Jemena Gas Networks (NSW) Ltd

IT Investment Brief – Gas Retail Markets Settlement - Major Application Lifecycle

Non-Recurrent – Maintain

Jemena
bringing energy to life

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Glossary

AEMO	Australian Energy Market Operator
AEST	Australian Eastern Standard Time
CABS	Contract Administration and Billing System
Capex	Capital Expenditure
CLP	Change in Linepack
COTS	Commercial Off-The Shelf software solution
Current regulatory period	The period covering 1 Jul 2020 to 30 Jun 2025
ELMS	Emergency Load Management System
ICT	Information and Communications Technology
Jemena	Refers to the parent company of Jemena Gas Network
JGN	Jemena Gas Network
Next regulatory period	The period covering 1 Jul 2025 to 30 Jun 2030
NPV	Net Present Value
OBA	Operational Balancing Arrangement
OBG	Operational Balancing Gas
Opex	Operating Expenditure
OS	Operating System
RMP	Retail Market Procedures
RMP	Retail Market Procedures
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
SAP	SAP accounting and Enterprise Resource Planning software
SCADA	Supervisory Control and Data Acquisition System
SCLP	Share of Change in Linepack (required for short term trading market)
STTM	Short Term Trading Market
Totex	Total Expenditure
UAG	Unaccounted for Gas

Gas Retail Markets Settlement – Major Application Lifecycle

Objective	The objective of this initiative is to efficiently maintain the critical functions of Jemena Gas Network's (**JGN**) Contract Administration & Billing System (**CABS**) and Emergency Load Management System (**ELMS**) application, which are critical systems for the functioning of gas markets and networks in NSW.		
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

JGN uses a single, bespoke, system to provide retailer nomination, network balancing, unaccounted for gas supply management, invoicing and managing gas emergency functionality. These functions are provided through the operation of the following systems: CABS and ELMS.

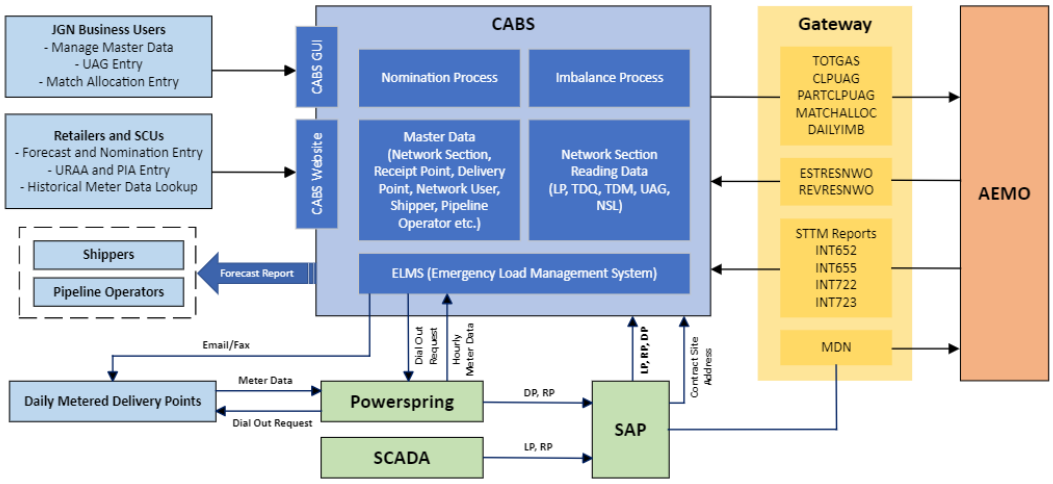
Contract Administration & Billing System (CABS):

- Manages the demand of customer contract information, generating no-operational balancing arrangement data (No-OBA) requiring (OBG) allocation calculation agent and invoicing capability.
- Managing nomination / forecasting services, sending critical market data to AEMO for Short Term Trading Market (STTM) and non-STTM (NSW Regional and ACT) networks and provisioning controlled access for authorised retailers, self-contracting users, and with-consent 3rd-parties to access customer meter data.

Emergency Load Management System (ELMS)

- Emergency Load Management System for gas supply and network emergencies that require key "demand–class" consumers to reduce load.

