

# ZSS Fire systems replacement (NMP14)

Regulatory Business Case (RBC)

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# 1. Summary

This business case has been prepared to support the 2024-29 Regulatory Proposal. The business case demonstrates that Power and Water has undertaken appropriate analysis of the need for the expenditure and identified credible options that will resolve the need and ensure that Power and Water continues to meet the National Electricity Objectives and maintain the quality, reliability, and security of supply of standard control services and maintain the safety of the distribution system.

The proposed investment identified in this business case will undergo further assessment and scrutiny through Power and Water’s normal governance processes prior to implementation and delivery.

This business case addresses the condition and compliance risks of fire suppression systems installed at substations.

## 1.1 Business need

Fire suppression systems are installed at zone substations on Power and Water’s network. They are comprised of a fire indicator panel for monitoring and control, and a gas system to suppress the fire. Fire suppression systems are required by legislation.

Fire indicator panels have an expected life of approximately 15 years and are replaced based on condition or end of support by vendors. The high pressure cylinders that supply the gas system are required to be replaced according to prescribed timeframes.

Power and Water has identified that one fire indicator panel will require replacement and there will be on average 10 cylinders requiring replacement each year during the next regulatory period (2024-29).

## 1.2 Options analysis

The options considered to resolve this need are shown in Table 1.

Table 1 Summary of credible options

Option No.	Option name	Recommended
1	Reactive replacement	No
2	Planned replacement	Yes

As part of a holistic assessment, non-network solutions, capex/opex trade-offs and retirement or derating options were also considered, but found that none of these options addressed the underlying network issues.

## 1.3 Recommendation

Table 2 shows a summary of the expenditure requirements for the 2024-29 regulatory period.

Table 2 Annual capital and operational expenditure (\$'000, real 2021/22)

Item	FY25	FY26	FY27	FY28	FY29	Total
Capex	241.7	326.3	309.6		92.4	970.0
Opex	-	-	-	-	-	-
<b>Total</b>	<b>241.7</b>	<b>326.3</b>	<b>309.6</b>		<b>92.4</b>	<b>970.0</b>

## 2. Identified need

This section provides the background and context to this business case, identifies the issues that are posing increasing risks of obsolescence and non-compliant protection relays to Power and Water and its customers, describes the current mitigation program and its delivery status, highlights the consequence of asset failure, and provides a risk assessment of the inherent risk if no investment is undertaken.

### 2.1 Asset profile

Fire suppression systems are installed in zone substations on Power and Water's network. They typically use an inert gas to displace oxygen to suppress the fire and are comprised of two key systems:

- **Fire indicator panels:** these provide the monitoring and control of the fire system and the interface to SCADA to enable remote monitoring.
- **Fire suppression systems:** these are comprised of the fire retardant (typically gas in electrical facilities) and the distribution pipework. Power and Water uses Argon gas (or blend) as the standard for fire suppression systems. Previously, low pressure CO2 was used, however, there were considerable issues with storing the CO2 at sufficiently low temperatures and health impacts.

### 2.2 Regulatory requirements

Power and Water is required to maintain its fire protection systems and equipment in accordance with the requirements of the following Northern Territory legislation:

- Building Act;
- Building Regulations;
- Fire and Emergency Act; and
- Fire and Emergency Regulations.

The effect of the legislation is to require Power and Water to install, commission, operate and maintain comprehensive fire protection systems and equipment to mitigate the risk to its employees, contractors and the public.

### 2.3 Condition and emerging issues

During the past two years, Power and Water has undertaken a significant review and maintenance of their fire systems to ensure that they are compliant and functioning correctly. While a number of issues have been identified and corrected, they have been mostly one-off issues that should no longer present a significant risk to network reliability or personnel safety.

However, several ongoing issues were also identified on the network that include:

- **Obsolescence of the fire indicator panels:** Manufacturers continue to develop new products to supersede their older product ranges. As such advances occur, manufacturers reduce the level of support that they offer to purchasers of the older products, with equipment becoming obsolete and spare parts having reduced availability after typically no more than 15 years (with restrictions on supply prior to this time).

- Time based replacement requirements for gas cylinders: Cylinders have a recommended replacement date as they require pressure testing to ensure that they are still safe to hold the pressurised gases.

## 2.4 Current management program

Power and Water has historically managed the fire protection systems as part of the zone substation minor asset replacement program. However, following review of the maintenance programs it has since been established as its own program to ensure sufficient transparency of progress against compliance obligations.

