.

Electronic Drawings Management System (EDMS) Upgrade

SP AusNet plans functional enhancements to upgrade the EDMS application to increase the efficiency of managing asset drawings. Improvements include workflow to improve the efficiency of drawing production and modification. This is a corporate wide project approved by the AER in the 2011 EDPR determination on the basis of a [C-I-C]% allocated to the Transmission network and is consistent with the 2012 GAAR submission.

6.2.4 Timeframe

Figure 10– ICT Asset and Works Management Program



6.2.5 Forecast Costs

The forecast capital expenditure with consideration to the objectives, scope, assumptions, risks, dependencies and forecasting process as set out above, are as outlined in the table below.

Table 17– ICT Asset and Works Management Forecast Capital Expenditure (REAL FY 2012/13 \$000)

[C-I-C]

Forecast operating expenditure associated with the IT Services that support and maintain the IT Asset and Works Management systems and infrastructure are forecast to continue consistent with actual costs in the current regulatory control period.

6.2.6 Business Benefits and Implications

The benefits that SP AusNet expects to realise following the delivery of this program include:

- Provides improved facilities to support the efficient management of transmission assets, avoids other business costs associated with the management of a larger asset based request to support growth over the period.
- Operating expenditure efficiency to minimise any future increases in requirements for future spends.
- Facilitate work safety for office and field staff.
- Modernise our IT assets through replacement or upgrade to avoid increased costs and risks.
- Improved accuracy of data quality.
- Enable more accurate reporting and analytics on assets owned.
- Improve collaboration through capture of geographical information and integration of that information to provide an up-to-date and accurate asset mapping, allowing for greater cost efficient asset allocation and crew assignment.
- Enable advanced spatial estimation and planning and coordination with third parties.
- Improved effectiveness of capital investment in asset replacement and maintenance works, due to better asset usage and planning data; and
- [C-I-C]

6.2.7 Options Analysis

More detailed option analysis is provided on a project by project basis in the Appendix. In summary the options considered are:

Do Nothing

The do nothing option is not recommended as it exposes the business to unacceptable risk of failure of systems, by not complying with vendor support agreements. In addition, without improvements to the asset management systems business costs will increase as additional assets are added in response to customer growth.

Build standalone system for managing Transmission assets

This option is not recommended as it is more efficient to build common systems that support a number of asset businesses.

[C-I-C]

6.2.8 Risk Assessment

A risk assessment has been conducted, based on the SP AusNet Risk Management Framework, to highlight the risk of not proceeding with the Asset and Works Management Program. The table below identifies the key risks, and the consequence and likelihood of each risk to determine the risk rating. Refer to [Appendices: Section 8.1 Risk Assessment Framework](#) for details of SP AusNet’s risk rating matrix (I – IV), risk consequence criteria (rating 1 – 5) and likelihood criteria (rating A – E).

Table 18– ICT Asset and Works Management Risk Assessment

Risk	Description	Consequence Description	Consequence Rating	Likelihood Rating	Risk Rating
Poor quality asset data	Asset replacement work is expected to double over the forthcoming regulatory control period. [C-I-C]	Increased operational risks to work crews due to inaccurate asset information on site; Inefficient allocation of work due to lack of data on asset location, quality or availability.	3	C	III
Reduced works planning capability	Works planning is disadvantaged and potentially delayed from lack of access to tools that will add valuable data to considerations.	Increased costs and delay due to work planning without the added advantage of spatial data; Increased safety risk, due to low data integrity, lack of data and inefficiently managed assets; and Reduce effects of AMS due to lack of ability to manage network’s asset as a whole.	2	C	III
Obsolete / near obsolete asset and works management systems	The EAM, EDMS and Project Management Systems will reach “end-of-life” during the forthcoming regulatory control period.	Cost of software maintenance and support services increases; and Increasing likelihood that in case of failure, SP AusNet will be unable to obtain timely applications support, which will have an impact on business operations. This will limit the ability to efficiently manage assets and plan work.	2	C	III

6.3 Back Office Management

6.3.1 Background

This program of work relates to the Corporate Services Automation program in the current regulatory control period. The **TRR Regulatory Control Period Performance FY2008-FY2013** document provides further information relating to the investment made in upgrading of Back Office Systems including Enterprise Financials, HR and Payroll thus far. SP AusNet currently has a wide range of applications to support the core business operations of back office operations of Finance, Human Resource and Procurement. The applications being utilised today range from packaged software such as [C-I-C] to a multitude of [C-I-C]. Each of the applications has a different look-and-feel, processes, sign-on, support / maintenance arrangement, master data, transactional data, data model and integration capabilities.

6.3.2 Objectives

[C-I-C]

6.3.3 Scope

Due to the complexity of the current state environment SP AusNet has broken this program into smaller more manageable phases of work to improve the deliverability of the program.

The following projects were approved by the AER in the 2011 EDPR determination and submitted in the 2012 GAAR determination. These projects are corporate wide projects and were approved on the basis of [C-I-C] allocation to the Transmission network.

Enterprise Finance Consolidation

[C-I-C]

Enterprise HR Consolidation

[C-I-C]

Corporate Risk Consolidation

[C-I-C]

6.3.4 Timeframe

Figure 11 – ICT Back Office Management Program

[C-I-C]

6.3.5 Forecast Costs

The forecast capital expenditure with consideration to the objectives, scope, assumptions, risks, dependencies and forecasting process as set out above, are as outlined in the table below.

Table 19 – ICT Back Office Management Forecast Capital Expenditure (REAL FY 2012/13 \$000)

[C-I-C]

6.3.6 Business Benefits and Implications

The benefits that SP AusNet expects to realise following the delivery of this program include:

- Able to meet increasing demands of internal and external stakeholders to present accurate data that has had no manual intervention. This is critical for the safety of the asset. This capability will bring in productivity improvements and efficiencies and will enable increase volume of business transactions to be performed without commensurate increase in business costs.
- [C-I-C]
- Provide decision support information (i.e. costs, health and safety, risk and compliance) to assist with asset maintenance and works program planning.
- [C-I-C]
- Increase labour productivity in terms of services to cost ratio and utilisation with improved safety; and
- Reduce administrative activities through more automated processes and better tools to manage data.

6.3.7 Option Analysis

More detailed option analysis is provided on a project by project basis in the appendix. In summary the options considered are:

Do Nothing

The do nothing option is not recommended as it exposes the business to unacceptable risk of failure of systems, by not complying with vendor support agreements. In addition, without improvements to the customer systems business costs will increase in response to customer growth.

Build standalone Transmission system

This option is not recommended as it is more efficient to build common systems that support a number of asset businesses.

Build common systems for SP AusNet’s asset businesses

[C-I-C]

6.3.8 Risk Assessment

A risk assessment has been conducted, based on the SP AusNet Risk Management Framework, to highlight the risk of not proceeding with the Workforce Collaboration Program. The table below identifies the key risks, and the consequence and likelihood of each risk to determine the risk rating. Refer to [Appendices: Section 8.1 Risk Assessment Framework](#) for details of SP AusNet’s risk rating matrix (I – IV), risk consequence criteria (rating 1 – 5) and likelihood criteria (rating A – E).

Table 20 – ICT Back Office Management Risk Assessment

Risk	Description	Consequence Description	Consequence Rating	Likelihood Rating	Risk Rating
Obsolete / near obsolete back office management systems	The Back Office Systems will reach “end-of-life” during the forthcoming regulatory control period, without upgrades and extensions, the systems will be unsupported and probability of failure increases.	Cost of software maintenance and support services increases; and Increasing likelihood that in case of failure, SP AusNet will be unable to obtain timely applications support, which will have an impact on business operations. This will limit the ability to efficiently manage assets and plan work.	3	C	II

6.4 Workforce Collaboration

6.4.1 Background

In the current regulatory control period SP AusNet developed a comprehensive Workforce Mobility Strategy and Solution Architecture. This strategy has resulted in some focused investment for satellite navigation devices containing transmission system assets and a replacement of the obsolete Asset Inspection mobile devices, commissioned in [C-I-C].

