Asset Management Plan
Operational Technology
Environment
2020-25

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Part of the Energy Queensland Group

Executive Summary

This Asset Management Plan (AMP) covers the management of Energy Queensland Limited's (EQL) Operational Technology Equipment (OTE) asset class, which consists of networking devices that directly support the deployment of critical information technology solutions within a secure network environment. This includes routers, switches, gateways and firewalls, along with software solutions which operate and add additional security layers to this hardware.

EQL's OTE is predominantly located within Data and Control Centres at Townsville, Rockhampton and within Brisbane at Victoria Park and the Brisbane CBD.

The asset class is faced with a number of issues, most of which relate to the challenges associated with needing to keep pace with technological advancements, the increased network capacity requirements of rapidly advancing intelligent devices, and the rising sophistication of cyber-security threats on an expansive network.

Asset management strategies for this asset class consist predominantly of the replacement of equipment at the end of their associated vendor supply and support contracts, as consistent software updates are crucial for the continued effectiveness of the devices. To support this approach, performance monitoring systems and device self-check functions are also used to identify faltering equipment so that they can be replaced before a complete in-service failure.

Document Tracking Details

Ref. No.	Regulatory Proposal Chapter Reference	Document	File Name
NET AMP – 008	7.034	Asset Management Plan - Operational Technology Environment	EGX ERG 7.034 Asset Management Plan - Operational Tech Environment JAN19 PUBLIC

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1   Introduction

Energy Queensland Limited (EQL or "Energy Queensland") employs the use of Operational Technology (OT) networks whose primary function is to directly support the deployment of critical Information Technology solutions within a secure network environment. The equipment within these networks includes telecommunications devices such as routers, switches, gateways and firewalls, along with software solutions which operate and add additional security layers to this hardware. These assets are predominantly located within Data and Control Centres across the Northern, Southern and South Eastern Regions.

Energy Queensland Limited (EQL) was formed 1 July 2016 and holds Distribution Licences for the following regions:

- South East Region (Legacy organisation: Energex Limited); and
- Northern and Southern Regions (Legacy organisation: Ergon Energy Corporation Limited).

There are variations between the EQL regions as a result of geographic influences, market operation influences and legacy organisation management practices. This Asset Management Plan (AMP) reflects the current practices and strategies for all assets managed by EQL, recognising the differences that have arisen due to legacy organisation management. These variations are expected to diminish over time with integration of asset management practices.

1.1   Purpose

The purpose of this document is to demonstrate the responsible and sustainable management of Operational Technology Equipment on the EQL network. The objectives of this plan are to:

1. Deliver customer outcomes to the required level of service.
2. Demonstrate alignment of asset management practices with EQL's Strategic Asset Management Plan and business objectives.
3. Demonstrate compliance to regulatory requirements.
4. Manage the risk associated with operating the assets over their lifespan.
5. Optimise the value EQL derives from the asset class.

This asset plan will be updated periodically to ensure it remains current and relevant to the organisation and its strategic objectives. Full revision of the plan will be completed every five years as a minimum.

This Asset Management Plan is guided by the following legislation, regulations, rules and codes:

- *National Electricity Rules (NER)*
- *Electricity Act 1994 (Qld)*
- *Electrical Safety Act 2002(Qld)*
- *Electrical Safety Regulation 2013 (ESR) (Qld)*
- *Electrical Safety Code of Practice 2013 – Works (Qld) (ESCOP)*
- *Work Health & Safety Act 2011 (Qld)*
- *Work Health & Safety Regulation 2011 (Qld)*
- Ergon Energy Corporation Limited Distribution Authority No D01/99
- Energex Limited Distribution Authority No. D07/98.

This asset management plan forms part of EQL's strategic asset management documentation as shown in Figure 1. It is part of a suite of asset management plans, which collectively describe EQL's approach to the lifecycle management of the various assets which make up the network used to deliver electricity to its customers. **Error! Reference source not found.** contains references to other documents relevant to the management of the asset class covered in this plan.
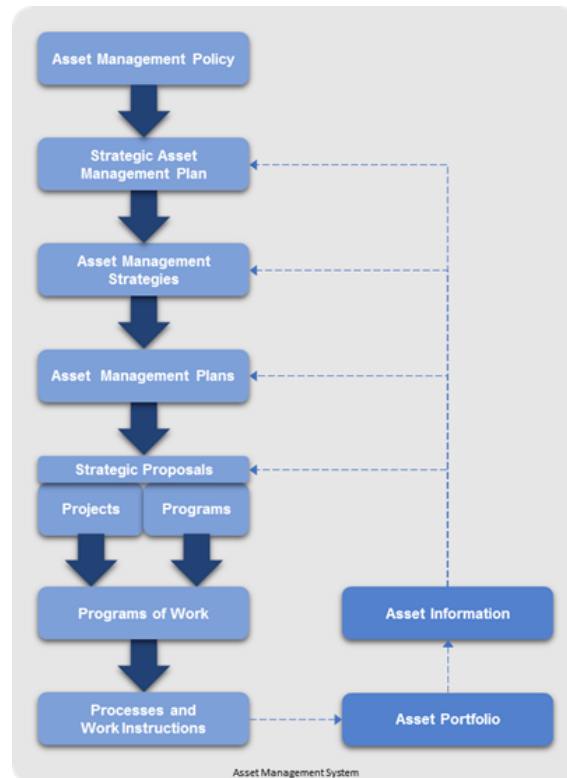
Figure 1: EQL Document Hierarchy

