PWC Asset Class Management Plan

Power Transformers

January 2023

PowerWater

Version control

This document has been approved in accordance with the Delegation of Authority (DoA) as evidenced by signatures and dates contained herein.

Rev	Date	Description	Author	Endorsed	Approved
1	17/01/2023	Revised and moved to new template	M Van Doornik Asset Engineer	B Kaye Manager Asset Strategy and Risk	S Eassie Senior Manager Asset Management

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1. Introduction

ISO 55000 defines an Asset Management Plan (AMP) as documented information that specifies the activities, resources and timescales required for an individual asset, or a grouping of assets, to achieve the organisation's asset management objectives.

1.1 Purpose and context

The purpose of this Asset Management Plan (AMP) is aligned to the requirements specified in ISO 55000. This AMP:

- Defines what is included and exclude from its scope
- Describes the asset class being managed
- Defines how this asset class will contribute to achieving the Asset Management Objectives that are defined in the Strategic Asset Management Plan (SAMP)
- Identifies the challenges we are expecting to encounter over the AMP planning horizon
- Sets out the projects and programs that we will invest in to ensure we achieve the AM Objectives and address the identified challenges
- Quantifies the risk posed by this asset class with and without the proposed projects and programs of work

By reviewing this AMP and reassessing asset performance on an annual basis, we will ensure that any emerging issues are identified and can be addressed prior to becoming a significant risk. The outcome of the annual review will support the annual update of the Statement of Corporate Intent (SCI) and provide an input into the annual Transmission and Distribution Annual Planning Report (TDAPR).

1.2 Scope of the AMP

The AMP covers the Power Transformers asset class which are typically located within zone substations. The scope is limited to the regulated assets that are regulated by the Australian Energy Regulator (AER). It covers capital expenditure (replacement and growth) and operational expenditure (inspection and maintenance).

The AMP excludes:

- Non-regulated assets that are managed by Power and Water, noting no power transformers are operated outside of the regulated networks at present
- Distribution transformer and instrument transformer assets

This AMP will avoid, as far as practicable, repeating information that is contained in other documentation. Instead, it will provide a reference to the relevant document or data source.

1.3 Timeframe the AMP

This AMP is focused on a 10-year planning horizon, with respect to expenditure forecasts, that aligns with the requirements of the SCI and TDAPR. However, when assessing future challenges and emerging trends we may consider longer timeframes and will comment by exception if any longer-term issues are expected to arise.

1.4 Asset Management Framework

Power and Water has a Strategic Asset Management System[1] which sets out the framework for asset management and the hierarchy of documents. This provides line of sight from the corporate objectives through to the asset objectives and how management of this asset class will contribute to achieving those objectives. Figure 1 highlights how the AMP fits in with the overall asset management system.