SP AusNet contends that improving information to field crew is an important capability that many other asset businesses have invested in and with the maturing of their capabilities are starting to derive forecasted benefits.

SP AusNet's workforce does not have access to quality information concerning the asset and work being performed at the work location, sometimes leading to inaccurate decision making and workforce planning. Technology is a viable and strategic response to this problem by improving the information capture and management processes of assets.

In the current regulatory control period, an enterprise content management strategy was devised and is being implemented currently.

6.4.2 Objectives

The aim of the Workforce Collaboration Program is to deploy capabilities that will facilitate access to quality information and closer collaboration through knowledge capture and sharing within the SP AusNet workforce.

Implementing this program will:

- Improve capture and utilisation of knowledge.
- Improve the quality and timeliness of data from the field to the office as the ability to capture data at the network asset is improved.
- Support the scheduling work for field teams and the completion of work through better communication and information provision.
- Provide a view of works management and the status of repairs.
- Establish a data taxonomy for the management of documents and drawings.
- Establish a multi-channel network for communication between the workforce and customers.
- Create opportunities for process effectiveness improvements and
- Provide an ability to visualise and project views of information to multiple stakeholders enabling better decision support, and increase visibility of events and responses to those events.

6.4.3 Scope

The following projects are corporate wide projects and have been approved by the AER in the 2011 EDPR and 2012 GAAR submission on the basis of [C-I-C] allocation to the Transmission network. The ECM project however, has been recently re-scoped to include a minor upgrade during the period and represents an increase to the previous submissions.

Enterprise Content Management Upgrade and Extensions

As per the ICT asset management lifecycle, the ECM system will be commissioned in [C-I-C].

The Enterprise Content Management platform provides the ability for SP AusNet to have a central repository to capture, manage, store, preserve and deliver content and documents related to organisational processes. The ECM tools and strategies allow the management of unstructured information wherever the information exists. The ECM platform will be targeted to deliver information across SP AusNet's business function domains and additionally enable document collaboration, workflow, information sharing, and web content management. The solution will be delivered with adherence to appropriate information security requirements, identity and access management obligations and empowered to maximise future capability requirements giving consideration to both office based and mobile computing functionalities.

The solution once delivered in the initial delivery of the period, will require a minor upgrade commencing in [C-I-C], to reduce the risk of failure and ensure compliance to vendor support.

Enterprise Portal

The Enterprise Portal is the technical platform offering the presentation of content and web forms, secure access and the rendering of content over the mobile infrastructure to field workers in a structured and consistent format. This is a platform on which to construct internet and intranet portals that will consolidate and present information from multiple sources including spatial, analytical, reporting and enterprise content management sources. The envisaged user base will include SP AusNet employees including field workers, SP AusNet Customers, Third party contractors, retailers, regulatory bodies and other partners requiring access to SP AusNet information and applications.

Access and usage of the Portal will be standardised so that a user's experience is consistent and productive.

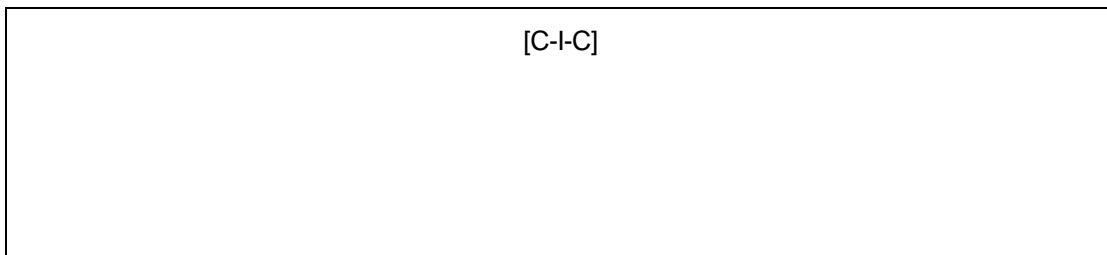
Workforce Mobile Computing

[C-I-C]

6.4.4 Timeframe

The illustration below indicates the year in which we forecast the projects to occur.

Figure 12 – ICT Workforce Collaboration Program



6.4.5 Forecast Costs

The forecast capital expenditure with consideration to the objectives, scope, assumptions, risks, dependencies and forecasting process as set out above, are as outlined in the table below.

Table 21 – ICT Workforce Collaboration Forecast Capital Expenditure (REAL FY 2012/13 \$000)

[C-I-C]

6.4.6 Business Benefits

The benefits that SP AusNet expects to realise following the delivery of this program include:

- Move to a workforce that makes and acts on decisions, not assembles documentation.
- Agility and flexibility to implement and communicate change across the entire distribution business and workforce.
- Increase customer satisfaction due to better methods of communications and ease of obtaining relevant information.
- One single authoritative source of all non-character based documentation, drawings and images to support the total workforce.
- Reduce risks of non-compliance and safety incidents; and enabling rapid escalation.
- Reduce duplication of information and ability to retain intellectual property.
- Offer significant opportunities to improve the assignment of work to crews, and enable the information being prepared, captured and stored to be better utilised and leveraged both in regards to immediate need of crews, and for office based activities including planning of work, and processing of captured information to derive actionable intelligence.
- Improvement to the manner in which authoritative information are captured, stored, and distributed will benefit efforts to ensure that the right information is being provided to the right person, at the right time, for the right job and
- Capture of tacit and explicit knowledge to support knowledge sharing, scheduling, planning and safety.

6.4.7 Option Analysis

More detailed option analysis is provided on a project by project basis in the appendix. In summary the options considered are:

Do Nothing

This option is not recommended as without improvements to the workforce collaboration systems business costs will increase as additional assets are added in response to customer growth.

Build standalone Transmission system

This option is not recommended as it is more efficient to build common systems that support a number of asset businesses.

Build common systems for SP AusNet's asset businesses

[C-I-C]

6.4.8 Risk Assessment

A risk assessment has been conducted, based on the SP AusNet Risk Management Framework, to highlight the risk of not proceeding with the Workforce Collaboration Program. The table below identifies the key risks, and the consequence and likelihood of each risk to determine the risk rating. Refer to [Appendices: Section 8.1 Risk Assessment Framework](#) for details of SP AusNet’s risk rating matrix (I – IV), risk consequence criteria (rating 1 – 5) and likelihood criteria (rating A – E).

Table 22 – ICT Workforce Collaboration Risk Assessment

Risk	Description	Consequence Description	Consequence Rating	Likelihood Rating	Risk Rating
Reduced quality and timeliness of asset and works related data	With additional network intelligence providing substantially more data, there is a need to capture data at the work site to allow for efficient decision making with reliable data.	Asset Planning is impacted as with limited or delayed availability of data; Quality of data cannot be improved as capture of data is inefficient;	3	D	II
Ineffective works and crews allocation	Increase costs from the inability to utilise workforce collaboration tools.	Un-optimised workforce dispatch and route planning; Risks to work crew due to incomplete or lack of up-to-date relevant data; and Risks to public safety due to incomplete details of work being undertaken.	3	C	II
Ineffective method of communication and knowledge sharing	Compromised ability to build coordination and knowledge sharing amongst the SP AusNet workforce.	Limits SP AusNet’s ability to properly capture and manage knowledge sharing; Reduced ability to improve process efficiency, support better decision making; Loose valuable knowledge through retiring workforce.	3	B	III

6.5 Analytics and Reporting

6.5.1 Background

This program relates primarily to the Reporting and Data Interrogation program in the current regulatory control period, which was aimed at meeting regulatory reporting demands, and increasing the automation from asset, works, network, customer and back office systems to a data warehouse.