1.2   Scope

The OTE networks are separate from the Corporate IT networks, however, they do interconnect. These networks span across two data centres in Victoria Park and Wharf Street within the South East Region, and a larger area controlled by two Control Centres in Townsville and Rockhampton for the Northern and Southern Regions. Assets in these networks include switches, routers, firewalls, application managers and servers.

The scope of this asset plan considers network elements within these Data and Control Centres - excluding those captured within the broader Telecommunications Equipment document – which consists of the following:

- Switches,
- Servers,
- Routers,
- Firewalls,
- Gateways,
- Appliance Delivery Controllers, and
- VoIP phones.

This document does not consider the following equipment:-

- PDH Network
- Microwave Radios
- Batteries and Chargers
- Solar Power Systems
- Diesel Generators
- Substation IP network, or
- IP networking equipment associated with broader Telecommunications Equipment

These assets are addressed in other asset plan documents. Energex's intent is ongoing development of a suite of asset plans which provide a coordinated and optimised approach to the lifecycle management of all assets within Energex's Regulated Asset Base.

1.3   Total Current Replacement Cost

The assets covered by this AMP are of relatively high volume and low cost and are typically managed on a population basis using their supply and obsolescence status. Depending on the potential risk for in-service failure and the impacts thereof, some assets may be removed from service proactively – other assets are managed with a Run-to-Failure strategy.

Based upon asset quantities and replacement costs, EQL's Operational Technology Equipment has a replacement value of the order of $18.03 Million (Northern and Southern regions: $4.37 Million, South East region: $13.66 million). This valuation is the gross replacement cost of the assets, based on the cost of replacement of modern equivalents, without asset optimisation or age assigned depreciation. Figure 2 provides an indication of the relative financial value of EQL Operational Technology Equipment compared to other asset classes.

1.4   Asset Function and Strategic Alignment

The function of the OTE is to facilitate critical Information Technology services.

The table below details how the OTE contributes to the corporate strategic asset management objectives.

Asset Management Objectives	Relationship of Asset to Asset Management Objectives
Ensure network safety for staff, contractors and the community	Diligent and consistent maintenance and operations support asset performance and hence safety for all stakeholders
Meet customer and stakeholder expectations	Continued asset serviceability supports network reliability and promotes delivery of a standard quality electrical energy service.
Manage risk, performance standards and asset investment to deliver balanced commercial outcomes	Failure of this asset can result in increased public safety risk and disruption of the electricity network. Asset longevity assists in minimising capital and operational expenditure.

Asset Management Objectives	Relationship of Asset to Asset Management Objectives
Develop Asset Management capability and align practices to the global ISO55000 standard	This AMP is consistent with ISO55000 objectives and drives asset management capability by promoting a continuous improvement environment
Modernise the network and facilitate access to innovative energy technologies	This AMP promotes the replacement of assets at end of economic life as necessary to suit modern standards and requirements

Table 1: Asset Function and Strategic Alignment

1.5 Owners and stakeholders

Role	Responsible Party
Asset Owner	Chief Financial Officer
Asset Operations Delivery	EGM Distribution
Asset Manager	EGM Asset Safety & Performance

Table 2: Stakeholders

2 Asset Class Information

The following sections provide summary of the key functions and attributes of the assets covered in this management plan.

2.1 Asset Description

EQL's Operational Technology networks consist of a variety of networking assets from multiple vendors. These assets have been grouped together based on their high-level functionality in order to aid modelling.

2.1.1 Switches

Switches are telecommunications equipment that connects devices together over networks. Switches provide data forwarding functions exclusively using packet switching. They are mainly used as access points to the various distinct networks in the OTE.

2.1.2 Servers

Servers are a type of computing equipment that provides functions or services to other devices. Typical servers are utilised for data sharing or for performing computations.

2.1.3 Routers

Routers similar to switches provide packet forwarding functions but do so based on internal routing policies, thus allowing inter-network packet transfer. Routers are mainly used as points of interconnect between different networks within the OTE.

2.1.4 Firewalls

Network firewalls are security devices that restrict the flow of traffic within the OTE based on a defined set of security rules. They filter traffic through multiple networks and provide security from unauthorized intrusion into the OTE.