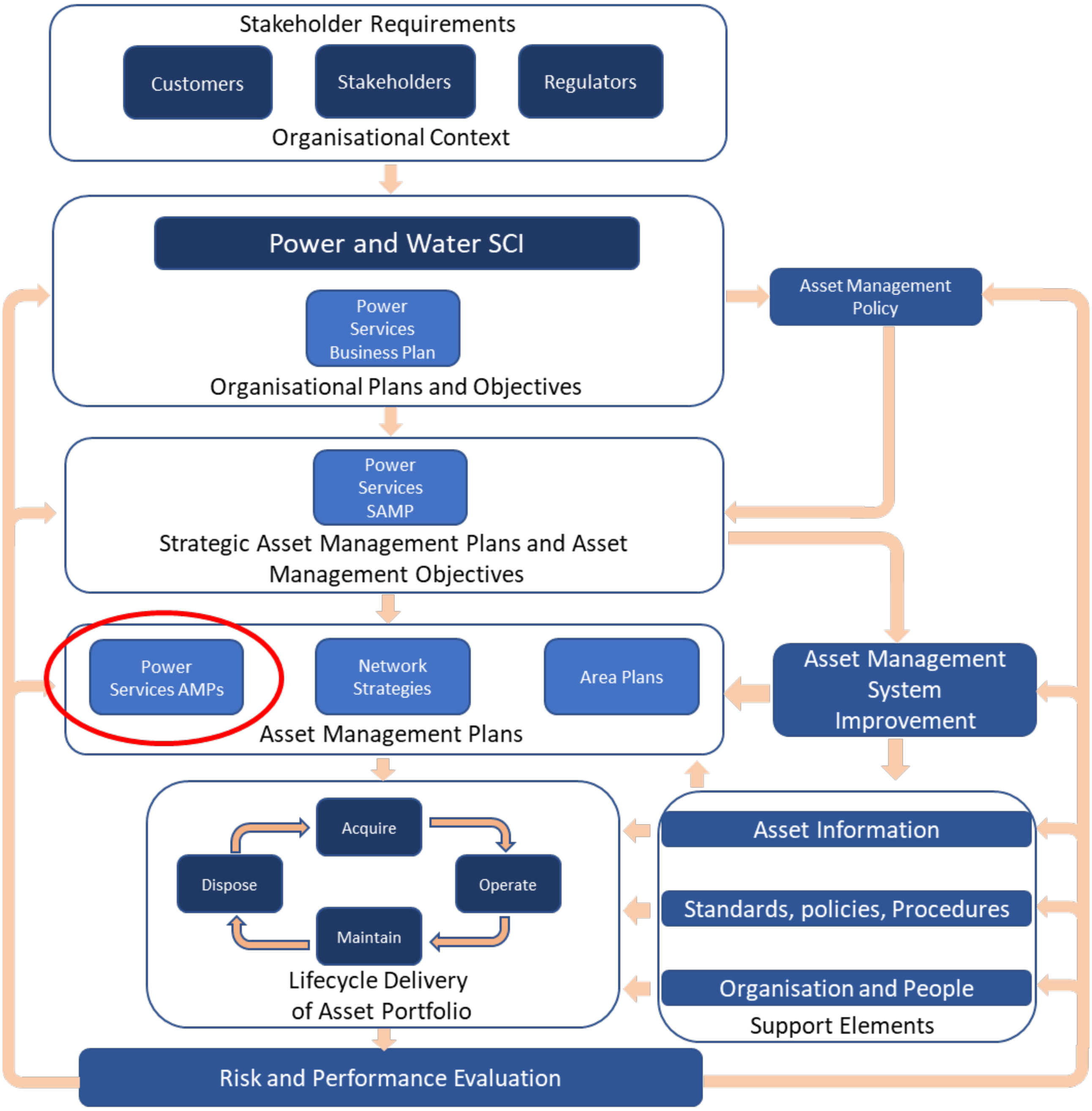

Figure 1: The AMP within the context of the Asset Management System

[1] CONTROL0548

1.5 Document Structure

This document has been structured to align with the Power and Water Asset Management Standard and fits under the SAMP in the hierarchy of documentation. The document has been designed to be concise and provide the outcomes of detailed analysis with references, and not repeat the analysis in this document.

The purpose of each section is described below:

- **Asset profile** provides an overview of what the asset is to provide context to the reader of the asset's role in the electricity transmission and distribution network. It provides a breakdown by asset characteristics and volumes as well as the age profile which is an important input to asset management.
- **Asset objectives and performance** sets out the asset objectives and how they apply to this asset class. Any gaps or emerging trends are identified and linked to a project or program, if relevant, to address the issue and ensure the asset objectives are achieved.
- **Asset challenges and emerging issues** outlines any existing or emerging challenges that may impact the performance of the asset class or may otherwise impact the management of, or need for, the asset class.
- **Implementation plan** sets out the project and programs with expenditure per year for the 10 year planning horizon. This is a point in time assessment that is updated periodically so it may not align fully to the SCI and TDAPR if additional analysis has been completed subsequent to the AMP update.
- **Risk quantification and mitigation** describes the approach to risk-based investment decision-making and demonstrates the risk mitigated by the proposed implementation plan.
- **Asset lifecycle management** describes the asset management approach at each stage in the asset lifecycle.
- **Continuous Improvement** outlines the improvement plans related to the asset class.

2. Asset Profile

Power transformers convert electricity from one voltage to another. In the context of electricity distribution, they are typically used to reduce the voltage down from transmission voltages (132kV or 66kV) to distribution voltages (22kV or 11kV). They interface with other equipment such as surge arrestors, conductors and protection devices.

Power transformers are located within zone substations, and supply customers within a geographical area. They are high value assets that are essential to the functioning of the network and are therefore managed through inspection, testing and maintenance.

Power and Water has a unique network with a small customer base split across three separate networks of Darwin-Katherine, Alice Springs and Tennant Creek. As a result, there is a large variation between power transformer capacities, ranging from 0.5 MVA at Centre Yard up to 125 MVA at Hudson Creek.

2.1 Fleet characteristics

Power transformers consist of a main tank which contains insulating paper wrapped copper windings immersed in oil that act as both an insulation and cooling medium. The other main components are:

- Tap changer to regulate voltage
- Radiators for cooling insulating oil, often with fans or pumps to improve the cooling capacity
- Oil conservators and bladders to maintain positive oil pressure and oil condition
- Bushings to provide insulation and allow connection of the incoming conductor to the power transformer
- Bunding to contain oil leaks

Different utilisation and climatic environments across the regions, particularly the heat and humidity during the wet season, present different challenges for managing power transformers, with associated risk and expenditure implications.