In this regulatory control period, SP AusNet proposes to build a business intelligence platform that provides an enterprise solution to the business reporting need. Consistent with the “Less is more” and “capture data once” principles of the ICT strategy, this program will consolidate the current reporting solutions onto a common platform and provide the appropriate data presentation tools.

6.5.2 Objectives

The Analytics and Reporting Program has two key objectives. The first is to maintain the IT systems and Infrastructure before they reach end of life. The second is to respond to the increasing volumes of data and improve our capabilities to derive actionable intelligence from data captured around the undertaking of asset replacement, maintenance and capital works, and the state and performance of the network.

This program will enable the convergence of disparate data from all points of the enterprise into one location and also provide data accuracy where information can be analysed and used to support management and operational decision making. The program will also facilitate timely and relevant report generation for internal and external stakeholders.

The analytics platform will be extended to provide data analytics capabilities and better visualisation of data. This will enable the business to make more informed decisions, particularly during high activity periods, and undertake a more proactive and strategic approach around asset management and optimisation of the network.

6.5.3 Scope

The following projects are corporate wide projects and have been approved by the AER in the 2011 EDPR on the basis of [C-I-C] allocation to the transmission network.

Enterprise Data Warehouse Upgrade

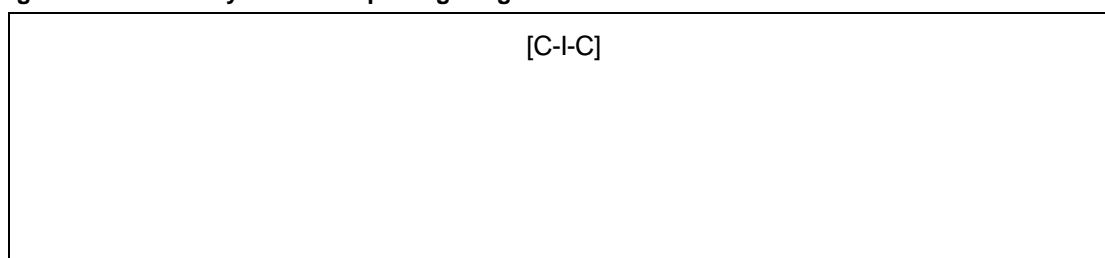
Upgrade the EDW platform, including the ETL and BI tools, to correspond with the vendor product roadmap and to support the anticipated growth capacity. SP AusNet is currently implementing a project to build an Enterprise data warehouse capability that can store and process significant volumes of data.

Reporting Dashboard

Implement a reporting dashboard to enable users to access “views of data” that can be customised for specific needs and levels of authority to make more informed decisions. The data presented may be aggregated with the capability to “slice and dice” the data and drill down to lower levels of detail. This will require some of the existing reports to be redeveloped and new reports to be implemented.

6.5.4 Timeframe

Figure 13 – ICT Analytics and Reporting Program



6.5.5 Forecast Costs

The forecast capital expenditure with consideration to the objectives, scope, assumptions, risks, dependencies and forecasting process as set out above, are as outlined in the table below.

Table 23 – ICT Analytics and Reporting Forecast Capital Expenditure (REAL FY 2012/13 \$000)

[C-I-C]

6.5.6 Business Benefits and Implications

The Analytics and Reporting Program will provide SP AusNet with the ability to comply with regulatory obligations and maintain quality, reliable and secure supply. This program will provide the opportunity to realise the following business benefits:

- More effective and efficient forecasting and scaling of activity in response to the projected AMS capacity requirements for customer and asset works.
- Improve allocation of capital (including capital deferral) for asset replacement, based on asset condition and reliability centred maintenance, supported by analytical intelligence.
- Better organisational agility by leveraging real-time / near real-time analytical data to make better decisions in response to an increasingly variable network environment (extreme weather events and climate change).
- Better monitoring of network and workforce performance with the ability to report and analyse historical and forecast performance metrics more effectively and efficiently.
- Increased workforce productivity and utilisation, by reducing the manual effort spent on data cleansing and processing, hence providing more time to analyse the decision support information presented and
- Better flexibility and capacity to scale to meet frequently changing and increasingly complex regulatory and safety compliance reporting requirements.

6.5.7 Option Analysis

More detailed option analysis is provided on a project by project basis in the appendix. In summary the options considered are:

Do Nothing

The do nothing option is not recommended as it exposes the business to unacceptable risk of failure of systems, by not complying with vendor support agreements. In addition, without improvements to the customer systems business costs will increase in response to customer growth.

Build standalone Transmission system

This option is not recommended as it is more efficient to build common systems that support a number of asset businesses.

Upgrade Data and Reporting Solution for SP AusNet's asset businesses

This option is recommend as it meets the business requirement by providing a fit for purpose reporting platform for SP AusNet and sharing the cost of development and support of these systems across SP AusNet's asset management businesses. This approach has been previously accepted by the AER in the 2011 EDPR determination for SP AusNet and is consistent with the 2012 GAAR submission with the exception of the new Service Reporting tools project.

6.5.8 Risk Assessment

A risk assessment has been conducted, based on the SP AusNet Risk Management Framework, to highlight the risk of not proceeding with the Analytics and Reporting Program. The table below identifies the key risks, and the consequence and likelihood of each risk to determine the risk rating. Refer to [Appendices: Section 8.1 Risk Assessment Framework](#) for details of SP AusNet’s risk rating matrix (I – IV), risk consequence criteria (rating 1 – 5) and likelihood criteria (rating A – E).

Table 24 – ICT Workforce Collaboration Risk Assessment

Risk	Description	Consequence Description	Consequence Rating	Likelihood Rating	Risk Rating
Reduced efficiency of workforce	With volume of network related data increasing and without support of analytic and reporting tools, staff will increasingly need to manually collate data to inform decision making	Limits SP AusNet’s ability to properly deal with increasing data volumes and to make informed actionable business decisions; Reduce integration of real-time data benchmarked against historical performance; Reduce ability to make predictive business decision.	3	C	II

6.6 Network Management (SCADA and Real Time Systems)

6.6.1 Background

The proposed program is aimed at upgrading and enhancing SP AusNet’s SCADA Energy Management System (EMS) Master Station and Historical Information Systems (Pi). The program also seeks to improve Transmission Outage Reporting systems to provide enhanced integrity and management of data for use in Outage Management and Planning.

The SCADA/EMS platform provides remote control and data acquisition of the electricity transmission network and is an important operational tool in maintaining the stability and reliability of the network. PI Data historian solutions are used to collect and stored information from mission critical systems, extract and perform accurate analyses and enable key decisions makers as quickly as possible. The SCADA and Pi systems are operationally critical systems as the risk of system failure carries significant legal, regulatory and consequential implications that can adversely impact the electricity market, generator dispatch and/or operation of the Transmission system. SP AusNet’s SCADA is consolidated onto an enterprise wide solution supplied by [C-I-C]

The SCADA/EMS Master Station platform incorporates a dual redundant computer system duplicated at the [C-I-C] and [C-I-C] data centres. The Control Room Operations Centre, housing the prime users of the SCADA system and is located in [C-I-C] Information is managed by essential tools such as the wallboard display that enables decision making pertaining to the electricity network. The [C-I-C] and [C-I-C] data centres also play roles in emergency back-up control and disaster recovery facilities.

Transmission Outage Management currently resides in the [C-I-C] system, a [C-I-C] Asset Management module and outage planning and management is performed using a series of manual processes, reconciliations and data entry using [C-I-C] and [C-I-C].

In the current regulatory control period the major initiative completed was the consolidation of the SCADA Master Stations. This was a significant program of work to consolidate eight SCADA Master Station IT systems into one [C-I-C] platform for synergies and cost savings between control rooms and support staff. Other initiatives also completed included standardisation of the PI Historian products into a single integrated tool and routine SCADA software platform upgrades.