Figure 1: Architecture Diagram showing CABS, ELMS in the context of our wider system network



Capabilities delivered as part of the 2020-25 Regulatory Period

As part of the 2020-25 regulatory period, JGN proposed an initiative called STTM System Replacement". This initiative focussed on the separation of the STTM function from the CABS and ELMS system into a bespoke application. Initial works on this project in the 2020-25 regulatory period included moving the application infrastructure to the cloud and addressing cyber security vulnerabilities.

- Moving the application infrastructure to the cloud delivered cost savings with lower infrastructure costs, on demand scalability to handle increased usage, improved resilience with support for disaster recovery, business continuity and high availability.
- Addressing the cyber-security vulnerabilities has ensured that our customer data is not compromised, and the market obligations are not put at risk of being breached. The remediation program addressed key open cyber risks, embeds security best practices and future proofs application against current known vulnerabilities.

Following a detailed assessment of the architecture options, the proposal for the 2025-2030 regulatory period is to decouple two applications: ELMS (for internal users only) and CABS (for both internal and

	external users), and rewriting these applications, including the STTM component for CABS, to alleviate key issues outlined below: **Key Residual Issues** • Whilst JGN has moved the system to cloud platforms and updated the underlying database and Operating system, the underlying technologies such as webservers are ageing and requires re-platforming / re-write. As a result application users have highlighted several pain points associated with the current platform including, slow performance, outdated technology, poor user navigation experience, limited internal and external reporting, inflexible system configuration, manual handling of customer data for key business operations, and security vulnerability concerns. • The system cannot be maintained: JGN can no longer access the software vendor, developer organisation or any of the individuals involved in the original development. The system cannot be readily modified and is at risk of other changes within the ICT environment affecting it in ways JGN may not be able to mitigate. • JGN does not have in house capability or ready to access external capability to update or repair the software in the event of catastrophic failure. With a growing need for rapid response in the digital domain—especially with growing cyber security risks—JGN cannot respond and thus puts the gas markets functionality at risk of failure. • The ageing technology is incompatible with new security features making it prone to cyber security risks and ongoing risk remediation is time consuming. • CABS is integral to JGN's ability to meet its market obligations for STTM and the non-STTM networks, with STTM being the most business-critical regime to support—there are no other provider or systems that provide these services. If any market or rule change is introduced by regulatory bodies, it is almost certain markets would be impacted. Systems need to be in a ready-state for market reform, especially given the speed at which changes are taking place in the energy market. To initiate a full new system development would not meet the timing requirements of market reforms. • CABS is not a standalone system, it is one which is intricately connected with multiple systems. This drives a requirement for significant regression testing when there are changes within the application itself or on the wider interconnected systems. Any maintenance, updates or addition of features add to the complexity imposed by the outdated programming framework the application was built on. This is further impaired by the presence of redundant (but still executing) code and the lack of skills and documentation available to support the application.
Customer Importance	ICT plays a critical role in JGN's ability to deliver safe, secure, reliable, and affordable services to customers. Throughout the engagement with them for this submission, customers outlined that they expect JGN to maintain the current services throughout the 2025-30 period. To enable JGN to maintain current service levels, CABS and ELMS must continue to be reliable, secure, and meet the other performance requirements of its role in the market as they are critical systems for the functioning of gas markets and networks in NSW and other jurisdictions. Retailers, self-contracting users, and with-consent 3rd parties use the CABS application to access current and historical consumption information. More than 400 Commercial and Industrial customers access hourly consumption data via subscription. This application is business critical and is required to support these customer functions 24x7.
Key Considerations	CABS is integral to JGN's ability to meet its market obligations for STTM and non STTM networks. Due to the critical nature of the CABS system, JGN has an obligation to ensure it is highly reliable and can be supported in line with changes occurring in the gas network. The following have been considered when developing our options: • JGN is managing its market obligations under the current system, although with some risk. • We have been able to port the application to run on the cloud and with supported hardware and layered software (OS and database) platforms that reduces the risk and potential for instability. • We have also not had a market or rule change that cannot be accommodated for some years. • The risk mitigations in place today are tactical solutions, not strategic ones.

