Grid Comms Operational Support Systems Replacements Ergon

Justification Statement

21/ 10 / 2024

ERGON ENERGY NETWORK
Part of Energy Queensland

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DOCUMENT VERSION

Version Number	Change Detail	Date	Updated by
1.0	Approved Version	15/11/2024	General Manager Grid Technology

1. SUMMARY

Title	Grid Comms Operational Support Systems Replacements
DNSP	Ergon Energy
Expenditure category	☒ Replacement ☐ Augmentation ☐ Connections ☐ Non-network
Identified need *(select all applicable)*	☐ Legislation ☐ Regulatory compliance ☒ Reliability ☐ CECV ☒ Safety ☐ Environment ☒ Financial ☐ Other This ongoing program to address the need to maintain business critical Telecommunications Operational Support Systems (OSS) that play a crucial role in efficiently managing, operating and maintaining a large telecommunications network.
Expenditure	<table><tr><th>Year</th><th>2025-26</th><th>2026-27</th><th>2027-28</th><th>2028-29</th><th>2029-30</th><th>2025-30</th></tr><tr><td>$m, direct 2022-23</td><td>$1.99M</td><td>$1.59M</td><td>$0.39M</td><td>$0</td><td>$0</td><td>**$3.98M**</td></tr></table>
Benefits	This project will enable Ergon to continue proactively manage and optimise our telecommunications network infrastructure, support the broader business's growing demands and ensuring a resilient and reliable network environment. In addition, the project will maintain system stability, enhance network visibility, improve operational efficiency, strengthen security measures, and overall enhance network performance, improved stability, and increased reliability.

2. PURPOSE AND SCOPE

This document recommends the optimal capital investment necessary for replacement of aged Operational Support Systems. This is a preliminary business case document that has been developed for the purposes of seeking funding for the required investment in coordination with the Ergon Regulatory Proposal to the Australian Energy Regulator (AER) for the 2025-30 regulatory control period. Prior to investment, further detail will be assessed in accordance with the established Energy Queensland investment governance processes. The costs presented ($3,987,068) are in (2022/23) direct dollars.

3. BACKGROUND

Asset Population / Site Summary / Capability

Ergon Energy has various Telecommunications Operational Support Systems (OSS) that consist of software systems that play a crucial role in efficiently managing and maintaining a large telecommunications network. These set of systems provide the following capability:

- **Fault Detection, Network Visibility and Monitoring:** An OSS provides real-time visibility into the network infrastructure, allowing Ergon to proactively monitor the performance, health, and status of network devices and links. With real-time monitoring Ergon can detect and diagnose faults and network anomalies promptly. The system generates alerts and notifications when it identifies issues, enabling operational staff to respond quickly and resolve problems before they escalate, reducing downtime and minimizing service disruptions thereby contributing to ensuring business continuity.
- **Performance Optimisation:** The OSS enables proactive monitoring of key network metrics, such as bandwidth utilisation, latency, and packet loss. It facilitates quick identification of issues and ensuring optimal network performance. It enables Ergon to fine-tune network configurations, allocate bandwidth based on priorities, and optimise the use of telecommunications assets and links.
- **Configuration Management:** An OSS helps maintain consistent network configurations across devices. It facilitates the provisioning and deployment of configuration changes, ensuring that all network devices are correctly configured, reducing the risk of configuration errors and misalignments to improve reliability.
- **Security Monitoring and Threat Detection:** OSS plays a crucial role in network security by monitoring for security threats and anomalies. It can detect unauthorised access attempts, unusual traffic patterns, and suspicious behaviour, enabling timely responses to potential security breaches.
- **Capacity Planning:** By collecting and analysing historical network data, an OSS supports capacity planning efforts. It helps predict future network requirements, anticipate potential scalability issues, and make informed decisions regarding network expansion and upgrades.
- **Compliance and Reporting:** An OSS facilitates compliance with regulatory requirements and internal policies by providing detailed network performance reports and logs. These reports help in auditing and demonstrating adherence to various industry standards and internal service level agreements.

- **Streamlining Operations:** An OSS automates routine network management tasks, freeing up personnel to focus on more strategic initiatives. Automation reduces manual intervention, improves efficiency, and minimises the chances of human errors.