6.6.2 Objectives

The objective of the new Network Management Program for this regulatory period is to enable SP AusNet to meet its core business of maintaining high asset availability and reliability which seeks to exceed Customer Expectations. The program has been primarily designed to allow SP AusNet to maintain its existing provision and maintenance of communications for control and operations of facilities in accordance with clause 4.11.2(a) of the NER that ensures regulatory compliance for TNSP operations.

Additionally, the program of work defined will also endeavour to ensure that SP AusNet can provide a framework to not only achieve its current obligations but anticipate realistic changes in demand to the network as required. Proactive monitoring and replacement of assets to improve their reliability and maximise their asset life, progressively increases the size of the capital asset base and resulting data storage requirements. In light of this increase, the project will venture to ensure that any additional load on the [C-I-C] platforms can be successfully absorbed and managed. The result will ensure that data communications facilities have sufficient capacity and performance to allow AEMO to discharge its market and power system security functions as set out in the NER.

The Outage Management program seeks to augment the data integrity, planning and scheduling of outage management by referencing single source of truth asset and work maintenance data and integrating them into a centralised enterprise outage management platform. The program seeks to implement this solution to better manage outages both planned and unplanned and provide increased visibility to the market of SP AusNet outages.

The Network Management program seeks to also implement cost effective tools to optimise efficient good industry practice management of the network; provide ability to manage high activity periods, and reduce requirements for physical resources to operate the network.

6.6.3 Scope

SCADA Application Upgrade

To maintain the high reliability of the network, it is planned to upgrade the SCADA EMS system, PI Historian and underlying infrastructure to minimise the risk of network failure and provide a best-fit solution for SP AusNet. To meet this requirement, the proposal is to complete one minor upgrade (software only) during the forthcoming period, which will also realise the additional benefit of maintaining vendor support.

The aim of the upgrade programme will be to align with vendor product roadmaps and licensing agreements where appropriate. RTS systems will be reviewed and brought into line with “High Availability”, “High Performance” and “Secure SCADA Network” principles to ensure the systems are fit for purpose.

SCADA Enhancements

Controller Training Simulator

The proposal is for the deployment of a controller training simulator to train new network controllers and improve the capabilities of existing network controllers. Good Practice Industry experience demonstrates this method of instruction as the safest and cost-effective technique to teach and maintain network controlling skills and responsibilities.

The requirement to maintain high network reliability requires highly capable and skilled staff and this initiative will form a critical part of the training and development program. Currently any training for new or existing staff is conducted on the existing live network and this represents the potential of significant risk to the network. The implementation of this initiative would align SP AusNet with normal industry practice, where fully functional training simulators are currently in place.

This application will deliver overall business benefits by improving knowledge and skills required to manage the complex power systems. The training simulation will include emphasis on processes to maintain reliability and methods to minimise or eliminate market impact. The program will also seek to teach good practices on the maximisation of asset usage, managing information from analytical tools and the importance and impacts of operational errors. Turnover of experienced staff is an unavoidable reality of utilities businesses so implementation of this project enables operators to effectively learn necessary skills and use these to mitigate network risks.

Remote Testing Improvements

Current testing of Remote Terminal Units, field devices and protection relays at AusNet's test facility, is performed via a telephone conversation which makes testing difficult, resource intensive and has the potential to introduce errors for these assets.

Failure to implement stringent testing standards and correct analysis of testing results has the increased likelihood of introduced risk to the stability and reliability of the network as testing scenarios and results are currently relayed verbally between resources. The resource intensive nature of the current process also does not represent a cost-effective utilisation of network management resources.

The establishment of a secure SCADA link will improve testing of the integration of the new devices with the SCADA system by enabling increased visibility of testing scenarios and results for resources.

Database Overhaul

There has been significant growth in the number of alarms from the field as the volume of data points continue to increase in the SP AusNet asset base. The reliability of the network is dependent on the Network Management controller and team being able to correctly process the relevant alarms received and action where required. The current SCADA EMS upgrade project is implementing an Intelligent Alarm Processor application that is used to condense multiple alarms into a single view summary and only generate one view of the alarm to the controller. To enable this functionality to be implemented and improved, the SCADA EMS Database will need to be reviewed and restructured to accommodate the enhanced data and subsequent processing requirements. The implementation of a best-fit solution will provide a mechanism to manage increased current data volumes and provide a framework for future anticipated data point requirements.

Situational Awareness

Building further on the work proposed to aid the interpretation of control room data, it is proposed to implement [C-I-C] which is an [C-I-C] product used to interpret the data and display the data on to meaningful visual displays.

Visualization techniques allow controllers to fully visualise their networks with the right level of situational awareness and to proactively operate the grid. The increased visibility of key alarms will also provide a better framework for enhanced decision making by the Network Controller. The solution represents a cost-effective method to manage increasing volumes of transmission controls whilst maintaining effective communications facilities for control.

The aim of the enhancement programme will be to:

- Provide increased capacity to maintain data visibility in an environment where volumes are increasing due to business and asset growth
- Improve testing and implementation platform to minimise external security threats and ensure compliance to accuracy of data views and exchanges.

- Increased visibility of asset data and controls to ensure accurate analysis of information and where required decision making
- Strengthen the training programme with enhanced delivery methods to ensure operational staff are empowered to effectively manage network operations

SCADA Growth

Increased Data Points

The SCADA and associated PI historian systems underpin the management of the SP AusNet Transmission asset network. Investments in capital work programs results in an increased SCADA data point costs that must be established to support the augmented data in the SCADA systems. The growth program aims to provide increased capability to maintain data visibility in the SCADA systems where data volumes are increasing due to business and asset growth

PI Front End Expansion

The PI Historian is designed to archive automation and process data received as a result of high frequency data collected from the SCADA network. As a result of business growth and investment in the capital works program it is expected that the PI historian system will also require expansion to support the increased volumes of data. This initiative will continue to underpin the obligation to meet demand requirements, analyse processes to achieve good practice performance monitoring and provide high network reliability.

The aim of the growth programme will be to provide increased capacity to maintain data visibility in an environment where volumes are increasing due to business and asset growth

SCADA Lifecycle

Hardwired Voltage/Frequency and Trutime clock replacement

SP AusNet is required to provide high accuracy time deviation and frequency measurement to AEMO. SP AusNet uses Trutime clocks to derive the measurements via hardwired voltage sources from several Terminal Station sites using copper supervisory cables. The cables are end of life and due to the aging technology and associated parts are now difficult and expensive to maintain. The Trutime clocks were last replaced in [C-I-C] and are no longer supported by the Vendor due to its asset life expiry. This proposal is to replace the clocks and derive the measurement from good practice industry technology alternative utilising digital communication technology (i.e. No longer utilising copper cable.)

Engineering Application Refresh

The [C-I-C] Application provides thermal monitoring and protection of transmission lines, cables and selected transformers. The application is used to proactively monitor overload conditions, maximise asset utilisation and in turn maintain public safety.

The [C-I-C] code was first developed in the late eighties and is written [C-I-C], a language that at the time was an industry standard. Moving forwards, [C-I-C] is now an increasingly unsupported development code-set due to the difficulty of finding and managing cost-effective resources. The SCADA vendor will no longer support the current interfaces for its applications and will no longer develop applications built using [C-I-C], preferring development technologies with cost-effective and accessible resources.

The proposal therefore is to redeploy the [C-I-C] functionality in a supportable platform to enable ongoing interface operations and subsequent support. The opportunity will also be taken during the project to review the design & development of the application and deliver using contemporary good practice architecture frameworks. This decision has been taken in light of an unstructured code basis developed over many years that makes future development and support costly both from a time and effort perspective. A comprehensive testing programme will also be integrated to mitigate any risks and ensure that there is no impact to the existing functionality.