Power transformers are sized to meet the forecast demand in the zone substations supply area. As a result of the geographical areas supplied by Power and Water, the power transformers on the network range in size from 0.5 MVA through to 125 MVA and include primary voltages from 11kV to 132kV (See Table 1).

	Voltage level (kV)			
Region	**11 & 22**	**66**	**132**	**Total**
Darwin	1	41	6	**48**
Katherine	3	2	2	**7**
Alice Springs	7	5	-	**12**
Tennant Creek	2	-	-	**2**
Total	**13**	**48**	**8**	**69**

Table 1 - Summary of asset fleet characteristics

2.2 Age profile

The asset age profile is shown in Figure 2, with a breakdown of volume by primary voltage and age.

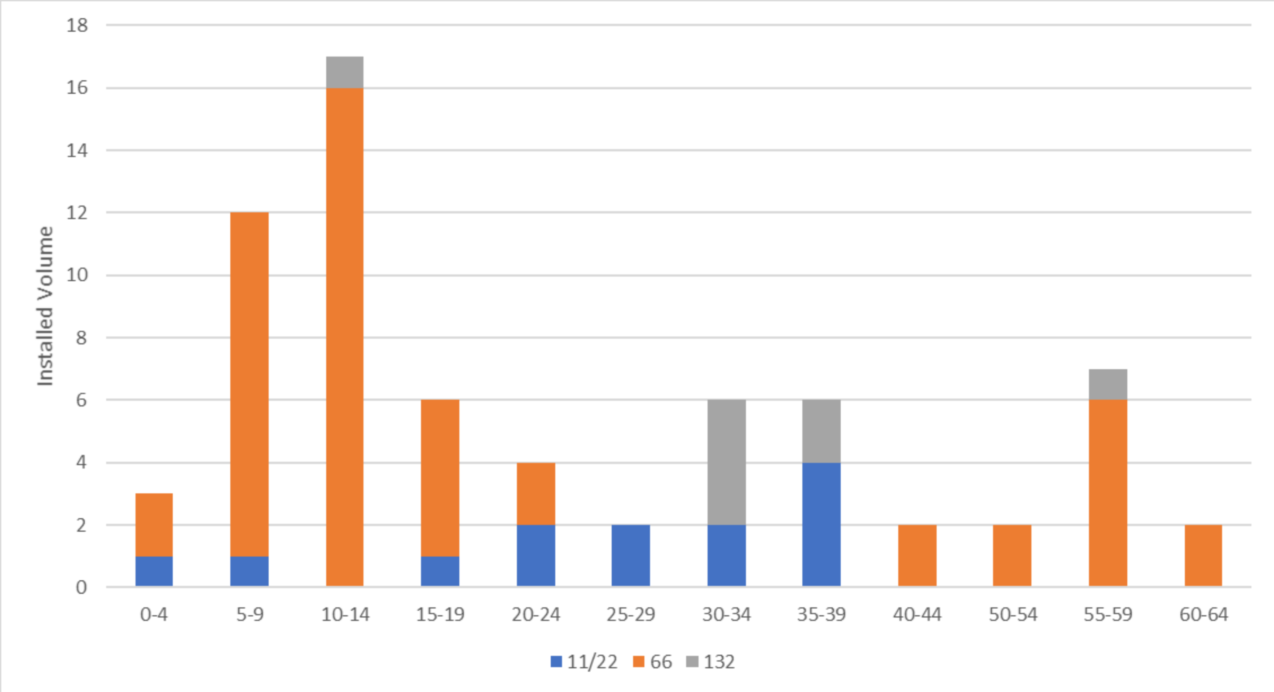

Figure 2 – Power transformer age profile by primary voltage

The average age of the power transformer fleet is 24 years and more than half of the assets are less than 20 years old. This is due to the significant volume of aged power transformers replaced over the past 10-15 years as well as the establishment of several new zone substations including Archer, Leanyer and Wishart substations.

The expected life of power transformers is 45 years and there are 11 assets which currently exceed this age. The condition of aged assets is carefully monitored, and those identified to be in poor condition are nominated for replacement. Assets that exceed their nominal lives but are in good condition are kept in service until our condition assessment justifies their replacement. Of the 11 assets currently exceeding their nominal lives, all but two are planned for replacement or decommissioning in the next 10 years.

The age profile shows there are only eight additional power transformer assets that will exceed their nominal lives in the next 10 years and only two of these are planned for condition-based replacement in that period.