Asset Management Overview

Ergon Energy has 28 different Operational Support Systems as listed below to manage the operational state of the telecommunications network. Many of these are vendor supplied specific software components to configure, monitor, update and troubleshoot specific make/model network devices.

The average life for these software systems is between 3 to 5 years however in some cases the software assets can remain in use for much longer periods if the business requirement still exists and continues to meet Ergon's needs effectively.

System	System Criticality
[redacted]	High
	Medium
	High
	Medium
	Medium
	Medium
	High
	High
	High
	Medium
	Medium
	Medium
	Low
	Medium
	Medium
	Low
	Medium
	Medium
	High
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	High
	Medium
	Medium
	Medium
	Medium
	High
	High
	Medium

4. IDENTIFIED NEED

Summary

Ergon Energy is aware of the need to efficiently manage these software systems and this project proposes a multi-faceted approach as follows to ensure a prudent approach to maintaining system stability, increase reliability and performance, ultimately managing costs by replacing services before Inservice failure or removal of support impacts the manageability of the infrastructure.

Proactive management of Operational Support Systems addresses issues associated with vendor support, equipment compatibility, cybersecurity, and operational efficiency:

Maintain vendor support and access to critical updates

As Operational Support Systems age, vendor support gradually declines and eventually systems reach end-of-life (EOL) or end-of-support (EOS) status. Without active vendor support, access to critical updates, bug fixes, and technical assistance is lost, making it difficult to address system issues effectively. Proactively upgrades ensures continuous access to vendor support, which is essential for maintaining system stability, resolving issues quickly, and receiving the latest patches and enhancements.

Ensuring Compatibility with New Equipment and Technologies

It is required that Operational Support Systems are upgraded to current revisions on regular basis to ensure compatibility with newly deployed network devices, technologies and firmware. Without this can lead to operational inefficiencies and difficulties in managing the network and preventing costly integration issues.

Mitigating Cyber Security Risks

Cyber threats become more sophisticated and target Operational Support systems as they centrally manage large volumes of equipment and can cause significant disruption if compromised. The older versions are more vulnerable to attacks due to outdated security features and the lack of regular security patches. A proactive upgrade program ensures that the systems incorporate the latest cybersecurity patches.

Improving Network Visibility and Operational Efficiency:

Manufacturers of Operational Support Systems continuously improve their systems through regular system updates to improve real-time monitoring, fault detection, and performance management which ultimately provides enhanced visibility and control over network equipment.

Proactively upgrading the systems improves operational efficiency by offering better analytics, automation features, and predictive maintenance capabilities, which reduce downtime and improve network reliability.

Options Analysis

Ergon Energy evaluated multiple options as follows to determine the most prudent asset management approach for Operational Support Systems. These options are summarised in the table below and detailed further in each subsequent section.

Option	Total Cost	NPV
Option 1 (Proposed) – Multi-faceted proactive approach	$3.98M	$413,789
Option 2 – Accept the AER proposed 37% reduction	$2.51M	-$48,246
Option 3 – Wholesale replacement	$8.80M	-$4.28M
Option 4 – Counterfactual - Reactive replacement approach	$4.95M	-$4.3M

Option 1 (Proposed) – Multi-faceted proactive approach.

The software lifecycle and replacement strategy are evaluated on a case-by-case basis, considering the specific circumstances and objectives of each system. This option proposes a

multi-faceted proactive strategy for lifecycle management of Operational Support Systems summarised as follows:

- **Maintain software currency.** Regular and routine patching to occur where required to resolve software bugs, security vulnerabilities, maintain system stability. This project proposes to patch each of the **28 x systems** at an average interval of once per annum in accordance with vendor recommendations and industry guidelines.

- **Maintain vendor support.** Maintaining vendor support is vital for these software systems because it offers technical expertise, bug fixes, compatibility updates, security patches, performance improvements, troubleshooting assistance, online manuals and training resources. The availability of vendor support ensures that software systems remain reliable, secure, and up to date, enhancing their value and contributing to the smooth functioning of Ergon Energy's daily operations. Generally, once every 3-5 years it is required to perform a major revision upgrade of each system to maintain vendor support for the software itself, or to ensure compatibility with newly deployed telecommunications equipment, firmware and feature sets managed through this software. This project proposes a major upgrade on **5 x systems** throughout the period.