The aim of the lifecycle programme will be to

- Align with vendor product roadmaps and licensing requirements where appropriate;
- Ensure RTS assets are in line with Asset management lifecycle

SCADA Security

Software QA/QC Environment

Security reviews, completed in [C-I-C] by external consultants have identified the SCADA EMS system as vulnerable to external attack due to insufficient software security patching. This attack represents a potential risk to the availability of network monitoring tools which in turn may compromise the safety and security of the network.

A Software Quality Assurance and Quality Control (QA/QC) Environment inclusive of a patching regime and review process has commenced to mitigate this risk, but further enhancements to the testing environment are still required. The aim of the completed quality assurance environment will be to ensure that data communications facilities do not cause incorrect operational data to be received from or issued to power system plant before any new or modified functionality is introduced into the production environment.

Serial to IP security

The SCADA EMS system connects to the remote terminal units (RTUs) predominantly via serial communications. As Wide Area networks are further deployed through the network and vendors move to good practice IP connections, a secure IP mechanism will need to be established to ensure continued safety and security of the data and associated network assets.

Outage Management Reporting Tools

Service Standard Reporting Tools

A review of the Transmission Regulatory reporting system was undertaken to evaluate effectiveness. This review identified areas of inadequacy in relating to reporting against the AIS and MIC component of the Service Target Performance Incentive Scheme (STPIS). The review also identified areas where manual processes need to be replaced with automated reporting processes to increase efficiency and accuracy.

In addition, requirements in the area of Outage Planning Management mean that SP AusNet must use AEMO's Network Outage Management System (NOS) as the primary form of outage information and optimise planned outages 13 months in advance. Investment in a B2B link between SP AusNet's reporting system and AEMO's NOS is necessary to ensure SP AusNet continues to comply with clause 11.30.2(g) of the National Electricity Rules(which requires TNSPs provide AEMO with such information as is requested by AEMO for inclusion in its congestion information resource).

[C-I-C]

The project comprises the migration, upgrade and de-commission of the current regulatory reporting suite to new dashboard reporting platforms using new single source of truth SP AusNet master asset and work management systems and integrating these with an enterprise Outage Management solution. The delivery will also introduce enhanced B2B functionality for Outage Management that integrates SP AusNet's asset management systems with [C-I-C] The project will also include a direct interface with [C-I-C] to allow SP AusNet to maintain a data and reporting solution. This will deliver real time reporting functionality, data query and management

tools using near real time constraints, demand and pricing information to better predict and administer network and outage planning and management.

6.6.4 Timeframe

Figure 14 – ICT Network Management SCADA and Real Time Systems Program

[C-I-C]

6.6.5 Forecast Costs

The forecast capital expenditure with consideration to the objectives, scope, assumptions, risks, dependencies and forecasting process as set out above, are as outlined in the table below.

Table 25– ICT Network Management SCADA and Real Time Systems Forecast Capital Expenditure (REAL FY 2012/13 \$000)

[C-I-C]

6.6.6 Business Benefits and Implications

The benefits that SP AusNet expects to realize following the delivery of this program include:

- Ability to maintain the quality, reliability and security of supply.
- Improve accuracy of data quality.
- Repeatable, transferable, transparent and auditable processes and data flow to assure compliance to regulatory and safety obligations.
- Reduce risk of system failure and demonstration of prudent management of a key operational system by ensuring the system is vendor supported.
- Enhance information displays in order to aid reactive network management processes.
- Improve system security.
- Provide ability to scale, flexible and agile to change to embrace and outperform reliability, customer and safety targets.

- Meet SP AusNet’s regulatory requirements by the continued provision of the latest available communication, monitoring and control facilities allowing secure, safe and reliable operation of increasingly complex transmission and distribution networks.
- Alignment with other utilities (e.g. Transpower and ElectraNet) and regulatory bodies (e.g. AEMO) in terms of software versions and good practice industry experience.
- 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
- Best Practice training and software implementations to allow staff to operate value add tasks instead of repeating low value operations, testing and training processes.

The Upgrade also aligns to fit SP AusNet’s Scorecard under the three major areas which benefit the customers. From a financial perspective, reducing the risk of unsupported software and aging hardware failures, whilst in parallel minimising maintenance costs and improving reliability of systems by increasing agility to meet regulatory incentive schemes.

From an improved internal process perspective, ensuring technology is adaptable to support business transformation programmes, improving system availability with enhanced disaster recovery capability whilst also implementing latest good practice securing authentication facilities.

Finally from a people perspective, providing technology to allow staff to remain innovative whilst also utilising industry good practice training and operational process to maximise the value of people by performing value added services.

6.6.7 Options Analysis

More detailed option analysis is provided on a project by project basis in the appendix. In summary the options considered are:

Do Nothing

Given the critical nature of the network management systems to the safety and reliability of the Transmission network, the do nothing option is not recommended as it exposes the business to unacceptable risk of failure of systems, by not complying with vendor support agreements.

Upgrade SCADA EMS System

This option is recommended as it meets the business requirement by ensuring the SCADA EMS and Pi Historian system remains in vendor support

6.6.8 Risk Assessment

Refer to [Appendices: Section 8.1 Risk Assessment Framework](#) for details of SP AusNet’s risk rating matrix (I – IV), risk consequence criteria (rating 1 – 5) and likelihood criteria (rating A – E).

Table 26 – ICT Network Management Risk Assessment

APPENDIX 4H - TRANSMISSION RESET REVIEW – ICT STRATEGY

Risk	Description	Consequence Description	Consequence Rating	Likelihood Rating	Risk Rating
Software failure within the SCADA/EMS environment	The SCADA/EMS software will be considered as being at End of Life during the period and will be in need of replacement	Software failure may be a result of various factors including a security breach- this may result in an inability to effectively control the energy. Transmission networks.	4	D	I
Events not actioned according to the right priority	Over recent years, there has been significant growth in the number of alarms from the field as the number of data points continue to increase.	There is increased potential for alarms being missed or actioned in wrong order. This may need to the failure of equipment's, primary plants etc.	3	D	II
Expansion Issues	Insufficient Capacity	A limitation of the size of the SCADA system will restrict the automation component of the Capex program.	3	D	II

6.7 IT Infrastructure and Operations

6.7.1 Background

During the current regulatory control period, SP AusNet has invested in IT infrastructure spanning from data centres and their related facilities, server, storage, operating systems, infrastructure software and communications network.

The IT Infrastructure and Operations Program covers nine key infrastructure environments:

- The Wintel environment covers Wintel servers (high end/low end rack mount and blade form factor), desktop equipment and peripherals (desktops, laptops, NOC workstations and printers) and software.
- The UNIX environment covers UNIX servers and associated management tools used to provide corporate systems support and software and databases.
- The Real Time Systems (RTS) environment covers SCADA, data warehousing tools relating to RTS, primary operations centre and the disaster recovery operations centre.
- The Network and Communications environment covers the corporate network, High Security network, SCADA IP network, firewalls, routers, switches, VPN concentrators, packet shapers, VoIP telephony and Huntsman IDS.
- The Data Centre environment covers upgrade or replacement of end of life assets for primary data centre [C-I-C] secondary data centre [C-I-C] and a number of computer rooms located in CBD, Metro and regional offices.
- The Security environment covers network resilience, monitoring, auditing and identity & access management tools used to ensure the protection and safety of the network.
- The Storage environment covers SAN storage, NAS and the backup environment.

- The Disaster Recovery environment covers management tools used to maintain business continuity and disaster recovery.
- The Database Refresh environment covers [C-I-C] databases that are used by business critical applications.

6.7.2 Objectives

This program enables ongoing operations of core IT systems with minimum interruptions and mitigation of operational risks. It will enable a robust infrastructure against deliberate attacks and accidental errors; and implementation of appropriate tools to manage the IT Infrastructure environment. Replacement of aging assets and extension of current capacity will allow a robust infrastructure state for the future.