Historical and estimated (budget) expenditure for the current regulatory period is shown below in Figure 1, following removal from the substation minor asset replacement program.

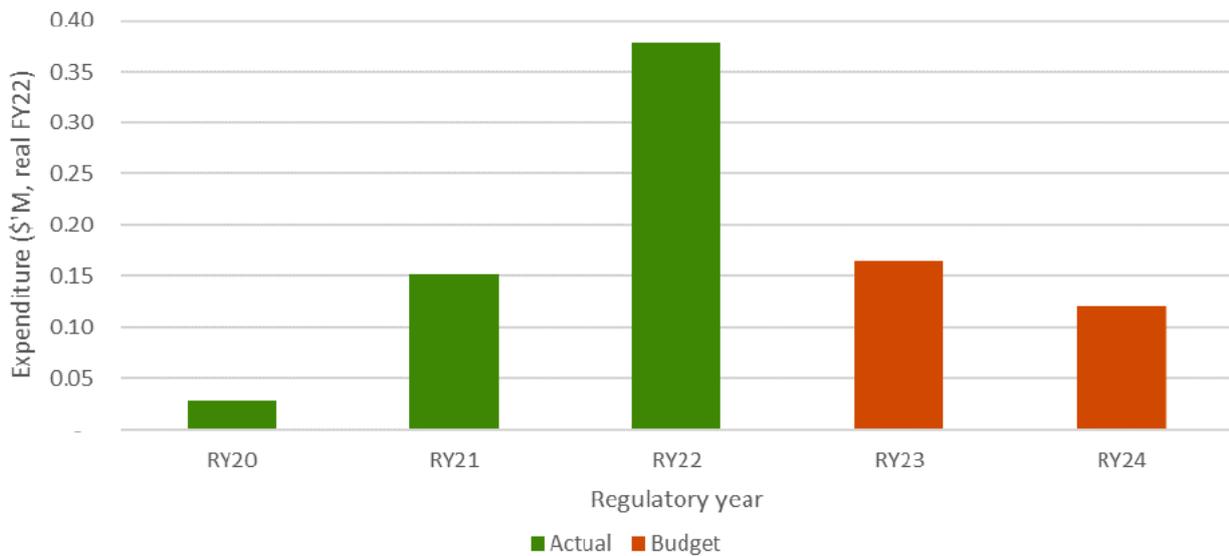


Figure 1 Historical actual expenditure and budget

The expenditure profile is of a lumpy nature due to the compliance driven replacement of components of the fire systems, as they become obsolete and require replacement. The average annual expenditure in the current period is expected to be approximately \$170,000 pa.<sup>1</sup>

## 2.5 Risk assessment

Power and Water has developed the Risk Quantification Procedure to enable consistent quantification of risk from their assets into dollar terms. Power and Water does not have sufficient data to quantify the risk posed by the fire systems so a qualitative assessment of the risks has been undertaken instead.

The key risks posed by an inadequate fire system result in a High risk rating with a target risk rating of Medium. The factors that contribute to this risk ranking are:

- **Health and Safety:** Fire is typically caused by the failure of an asset resulting in a fault. This is most likely to occur when switching operations are undertaken. Typically, field crew are present for switching

<sup>1</sup> rounded

operations which elevates the likelihood of an injury when an asset fails. Fire systems are essential for controlling and extinguishing fires once they occur and therefore for protecting our field crew.

- **Compliance:** Power and Water has compliance obligations as described in section 2.2. Failure to properly manage the fire systems will significantly impact Power and Waters ability to maintain compliance.
- **Service delivery:** Fire within a zone substation will cause damage to more assets than the initial fault the initiated the fire. An uncontrolled fire will result in extending outages as more assets will need to be repaired or replaced, and therefore result in poor service to our customers.
- **Direct financial impact:** Fire within a zone substation will cause damage to more assets than the initial fault the initiated the fire. An uncontrolled fire will result in more assets that will need to be repaired or replaced, and therefore result in additional (avoidable) cost to our customers.

The qualitative risk assessment of the inherent risk and targeted risk is shown in Figure 2 using the matrix approach set out in the Enterprise Risk Management Standard.

	Insignifiant	Minor	Moderate	Major	Severe
Almost certain	Medium	High	Very High	Extreme	Extreme
Likely	Low	Medium	High	Very High	Extreme
Possible	Low	Low	Medium	High	Very High
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	Medium

Figure 2 Qualitative risk assessment

## 2.6 Summary

Fire indicator panels have an expected life of approximately 15 years and are replaced based on condition or end of support by vendors. The high pressure cylinders that supply the gas system are required to be replaced according to prescribed timeframes.