- **Maintain obsolete software system.** The software system in this category has either been retired from the manufacturer, or the capability can be consolidated into other existing systems to reduce the amount of overhead required to manage and maintain. This project proposes to consolidate **4 x systems** throughout the period.

Historical expenditure on proactive Grid Comms OSS Replacement/Upgrade projects over the previous two RCP are as follows:

RCP	Project	Cost
2015-20	WR1105864 Telco NMS Solution Upgrade	$3.44M
	WR1346525 Telco IP Network Mgmt Upgrade	$0.25M
	WR950351 Operational Network Security Zones	$0.72M
	WR1267845 TDM Aged Service Management Replacement	$0.41M
	Sub Total	**$4.81M**
2020-25	WR1500221 Telco, Ethernet Aged Replacement	$0.33M
	IAM DD-00026WP2 – Thycotic Remediation	$0.06M
	WR1069318 - Telco Obsolete OCC Telephony System	$0.06M
	WR1359204 OSS Server Replacements	$1.69M
	WR1588287 IBM Tivoli Deployment	$2.11M
	Sub Total	**$4.25M**

The proposed expenditure of this program is $3.98M. This is less then both previous periods based on efficiency gains where systems have been deployed in shared OT environment enabling use across both Ergon and Energex DNSP thereby reducing duplication in many cases.

Option 2 – Accept the AER proposed 37% reduction

This option is accepting the AERs 37% reduction in the program which would result in total program expenditure in the order of **$2.51M**. This option would involve the following:

- **Maintain software currency.** This option will not involve any proactive regular and routine patching to resolve software bugs, security vulnerabilities, maintain system stability. Any issues encountered will require reactive action and over time systems will fall out of vendor support. Once systems fall out of vendor support should a significant issue arise, then systems will reactively be patch and upgraded at a significant cost.
- **Maintain vendor support.** This option proposes to maintain vendor support with major upgrades on only **2 x systems of the 5 systems forecast as going to need upgrading for** the period. If issues arise EQL may be forced to reactively perform necessary upgrades to allow fixes to be applied.
- **Maintain obsolete software system.** This option will continue the status quo and maintain existing systems that have been retired from the manufacturer, no consolidation will be performed.

Option 3 – Wholesale replacement

Ergon considered the option whereby each systems undergo major upgrades ahead of the business need on all current software systems at more regular intervals however the program was grossly more expensive than the proposed program and was rejected.

In addition to being extremely cost prohibitive, there was concerns in the deliverability due to the systems requiring specialist technical staff and being labour intensive.

This program was estimated at $8.80M.

Option 4 – Counterfactual – Reactive replacement

This option involves a pure reactive approach which essentially means software systems are not patched, maintained or upgraded. The counterfactual option will result in the loss of communications functionality considered essential to managing a reliable Telecommunications network.

Without vendors supported systems, rectification of services as a result of failed assets can involve extended outages and occur across the entire population of the asset model. The software that runs active equipment hardware requires technically complex configuration updates to maintain the device's functionality in an ever-changing telecommunications network environment. When the vendor stops product support then the only source of software updates cease. In addition, since the software is considered closed source it cannot be "fixed" by anyone but the vendor.

The following impacts include:

- Partial or no visibility of the telecommunications network resulting in faults/incidents going undetected and causing further cascading issues and business impacts.

- Exposure to software bugs and cyber security vulnerability by not maintaining or patching critical software.
- Increased risk of software license non-compliance and violation of terms of use agreements.
- Inability to onboard and monitor newly commissioned network devices.
- Increased costs upon a system failure to reactively reinstate to a vendor supported revision.
- Equipment can't be centrally configured resulting in increased labour.
- Loss of automation would result in increased labour for manual intensive tasks.
- Configuration compliance of the network would result in increased faults.
- Previously automated tasks becoming manual and time consuming.
- Loss of network health and performance data collection resulting in extended outages and inability to determine root cause of faults and problems.

The total estimated cost of the counterfactual case over the estimated asset life is $4,956,175.

