Jemena Electricity Networks (Vic) Ltd

IT Investment Brief – Emergency Backstop Lifecycle Upgrade

Non-recurrent – Maintain Services

Jemena
bringing energy to life

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Glossary

Capex	Capital Expenditure
Current regulatory period	The period covering 1 July 2021 to 30 June 2026
ICT	Information and Communications Technology
Jemena	Refers to the parent company of Jemena Electricity Network
JEN	Jemena Electricity Network
Next regulatory period	The period covering 1 July 2026 to 30 June 2031
NPV	Net Present Value
Opex	Operating Expenditure
RYxx	Regulatory year covering the 12 months to 30 June of year 20xx for years in the Next Regulatory Period. For example, RY25 covers 1 July 2024 to 30 June 2025
Totex	Total Expenditure

Emergency Backstop Lifecycle Upgrade

Objective	This initiative aims to undertake major and minor upgrades of Jemena Electricity Networks Vic Ltd. (JEN)'s Low Voltage Distribution Energy Resource Management System (LV DERMS) system that underpins the mandated Victorian Emergency Backstop Mechanism (VEBM) to ensure ongoing system availability and reliability required to meet the new regulatory requirements.		
Non-recurrent ICT sub-categorisation	☒ Maintaining existing services, functionalities, capability, and/or market benefits	☒ Complying with new/altered regulatory obligations/requirements	☐ New or expanded ICT capability, functions, and services

Background

Victorian Emergency Backstop Mechanism (VEBM)

As Victoria progresses to its legislated net zero emissions goals, increasing penetration of variable distributed photovoltaic (DPV) systems has seen record minimum operational demand levels and an increasing risk of minimum system load emergency events in our state.

In response, the Victorian Government has designed and mandated the VEBM. The VEBM requires that all new and replacement DPV systems connected to Victorian distribution networks can be remotely interrupted or curtailed when the relevant distribution network service provider (DNSP) is directed by the Australian Energy Market Operator (AEMO) in a minimum system load event. AEMO directions will only be made when AEMO deems it necessary to maintain system security.

VEBM regulations

The VEBM is being implemented in two stages:

- Stage 1 commenced on 25 October 2023 and applied to new and replacement DPV systems with a generating capacity greater than 200 kilovolt-amperes (kVA) and no more than 30 megavolt-amperes (MVA), requiring that from 1 January 2024, these be capable of remote interruption or curtailment by the relevant DNSP. Costs associated with this stage are not included in this application. Instead, JEN has absorbed the necessary costs to comply with this new obligation.
- Stage 2 currently commences on 1 July 2024 and applies to new, and replacement distributed photovoltaic systems with a generating capacity of 200 kW and below.

The Victorian Government implemented the VEBM via two Ministerial Orders under section 33AB of the Electricity Industry Act 2000 (the VEBM Orders):

- Ministerial Order specifying licence condition 2023 (No.1) (Stage 1 Order) in Victoria Government Gazette No. S 542 Wednesday 11 October 2023.
- Ministerial Order specifying licence condition 2024 (Stage 2 Order) in Victoria Government Gazette No. S 31 Wednesday 31 January 2024.

JEN has implemented this capability via three key workstreams

JEN is delivering this capability via three key workstreams:

1. Digital systems, which comprise the design and implementation of:
   - LV Distributed Energy Resources Management System and Utility Server for the CSIP-AUS technology.
     - CSIP-AUS enables control (trip, restore, setpoint) and monitoring capabilities over the public internet, allowing JEN to directly or indirectly communicate with photovoltaic generation inverters using a new JEN CSIP-AUS Utility Server and LV DERMS. CSIP-AUS is the preferred solution for photovoltaic generation inverters of up to and including 200kVA.
     - LV DERMS delivers a data-driven method for managing consumer energy resources (CERs), such as rooftop solar or battery storage, while maintaining network stability within the low-voltage network.
   - Generation Monitoring Meters (GMMs) are being deployed concurrently with CSIP-AUS and adopted as an alternative method to comply with VEBM requirements—applicable for contestable revenue meter installations—for customers without a reliable internet connection or for non-inverter-based embedded generators. When connecting embedded generation using GMM, JEN will install a dedicated Vic AMI Current Transformer meter as a non-market meter. The GMM has control (trip and restore)