Power and Water has identified that one fire indicator panel will require replacement and there will be on average 10 cylinders requiring replacement each year during the next regulatory period (2024-29).

### 3. Options analysis

This section describes the various options that were analysed to address the increasing risk to identify the recommended option. The options are analysed based on ability to address the identified needs, prudence and efficiency, commercial and technical feasibility, deliverability, benefits and an optimal balance between long term asset risk and short-term asset performance.

#### 3.1 Comparison of credible options

Credible options are identified as options that address the identified need, are technically feasible and can be implemented within the required timeframe. The following options have been identified:

- Option 1: Replace on failure.
- Option 2: Planned replacement (a continuation of the current NMP14 program).

A comparison of the three identified credible options and the issues they address in the identified need is depicted in the table below. A discussion of each option is provided in the following sections.

As summarised in Table 3, Option 2 is the technically feasible option and continues the current NMP14 program.

Table 3 Summary of options analysis outcomes

Assessment metrics	Option 1	Option 2
NPV (\$'000, real FY22)	-	862
BCR	N/A	N/A
Capex (\$'000, real FY22)	-	970
Meets customer expectations	○	●
Aligns with Asset Objectives	○	●
Technical Viability	●	●
Deliverability	●	●
Preferred	✘	✓

- Fully addressed the issue
- ◐ Adequately addressed the issue
- ◑ Partially addressed the issue
- Did not address the issue

### 3.1.1 Option 1 – Replace on failure

This option proposes to only replace the fire system and components once they have functionally failed. This option may enable Power and Water to retain the assets in service for a longer period of time, however, it significantly increases the level of risk to the safety of field crews and members of the public, and the security and reliability of the electricity network. Detection of a failure of the fire system (to identify the need to replace) would follow regular testing, or on the presence of an observable fire event. A fire event assumes that another failure has occurred and would likely result in a higher consequence.

This option is not considered technically feasible as it does not ensure compliance with the relevant legislation or aligns with the requirements of the NT NER. Accordingly, a financial assessment was not undertaken. This option is not recommended.

### 3.1.2 Option 2 – Planned replacement

This option proposes to undertake planned replacement of the fire systems components as required based on condition, age, obsolescence and compliance-testing requirements for pressure vessels.

This option continues the current program to enable Power and Water to remain compliant with the relevant legislation and to ensure appropriate fire suppression facilities exist at zone substations, thereby ensure network reliability and the safety of field crews.

Figure 3 shows the actual, budget and forecast expenditure of the planned replacement option. This results in an annual average expenditure of approximately \$190k pa, being a minor increase from the current period. The lumpy nature is reflective of the timing of the fire system replacement using the same methodology that has applied during the current regulatory period. This option is recommended.

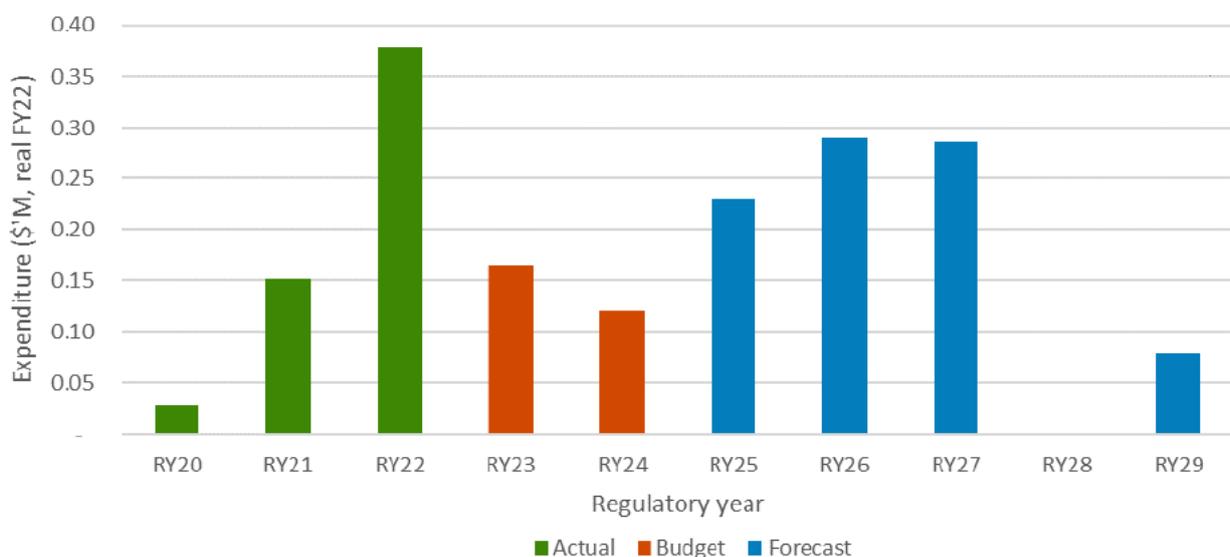


Figure 3 Actual, budget and forecast expenditure

## 3.2 Non-credible options

Our analysis also identified a number of options found to be non-credible. These options are described below and were not taken through to detail analysis for the reasons provided.

