OTE Storage and Backup Replacement Ergon Energy

Justification Statement

8th November 2024

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	OTE Infrastructure Improvements
DNSP	Ergon
Expenditure category	☒ Replacement ☐ Augmentation ☐ Connections ☐ Non-network
Identified need *(select all applicable)*	☐ Legislation ☒ Regulatory compliance ☒ Reliability ☐ CECV ☐ Safety ☐ Environment ☐ Financial ☐ Other Ergon Energy distributes energy to 93% of Queensland and has two Control Room facilities in Townsville and Rockhampton. In contrast, Energex operates one Control Room but manages several sites in the Southeast corner. The existence of multiple Control facilities supports Energy Queensland's overall strategy for diversity and risk management, which also involves distributing Data Centre capabilities across the state. The Operational Technology Environment (OTE) offers a secure computing platform designed for real-time and critical operations that manage the distribution network. These assets are essential for ensuring a reliable energy supply to customers, and Ergon Energy recognizes the importance of effectively managing them. Many of these assets are expected to reach the end of their original design lifespan during the 2025-30 regulatory period. These storage and backup systems are crucial for the operation of key control systems within the OTE. If the lifecycle of these assets is not managed properly, it could jeopardize critical business services. The Operational Technology team understands that renewing aging Storage Area Networks (SAN) and backup equipment is vital for maintaining optimal performance, improving data protection, and lowering operational costs. By proactively addressing these infrastructure needs, Ergon Energy can enhance its agility, stability, and resilience in the Operational Technology environment.
Expenditure	

Year	Previous period	2025-26	2026-27	2027-28	2028-29	2029-30	2025-30
$m, direct 2027-30	1.66M			0.75M	0.31M	0.21M	**1.28M**

Benefits	• $452k of avoided costs associated with additional support and maintenance costs and reduced Value of Customer Reliability (VCR) savings • Avoidance of significant business disruptions in the delivery of planned and unplanned work on the network due to the failure or performance issues caused by aging control and communications platforms and supporting technology stack • Avoided cyber security risks associated with exposure of vulnerabilities associated with aging software and hardware • Avoidance of data loss associated with failing infrastructure
Consumer engagement	At this point in time, no customer engagement has been performed on this specific network ICT business case.

Table 1 The Executive Summary

2 PURPOSE AND SCOPE

The purpose and scope of this business case is to assess the feasible investment option for managing the prudent and efficient asset lifecycle of Ergon Energy's Operational Technology Environment storage and backup system so that it remains secure, reliable, and efficient.

The investment that underpins this business case is driven by the following objectives:

- Maintain prudent and efficient asset management of Ergon Energy's Operational Technology Environment storage and backup infrastructure
- Provide efficient, reliable, and scalable infrastructure services to Ergon Energy's control rooms
- Support and integrate new and emerging operational technologies
- Modernise the systems to mitigate increasing cyber security risk
- Ensure critical systems are supported by an up-to-date storage and backup systems

3 BACKGROUND

3.1 Asset Population / Site Summary / Capability

The Ergon Energy operational technology environment (OTE) provides a secure computing environment, architected to support real-time and high criticality computing solutions for the operation and control of the distribution network. As such these assets are central to ensuring the supply of energy to customers. Ergon Energy is aware of the need to effectively manage their existing assets. Many of the existing assets are now approaching, have reached, or have passed their original design life.

The list of assets and systems that are included in this justification:

- 3 centralised storage systems that were purchased in 2020
- 4 fibre channel network switches purchased in 2020
- Renew associated support and management systems for the Storage Area Network (SAN)
- Commvault backup system and associated media agents

Replacement of the Storage and Backup systems would occur in financial year 2027, ensuring that asset management of the critical platforms aligns with Energy Queensland's Digital Asset Management Guidelines, by not extending operation of the assets beyond their useful life. This will allow for the high availability and performance of the platform to remain constant to avoid costly business disruptions due to asset failures or performance issues.

4 IDENTIFIED NEED

4.1 Summary

As organizations increasingly rely on digital data for operations and decision-making, the need to renew aging Storage Area Network (SAN) and IT backup equipment has become paramount. Aging SAN systems can lead to significant performance bottlenecks, resulting in slower data access times and diminished application performance. This inefficiency not only hampers productivity but can also inhibit performance of control systems. By upgrading to modern SAN solutions, organizations can enhance data transfer speeds, improve overall system responsiveness, and support growing storage demands.