2.1.5 Gateways

Gateways are devices that connect two networks with differing protocols and provide bidirectional protocol translation in order to facilitate data transfer.

The ISDN and ATA Gateways are the backbones of South East Region's Operation Telephony Network (OTN). These gateways support the day to day operation of the business and were recently upgraded to IP utilising the South East Region's current generation telecommunications network.

2.1.6 Application Delivery Controllers

Application Delivery Controllers (ADCs) are computer networking devices used within data centres to provide acceleration of common tasks, being able to perform tasks that would otherwise be undertaken by servers in order to reduce demand on general computing resources

2.1.7 Voice over IP (VoIP) Phones

Voice over IP (VoIP) is a technology used to transmit and receive telephone calls over an IP based network rather than the traditional public switched telephone network (PSTN).

2.2 Asset Quantity and Physical Distribution

The table below lists the asset quantity totals for the South East and Northern and Southern Regions' Operational Technology Equipment.

Asset Type	South East	Northern & Southern	Total
Switches	67	7	74
Servers / Appliance Delivery Controllers	21	28	49
Routers	25	-	25
Firewalls	53	10	63
Gateways	6	-	6
VoIP Phones	235	-	235
TOTAL	407	45	452

Table 3: Asset Quantity

2.3 Asset Age Distribution

Within the EQL OTE, the operational lifespans of equipment are fundamentally tied with the duration of the vendor support and supply contracts that the equipment is procured with. Different equipment types are generally deployed together at the commencement of a given contract and typically will not require targeted replacement relying on age-based prediction. For these reasons, the Asset Age Distribution in Figure 2 below is based on manufacture date rather than installation date.
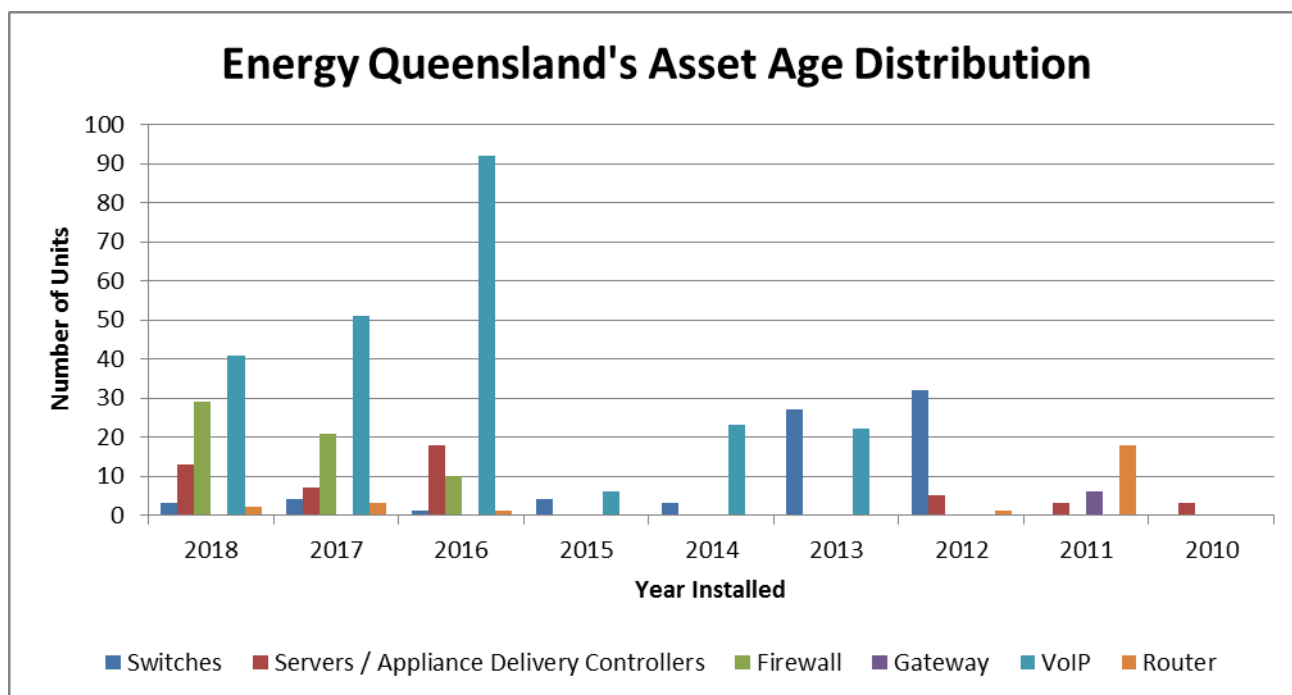
Figure 2: EQL OTE Asset Age Distribution

2.4   Population Trends

As can be seen in the asset age distribution, EQL's OTE asset fleet is of relatively low age when compared to other asset classes. The asset age distribution is expected to remain low as the replacement strategy for this asset class is fundamentally influenced by vendor supply and support contracts.