	• The long-term solution is to port the application functionality onto a new, supported platform. It can be achieved in 2 phases. The first phase is decoupling of the ELMS functionality from the current CABS/ELMS platform. The second phase is to re-build the CABS application from the ground up using modern technologies and best practices.
Options	JGN has considered 4 options to deliver the capability articulated above: (1) Do nothing (2) CABS/ELMS re-write / re-platforming (3) COTS replacement (4) Application modernisation **Option 1: Do nothing** **Description** This option requires that no action is taken, and the current system would not be updated or refreshed. **Benefits** • By doing nothing, JGN would avoid incurring the costs and increase our overall risk profile in relation to the risks outlined above. **Risks** • Lack of investment will result in a significant and, over time, increasing risk to JGN's ability to meet its market obligations reliably. • The outdated components and ageing technology may have outdated security features and lack the latest patches, making it prone to cyber security risks. • The technology may not be compatible with the other applications, which will restrict the integration with other applications, leading to inefficiencies and restricted use. • The application over time may result in slower processing, longer response time and increased downtime, impacting employee, customer experience and ability to fulfil market obligations. • The application maintenance costs may increase as it would be difficult and would take longer to patch the application with compatible components. • It will restrict innovation, delivery of new features and adoption of new technologies. **Summary** This option is not recommended. As outlined above, there are significant risks of doing nothing, moreover, there would generally be no benefits for JGN for incurring these risks other than avoiding the costs. JGN also considers that it does not reflect good industry practice. **Option 2: Re-write / Re-platforming** **Description** This option will decouple ELMS function from CABS application onto a new supported platform and a re-write of the CABS application, both to be a bespoke in-house development. **Benefits** • De-coupling the ELMS function from CABS application would reduce overall complexity, improve maintainability, and fault tolerance. • A re-write would provide an opportunity to implement latest security practises, encryption standards and authentication mechanisms, reducing the risk of security breaches. • A re-write would allow alignment of software features with customer needs, increase agility and flexibility to incorporate new features and enhance overall user and customer experience. • A re-write would allow seamless integration with third party services, ensuring compatibility with latest technologies.

- A modern well architected application would make it easier to handle increased user demand without impacting the performance and responsiveness.
- Reduce the time and effort required for monitoring, troubleshooting and resolution of issues.
- A resilient and adaptable application that can maintain same level of market obligation and incorporate changing compliance requirements effectively.

Risks

- Application decoupling and re-write can be resource intensive, and it may exceed the allocated budget due to unforeseen complexities, increased development time and unexpected dependencies.
- Data migration, mapping issues, data inconsistencies may arise during migration process, leading to data integrity, loss, or data corruption.
- Users may need to be retrained on the new application, which can be time consuming. Poor user adoption may impact the success of the new application.
- Access to business intelligence to reverse engineer application features, application logic and reconciliation for key business operations.
- Disruption to business operations if key business functionality is not available in the new application.
- Risk of not meeting compliance and market obligations due to integration challenges.
- Inadequate testing may result in release of new system with undiscovered flaws, negatively impacting performance and user experience.

Costs

$2023	RY26	RY27	RY28	RY29	RY30
Total Capex	$2,567,340	$1,813,080	-	-	-
Non-recurrent Opex	$86,480	$201,480	-	-	-
Recurrent Step Opex	$15,000	$15,000	$15,000	$15,000	$15,000
Total Opex	$101,480	$216,480	$15,000	$15,000	$15,000
Totex	**$2,668,820**	**$2,029,560**	**$15,000**	**$15,000**	**$15,000**

This option will incur non-recurrent totex costs for JGN of $**4**,**743,380,** comprising $4,380,420 non-recurrent capex, $287,960 non-recurrent opex and recurrent step opex for JGN of **$75,000** for the 2025 – 2030 period to deliver Gas Retail Markets Settlements capability.

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. It provides a strategic solution to address the problem. It ensures JGN's core applications remain current, reliable, secure and fit for purpose. The outline scope of works for Option 2 is:

- Capture market requirements for STTM and other markets.
- Capture business functional requirements and non-functional requirements (security, performance, availability, user experience, etc.)
- "Reverse engineering" of the current operations of the CABS and ELMS application.
- An architecture design for the CABS and ELMS application.
- Build of the ELMS application followed by CABS to deliver the market and business functional and non-functional requirements.
- User training.
- Conduct AEMO market testing and cutover.
- Retire and decommission the existing applications.

Option 3: COTS Replacement

Description

This option refers to replacing the current application with a commercially available, pre-built solution that can be purchased or licensed off the shelf.