Additionally, older backup equipment poses considerable risks to data integrity, security and availability. As backup technologies age, they may fail to keep pace with the increasing volume of data generated. This can lead to incomplete backups, longer recovery times, and even data loss in the event of a failure. Renewing this equipment not only ensures that backups are reliable and efficient but also provides organizations with the ability to implement more advanced backup strategies, such as Ransomware protection and automated recovery processes.

Furthermore, aging SAN and backup systems can be more costly to maintain than their modern counterparts. Older equipment often requires more frequent repairs and may consume more power, leading to higher operational costs over time. By investing in new technology, we can reduce maintenance expenditures, improve energy efficiency, and ultimately lower the total cost of ownership. Modern SAN solutions and backup equipment often come with built-in features that enhance data management, optimize resource utilization, and provide better scalability to meet future growth.

The software and infrastructure lifecycle and replacement strategy are evaluated on a case-by-case basis, considering the specific circumstances and objectives of each system. The strategy for lifecycle management is categorised as follows:

- **Maintain currency.** Regular and routing patching to occur where required to resolve software bugs, security vulnerabilities, maintain system stability.
- **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'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.
- **Maintain reliability.** Replacement of the SAN system to ensure that asset management of the critical platforms aligns with Energy Queensland's Digital Asset Management Guidelines, by not extending operation of the assets beyond their useful life. This will allow for the high availability and performance of the platform to remain constant to avoid costly business disruptions due to asset failures or performance issues.

The counterfactual considers the continued use of the current infrastructure platform and supporting technology stack beyond its useful asset life from FY25 onwards. This means that only extended maintenance and support (where available) and remedial/restoration of services with be

funded through operating costs, with no capital investment in minor and major upgrade and/or replacement of the infrastructure.

The absence of capital investment in the 2025-30 regulatory control period would mean that over time the current solution would no longer be fit-for-purpose and may become incompatible with new and emerging systems and technologies used by Ergon Energy and third parties.

Whilst this option has extremely low upfront expenditure and minimal business change, these are outweighed by the growing risks that impact the efficient delivery of services within the control room and the network, as well as increased long-term costs that would have a direct impact on Ergon Energy and its customers. Long term issues resultant from this option include:

- Potential disruptions to critical business operations in the control room and in the field from degrading performance and/or failure of the underlying infrastructure and its supporting technology stack
- Increased cyber security risks associated with vulnerabilities on aging/legacy solution that becomes more difficult to efficiently secure over time
- Reduced customer confidence through potential delays in planned outages and restoration of power following unplanned outages.

The recommended option involves the replacement of the SAN in 2027/28 financial year and the replacement of the backup system in 2028/29.

4.2 Costs

4.2.1 Base Case Costs

Base Case Costs include the costs associated with keeping the legacy environment maintained in an operational state. These cover the costs associated with maintaining both hardware and software ongoing should the status quo be maintained.

Table 2 Base Case Costs

	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025-30
Capex	-	-	-	-	-	-
Opex	$0.18M	$0.19M	$0.20M	$0.21M	$0.22M	$1.00M
Totex	**$0.18M**	**$0.19M**	**$0.20M**	**$0.21M**	**$0.22M**	**$1.00M**
Benefits	-	-	-	-	-	-

4.3 Risks

The base case assumes there is no investment to add new features and improvements. This option therefore exposes Ergon Energy to several risks, as summarised in the following table

