Grid Comms – Operational Voice Replacements Ergon Energy

Justification Statement

25/ 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

SUMMARY

Title	Grid Comms Operational Voice 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 replace Operational Voice Assets addresses the need to ensure costs and risk remain manageable by replacing higher risk components of the asset base in a timely fashion before the cost of in-service failures and associated issues escalate to unmanageable levels in terms of costs and risk.
Expenditure	
Benefits	This proactive program will reduce costs associated with moving to a reactive program, will reduce risks associated with increased outages of in-service equipment, and has a range of other advantages compared to the fail fix asset strategy.

Year	2025-26	2026-27	2027-28	2028-29	2029-30	2025-30
$m, direct 2022-23	$0	$0	$0.20M	$0.81M	$1.01M	**$2.02M**

PURPOSE AND SCOPE

This document recommends the optimal capital investment necessary for replacement of obsolete Operational Voice network assets. This preliminary business case document 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 ($2,029,991) are in (2022/23) direct dollars.

BACKGROUND

1.1 Asset Population / Site Summary / Capability

Ergon Energy's Telecommunications Network Assets enable mission critical real-time voice and data communications to allow automation, remote monitoring, and control of the power network, enabling the ability to co-ordinate safe and efficient work activities as well as extend the reach of corporate information systems across a common infrastructure.

Ergon Energy operates several telephony systems to provide the following capabilities:

- Provide telephone capability at substations, comms sites, and other corporate locations – this is a critical requirement for locations where mobile phone coverage is poor or non-existent.
- Provide a DR (Disaster Recovery) telephone capability for Control Centres such that for a range of failure scenarios including failures in the Telstra network, failures of internal console infrastructure, or failures of other components in the EQL infrastructure, control rooms will still be able to perform the key role of operating the power network.
- Provide the required interfacing between internal telephone services and the Telstra network.

1.2 Asset Management Overview

The table below lists the total asset population quantities for each asset type in this category, the quantity that has exceeded vendor end of life support dates, the driver for replacement, and the asset criticality to the business.

Table 1: Asset Summary

Asset Class / Technology Type	Total Quantity	2025-30 End of Life Quantity	Asset Criticality	Replacement Strategy
CORE SYSTEMS (Includes both Production and Non-Production environments)				
Voice Platform	6	6	<u>High</u> Component failure leads to network wide outages.	Maintain vendor support.
SBCs (Session Boarder Controllers)	6	6		
Voice network management software	6	6		
SIP (Session Initiation Protocol) Trunks	3	0		
TELEPHONES				
IP Phones located at operational sites	352	165	<u>Low</u> Component failure leads to outages to single site.	Strategic replacement of critical sites. Reactive replace – Fix on fail.

The majority of the voice assets listed above were installed between 2014 and 2022 timeframe and have a nominal asset life of 7 years.

The Core voice manufacturer made an End-of-Life announcement on 7th Oct 2024 which provides End of Software Maintenance releases in April 2026, and the full Last Date of Support in April 2027.

IDENTIFIED NEED

2.1 Summary

This program seeks to manage risks and costs associated with provision of comms equipment by replacing critical equipment ahead of asset obsolescence and in service failure. Not proceeding with the program will require expensive reactive replacement, which has the potential to extend power network outages as failure of these assets can directly impact network restoration activities.

These phone systems enable voice communications between substations, Control Centres and external parties like Emergency Services and members of the public. A number of IP phones are deployed in remote regional sites that do not have public telephone carrier coverage and is relied upon for as the primary means of voice comms and for emergency use. These systems including the Session Border Controllers (SBC)'s are tightly integrated with other systems including the Zetron ACOM Network Operator consoles, and they provide the only and primary means of making external telephony calls to staff with mobile phones and the outside world.

The majority of the core components will need replacing during the 2025-30 regulatory period as per Table 1 above.

Replacement of non-core equipment will be progressed via opportunistic bundling with other works that take crews to required locations or via fail fix processes. The strategy for lifecycle management of Operational Support Systems is categorised as follows:

Maintain vendor support and access to critical updates

These Operational Voice Systems are highly complex configurable items. As these systems age, vendor support gradually declines, and eventually the 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. Proactive upgrades ensure continuous access to vendor support, which is essential for maintaining system stability, resolving issues quickly, and receiving the latest patches and enhancements.

On average there are approximately 3-4 support tickets raised with the manufacturer per annum for configuration support and assistance in diagnosing the root cause of call issues.

Ensuring Compatibility with new equipment and technologies
It is required that Voice systems are upgraded to current revisions on a regular basis to ensure compatibility with newly deployed network devices, technologies, and firmware. Not maintaining up to date firmware/software can lead to operational inefficiencies and difficulties in managing the network and preventing costly reactive integration issues.

Mitigating cyber security risks
Cyber threats are becoming more sophisticated and often target Core Operational Voice systems as they centrally manage telephony and can cause significant disruption if compromised.

The primary function of the SBC equipment is to act as a security appliance to interface voice communications to 3rd party systems and networks.