2.5   Asset Life Limiting Factors

There are many drivers for the replacement of OTE equipment. While the physical condition of an asset is typically the primary driver for replacement, due to increasing the chance of in-service failure, other drivers exist that are associated with regulatory, legislative and economic factors. These non-physical factors include vendor driven end of sale and end of support drivers and organisational efficiency targets, among others.

Below is a list of identified asset life limiting factors for the OTE. There is significant overlap of these replacement drivers, owing to the common operating environment that the assets exist within. Some assets have unique life limiting factors due to their specific function, componentry or external influences. The influence and impact of each factor are briefly discussed.

Factor	Asset	Influence	Impact
Age	All	Under typical conditions, mechanical and electronic components experience degradation over time which leads to reduced functionality or failure.	Mechanical or electronic components degrading over time (e.g. Capacitors and semiconductors).
Support Contract Expiration	All	Asset procurement and support contracts with vendors expire for specific equipment.	Procurement and support ceases for a given asset, resulting in an inability to continue sourcing or maintaining the asset, and thus leading to product obsolescence.

Factor	Asset	Influence	Impact
Environmental / Atmospheric Corrosion and Damage	All	Exposure to an uncontrolled atmosphere/environment or corrosive substance degrades the asset over time.	Asset degradation due to weathering and corrosive pollutants, leading to both open and short circuits in electronic equipment and resulting in reduced life span.
Operational Damage	All	Damage caused by the operation, such as vibration or mechanical wear, causing material stress and deterioration.	Degradation of materials, reducing the serviceability of the asset.

Table 4: OTE Equipment Life Limiting Factors

3 Current and Desired Levels of Service

EQL has an asset management objective to ensure a safe and reliable network for the community. Programs associated with these asset classes, therefore, aim to reduce in service failures to levels which deliver a safety risk level which is considered As Low As Reasonably Practicable (ALARP) and as a minimum maintains current performance standards. These performance standards are not expected to change in the near future for the OTE; however, the associated network will expand as necessary to accommodate for arising needs.

3.1 Desired Levels of Service

This asset class will be managed, in a manner consistent with corporate asset management policies, to achieve all legislated obligations and any specifically defined corporate key performance indicators and to support all associated key result areas as reported in the Statement of Corporate Intent (SCI).

Safety risks associated with this asset class will be eliminated SFAIRP, and if not able to be eliminated, mitigated SFAIRP. All other risks associated with this asset class will be managed ALARP.

This asset class consists of a functionally alike population differing in age, vendor, technology, material, construction design, technical performance, purchase price and maintenance requirements. The population will be managed consistently based upon generic performance outcomes, with an implicit aim to achieve the intended and optimised life cycle costs contemplated for the asset class and application.

All inspection and maintenance activities will be performed in a manner consistent with manufacturers' advice, good engineering operating practice, and historical performance, with the intent to achieve the longest practical asset life overall.

Life extension techniques will be applied where practical, consistent with overall legislative, risk, reliability and financial expectations. Problematic assets such as those with very high maintenance or high safety risks will be considered for early retirement.

Assets of this class typically become obsolete before end of life. Once the asset type is obsolete, assets will be managed, replaced, and reallocated as appropriate to achieve appropriate risk management and optimum asset class longevity and performance.

3.2 Legislative Requirements

Regulatory performance outcomes for this asset include compliance with all legislative and regulatory standards, including the Queensland Electrical Safety Act 2002, the Queensland Electrical Safety Regulation 2013 (ESR), and the Queensland Electrical Safety Codes of Practice.

The Queensland Electrical Safety Act 2002 s29 imposes a specific Duty of Care for EQL, which is a prescribed Electrical Entity under that Act:

1. An electricity entity has a duty to ensure that it works—

    a. are electrically safe; and

    b. are operated in a way that is electrically safe.

2. Without limiting subsection (1), the duty includes the requirement that the electricity entities inspect, test and maintain the works.

3.3 Performance Requirements

EQL does not have a specific business target relating to OTE performance. The required performance outcomes related to the Asset Management Objectives identified in Table 1 of this report, in particular:

- Safety: personnel and the public
- Network Performance: Achieving an acceptable level of network reliability
- Legislative Compliance Requirements

3.4 Current Levels of Service

The current state of the EQL OTE assets is sufficient to facilitate the transfer of data and information across the Northern, Southern and South-East Queensland regions. Whilst there are no specific performance targets or legislative requirements that would dictate the immediate further development of the OTE network, the OTE must be capable of meeting the needs of the organisation at all times.

Asset failures can occur where the programs that are in place to manage the assets do not identify and rectify an issue prior to the equipment failing in service. Failures typically result in or expose the organisation to risk and represent the point at which asset related risk changes from being proactively managed to retrospectively mitigate. The duration of exposure to risk can be minimised by having strategies in place to quickly and efficiently replace failed equipment, such as with the use of strategic spares.