The objectives of each infrastructure environment are described below:

Data Centre Environment

- Replacing aging infrastructure assets in alignment with Asset management life cycles. This includes contemporary equipment and asset cooling systems, new lighting and associated generator requirements and replaced underlying asset infrastructure designed to maintain existing commitments.
- Enable and sustain technology to maintain temperature, air distribution and humidity of areas where mission critical information and assets are housed.
- Upgrade of key infrastructure assets to align data centre hosting obligations with existing and projected business requirements. This includes the rebuild of [C-I-C] SCADA room.
- Provide increased capacity to maintain data visibility in an environment where volumes are increasing due to business and asset growth.
- Enhanced security systems to maintain secure data and applications.
- Enable emergency support functions such as Fire Alarms and Uninterrupted power supplies to continue to successfully support the protection of data and personnel.
- Maintenance of existing facilities to ensure safe, secure workplaces.
- Remediation and maintenance of existing assets to maximise their asset life and continuous successful operations.

Wintel Infrastructure

- Align with vendor product roadmaps where appropriate based on the application of asset management lifecycle.
- Leverage virtualisation technology where technically and financially appropriate and/or driven by flexibility requirements.
- Create repeatable architecture patterns and develop appropriate designs to enable a high availability environment consistent with good industry practices.
- Upgrade of key infrastructure assets including laptops, desktops and printers to ensure continuous business and support operations.
- Use the appropriate mix of high-end and low-end rack mount and blade servers to enable cost effective service level delivery.
- Implement provisioning processes that support the dynamic allocation of capacity and

- Where appropriate, abstract the physical infrastructure from the business applications therefore enabling agility and flexibility.

UNIX Infrastructure

- Align with vendor product roadmaps where appropriate to maintain system support.
- Virtualise UNIX environments to provide better utilisation of hardware resources.
- Standardise system software to achieve economies of scale with vendors and reduce UNIX and DBMS skills set required, leading to better managed, configured and supported servers.
- Enable version and patch level management.
- Establish an enterprise UNIX environment lifecycle management to align with the various vendors' software Release Model.
- Define and establish an appropriate approach to server lifecycle and asset refreshment utilising where relevant good practice efficient server management.
- Standardise hardware improving the ability to reuse and redeploy ICT Infrastructure, and providing smaller, greener hardware footprint.
- Standardise hardware to reduced vendor management overheads and operating expenditure.
- Enable High Availability capability.
- Establish Production, Pre-Production, Test, Development work environments. Implement change control and change release management processes and
- Standardised asset management tools and processes.

Real Time Systems Infrastructure

- Align with vendor product roadmaps where appropriate to maintain system support.
- Upgrade and maintain RTS IT infrastructure is in line with the Service Level Delivery principle and meeting all product requirements and recommendations.
- Standardised asset management tools and processes.

Network and Communications Infrastructure

- Align with vendor product roadmaps where appropriate.
- SP AusNet employees will be able to work securely.
- Enable the support of Ethernet and time sensitive (synchronous) traffic in a consolidated Next Generation network.
- Enable the IP network for Ipv6 compatibility to ensure reliable integration with external parties.
- Accommodate planned growth in fringe RTU outstations and remote monitoring devices within the Transmission network and minimise congestion.
- Improve physical site security and access of radio sites.
- Remote VPN user access to SP AusNet network will be monitored and any malicious attack will be detected and alerted automatically where possible.
- Enhancement of Operational Support Systems (OSS) for improved network management and operation in line with ITIL practices.

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- Network manageability to ensure a high available environment that meets or exceeds the business requirements.
- Consolidate and rationalise the customer and business voice telephony network into a single VoIP solution.
- Introduce unified communications enhancement through fully leveraging new capabilities and (VoIP) protocols where benefits can be clearly identified and
- Implement wireless communications in offices where there is a sizable workforce and or get a considerable number of mobile workers and visitors that will benefit from the flexibility of a wireless network and reduced costs of fixed wiring modifications.

Security Infrastructure

- Align with vendor product roadmaps where appropriate.
- Review and update of Governance procedures that define the policies, standards and operations of network security.
- Provide improved Training and Awareness through user education programs, materials and packages designed to mitigate any gaps and maintain information security.
- Consolidate and develop existing network information security and resilience including the replacement of end of life assets.
- Enhance monitoring and audit capabilities of information security and
- Implementation of new Identity and Access Management to comply with regulatory obligations.

Storage Infrastructure

Use of tiered storage based on purpose, allowing optimised performance characteristics and efficient storage cost. Storage will be tiered in the following manner:

- Service 1 (Tier1)—Performance disks providing high speed, smaller size disks and a higher number of spindles at higher cost.
- Service 2 (Tier2)—Capacity disk providing moderate speed larger disks with fewer spindles at a moderate cost.
- Service 3 (Tier 3)—Archive disk providing low speed, large disks are a low cost.
- Tape—Archive tape to enable removal of backups to an offsite store to comply with legislative requirements.

Disaster Recovery Infrastructure

- Align with vendor product roadmaps where appropriate to maintain system support.
- Upgrade and maintain disaster recovery and business continuity tools and software to ensure the ability to support and maintain business operations in the case of unplanned interruptions, outages or disasters.
- Maintain identification and analysis tools to mitigate and minimise internal and external risks and
- Standardised asset management tools and processes.

Database Refresh Infrastructure

- Align with vendor product roadmaps where appropriate to maintain system support and

- Upgrade [C-I-C] databases to maintain business and operational systems support.

6.7.3 Scope

The scope of this program focuses on mitigation of identified risks to an acceptable level of residual risk, while accommodate organic growth within SP AusNet. The key projects proposed within the ICT Infrastructure and Operations Program is outlined below:

Data Centre Facilities

Refresh of Data Centre infrastructure assets that exceed the ICT asset life principle over the next three years and a programme to increase the current capacity to effectively manage assets over the forthcoming regulatory control period. This includes critical extension of power and cooling capacity; physical floor space extensions and end of life equipment upgrades.

The programme of work includes

- Increase of current data centres capacity to ensure continued successful business operational support. This project is a tactical strategy to ensure capability of the data centre until [C-I-C] where a full data centre replacement is planned.
- Upgrades and replacements of air conditioner units (CRAC), components (VAV, VRF and CH1) and systems and replacements of small air-conditioning units at smaller sites.
- The [C-I-C] SCADA room will be re-built to extend its current capacity. This project will include the installation of new air-conditioning units to maintain the temperature, air distribution and humidity of SCADA assets and as a result will replace existing Split Air-conditioning systems.
- Replacement of Lighting Inverter and supporting Generator to both increase current lighting and electricity capacity and replace assets that have reached the end of asset life cycle.
- Replacement of Fire Alarm system and Fire Panel Replacement in alignment with asset management life cycle and to maintain safe ways of work.
- The Corporate room will undertake a cable clean-up programme which will simultaneously increase the current capacity of the area and supersede existing cabinets.
- Existing AC Boards at sites will be replaced as they have reach end of their asset life cycle.
- Uninterrupted Power Supply (UPS) and air-conditioning replacement at Regional ICT Office to maintain alignment of assets to asset life management cycle.
- Clean-up and Remediation of Communications room at regional sites and
- Replacement of existing Security Systems as current operations have reached end of life.

Desktop and Printers Refresh

This project will complete the replacement of identified hardware assets including workstations, desktops and laptops and printer infrastructure based on the asset management lifecycle.

Desktop SOE Refresh

This project will complete a refresh of the Standard operating environment for identified desktop systems that have reached their end of life, during the regulatory control period. This refresh will also include a refresh of the corresponding desktop operating systems in alignment with efficient asset life cycles.