	capability and monitoring capability. As the GMM is a JEN-owned AMI meter, it interfaces directly into JEN's existing AMI meshed radio communications network. The GMM's internal load contactor is used to trip and restore the main contactors of the customer's inverter. This meter is used for its control and switching capabilities only; it is not used for meter data provision purposes. • Modify the existing Electricity Distribution Portal and implement the new CSIP-AUS Capability Commissioning Portal to enable photovoltaic embedded generation installers or customers to submit new required information and perform commissioning tests of inverters. • Establishment of Inter-Control Centre Communications Protocol (ICCP) with the Transmission Network Service Provider (TNSP) Transmission Operation Centre (TOC) to enable JEN's Network Operation to manage and respond to AEMO direction through the TNSP TOC via the SCADA link for real-time information. 2. Change management, communication and engagement to develop and implement the new operating model for the end-to-end process change. 3. Strategies, guidelines and documentation to ensure continued delivery against forecast inverter volume increase to maintain compliance. This Investment Brief focuses on the ongoing management of the LV DERMS system in the next regulatory period.
Customer Importance	Whilst the VEBM is a government-mandated obligation on JEN, establishing the VEBM capability will deliver benefits to our customers by: • Enabling continual uptake of photovoltaic generation, allowing customers to lower their electricity bills through self-consumption of their self-generated electricity. • Continuing to provide a safe and secure supply that benefits all customers through the effective management of grid stability by AEMO. The ongoing management of LV DERMS system is required to ensure JEN can continue delivering these benefits to customers.
Key Considerations	**Cost pass through application** JEN has implemented new systems capabilities, operating processes, and customer notification arrangements to comply with the VEBM service obligations added to our licence conditions, which must be implemented within the legislated timeframes. However, we did not forecast the costs of deploying the functionality required by the VEBM during this current regulatory control period. Instead, to implement these changes, JEN has necessarily incurred additional costs and sought to recover these through the cost recovery mechanism outlined in the JEN 2021-26 price determination.[1] The cost pass-through application[2] was approved 20 September 2024.[3] **Costs for ongoing lifecycle upgrades were not covered in the application** The cost pass through only considered costs incurred during this current regulatory period. Costs associated with ongoing maintenance and associated major and minor upgrades that will be required in the next regulatory period were not included in the cost pass through application. These costs are an incremental requirement as a result of JEN's requirement to comply with the VEBM service obligations. **System risk assessment** The LV-DERMS platform is a new product from Itron and will likely contain inherent faults and issues that have not yet been identified, removed or reduced due to the lack of exposure of the platform to real-time operational conditions and performance feedback from the market. It is expected the vendor will make adaptive changes to the software and will deliver the changes as product version updates. Also, given the Victorian Emergency Backstop Mechanism and CSIP-Aus protocol have only recently taken operational-effect from 1 October 2024, Jemena will implement the most contemporary versions of LV-DERMS software throughout the next regulatory period, in order to

[1] AER, *Final decision - Jemena distribution determination 2021–26 - Attachment 15 - Pass through events, April 2021.*

[2] Jemena VEBM cost pass through application | Australian Energy Regulator (AER) - https://www.aer.gov.au/industry/networks/cost-pass-throughs/jemena-vebm-cost-pass-through-application

[3] AER Determination - Jemena VEBM cost pass through - 20 September 2024 | Australian Energy Regulator (AER) - https://www.aer.gov.au/documents/aer-determination-jemena-vebm-cost-pass-through-20-september-2024

	best respond to further regulatory requirements that may require the LV-DERMS platform to adapt. Based on this risk assessment and our experience with implementing other less mature systems and processes, we will need to implement a higher proportion of upgrades over the next regulatory period to address new major and minor updates that address security, defects and other unidentified issues. **How we estimated costs** The estimates for this initiative have been derived using the upgrade costs from a similar Operational Technology (OT) Platform, UIQ/SIQ that has comparable complexity, duration, and scope. We believe this approach provides an efficient and accurate estimate without the need for granular project build-up, which is even more uncertain. This approach allows for cost estimation based on historical actuals for a similar platform and reduces risk. It is effective for projects such as this, where the outcomes and requirements are well known but we haven't yet undertaken any upgrades. The capital expenditure will cover costs associated with the vendor and internal JEN subject matter experts for planning, design, implementation, testing, documentation and heightened support associated with the upgrades.
Options	JEN has considered two alternatives: (1) Do nothing – maintain current version and manage the risk – not recommended (2) LV-DERMS systems lifecycle upgrade – recommended **Option 1: Do nothing – maintain current version and manage the risk** **Description** The LV-DERM system would not be updated or refreshed. JEN could attempt to put in place manual mitigations such as: • Isolation of systems to contain the unsupported system that might pose a cyber-security risk. • Minimise use of the system and switch to alternative options and paper-based approaches to accommodate for new functionality and/or integration requirements. • Develop additional custom functionality outside the application to achieve the required outcomes. These all require significant manual resource and associated cost to achieve without a guarantee that our efforts would be successful, whilst also introducing business inefficiencies and time constraints. **Benefits** By maintaining the current version, JEN would avoid incurring the costs and many of the risks outlined at Option 2 below. **Risks** Outdated LV-DERMS versions will lack crucial security patches and updates, making them vulnerable to cyber threats and data breaches, compromising the confidentiality, integrity, and availability of the JEN environment. Whilst the vendor would continue to provide support, over time, as the LV-DERMS becomes more and more out of date compared with current versions, it will become more and more difficult to address system performance and availability issues. Eventually, the older versions would be unsupported all together increasing risks all the more. Furthermore, an outdated LV-DERMS version will lack defect-fixes, new features, functionalities, and/or integrations that streamline operations. As technology evolves, an outdated LV-DERMS version will become incompatible with newer software, data formats, or hardware platforms, limiting interoperability and hindering collaboration with external stakeholders. Collectively, this will result in a significant risk to JEN's ability to comply with the VEBM.