4 Asset related corporate risk

As detailed in Section 3.2, Queensland legislation details that EQL has a Duty to ensure its works are electrically safe. This safety Duty requires that EQL take action SFAIRP to eliminate safety related risks, and where it is not possible to eliminate these risks, to mitigate them SFAIRP[1].

Figure 3 provides a threat-barrier diagram for EQL OTE assets. Many threats are unable to be controlled (e.g. cyberattacks), although EQL undertakes a number of actions to mitigate them SFAIRP. Failure of an OTE assets risks public and staff safety in several ways, most notably:

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[1] Queensland Electrical Safety Act 2002 s10 and s29

- Loss of comms assisted feeder protection leading to delayed fault tripping
- Loss of real-time SCADA data and control
- Sever impairment of the Energex Network Operations Control Centre

EQL's safety Duty results in most inspection, maintenance, refurbishment and replacement works and expenditure related to OTE assets being focused on preventing and mitigating asset failures.

The asset performance standards described in Section 3 detail EQLs achievements to date in respect of this safety Duty. The following sections detail the ongoing asset management journey necessary to continue to achieve this performance in the future.

Threat/barrier diagram: Operational Technology Equipment Failure
Note: Thickness of barrier describes effectiveness of control measure.
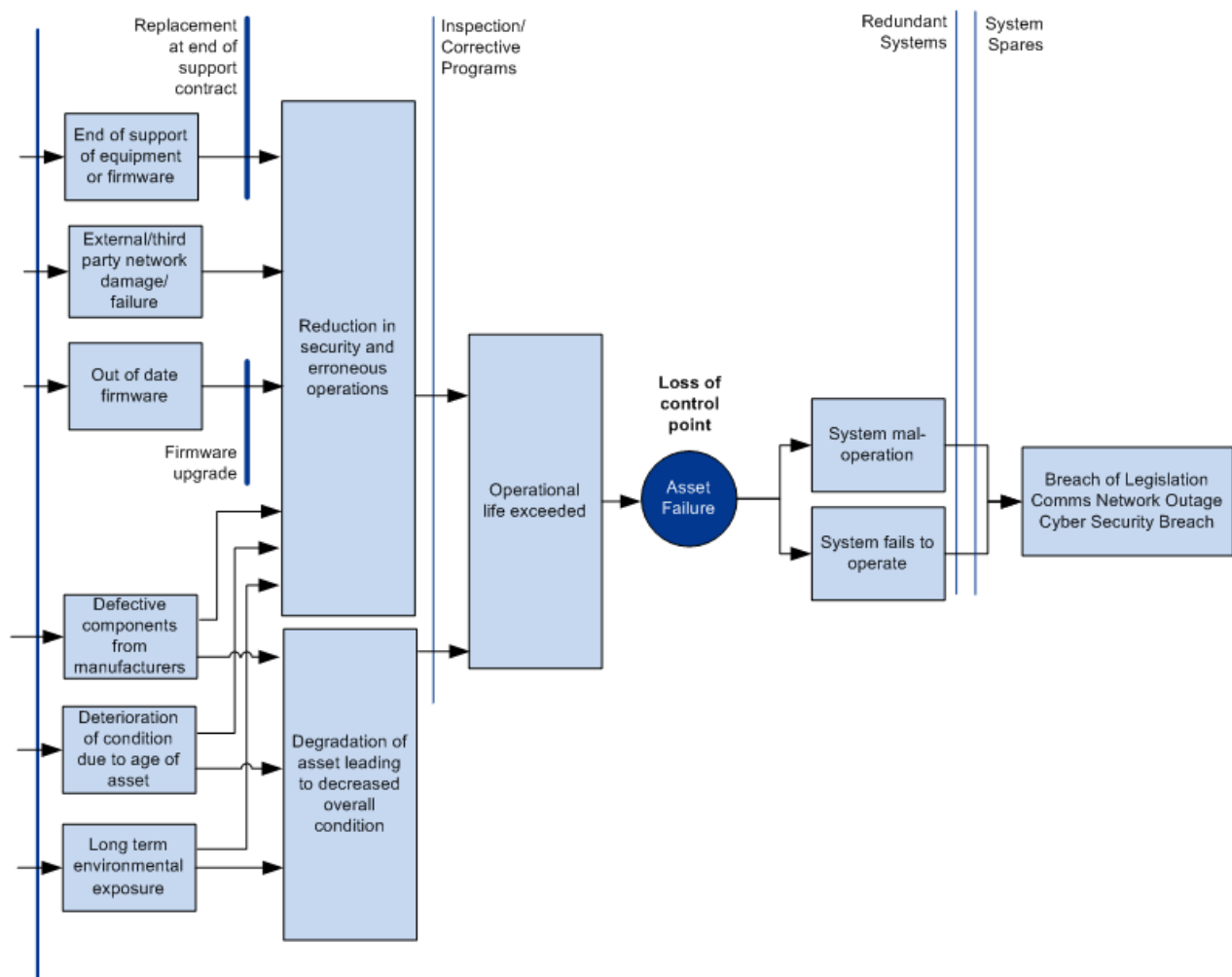

Figure 3. OTE Threat / Barrier Diagram

5 Health, Safety & Environment

There are relatively few health, safety or environmental hazards associated with OTE. The following hazards have been identified and are being actively managed.