### **3.2.1 Retire assets – does not address the need**

Total retirement of the assets is not a credible option as the provision of fire protection systems are a legislative obligation and are required for safe and reliable distribution of the electricity network. Retirement of the assets is not a valid option while the relevant zone substation remains in operation.

### **3.2.2 Non-Network alternatives – does not address the need**

Due to the type and function of these assets, there are no non-network alternatives or solutions that can be implemented in place of direct asset replacement with like for like (modern equivalent) assets. When a fire system is identified for replacement, Power and Water undertakes an assessment of whether the size or type can be changed to reduce cost or to meet future demand most efficiently.

### **3.2.3 Capex/Opex Substitution – does not address the need**

Since the driver of this investment is to ensure ongoing immediate action to extinguish/suppress fires, it is not feasible to substitute capital expenditure with operational expenditure to resolve the risk. Only capital expenditure to ensure the ongoing functioning of the fire system will resolve the underlying issues.

## 4. Recommendation

The recommended option is Option 2 - Planned replacement at an estimated cost of \$0.97 million (real 2021/22) as the most prudent and cost effective to meet the identified needs.

The proposed program is consistent with the National Electricity Rules Capital Expenditure Objectives as the expenditure is required to maintain the quality, reliability, and security of supply of standard control services and maintain the safety of the distribution system.

### 4.1 Strategic alignment

The “Power and Water Corporation Strategic Direction” is to meet the changing needs of the business, our customers and is aligned with the market and future economic conditions of the Northern Territory projected out to 2030.

This proposal aligns with Asset Management System Policies, Strategies and Plans that contributes to the D2021/260606 “PWC Strategic Direction” as indicated in the table below.

Table 4 Strategic alignment

	Strategic direction focus area	Strategic direction priority
1	Customer and the community at the centre	Improve Public Health and Safety
2	Always Safe	Cost Prudence

### 4.2 Dependent projects

There are no known projects or other network issues that are dependent on the resolution of this network issue.

### 4.3 Deliverability

This project is an ongoing project with historical data that demonstrates it has been consistently delivered at a comparable level of expenditure. No delivery risks have been identified.

### 4.4 Customer considerations

As required by the AER’s Better Resets Handbook, in developing this program Power and Water has taken into consideration feedback from its customers.

Feedback received through customer consultation undertaken at the time of preparing this business case has demonstrated strong support amongst the community for appropriate expenditure to enable long term maintenance of the network to ensure continued reliability, maintainability and safety of supply.

### 4.5 Expenditure profile

Table 5 shows a summary of the expenditure requirements for 2024-29 Regulatory Period.

Table 5 Annual capital and operational expenditure (\$'000, real 2021/22)

Item	FY25	FY26	FY27	FY28	FY29	Total
Capex	241.7	326.3	309.6		92.4	970.0
Opex	-	-	-	-	-	-
<b>Total</b>	<b>241.7</b>	<b>326.3</b>	<b>309.6</b>		<b>92.4</b>	<b>970.0</b>

## 4.6 High-level scope of works

A high level overview of the scope by volumes of assets is shown in Table 6. The volumes are based on the periodic replacement requirements for cylinders and obsolescence of panels and VESDA units.

Table 6 Summary of assets to be replaced

Asset	2025	2026	2027	2028	2029	Total
Cylinders	24	42	42		10	118
Panels	4	3	4		2	13
VESDA Units	4	3	4		2	13

## Appendix A. Cost estimation

The cost estimate is based on market / vendor quotes and comparison to historical prices.

The Fire system replacement at Strangways was completed for [REDACTED]. The costs were used as the basis for the panels and VESDA units.

Gas cylinders are based on an estimate for each site by BSA along with recommended labour costs for installation. The typical cost was found to be [REDACTED] including labour.

The expenditure required per year was then calculated based on unit rates multiplied by identified units as set out in Table 6.

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