The older versions are more vulnerable to attacks due to outdated security features and the lack of regular security patches. It is certain that security vulnerabilities will be announced impacting these assets as they become obsolete. A proactive upgrade program ensures that the systems incorporate the latest cybersecurity patches.

Improving Network Visibility and Operational Efficiency
Manufacturers of Core Voice systems continuously improve their applications through regular system updates to improve real-time monitoring, fault detection, and performance management which ultimately provides enhanced visibility and control over the end-to-end system.

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

2.2 Options Analysis

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

Table 2 Table of Options

Option	Total Cost	NPV
Option 1 (Proposed) – Maintain vendor support	$2.02M	$81,505
Option 2 – Accept the AER proposed 37% reduction	$1.27M	-$204,885
Option 3 – Counterfactual - Reactive replacement approach	$3.76M	-$3,509,063

2.2.1 Option 1 – Maintain vendor support.

This option involves ensuring systems remain current for manufacturers support by actively monitoring supplier hardware/software support cycles and replacing before support lapses.

Maintaining vendor support is vital for these Core Operational Voice 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.

This project proposes to proactively replace/upgrade all 18 x obsolete Core components including:

- 6 x Call manager
- 6 x SBC's
- 6 x Voice network management software

The proposed expenditure of this program is $2.02M.

2.2.2 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 $1.27M.

This would enable replacement of the 6 x Call Manager instances only.

Note it is not possible to partially replace a percentage of Core components due to the way these systems integrate, with vendor proprietary implementations that operate together as a single highly available redundant system Thus replacing any number other than all 6 units (for each type) are not viable options.

Due to the nature of these systems and the regular volume of configuration changes that occur to this asset class, it is almost certain that issues will be encountered on the remaining units that are beyond vendor support and will require reactive action. Current vendor support tickets for the 6 x SBC items average at approx. 1-2 per annum.

Often workarounds can be implemented that result in increased O&M costs and higher business impacts with increased outages (e.g. to power cycle equipment) due to equipment criticality to business operations.

2.2.3 Option 3 - Counterfactual – Reactive replacement

The counterfactual option to reactively replace items will result in the loss of critical voice telephony communications considered essential to the business. Should these systems fail, this would result in extended voice outages with the following consequences:

- Inability for field crews to communicate effectively to control-rooms which is heavily utilised for day-to-day activities.
- Safety risks for staff not being able to contact emergency services in areas of poor mobile phone coverage.
- Delays in the day-to-day Program of Work, failure of components will mean that extra contingency arrangements will have to be activated, however these are not as efficient as the normal operating processes and in some cases result in non-emergency work packages being put on hold till issues are resolved.

Additionally, performing replacements reactively is very problematic and can take considerable amount of time and costing in the order of 2.5 times as much to fix (compared to resolving as part of planned proactive work) due to a range of reasons including:

- **Lack of Like for Like replacements**: Once support is discontinued, issue resolution becomes increasingly difficult whereby replacement solutions are not drop in substitutes and therefore require complete re-architecture with tight integrations into the other remaining systems. Any failure could result in prolonged downtime, negatively impacting operational efficiency and causing costly delays.
- **Inability to onboard new terminal devices**: Once Core systems are End of Life, it can result in the inability to onboard new Telephones into the existing systems, which would then require reactively deploying parallel duplicated systems with temporary integrations into the existing systems to maintain functionality.
- **Broad business impacts:** An outage to the telecommunications core voice systems can cause delays, cancellations, and rescheduling of planned and unplanned work to the power network; through to the inability to communicate via telephones effectively.
- **Higher labour costs:** Replacing these assets reactively requires specialised technicians to work on short notice or during off-hours (nights, weekends, or holidays) to minimise the impact on operations. This can take months to design and implement leading to increased labour costs or the need to bring in external contractors for emergency repairs. In addition, unplanned failures results in broader disruption to planned works as resources are diverted to emergence replacements.

The total anticipated cost for the period for the counterfactual option is $3,759,982.

2.3 Risks

The 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 3 Risks Associated with the Counterfactual