2.3 Criticality

Power and Water has established a Risk Quantification Procedure for Investment Decision Making to assess the overall risk posed by the asset fleet. However, when undertaking detailed scheduling and prioritisation of assets within the fleet for specific tasks, such as testing and inspection or replacement, we consider the localised characteristics of individual assets to account for relative criticality within the fleet.

The criticality assessment considers the diversity of the network, including impact on public safety, service disruption (reliability) or environmental incidents. The location of an asset has a significant impact on the likelihood and severity of the consequences.

The criticality of an asset is an assessment of its importance to the continued operation, reliability, stability and security of the power network. Criticality is dependent on the following key attributes which are assessed at the level of a zone substation:

- The type of customer they serve
- The redundancy of the substation
- Other mitigation factors that can be implemented in the case of failure, such as transferring load to other substations
- The time required to replace the power transformer. Large power transformers have a longer lead time, and the ability to undertake the installation and commissioning works is limited to the dry season.

Details of the criticality assessment approach can be found in our Health and Criticality Method (D2018/72550).

3. Asset objectives and performance

The Strategic Asset Management Plan (SAMP) defines the Asset Objectives and how they support Power and Water achieving the corporate objectives. This section shows how the Asset Objectives are supported by this asset class by establishing the measures and targets to assess if the Asset Objectives are being achieved, and any gap in performance that needs to be addressed.

Table 3 states the asset management objectives from the SAMP, identifies whether they are relevant to this asset class, and defines the measures of success, targets and performance gaps. This provides a 'line of sight' between the discrete asset targets and Power and Water corporate Key Result Areas.

The performance shown here represents the historical performance of the asset class to date. It is expected that benefits from investments proposed in the next regulatory period will manifest as benefits in these key objectives.

<table>
<tr><th>Objectives</th><th>Measures</th><th>Targets</th><th>Performance</th></tr>
<tr><td>Ensure appropriately skilled and qualified staff are employed to meet the current and future needs of the network.

Embed a fit for purpose Asset Management System across the business that is consistent across Regulated, Non-Regulated and IES.</td><td colspan="3">A capability development plan will include the requirements to ensure each asset class has defined capability requirements to enable effective management and performance.

The development of our Capital and Operational Works Plan (COWP) will define capacity requirements across different capabilities to achieve asset management objectives.</td></tr>
<tr><td rowspan="2">Maintain the safety of customers, community and staff demonstrated by reducing worker and public safety incidents and implementing public incident reporting metrics into asset plans.</td><td>Public injuries</td><td>0</td><td>0</td></tr>
<tr><td>Worker injuries</td><td>0</td><td>0</td></tr>
<tr><td>Reduce by 50% the number of feeders and communities exceeding performance targets by more than 100% by 2025.

Enable greater visibility of planned and unplanned interruptions to customers through improved online services for all networks and improve accuracy and transparency of</td><td>SAIDI and SAIFI targets.</td><td>Target by feeder type as set by the Utilities Commission.</td><td>Targets achieved. Refer to section 3.1</td></tr>
</table>

reliability performance metrics for isolated remote communities.			
Implement risk quantification for all regulated network (system) capital investment decisions by Jan 2023, and extend for remote generation and networks by 2025.	Implementation of risk quantification for decision making.	Use of Risk Quantification to assess investment needs for all aspects of the asset fleet.	Achieved.
Implement by EOFY 2023 asset criticality process to support granular prioritisation of corrective works based on public safety, reliability, security and other factors, and implement in the AMS and supporting systems by 2025	A quantitative criticality assessment criterion that can be integrated into defect management processes and supported by our ICT systems to be developed for all asset classes. Availability of power transformer condition data and low public risk impacts mean that implementation complexity is low.		
Prepare our network and systems to be ready for the future, including building in flexibility for future uncertainty, maximising hosting capacity for customer DERs and enabling the energy transition to reviewable energy according to the governments targets.	Development of specific capability requirements for various asset classes is a key focus of our Future Networks Strategy to support increased utilisation of DER while maintaining safety and reliability performance.		

Table 2 - Asset Management Objectives

3.1 Reliability performance

The Utilities Commission requires Power and Water to report performance against targets for SAIDI and SAIFI, by feeder category and network region. Power and Water do not disaggregate the feeder category targets by asset class. Instead, assess the performance of each asset class to identify trends that require further analysis, and to determine if a specific program of works is required to support achievement of Power and Water’s targets at the feeder category level.

From a whole of system perspective, Power and Water has continued to improve its performance, although there has been mixed performance in each feeder category and region. These trends are discussed in the SAMP and are the subject of the network reliability performance improvement strategy.

Figure 3 shows the historical and forecast performance of the power transformer asset class. Linear regression shows no discernible trend over the past 10 years. The forecast performance is based on a rolling average of historical performance. The contribution of SAIDI from year to year is very volatile due to power transformers being highly reliable assets. In addition, most of our zone substations have redundancy so a single power transformer fault will typically not result in an outage to customers. However, when there is an outage it can impact many customers and hence result in a high contribution to SAIDI performance.