- Risk of shock from Extra Low Voltage (ELV) power systems
- Use of equipment not compliant with RoHS guidelines.

6 Current Issues

There are a number of current issues associated with OTE equipment that have influenced EQL's asset management strategies. Action items have been raised in the following sections where relevant, detailing the specific actions that EQL will undertake as part of program delivery of the Asset Management Plan.

6.1 Short OTE Equipment Lifecycles

Many OTE devices are procured with vendor supply and support contracts that define the time period that further purchases and operational support of these devices will persist. These contracts are often far shorter than what could be achieved with a run-to-failure approach. As these factors significantly impact EQL's asset management strategies, assets will often be considered obsolescent at the expiration of these contracts. Maintaining a fleet of obsolescent assets on the network carries significantly increased risks - especially when strategic spares holdings dwindle. To reduce these risks these assets are typically targeted for replacement prior to reaching obsolescence. The removal of obsolescent devices from the network is generally complex given the quantities and service integration, so the process is often staggered into consecutive stages. The first devices pulled from service can also be held as strategic spares to minimise in-service failure risks until the further removals are completed.

Action 6.1-1: Give particular consideration to OTE equipment lifecycles to ensure that products likely to be declared end of support by vendors are not selected for introduction into the OTE.

Action 6.1-2: Investigate opportunities to purchase extended support contracts for OTE equipment

6.2 Sub-Optimal OTE Planning

Within the Northern and Southern Regions, EQL currently deploys OTE equipment that focuses on a specific business group or function. Although this provides value to an individual group, this limits the potential for equipment re-use or even sharing with other users. This ad-hoc model around operational technology has a number of unintended consequences such as duplication of systems and data, increased capital spend, and sub-optimal technology support.

Action 6.2-1: Continue efforts to rationalise OTE equipment and services to provide a uniform environment for all business users.

6.3 NBN Service Cutovers

As the National Broadband Network (NBN) continues its development within the state, many sites are being required to swap any existing third party networking services – such as Asymmetric Digital

Subscriber Lines (ADSL) - to the new NBN services. This requires the replacement of existing equipment and replacement with new NBN compatible equipment.

Action 6.3-1: Continue the conversion of ADSL and PSTN services onto new NBN services

6.4　Incomplete Historical Failure Data

Energy Queensland lacks a formal process or database specifically for capturing the complete failure data of OTE assets, outside of the JIRA platform which tracks issues within the OTE and telecommunications space. Whilst failure data can be extracted from JIRA, the exact assets affected and the distinction between faults or non-critical issues compared with a complete failure is not well defined. The failure modelling of OTE assets would greatly benefit from a purpose-made failure tracking process and database.

Action 6.4-1: Develop a system for OTE asset failure reporting as distinct from the JIRA issues tracking solution.

7　Emerging Issues

Emerging issues represent anticipated influences on asset management strategies at some time in the near future. While these issues may not be dealt with presently, they shape the way that strategies are formed going forward.

7.1　Increasing Cybersecurity Awareness

There are limited authentication and control of the users and systems and their data in the current operating environment within the Northern and Southern regions. This does not meet best practice for cyber security and information management. Currently, each group has to manage both infrastructures such as servers and data support including backups and governance, in addition to executing their primary role as data users. Although best efforts have been made to provide these services, the majority of services do not meet minimum recommended standards.

Action 7.1-1: Continue efforts to consolidate and coordinate functions and services within the Northern/Southern OTE

8 Improvements and Innovation

EQL is committed to undertaking a number of projects that seek to improve the current OTE asset base and continue to bring the class in line with modern standards and industry best practice. A number of these projects are discussed in the following sections.

8.1 Security Improvements

Effort is underway to improve the security of the OTE asset class including the cyber and physical aspects of the existing security arrangements. Issues that are identified in yearly audits are to be remediated, along with further improvements in order to meet current industry standards. With an increased focus on cyber-security within EQL, these improvements seek to bring the OTE security up to accepted best practice.