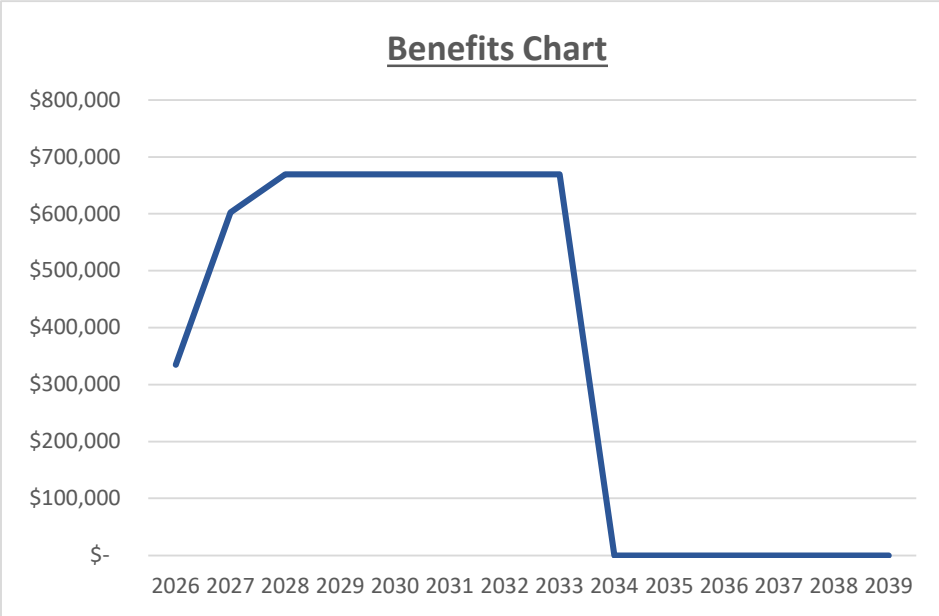
Risks

Table below outlines the risk assessment for the counterfactual scenario with no proactive program in place to address conditional and age issues (i.e. all work is done as reactive).

Table 1 Risks Associated with the Counterfactual

Risk	Description of Risk
Increased risk of system failure or degradation of system performance requiring emergency replacement increasing costs.	There is an estimated likelihood that on a yearly basis 2% of the at-risk systems will experience hardware/software defects that will result in 2.5 times the costs to resolve systems back to normal operations compared to undertaking as part of planned proactive work. Doing this reactivity results in significant complexity and increase in costs as result of: • Additional cost to restore the system itself which generally requires upgraded parallel hardware/software deployment then migration exercise that requires specialised expertise and can take considerable amount of time. • Increased cost of labour to manually manage, monitor and configure the network during the extended period of the system being down. • Increased costs to reactively resolve any undetected telecommunications faults that occurred during the period when the system was down and in the process of being restored that would have otherwise been detected in advance. • Additional cascading business impacts as result of voice and data communications to depots, substations, comms sites etc.
Increased cyber security risks due to vulnerabilities in obsolete systems requiring additional resources to monitor.	Aging infrastructure and the associated systems are no longer being supported and able to be patched or secured. This may expose Ergon to new and emerging cyber security vulnerabilities that could be exploited by actors with malicious intent. Aged software is certain (100% likely) to contain vulnerabilities, as identified by vendors constantly releasing security related patches. Cyber attempts on Utilities are to be expected therefore would require provision of additional FTE to ensure monitored for these risks. Est. $0.09M per annum.
Infrastructure not fit for purpose resulting in inability to efficiently manage the telco network resulting in increased labour costs for manual tasks.	Increased risk of the systems quickly becoming out of date and not meet the evolving business demands over time. Maintaining these systems to vendor supported revisions is vital for these assets because it offers technical expertise, bug fixes, equipment compatibility updates, resolve known cyber security and performance problems. Should these systems not be prudently maintained would result in inability to onboard and centrally manage newly commissioned network devices due to incompatibility with obsolete systems. Is certain (100% likely) to occur as identified by vendors constantly releasing software upgrades and patches. To address this would require provision of additional FTE to manually manage such assets resulting in increasing labour costs estimated at $0.37M per annum.

The table below outlines the cost benefits over the asset life of the systems to be implemented.



5. ECONOMIC ANALYSIS

Cost Summary 2025-30

Table 2 Cost summary 2025-30

Options	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025-30
Option 1 – Multi-faceted approach	$1,993,534	$1,594,827	$398,707	$0	$0	$3,987,068
Option 2 – 37% program reduction	$1,255,926	$1,004,741	$251,185	$0	$0	$2,511,853
Option 3 – Wholesale replacement	$1,760,000	$1,760,000	$1,760,000	$1,760,000	$1,760,000	$8,800,000
Option 4 - Counterfactual	$2,478,088	$1,982,470	$495,618	$0	$0	$4,956,175

We have modelled the costs and benefits in our NPV in the way we would deliver the program absent of any deliverability constraints. The investments have been phased for deliverability in the capex model, and so there will be some differences in the capital cost phasing. This phasing does not change the preferred option for this investment.