Risk Scenarios	Description of Risk
Obsolete Voice Gateways (SBCs) not replaced in the proactive program, and units fail with no spares available, resulting in an inability for Control Room to communicate with field crews using their console equipment and requiring a work around where controllers use their mobile phone to call field staff. Extra labour costs to the business and delayed restoration of outages.	All inbound phone calls from field personal to Network Control Rooms will fail, with Controllers being forced to move to contacting field personnel using their handheld mobile phones or the P25 radio network, which significantly slows processes between the field and the control room, causing delays, cancellation and rescheduling of planned and unplanned work to the power network estimated with conservative likelihood of 1% and impacts including: • Estimated delays totalling 4 hours, power restoring services of 200 kW with assumed VCR of $52 per kwh, and increased labour costs due to inefficiencies in communication. • Additional cost increases estimated at $0.33M over the period using a cost per call method to determine inefficiencies of not having centralised in dial telephony capability into the control rooms.
Proactive replacement does not proceed, Core Telephony system (Call Manager) fails, resulting in loss of operational telephony to selected substations and operational communications sites.	There is an estimated likelihood that on a yearly basis, 3% of the at-risk assets will experience either hardware or software defects that will result in significant impact to operations, particularly in areas of poor mobile phone coverage, that require an emergency response costing in the order of 2.5 times as much to fix compared to resolving as part of planned proactive work. This is due to the replacement solution not being a drop in substitute and requiring complete re-architecture as a parallel hardware/software deployment, then integrated into existing systems. Additional safety risks exist for field staff not being able to contact emergency services using substation Telephones in areas of poor mobile phone coverage, however, these have not been quantified as part of the NPV calculations for this project.
Core voice infrastructure becomes obsolete and not fit for purpose resulting in the inability to integrate and onboard new telephones. This would require another core voice system to be deployed reactivity in parallel and maintain duplicate capability increasing both material and labour costs.	Maintaining these core systems to vendor supported revisions is vital for these assets because it offers technical expertise, bug fixes, equipment compatibility updates, and resolutions to known cyber security and performance problems. Should these systems not be prudently maintained, it would result in the inability to onboard and centrally manage newly commissioned telephones due to incompatibility with obsolete systems. It is certain (100% likely) to occur as identified by vendors constantly releasing software upgrades/patches and new revisions of handsets. To address this would require reactive provision of an alternative system in parallel to existing, estimated in additional costs of $0.95M over the period.

The figure below outlines the cost benefits for the preferred option which has only been modelled over the estimated asset life of ~7 years.

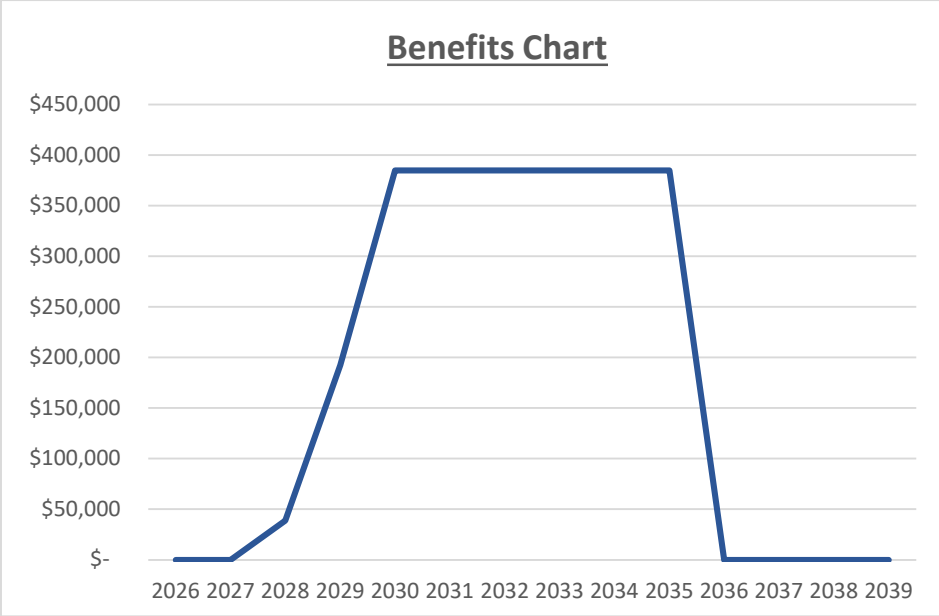

Figure 1 Cost Benefit of Preferred Option

ECONOMIC ANALYSIS

3.1 Cost summary 2025-30

Table 4 Cost summary 2025-30

Options	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025-30
Option 1 – Multi-faceted approach	$0	$0	$202,999	$811,996	$1,014,995	$2,029,991
Option 2 – 37% program reduction	$0	$0	$127,889	$511,558	$639,447	$1,278,894
Option 3 - Counterfactual	$751,996	$751,996	$751,996	$751,996	$751,996	$3,759,982

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.

3.2 NPV analysis

The resulting NPV value calculated for the proposed program was $81,505.

Table 5 NPV analysis

Options	NPV	Discount rate		Benefits	
		2.5%	4.5%	125%	75%
Option 1 – Multi-faceted approach	$81,505	$134,482	$36,392	$509,195	-$346,186
Option 2 – 37% program reduction	-$204,885	-$195,055	-$212,023	$502	-$410,272
Option 3 - Counterfactual	-$3,509,063	-$3,692,910	-$3,337,038	-$3,593,941	-$3,424,185

APPENDICES

3.3 Appendix 1: Alignment with the National Electricity Rules

Table 6 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 various other requirements are met by providing an appropriate, economically efficient program of works to prevent in-service failure of Operational voice infrastructure. 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 a wide range of SCS activities. 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**

NER capital expenditure objectives	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. 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

3.4 Appendix 2: Reconciliation Table

Table 7 Reconciliation

Expenditure	DNSP	2025-26	2026-27	2027-28	2028-29	2029-30	2025-30
GRID COMMS Operational Voice REPEX ($ Direct)	Ergon	$0	$0	$0.20M	$0.81M	$1.01M	**$2.02M**
Add escalation adjustments							