Action 8.1-1: Continue to conduct regular security audits on the OTE and implement audit recommendations

8.2 Environment Enhancements

Historically, the OTE assets within data centres and control rooms have been procured and installed through projects relating to specific technology types. This means that when enhancement or productivity opportunities arise that offer improvements to general OTE operation, these opportunities are often unable to be funded as they are not being captured in the specific technology projects. An OTE Enhancement project is currently underway which seeks to identify opportunities and provide funding to enhancement opportunities, independent of any specific technology installation projects. The OTE Enhancement project's particular interest is in technologies that can support an intelligent network, as well as provide increased security.

Action 8.2-1: Continue to identify opportunities to bundle asset replacement and thereby enhance the OTE through projects such as the OTE Enhancement project.

9 Lifecycle strategies

The following sections detail the lifecycle strategies that guide the asset management practices of EQL.

9.1 Philosophy of approach

The primary driver for the asset management of OTE equipment is the tie between the support contracts that the assets are procured with and the risks associated with maintaining an obsolescent asset fleet. Due to the critical nature of OTE assets and the requirement for hardware and software support, once the vendor support agreements expire, EQL begins the proactive replacement of the obsolescent equipment.

As an additional measure of reliability, OTE assets are continuously monitored to ensure they are working as expected.

9.2   Supporting Data Requirements

There are no specific supporting data requirements to manage OTE assets due to the support contract driven replacement of philosophy adopted by EQL. Similarly for OTE assets utilising fail-fix asset management philosophies supporting data is also not required.

9.3   Acquisition and procurement

OTE assets are procured via periodic supply contracts which provide a timeframe that a given vendor is able to produce each asset, often containing hardware/software support agreements for the same time period. Given that the availability of asset support and the acquisition of spares are critical components of EQL's asset management strategies, these time-limited supply contracts are a major driver for asset replacement. Whilst it becomes increasingly difficult to obtain spares of a given asset after the supply contracts have concluded, there is a very low lead time between the need for equipment and its supply during the contract period. Therefore unexpected failures in this time are often dealt with on a fail-fix basis.

9.4   Operation and Maintenance

OTE assets operate autonomously under normal conditions. Given that these assets have intelligent capabilities, human intervention is only required when abnormal conditions arise and the equipment generates an alarm through the associated monitoring system This also describes the typical extent of maintenance activities associated with OTE, as preventative maintenance for these assets is both unnecessary and largely infeasible.

9.4.1 Preventive maintenance

Software and firmware maintenance is performed regularly, as the currency of OTE asset software and firmware is integral to the safe and reliable performance of these devices. Continuous software and firmware updates for OTE assets is required to ensure new software bugs and vulnerabilities can be patched as soon as possible to maintain adequate security and performance of the network. New software releases are tested in a lab environment prior to deployment to identify potential new bugs that may impact the network.

EQL rarely performs physical preventive maintenance for OTE equipment as it is largely infeasible/unnecessary. The kinds of defects that would require preventative physical maintenance for OTE assets are typically prevented with operating environment control, such as proper air conditioning and filtering. More severe defects, in this case, would likely be indicative of a larger issue, like manufacturing faults, which are dealt with under vendor warranties.

9.4.2 Corrective maintenance

Occasionally there will be issues identified with OTE assets via their automatic alert functions, aggregated in support systems such as the 'Service Aware Manager' used within the South East region. These alarms are typically able to be resolved with simple human intervention in the form of equipment reboots or administrative action through online management systems. In cases of more severe defects being identified, corrective maintenance is only done if feasible with regards to finances and personnel effort, as the assets associated with the OTE are often easily replaceable and relatively affordable, supply contracts permitting.

9.4.3 Spares

Strategic spares are a critical component of the Energex asset maintenance strategies, as their availability significantly cuts down on asset replacement time and by extension network downtime. Spares may exist from additional assets being procured from vendors or from refurbished equipment recovered from decommissioning projects, along with being proactively removed from service specifically for the intention of being sent to spares inventory. This proactive removal of assets is often performed when a low stock of spares has been identified and determined to put the specific asset type at unacceptable risk levels.

9.5   Refurbishment and replacement

OTE equipment is relatively cheap to procure and the lead-times associated with these newly purchased assets is relatively low, compared to other asset classes. With the addition of significant repairs done to OTE assets requiring specialised knowledge and tools, a replace on fail or "Fail/Fix" system is typically utilised.

9.5.1 Refurbishment

Refurbishment is when an asset is removed from service and replaced, with the intention to repair and then re-use it once again. Energex rarely refurbishes OTE equipment, as it is more cost effective to simply replace the asset before or when it fails. Any vendor refurbishment of assets is managed as a replacement activity by EQL. Refurbishment by Energex also carries added risks, as vendor support is only provided for vendor refurbished assets.

9.5.2 Replacement

Asset replacements occur when equipment has been selectively identified for proactive removal as per the asset management strategies governing that asset or the equipment has failed in service and cannot be repaired. In the case of OTE assets, this is typically when the procurement and support contracts expire, leading to a replacement of obsolescent devices. Strategic spares will be utilised for all replacements and replenished either through the purchase of new spares from the vendor or through proactive removal from the current network.