Reliability performance has been impacted by the requirement to operate split buses at several zone substations due to inadequate fault level ratings on distribution switchgear. This issue is being addressed by our substation fault level replacement program and on completion of the program the buses will be operated normally closed.

Since FY12 there have been 8 incidents involving power transformers that have resulted in an outage to customers. The majority of these have been at small zone substations where there is no redundancy, and they have been caused by spurious trips or trips with unknown cause. Only one of these incidents occurred within the past 5 years.

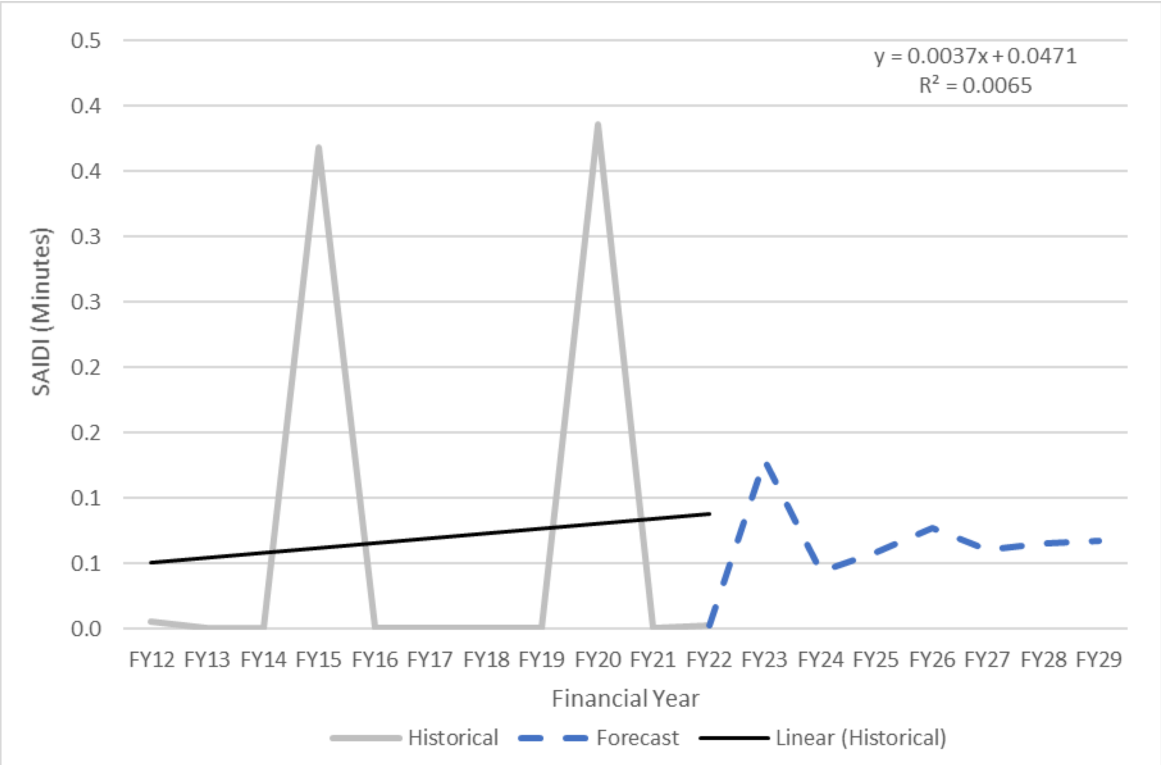

Figure 3 SAIDI performance of the Power Transformer asset class

While not resulting in a customer outage due to network redundancy, there have been a number of instances where auxiliary components such as buchholz relays and pressure relief devices have resulted in spurious trips of power transformers. In particular, a type issue with water ingress into pressure relief valves was found which affected multiple sites, and this issue has now been rectified.

3.2 Asset safety

Historically one of the main safety concerns for power transformers has been bushing failures. Bushing failures are a common failure mode across the industry and due to their porcelain construction a failure can cause debris to be scattered over a wide area. There has only been a single catastrophic bushing failure in the Power and Water network in the last 10 years, however, there have been several instances of bushings being replaced due to degraded condition. All issues were found on older power transformers and no catastrophic failures have occurred since the introduction of an improved preventative maintenance regime in 2014.

Another safety risk relates to working from heights during power transformer maintenance. Power and Water have retrofitted anchor points on top of the power transformers so maintenance crews can safely access and work from the top of the unit. Anchor points are now part of Power and Water's substation design manual as a standard feature for new power transformers.