WinTel Project Delivery Environment

This project will support the business systems design and development activities of SP AusNet, by establishing and making available multiple purpose driven environments that allows for full lifecycle application development testing and deployment. The project also includes enhanced management tools to oversee the new environments.

WinTel Server Hardware Refresh

Refresh of Wintel server hardware that exceed the ICT asset life principle during the forthcoming regulatory control period. This project looks to address current gaps, such as limited flexibility within the current infrastructure architecture to support agile business requirements; and physical tie between business systems and servers.

UNIX Server Hardware Refresh

Refresh of UNIX server hardware that exceed the IT asset life principle during the forthcoming regulatory control period. This project looks to address current gaps, such as limited flexibility within the current infrastructure architecture to support agile business requirements and physical tie between business systems and servers. Completion of the projects will also deliver enhancement management tools for enhanced decision making abilities.

Communication Hardware and Software Refresh

The scope of the Communications Hardware and Software Refresh is to replace communications infrastructure and undertake a refresh program during the course of the regulatory period to identify assets that have exceeded the IT Asset life cycle principles. The project will replace end of life communications equipment's including firewalls, routers, switches and VPN concentrators and upgrade end of life security defected communication equipment software.

ICT Network Management Tools and Support Systems

This project will deliver centralised view of events and performance across all network elements, independent of technology or vendor. The management tools will provide new or refreshed integrated service requests, incident and problem management processes for WinTel, UNIX, Real Time Systems (RTS), Storage and Disaster Recovery technologies. The benefits of this project will improve security and performance monitoring and logging capabilities.

Rationalise Voice Network

This project will focus on rationalising the business and customer voice networks currently in use within SP AusNet. It will aim to simplify the network through the use of standard VoIP protocols, improving ongoing support and simplifying the introduction of unified communications capability. Key tasks include:

- Interconnectivity to PSTN and (private) PABX operational systems;
- Standardisation on SIP VoIP and open (non-proprietary) network protocol(s);
- Integration of Voice mail system; and
- Interoperation with IVR.

Secure Wireless Solution

This project is aiming to implement and upgrade secure wireless solution in SP AusNet offices in alignment with asset management life cycles.

IPV6

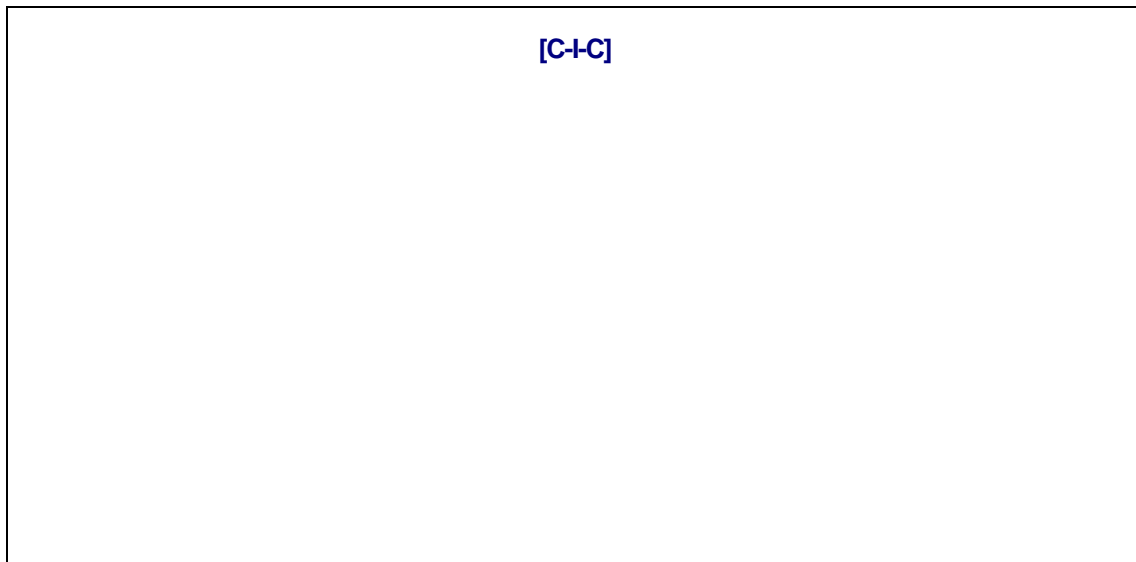
This project will be the development, trialling, implementation and modelling of an IPV6 operating model strategy. Scope will include hardware and DMZ architecture provisioning, development of security solution and application testing and piloting of the solution.

Storage Capacity and Backup

Replace aging asset and implement devices to provide for centralised management of data storage. Figure 15 illustrates the projected storage requirements over the coming regulatory control period. Provision of additional capacity will be provided through the virtualisation strategy.

Production storage has been estimated to grow at a further [C-I-C]% per annum. This is based on actual storage growth of active production databases, mandatory data storage for regulatory and legal requirements and user data growth rates.

Figure 15 – Projected Storage Requirements - BAU



Storage Management Tools

This project looks to replace aging storage infrastructure and undertake a refresh program during forthcoming regulatory control period. Scope covers identifying and replacing assets that exceed the IT asset life principle and identifying appropriate replacement strategies.

Corporate Network Security and Strategy Implementation

Introduction and establishment of various policies, procedures, processes, systems and associated training that will enhance network security monitoring and response. The scope of the program will include replacement of end of life assets, enhanced monitoring and auditing capabilities, new identity and access management procedures, improved network security architecture and enhanced governance and overall network security resilience. This is a major new initiative by SP AusNet designed to increase their security policies, procedures and underlying associated technologies.

Database Refresh

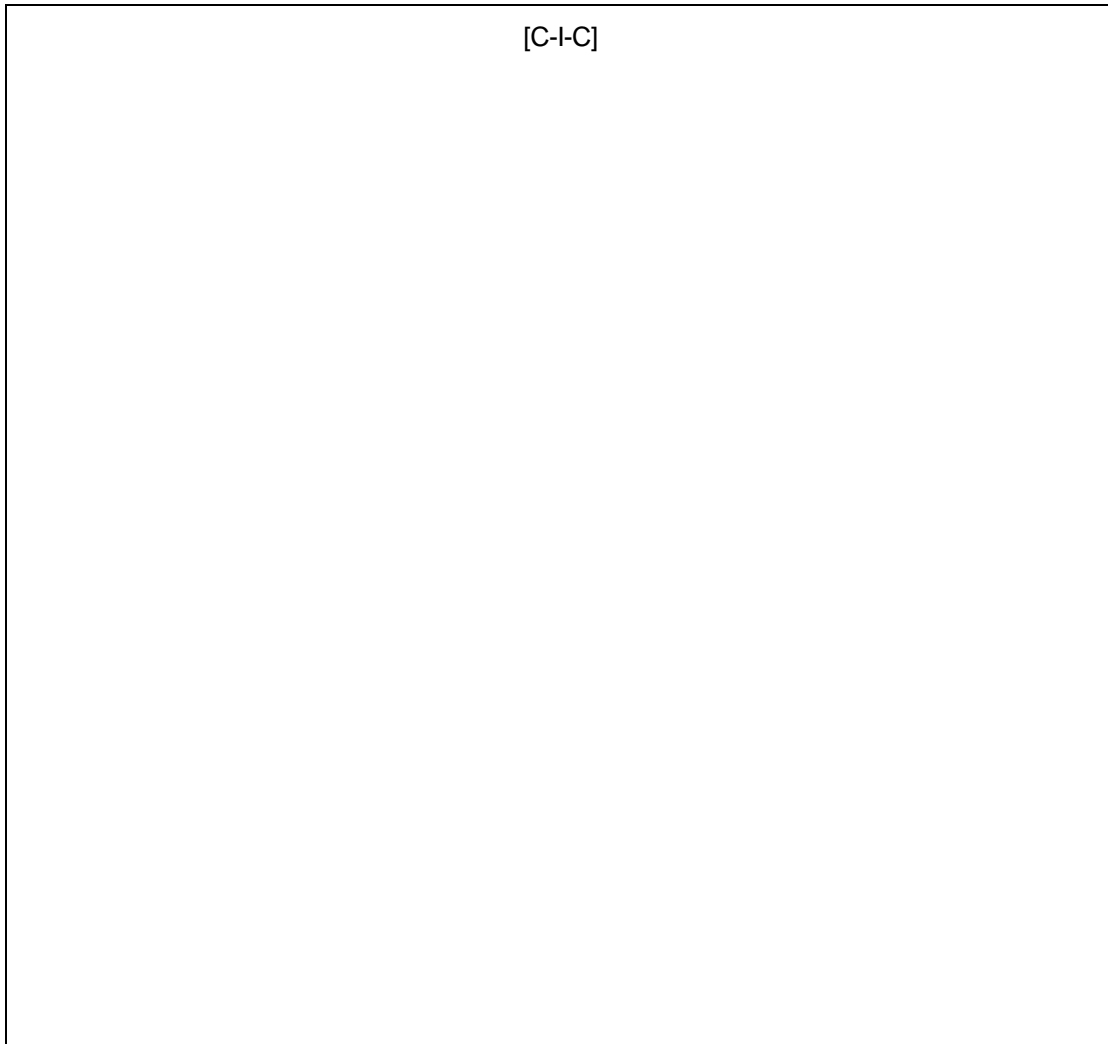
Refresh of [C-I-C] databases that exceed the IT asset life cycle principles during the forthcoming regulatory control period.