Benefits

- A COTS solution if available, would reduce initial development time and can be deployed more quickly than custom solutions.

Risks

- A complete COTS is unlikely due to specific and unique business use cases supported by the CABS/ELMS application. At large, combination of multiple COTS is likely to be required to cover ELMS and CABS capabilities.
- Lack of business intelligence may result in difficulties to assess adequate COTS solution and combination required.
- COTS solution may require customisation to meet current and proposed business requirements, which may introduce additional complexity.
- Vendor dependency for ongoing support, maintenance, and development.
- Total cost of ownership may be higher due to upfront costs, license fees, maintenance, and customisation.
- Transition from current custom-built system to a COTS solution may involve data migration challenges, mapping issues, data inconsistencies, leading to data integrity, loss, or data corruption.
- Users may need to be retrained on the new application, which can be time consuming. Poor user adoption may impact the success of the new application.

Summary

This option is not recommended as JGN business requirements and use cases are unique and suitable vendors or products have not been identified in the previous regulatory submissions or this period.

Option 4: Application Modernisation

Description

This option refers to making tactical improvements to the underlying infrastructure, platform, and minor code improvements without re-designing the current solution.

Benefits

- A more cost-effective option with minimal or no additional training for business users.

Risks

- Limited opportunity to improve end user experience by not re-designing solution.
- Lack of development intelligence to make major improvements to an unsupported platform.
- Legacy code base may hinder ability for timely updates and support.
- New business features or additional compliance requirements may result in additional customisation and breaking changes.
- Existing design may limit the ability to seamlessly integrate with third party services.

Summary

This option is not recommended as we do not consider it reflects good industry practice given the risks outlined above. Furthermore, it does not provide the lowest sustainable cost. Its tactical and not strategic, offers limited flexibility to introduce new features, requires initial upfront investment and

<table>
<tr><td></td><td>ongoing costly maintenance, resulting in cumulative technical debt which would require a re-write at a later stage.</td></tr>
<tr><td>Options Summary</td><td>The table below summarises the quantitative and qualitative differences between the analysed options.
<table>
<tr><th></th><th>Capex ($2023)</th><th>Project Opex ($2023)</th><th>Ongoing Opex ($2023)</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>High</td></tr>
<tr><td>Option 2</td><td>$4,380,420</td><td>$362,960</td><td>$75,000</td><td>($5,358.7)</td><td>Low</td></tr>
<tr><td>Option 3</td><td>Not applicable</td><td>Not applicable</td><td>Not applicable</td><td>Not applicable</td><td>Not assessed</td></tr>
<tr><td>Option 4</td><td>Not applicable</td><td>Not applicable</td><td>Not applicable</td><td>Not applicable</td><td>Not assessed</td></tr>
</table>
In addition to Project Totex, there would be an additional ongoing run costs of $15,000 per year, resulting in total run costs of $75,000 over 5 years.</td></tr>
<tr><td>What We Are Recommending</td><td>Option 2 - Re-write / Re-platforming is the recommended solution. This option best reflects good industry practice and provides the lowest sustainable costs. It will decouple ELMS function from CABS application onto a new supported platform and a re-write of the CABS application, both to be a bespoke in-house development. It provides a strategic solution to addressing the problem.
Given the unique nature of the Short-term Trading Market within NSW (and the Operational Balancing Gas regime in ACT), an in-house custom solution is the only clear option. CABS and ELMS de-coupling provides greater opportunity to deliver a more contemporary user experience and reduce current technical debt with a new design approach. It also leverage the use of existing cloud services and it ensures JGN’s core applications remain current, reliable, secure and fit for purpose.</td></tr>
<tr><td>Dependencies on other Investment Briefs</td><td>This Investment Brief is also related and aligned to the following Investment Briefs for the 2025 – 2030 period;
Cybersecurity - A re-write of the CABS application would provide an opportunity to implement latest security practices, encryption standards, and authentication mechanisms, reducing the risk of security breaches.
SAP Migration – SAP is an input to the CABS system, if it is allowed to reach end-of-support it will risk the CABS program’s abilities.</td></tr>
<tr><td>Relationship to ICT Capital Forecast</td><td>The supporting modelling for this investment brief is contained in following investment framework model: JGN - IT Investment Brief - Gas Retail Markets Settlement Support - Costs and Benefits Analysis Model</td></tr>
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