9.6   Disposal

OTE equipment does not require any particular handling care during disposal. Equipment is disposed of following both cybersecurity and electronic waste guidelines.

10 Program Requirements and Delivery

The programs of maintenance, refurbishment and replacement as required by the strategies contained in this AMP are documented in the Network Program Documents and are reflected in EQL's corporate management systems. Programs are typically coordinated to address the requirements of multiple asset classes at a higher level such as a substation site or feeder to provide delivery efficiency and reduce travel costs and overheads. The Network Program Documents provide a description of works included in the respective programs as well as the forecast units.

Program budgets are approved in accordance with the Corporate Financial Policy. The physical and financial performance of programs is monitored and reported on a monthly basis to manage variations in delivery and resulting network risk.

11 Summary of Actions

The following provides a summary of the specific actions noted throughout this AMP for ease of reference.

Action 9.6-1: Give particular consideration to OTE equipment lifecycles to ensure that products likely to be declared end of support by vendors are not selected for introduction into the OTE.

Action 9.6-2: Investigate opportunities to purchase extended support contracts for OTE equipment

Action 9.6-3: Continue efforts to rationalise OTE equipment and services to provide a uniform environment for all business users

Action 9.6-4: Continue the conversion of ADSL and PSTN services onto new NBN services

Action 9.6-5: Develop a system for OTE asset failure reporting as distinct from the JIRA issues tracking solution.

Action 9.6-6: Continue efforts to consolidate and coordinate functions and services within the Northern/Southern OTE

Action 9.6-7: Continue to conduct regular security audits on the OTE and implement audit recommendations

Action 9.6-8: Continue to identify opportunities to bundle asset replacement and thereby enhance the OTE through projects such as the OTE Enhancement project

Appendix 1.   References

It takes several years to integrate all standards and documents after a merger between two large corporations. This table details all documents authorised/approved for use in either legacy organisation, and therefore authorised/approved for use by EQL, that supports this Management Plan.

Legacy organisation	Document Number	Title	Type
	AS/NZS 3000:2018	Electrical Installations "Wiring Rules"	AS/NZS
Ergon	SGNW0018	Operational Technology Architecture and Environment Strategy 2020	Strategy
Energex		OT Environment – Refurbishment 2015/16 – 2019/20	Business Case
Energex		OT Environment – Establishment and Migrations Program	Business Case
	EA1994139	QLD Electricity Act 1994	
	NER v114	National Electricity Rules v114	
	ESA2002169	QLD Electrical Safety Act 2002	
	ESR2013260	QLD Electrical Safety Regulation 2013	
		QLD Electrical Safety Code of Practice 2013	
	WHASA2011218	QLD Work Health & Safety Act 2011	
	WHASR2011309	QLD Work Health & Safety Regulation 2011	

Appendix 2. Definitions

Term	Definition
Distribution	LV and up to 22kV network, all SWER networks
Extra Low Voltage	Takes the same meaning as defined in AS/NZS 3000:2018
Fail/Fix	A Fail/Fix asset management strategy involves the repair or replacement of an asset immediately upon failure of the asset.
Forced maintenance	This type of maintenance involves urgent, unplanned repair, replacement, or restoration work that is carried out as quickly as possible after the occurrence of an unexpected event or failure; in order to bring the network to at least its minimum acceptable and safe operating condition. Although unplanned, an annual estimate is provided for the PoW against the appropriate category and resource type.
Sub transmission	33kV and 66kV networks
Transmission	Above 66kV networks

Appendix 3. Acronyms and Abbreviations

The following abbreviations and acronyms may appear in this asset management plan.

Abbreviation or acronym	Definition
ADC	Application Delivery Controller
ADSL	Asymmetric Digital Subscriber Line
ALARP	As Low As Reasonably Practicable
AMP	Asset Management Plan
AS/NZS	Australian Standard / New Zealand Standard
ATA	Analog Telephone Adapter
AUGEX	Augmentation Expenditure
CBRM	Condition Based Risk Management
ELV	Extra Low Voltage
EQL	Energy Queensland Limited
ESCOP	Electricity Safety Code of Practice
ESR	Queensland Electrical Safety Regulation (2013)
IoT	Internet of Things
IP	Internet Protocol
ISCA	In-Service Condition Assessment
ISDN	Integrated Services Digital Network
LV	Low Voltage
NBN	National Broadband Network
NER	National Electricity Rules
OT	Operational Technology
OTN	Operational Telephony Network
PSTN	Public Switched Telephone Network
QLD	Queensland
REPEX	Renewal Expenditure
RIN	Regulatory Information Notice
RoHS	Restriction of Hazardous Substances
SCI	Statement of Corporate Intent
SFAIRP	So Far As Is Reasonably Practicable
VoIP	Voice over Internet Protocol