NPV Analysis

The NPV calculations have been modelled as a complete program, with benefits realised through proactive program delivery calculated.

The resulting NPV value calculated for the proposed program was $413,789.

Table 3 NPV analysis

Options	Discount rate		Benefits	
	2.5%	4.5%	125%	75%
Option 1 – Multi-faceted approach	$550,755	$291,500	$1,398,125	-$570,546
Option 2 – 37% program reduction	$17,498	-$106,331	$494,653	-$591,144
Option 3 – Wholesale replacement	-$4,425,730	-$4,154,252	-$3,505,937	-$5,070,816
Option 4 - Counterfactual	-$4,535,224	-$4,231,671	-$4,379,998	-$4,379,998

APPENDICES

Appendix 1: Alignment with the National Electricity Rules

Table 4 Recommended Option's Alignment with the National Electricity Rules

NER capital expenditure objectives	Rationale
A building block proposal must include the total forecast capital expenditure which the DNSP considers is required in order to achieve each of the following (the capital expenditure objectives):	
6.5.7 (a) (1) meet or manage the expected demand for standard control services over that period	
6.5.7 (a) (2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services;	As indicated in section 4, this proposal ensures that safety obligations, reliability obligations and protection requirements are met by providing an appropriate, economically efficient program of works to prevent in-service failure of physical linear media assets. Without this program, these obligations would be at significant risk of being breached.
6.5.7 (a) (3) to the extent that there is no applicable regulatory obligation or requirement in relation to: (i) the quality, reliability or security of supply of standard control services; or (ii) the reliability or security of the distribution system through the supply of standard control services, to the relevant extent: (iii) maintain the quality, reliability and security of supply of standard control services; and (iv) maintain the reliability and security of the distribution system through the supply of standard control services	This program of work ensures the integrity of communications functions that support SCADA, protection, voice and data communications systems. They are critical in the provision of network reliability in support of MSS and safety net security and reliability targets.
6.5.7 (a) (4) maintain the safety of the distribution system through the supply of standard control services.	This program of work ensures the integrity of communications functions that support SCADA, protection, voice, and data communications systems. They are critical in ensuring safety through correct protection operation, and through the availability of voice and data communications.
NER capital expenditure criteria	**Rationale**
The AER must be satisfied that the forecast capital expenditure reflects each of the following:	
6.5.7 (c) (1) (i) the efficient costs of achieving the capital expenditure objectives	The options considered in this proposal take into account the need for efficiency in delivery. The preferred option has utilised a delivery approach that provides for bundling of work in terms of both timing and geography to enable a lower cost delivery compared to other options. It generally avoids emergency replacements that incur higher costs by enabling efficient use of labour resources in the delivery of the work programs. Specialised contractors are utilised as appropriate to ensure that costs are efficiently managed through market testing. Cost performance of the program will be monitored to ensure that cost efficiency is maintained.

NER capital expenditure objectives	Rationale
	The unit costs that underpin our forecast have also been independently reviewed to ensure that they are efficient (Attachments 7.004 and 7.005 of our initial Regulatory Proposal).
6.5.7 (c) (1) (ii) the costs that a prudent operator would require to achieve the capital expenditure objectives	The prudency of this proposal is demonstrated through the options analysis conducted. The prudency of our CAPEX forecast is demonstrated through the application of our common frameworks put in place to effectively manage investment, risk, optimisation and governance of the Network Program of Work. An overview of these frameworks is set out in our Asset Management Overview, Risk and Optimisation Strategy (Attachment 7.026 of our initial Regulatory Proposal).
6.5.7 (c) (1) (iii) a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives	NA

Appendix 2: Reconciliation Table

Table 5 Reconciliation

Expenditure	DNSP	2025-26	2026-27	2027-28	2028-29	2029-30	2025-30
GRID COMMS Operational Support Systems REPEX ($ Direct)	Ergon	$1.99M	$1.59M	$0.39M	$0	$0	**$3.98M**