Table 3 Ergon Energy's Delivery Risks for the Counterfactual (Base Case) Option

#	Risk	Description of Risk
1	Increased risk of system failure or degradation of system performance	Aging infrastructure and the associated systems are past the end of their useful asset life and fails or reduces significantly in performance directly impacting business operations
2	Increased cyber security risks	Aging infrastructure and the associated systems are no longer being supported and able to be patched or secured. This may expose Ergon Energy to new and emerging cyber security vulnerabilities that could be exploited by actors with malicious intent. Probability of Failure (PoF): Aged technology is certain (100% likely) to contain vulnerabilities, as identified by vendors constantly releasing security related patches. Likelihood of Consequence (LoC) – Reliability: Cyber attempts on Utilities are to be expected and monitored. Provision of additional FTE along with a per server cost to ensure monitored for these risks. Est. $0.42M over the AER25-30 period.
3	Infrastructure not fit for purpose	Increased risk of the underlying infrastructure to allow integration with new control room technologies or meet evolving demands and control room needs over time
4	Increased restoration costs	An increase in frequency of technology related failures will also mean an increase in the restoration costs to restore the control room platforms back to normal operations. Probability of Failure (PoF): We have taken a minimalistic approached to the occurrence of aging technology causing a failure, and so have estimated this at only 1 occurrence in the AER period. However, as these systems are extremely complex with significant impact to business performance the impact can't be underestimated. Likelihood of Consequence (LoC) - Reliability: 100% likely that an outage would occur should no active remediation be conducted. Estimated $0.51M over the AER25-30 period.
5	Increased risk of data loss	There will be an increased risk of data loss as legacy technology may not be able to be fully restored and/or data becomes breached and leaked
6	Inability to source skills required for legacy technologies	There will be an increase in the costs and complexity of sourcing the right skills required to maintain and support legacy technology
7	More OT support team time spent on major incidents	Effort will be required to focus on non-value adding activities such as restoration as more incidents occur, meaning less effort concentrated on adding value for both Ergon Energy and the customer
8	Major impact on executing planned and unplanned control system work	An outage to the underlying OT infrastructure can lead to a failure of the control system causing cancellation/rescheduling of planned and unplanned work to the network. Probability of Failure (PoF): We have taken a minimalistic approached to estimating the impact to Customer Reliability, by limiting the exposure to 2 instances of a small 2000KWh impact. Likelihood of Consequence (LoC) - Reliability: 100% likely that an outage would occur should no active remediation be conducted.

		Estimated to have an impact of approximately $207k per annum of VCR costs and the rescheduling of planned work.
9	Inability to efficiently respond to changing business needs	Inability to efficiently respond to changing business needs (Queensland Energy and Jobs Plan, new technology, etc)

5 ECONOMIC ANALYSIS

5.1 Cost Summary 2025-30

Table 4 Cost Summary 2025-30

	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025-30
Capex	$0.0 M	$0.0 M	$0.75 M	$0.31 M	$0.21 M	$1.28 M
Opex	$0.0 M	$0.0 M	$0.0 M	$0.0 M	$0.0 M	$0.0 M
Totex	**$0.0 M**	**$0.0 M**	**$0.75 M**	**$0.31 M**	**$0.21 M**	**$1.28 M**
Benefits	$0.18M	$0.19M	$0.20M	$0.21M	$0.22M	$1.00M

5.2 NPV Analysis

Table 5 Base Case NPV Analysis

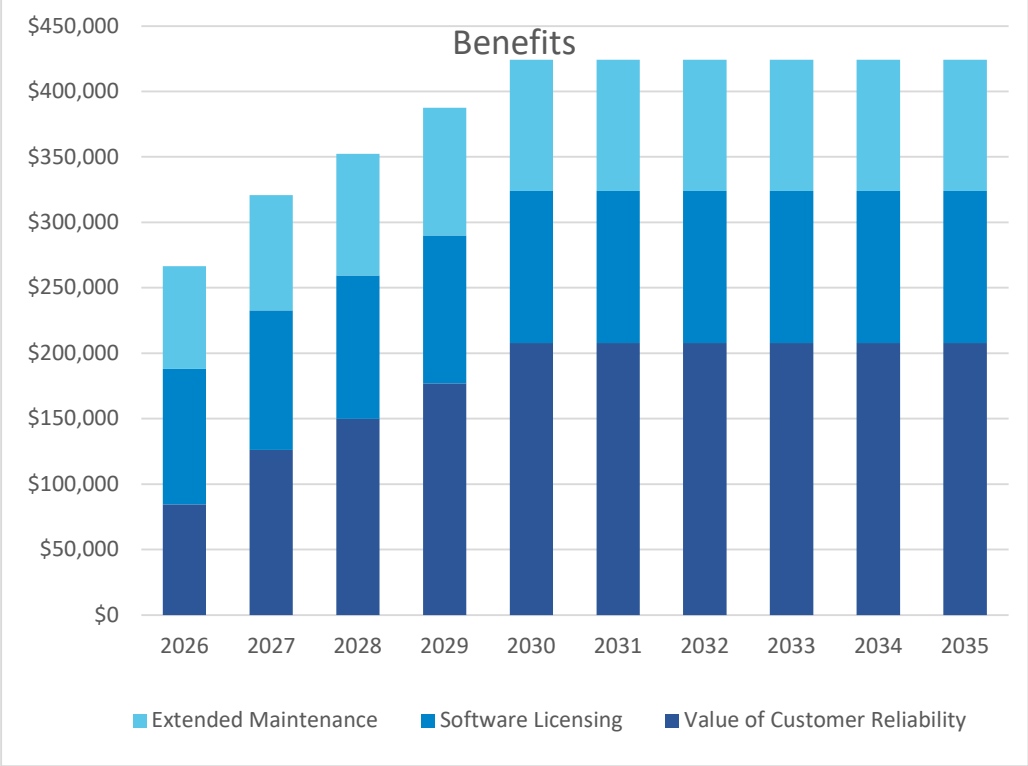
Net NPV	Capex NPV	Opex NPV	Benefits NPV
	$1.28M		($0.01M)