Summary

This option 1 (Do nothing) is not recommended as we believe the risks outlined above are not acceptable and we do not consider it reflects good industry practice.

Option 2: LV-DERMS lifecycle upgrade - recommended

Description

The objective of this option is to mitigate the disruption to business operations that could affect VEBM obligations and associated impacts on customers by proactively managing the lifecycle risks associated with LV-DERMS.

The primary objectives of this LV-DERMS Lifecycle Upgrade project are:

- Undertake lifecycle upgrades to ensure the LV-DERMS platform is performing as is required.
- Take advantage of patches, fixes and corrections to LV-DERMS suite to continuously improve the reliability and resilience of the platform to enable compliance with the VEBM.

Benefits

This upgrade approach would result in us continuing to use the same LV-DERMS platform as we currently have in place and maintaining a broadly similar IT architecture which leverages our inherent expertise and capabilities with existing systems.

As such, it reduces implementation risk given the upgrade to existing systems does not involve the installation of new technologies and requires minimal business process change.

The key benefit of this approach is that LV-DERMS would have full vendor support and all the functionality that comes with that including security patches, bug fixes, documentation updates and corrections.

Risks

The key risk associated with upgrading to a latest version is internal staff availability however we mitigate this risk by planning ahead to ensure relevant subject matter experts and developers are available. Where this isn't possible, we will leverage external vendor support.

Costs

JENs costs for this option is outlined in the table below.

$2024	RY27	RY28	RY29	RY30	RY31
Total Capex	$1,842,754	$808,803	$808,803	$1,842,754	$808,803
Non-recurrent Opex					
Recurrent-step Opex					
Total Opex					
Totex	**$1,842,754**	**$808,803**	**$808,803**	**$1,842,754**	**$808,803**

As noted in the table above, this option will incur non-recurrent capex costs of $6,111,917 over the next regulatory period to upgrade JEN's LV-DERMS. JEN has based these costs on a similar project (refer 'key considerations' above) and assumes a prudent approach to resourcing using a blend of employees ('internal labour') allocated to the project (project management, architecture, development, test and support resources), supplemented by consultants and/or contractors ('external labour'). This mix will be refined as further planning, design and market engagement is undertaken.

<table>
<tr><td></td><td colspan="6">Summary
This option is recommended as we consider it reflects good industry practice given the benefits and risks outlined above. Furthermore, it provides the lowest sustainable cost approach relative to the alternative option considered.</td></tr>
<tr><td>Options Summary</td><td colspan="6">The table below summarises the quantitative and qualitative differences between the analysed options.
<table><tr><th>$2024</th><th>Capex</th><th>Opex</th><th>Totex</th><th>NPV</th><th>Residual Risk</th></tr><tr><td>Option 1</td><td>Not applicable</td><td>Not applicable</td><td>Not applicable</td><td>Not applicable</td><td>Very High</td></tr><tr><td>Option 2</td><td>$6,111,917</td><td>$0</td><td>$6,111,917</td><td>Not applicable</td><td>Low</td></tr></table></td></tr>
<tr><td>What We Are Recommending</td><td colspan="6">JEN proposes to proceed with Option 2: LV-DERMS Lifecycle Upgrade.
JEN considers that it best reflects good industry practice and provides the most efficient cost.</td></tr>
<tr><td>Dependencies on other Investment Briefs</td><td colspan="6">Not applicable.</td></tr>
<tr><td>Relationship to ICT Capital Forecast</td><td colspan="6">The supporting modelling for this investment brief is contained in the following model: JEN – IT Investment Brief – Emergency Backstop Lifecycle Upgrade – Costs and Benefits Analysis Model.</td></tr>
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