Power transformer oil containment is an ongoing safety and environmental issue. Oil leaks are common in older power transformers and are often difficult to repair. We have tested our entire power transformer fleet and have a single power transformer with unscheduled PCBs (2-50ppm). The asset is labelled, and work instructions prescribe handling procedures for assets containing PCBs.

4. Asset Challenges and emerging issues

4.1 Criticality of Hudson Creek transformers

Hudson Creek substation is the central node of Power and Water's transmission network and is the primary supply point for Darwin. It comprises three 132/66kV transformers rated at 75/125 MVA ONAN/ONAF. Thes**e power** transformers have long lead times of 12 to 18 months and currently no strategic spare is held by Power and Water.

Due to the long lead times, if one power transformer fails there is an increased likelihood of a second event (N-2) occurring, in which case there is unlikely to be sufficient capacity to supply the demand. Power and Water would then need to rely on Weddell Generator being reliably available and operate the remaining transformer at its maximum capacity.

During the power transformer replacement time:

- Supply to Darwin would be at risk due to an increased potential for a N-2 contingency occurring
- Maintenance will be restricted on these highly critical transformers
- They will need to be operated at high utilisation to supply the demand

To mitigate this risk it is proposed to purchase a spare power transformer to support the three critical units at Hudson Creek.

4.2 Accelerated deterioration of transformers due to moisture

Deterioration of the paper insulation inside transformers is the primary driver for power transformer failure. The deterioration is measured through oil analysis and the presence of trace chemicals. When moisture dissolves into transformer oil, it acts to accelerate the rate of paper deterioration.

The high humidity and rain fall in the Northern Territory increases the ability of water to dissolve into the transformer oil as a result of normal transformer breathing, where there is not a conservator bladder. Additionally, as power transformers age and corrode or seals deteriorate, the likelihood of water ingress increases, further deteriorating the power transformer insulation.

Online and offline oil filtering is undertaken to remove moisture and contaminants from power transformer oil – predominantly water, but also oxidation by-products and gases. Online filtering units have been retrofitted to many critical power transformers to control moisture and this program is expected to be completed in FY24. Additionally, there is a program to install temperature and moisture probes on 10 critical power transformers to assist with managing moisture.

4.3 On-load tap changer (OLTC) Maintenance

Maintenance of critical OLTC components was affected by travel restrictions during the Covid pandemic. This is a key focus to address maintenance backlog. Due to outage constraints and resource availability, this maintenance has historically been optimised to reduce the resourcing risks and the current situation and scheduling management requires additional focus, and additional monitoring of OLTC condition.

5. Implementation plan

The following set of projects and programs have been developed to address the gaps in asset performance compared to the asset objectives and our long-term view to start planning for forthcoming asset challenges.

5.1 Replacement expenditure

Replacement expenditure is defined as work to replace an asset with its modern equivalent where the asset has reached the end of its useful life. Capex has a primary driver of replacement expenditure if the factor determining the expenditure is the existing asset's inability to efficiently maintain its service performance requirement.

The identified projects and programs are listed below. The indicative cost (real FY22) of the project or program for the 10-year horizon is provided and includes the entire project, not only the power transformer component:

- Replace Berrimah Zone Substation ($28.7 million)
- Upgrade Humpty Doo Zone Substation ($2.8 million)
- Cosmo Howley transformer replacement ($0.6 million)
- Centre Yard transformer replacement ($0.8 million)

5.2 Augmentation expenditure

Augmentation expenditure is defined as work to extend the network or to increase its capacity to transmit or distribute electricity. It also includes work relating to improving the quality of supply to customers within the network, for example, to meet regulatory obligations.

The identified projects and programs are listed below. The indicative cost (real FY22) of the project or program for the 10 year horizon is provided and includes the entire project, not only the poles and towers component:

- Tindal Zone Substation Upgrade ($6.9 million)
- Hudson Creek Spare 132kV Transformer ($1.9 million)

5.3 Operational expenditure

The forecast annual expenditure on maintenance activities is outlined in Table 3 below.

Maintenance Type	All Assets	Power Transformers
Routine Maintenance	$7.0	$0.7
Non-Routine Maintenance	$7.7	$0.9
Emergency Response	$7.6	$0.1
Total	**$22.3**	**$1.7**

Table 3 - Forecast annual maintenance expenditure ($ Million FY22)

5.4 Delivery plan

There have been a number of challenges during the current regulatory period that have resulted in under-delivery of capital plans. We have undertaken a detailed analysis of our internal processes and activities to identify the causes and compiled a detailed plan to address this issue. The analysis and resulting plan to enable delivery of the proposed program of works is described in our Capital Delivery Plan.