Table 6 NPV Sensitivity Analysis

Discount rate		Failure rate		Benefits	
2.5%	**4.5%**	**125%**	**75%**	**125%**	**75%**
($0.03M)	$0M	$0.33M	($0.35M)	$1.30M	($0.93M)

5.3 Benefit

The yearly benefits cashflow



5.4 Delivery Capability

Energy Qld has established has a robust framework in place to successfully deliver OT projects, leveraging a blend of internal expertise and external partnerships. By utilizing experienced contractors, we can quickly adapt to project demands and access specialized skills as needed. This flexibility not only allows us to scale our efforts based on the scope of each project but also ensures that we remain responsive to evolving client requirements. Over the past few years, we have significantly ramped up our delivery capabilities, successfully scaling from several projects per year to over ten.

To enhance our project execution, we have built strong collaborations with leading external firms that provide us with expertise and industry best practices. These partnerships enable us to stay at the forefront of technological advancements, ensuring that we deliver appropriate solutions. Central to our project management approach is a dedicated program manager who oversees all aspects of delivery, ensuring that projects align with strategic objectives and are executed efficiently. This leadership ensures seamless communication and coordination among all project teams and stakeholders.

In addition, our project teams include a business analyst and a change manager, both of whom play vital roles in our project delivery process. The business analyst engages closely with stakeholders to gather requirements and define project scopes, ensuring that the final deliverables meet client expectations. Meanwhile, the change manager focuses on facilitating smooth transitions, supporting teams and end-users

throughout the implementation process. This comprehensive approach, combined with our recent growth in project delivery capacity, underscores our capability to consistently deliver high-quality OT solutions that drive value for our clients.

6 PROJECT RISKS

No special project risks have been identified.

7 RECOMMENDATION

To proceed with SAN Storage and Backup replacement will improve reliability, enhance security, increase flexibility, improve efficiently, and enhance customer service, all of which will contribute to a more robust and safer network.

Table 7 Analysis Scorecard

Criteria	Counterfactual (Base Case)	OTE Server and Workstation replacement
Net Present Value	N/A	($0.01M)
Investment cost (TCO)*	$1.00M	$1.28M
Investment Risk	High	Low
Benefits	Low	High
Delivery time	Not applicable	2025-30 Period fleet replacement
Detailed analysis – Benefits	Lowest upfront cost	Replacement of the OT Infrastructure will improve platform reliability, mitigate security risks associated with legacy technology, and increase adaptability to new, or upgraded, applications and systems. It also avoids costs of $207k p.a. through VCR and additional support costs.
Detailed analysis – Risks	Whilst this option has low upfront expenditure this is outweighed by the growing risks and long-term costs that would have a direct impact on Ergon Energy's operation of its network and its ability to restore power for its customers.	Identified risks are mitigated as part of this option.
Detailed analysis - Advantages	No upfront capital investment or change management required.	Prudent and efficient asset lifecycle management of this platform in supporting critical business processes and systems. Replacement Infrastructure under vendor warranty.