Disaster Recovery

The proposed program of Disaster Recovery Infrastructure work is to identify, acquire and implement a suite of tools that allow for the monitoring, management and planning of the Disaster Recovery based infrastructure.

6.7.1 Timeframe

Figure 16 – ICT Infrastructure and Operations Program



6.7.2 Forecast Costs

Table 27– ICT Infrastructure and Operations Capital Expenditure ([C-I-C] \$000)

[C-I-C]

6.7.3 Business Benefits and Implications

The IT Infrastructure and Operations program focuses on the need to upgrade IT Infrastructure and Operations systems before they reach end of life and therefore, SP AusNet considers this expenditure critical to achieving the benefits stated below.

- Enable core objectives of AMS and ensure SP AusNet is able to maintain the quality, reliability and security of supply.
- Support the business operations that ensure the transmission and distribution networks operational reliability.
- Remote VPN user access to SP AusNet network will be monitored and any malicious attack will be detected and alerted automatically where possible.
- Ensure ongoing operations of core business systems and mitigation of operational risks, through automation of processes and procedures wherever possible; and consistent infrastructure components.
- Allow repeatable architecture patterns and develop appropriate designs to enable a high availability environment.
- Enable a robust, high performance and Next Generation ready corporate network.

- RTS systems and supporting IT Infrastructure are brought into line with “High Availability”, “High Performance” and “Secure SCADA Network” principles and fit for purpose.
- Integrate security and IT management tools.
- Class of Service SLAs based on the class of service being delivered and
- Rationalisation and software standardisation.

6.7.4 Option Analysis

More detailed option analysis is provided on a project by project basis in the Appendix. In summary the options considered are:

Do Nothing

The do nothing option is not recommended as it exposes the business to unacceptable risk of failure of systems, by not complying with vendor support agreements and ensures a lack of infrastructure capacity.

Build standalone Transmission Infrastructure

This option is not recommended as it is more efficient to build common ICT infrastructure that supports a number of asset businesses.

Purchase infrastructure as a service

This option may be considered for specific business applications where the risk and security concerns are addressed in a cost effective manner. As an example existing e-mail is provided by an external provider.

Upgrade common systems for SP AusNet’s asset businesses

This option is recommend as it meets the business requirement by providing fit for purpose ICT infrastructure and sharing the cost of development and support of this infrastructure across SP AusNet’s asset management businesses. This approach has been previously accepted by the AER in the 2011 EDPR determination for SP AusNet and is consistent with the 2012 GAAR submission

6.7.5 Risk Assessment

A risk assessment has been conducted, based on the SP AusNet Risk Management Framework, to highlight the risk of not proceeding with the IT Infrastructure and Operations Program. The table below identifies the key risks, and the consequence and likelihood of each risk to determine the risk rating. Refer to [Appendices: Section 8.1 Risk Assessment Framework](#) for details of SP AusNet’s risk rating matrix (I – IV), risk consequence criteria (rating 1 – 5) and likelihood criteria (rating A – E).

Table 28– ICT Infrastructure and Operations Management Risk Assessment

Risk	Description	Consequence Description	Consequence Rating	Likelihood Rating	Risk Rating
Obsolete IT infrastructure assets	A significant proportion of IT infrastructure assets are at / near end of life.	Cost of IT maintenance and support services increase. There is an increasing likelihood that in case of failure, SP AusNet will be unable to gain timely hardware support (spares and engineers) to re-establish the IT asset, which will have an impact on business operations.	3	D	II
Project specific infrastructure may be under utilised	Infrastructure is typically procured on a project basis, which does not allow the effective utilisation of the infrastructure.	Unnecessary costs may be incurred (hardware, software and support) and potential over supply of capacity.	2	C	III
Insufficient Development and Test facilities	Limited capacity for a full Software Development Life Cycle environment.	Reduced testing capability (including limited regression testing) will increase the probability of software errors not being corrected prior to promotion to production.	2	C	III

7 OPERATING EXPENDITURE REQUIREMENTS TO SUPPORT CAPEX PROPOSALS

7.1 Introduction

SP AusNet has identified incremental Operating expenditure requirements (OPEX) which will be required to support the proposed capital program and underpin the planned program delivery. These are set out in “Operating Expenditure Step Changes 2014-16,” Appendix 5D of the Revenue Proposal.

8 APPENDIX

8.1 Risk Assessment Framework

SP AusNet’ Risk Management Framework sets out the overarching philosophy, principles, requirements and responsibilities for a sound approach of risk oversight, management and ongoing internal control assurance required within SP AusNet. This Risk Management Framework has been leveraged for the IT program risk assessment.

For each risk, the consequence rating and likelihood rating is identified to determine the overall risk rating, which highlights the priority of the risk as set out in the Risk Matrix below.

Figure 17 – SP AusNet Risk Matrix

Consequences	5	II	II	I	I	I
	4	III	II	II	I	I
	3	III	III	II	II	I
	2	IV	III	III	II	II
	1	IV	IV	III	III	III
	A	B	C	D	E	
	Likelihood					

APPENDIX 4H - TRANSMISSION RESET REVIEW – ICT STRATEGY

8.2 Attachments and References

The following supporting documentation has been utilised in developing this ICT Strategy.

#	Document Name	Title & Description	Version and Date	Author/Source
1	2011-2015 EDPR IT	Documents and reference material pertaining to the 2011-2015 submission	Issue 9, November 2009	SP AusNet
2	2013 – 2017 GAAR IT	Documents and reference material pertaining to the 2013-2017 submission	Issue 5, March 2012	SP AusNet
3	ICT Strategy FY12- FY16 V1 5	The ICT Strategy & Framework for the period 2012 -2016.	24 August 2011	SP AusNet
4	SP AusNet Enterprise Architecture Framework	Document for design and architecture practice	Issue 5, May 2010	SP AusNet
5	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
6	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
7	TRR Regulatory Control Period Performance FY2008- FY2013	Document and associated reference material that defines the historic TRR Regulatory Control Period programme of work and associated performance	Version 1 - 2013	SP AusNet
8	Transmission Network ICT Project Justification	Document that articulates the high level business case for each Programme defined in the strategy document	Version 1 - 2013	SP AusNet
9	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]
10	[C-I-C]	[C-I-C]	[C-I-C]	[C-I-C]