6. Risk quantification and mitigation

Power and Water has established a Risk Quantification Procedure for Investment Decision Making to assess the overall risk posed by the asset fleet. Our procedure considers the asset's condition and failure modes, the likely risks of failure on safety, security and reliability of services to customers, and the relative maintenance and capital costs. In some cases, our decision making will be influenced by demand growth or customer upgrade requirements. Essentially, our decision making is based on an economic assessment of risks, costs, and benefits.

Figure 4 below shows our forecast of risk on the network that is contributed by the power transformers asset fleet. This analysis has only considered the energy at risk component of risk cost. The unmitigated risk shows increasing risk cost if no actions are taken to address known issues. The risk in the unmitigated case increases more rapidly from 2032 due to the firm capacity of Humpty Doo zone substation being exceeded. The mitigated risk shows that the risk cost decreases slightly and is then maintained for the 10 year forecast period. The current risk level provides a reference to the current level of risk.

There are a number of projects that are enabling Power Services to manage the risk. The key projects that are the replacement of Berrimah ZSS, decommissioning Centre Yard ZSS, managing the condition and load increase at Humpty Doo ZSS and the project that is being implemented during the current period to renew part of Pine Creek ZSS and return the remaining assets to the power station.

Our risk based economic analysis demonstrates that implementing the cockatoo conductor replacement program and reducing the contribution of risk cost is efficient and has a net benefit to our customers.

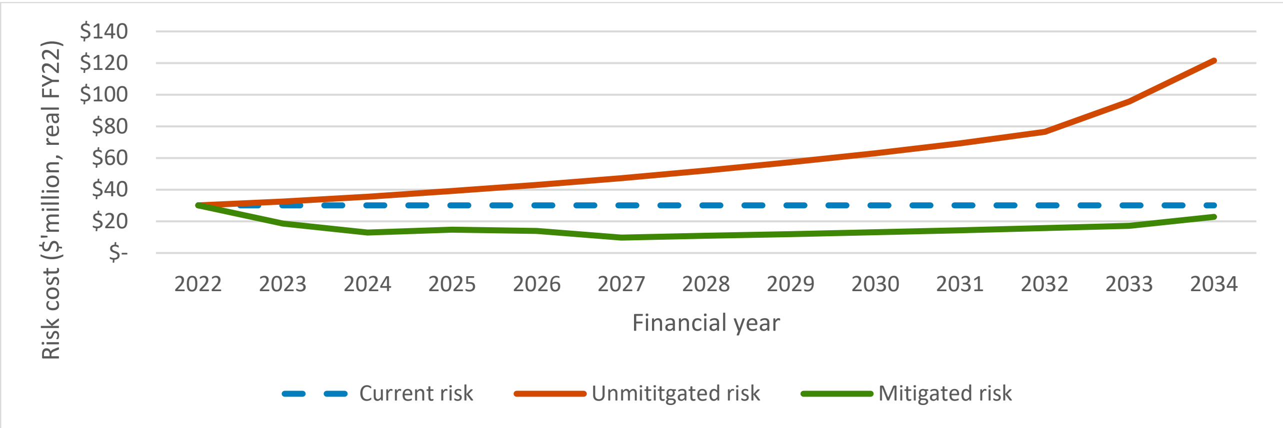

Figure 4 - Forecast total unmitigated and mitigated risk compared to the current risk level

7. Asset Lifecycle Management

Power and Water's asset management approach considers the entire asset lifecycle. This approach supports prudent asset management decision making to effectively balance risk, cost and performance over the life of the asset. The intended outcomes of a lifecycle approach for Power Transformers are to:

- Maximise asset utilisation
- Minimise asset lifecycle costs
- Minimise variation to mitigate supply chain risks and minimise spares
- Keep asset risk as low as reasonably practical
- Review and continuously improve asset management practices

The following sections detail Power and Water's lifecycle management activities.

7.1 Planning

Asset planning identifies the need for an asset, outlines its functional requirements, and identifies the lowest cost solution that maintains risk within tolerable levels. Key planning inputs include asset condition, performance, criticality, and forecast demand.

The requirement for a new asset can be triggered by augmentation drivers, such as the connection of new customers or load growth on existing assets, or replacement drivers such as asset condition or performance issues.

For power transformer assets a key planning consideration is the Network Technical Code and Planning Criteria. This code sets out the requirement for Power and Water to undertake annual planning reviews, investment analysis and reporting requirements, and defines the supply contingency criteria including restoration time targets.

7.2 Design

Power and Water develops and maintains a Substation Design Manual which defines the functional requirements for zone substation assets and allows for the standardisation of zone substation designs as far as is practicable, given the broad range of capacities and locations.

Standardisation enables consistent application of best industry practise and continuous improvement in safety, reliability, operability, and maintainability. It establishes technical commonality that allows for an off-the-shelf, best practice, and fit-for-purpose approach to engineering solutions. It also allows for interchangeability and reduced spares holdings that provides operations and asset management benefits.

Asset failures, feedback from maintainers and information from industry working groups may trigger updates and improvements to our design standards. For example, Power and Water have updated the standard designs for power transformer cable boxes to include removable links, so that cable terminations do not need to be removed for power transformer testing, and access panels that are safer and easier to remove.

7.3 Maintenance

Asset maintenance involves the upkeep of assets to ensure they will function to their required capability in a safe and reliable manner from their commissioning through to their disposal. Maintenance requirements can evolve as the condition and performance requirements of the assets change throughout its life.

Maintenance activities can be classified into three distinct areas: preventative (routine) maintenance, corrective (non-routine) maintenance, and unplanned maintenance (emergency response).

- **Preventative maintenance** requirements are documented in our Asset Strategies Procedures. For power transformers we perform the following preventative maintenance activities:
  - Regular visual inspection
  - Oil testing and Dissolved Gas Analysis (DGA). The oil testing measures oil quality and water ingress to ensure the integrity of the power transformer insulation, while DGA detects the build-up of fault gasses which can be analysed to understand asset condition, detect emerging failures and predict asset life. This testing is typically performed annually but may be done at higher frequency if warranted by prior results or known equipment issues.
  - Diagnostic maintenance involves the comprehensive electrical testing of the power transformer windings, tap changer, bushings, measurement and protective devices, as well as dirana testing to measure the concentration of water in the paper insulation.
  - Offline maintenance and inspection of components and protective devices, including terminations, control cabinets and cooling hardware.
  - Overhaul of on-load tap changers is performed in accordance with OEM recommendations, usually based on the number of operations and time in service.
- **Corrective maintenance** involves planned activities to repair defects or restore asset condition. Defects are typically identified during preventative maintenance and are prioritised for rectification based on the risk they pose to the network.
  - Oil leaks are a major cost driver of power transformer corrective maintenance, most often caused by degradation of cork gaskets which tend to deteriorate and become brittle over time. In some cases, this can be mitigated through external sealing compounds or by tightening sealing bolts, however often complete gasket replacement is required.
  - Oil leaks lead to high moisture levels in the insulating oil degrading internal paper insulation and it insulation performance. Power transformers with high moisture are prioritised for oil filtering to extend insulation life. Mobile oil filtering units are deployed to remove moisture from the oil over a period of weeks. Paper sampling is also performed when possible, to better understand performance of oil treatment and overall condition.
- **Unplanned maintenance** involves activities to immediately restore supply or make a site safe in response to asset functional failure.

7.4 Renewal

Asset renewal is the establishment of a new asset in response to an existing asset's condition, or the extension of life of an existing asset. The need for asset renewal is typically identified during maintenance and is verified in the asset planning stage. Asset renewal aims to optimise the utilisation of an asset whilst managing the safety and reliability risk associated with the failure of the asset.

Section 5 outlines the implementation plans.

7.5 Disposal

Assets are assessed for potential reuse prior to disposal. Where it is economical to do so, assets may be retained as essential spares or components of the asset salvaged for spare parts. This is particularly the case for legacy assets since like-for-like replacements may not be available. Assets with remaining value are offered for sale prior to disposal.

Power and Water ensures that all assets identified for disposal are disposed of in an environmentally responsible manner. Older power transformers assets have the potential for PCB contamination in the insulating oil, so assets are tested prior to disposal.

8. Continuous improvement

Table 4 below outlines the improvement plans related to the asset class.

Improvement Area	Today	Tomorrow / In Development	Future
Condition monitoring (windings/insulation)	Advanced offline testing capability and age-based approach. Participating in industry research and trials of advanced online oil monitoring.	Condition based offline testing. Online monitoring of bushing health and PD in main tank.	Advanced online transformer condition monitoring and end of life modelling
Condition monitoring (OLTC)	Oil analysis, time based internal inspection	Investigate diagnostic tools from manufacturer to optimise maintenance on relevant models	Standardised design and online condition monitoring implementation
Temperature monitoring	Temperature monitoring via WTI / OTI	Internal temperature monitoring via fibre and probes	Power **t**ransformer thermal modelling and dynamic rating calculation
Power transformer construction	Industry standards applied, moisture controls standard.	Investigate additional options with manufacturers to mitigate moisture ingress and seal degradation.	-

Table 4 - Asset improvement plan

Power and Water Corporation

Senior Manager Asset Management
Power Services
Phone 1800 245 092

powerwater.com.au

PowerWater