Jemena Electricity Networks (Vic) Ltd

Technology Plan

IT Investment Brief - Asset Mgt and GIS

Non-Recurrent - Maintain and New Capability

Glossary

Current regulatory period	The regulatory control period covering 1 Jan 2016 to 31 Dec 2020
Intervening period	The period covering 1 Jan 2021 to 30 Jun 2021 covers the time between the current regulatory period and the next regulatory period. The Intervening period arises with the move from a calendar year regulatory year to financial
Next regulatory period	The regulatory control period covering 1 Jul 2021 to 30 Jun 2026
RYxx	Regulatory year covering the 12 months to 30 June of year 20xx for years in the Next Regulatory Period and the 12 months to 31 December of year 20xx for years in the Current Regulatory Period *For example, RY20 covers 1 January 2019 to 31 December 2020 and RY22 covers 1 July 2021 to 30 June 2022. For readability, regulatory years during the current period are written in the form CYxx*
CYxx	The calendar year which covers the 12 months to 31 December of year 20xx. For the current regulatory period, this is equivalent to RYxx
GIS	Geographic Information System
JEN	Jemena Electricity Network (Vic) Ltd.
ICT	Information and Communications Technology
Jemena	Refers to the parent company of Jemena Electricity Network

Asset Management and GIS - Non-Recurrent Projects

Objective	To ensure Jemena Electricity Network (**JEN**) has fit for purpose Asset Management (**AM**) and Geographic Information Systems (**GIS**) to maintain the effective management of network maintenance, augmentation, and replacement planning. GIS forms a significant part of an ecosystem of related asset management tools and functionality that are focussed on the management of network assets through a spatial view of the grid.
	This document covers non-recurrent capital projects for the core GIS application and related systems that manage, store or process geographic information (no specific non-recurrent AM projects are planned during the next regulatory period). These are defined as projects are valued individually under $1m but in aggregate exceed $1m and are to enhance or extend JEN's GIS capabilities to meet emerging requirements, improve future efficiency and customer outcomes, or are for lifecycle updates of systems to maintain existing capabilities that occur on a frequency of less than once every five years.
Background	JEN currently operates the Smallworld GIS software supplied by GE and this application is customised to work on JEN's distribution network. JEN utilises the core variant of Smallworld, which leverages a generic GIS data model; however, this is not tailored to the changing needs of electricity networks operating in Victoria (in essence, the system does not receive the benefit of vendor updates as is the case for many of our other systems). To overcome this type of system deployment, JEN's installation of Smallworld GIS has been modified over time with several customisations that are necessary to manage electricity network geospatial data. The option to move to a dedicated, electricity-specific data model continues to be reviewed, but such a transition is not planned for the next regulatory period.
	JEN's GIS is a business-critical system providing geospatial data to internal and external systems and integrating with the Outage Management System (**OMS**), Distribution Management System (**DMS**) and SAP environments. The GIS is necessary to provide timely and accurate geographic data of asset location for external services (such as Dial Before You Dig (**DBYD**)), efficient construction, maintenance, fault management and outage notification and restoration. Given the critical nature of the GIS system, a failure could result in JEN failing to maintain service levels, and in extreme cases cause harm to employees, customers and the broader community.
	The GIS requires constant enhancement to remain fit-for-purpose for JEN's requirements. This need for continuous attention is primarily driven by new data requirements, such as for reporting of information requested by regulators and Governments (and their agencies), new device/asset types being connected to the network, analysis to support more advanced asset management approaches, and to enable an analysis of emerging issues that affect the quality of supply.
	As digital asset data is becoming more central to the planning and operation of the network and is being utilised in ways that differ from traditional use cases (e.g. CIC portals), JEN has found that the requirements for accurate and timely asset data are increasing. Completeness, currency and consistency issues, (e.g. from legacy data capture processes or manual entry) can introduce sources of error that now have more negative widespread consequences across more systems, internal and external users and customers. Investment in optimising asset data structures, the utilisation of additional, high-resolution comparative data sources, and the provision of evergreen GIS systems with strong controls on data entry, modification and access can minimise the occurrence of such consequences. Continuous network, process and systems changes—often through customisations— are required for supporting the data quality, which becomes critical to network safety and supply reliability.
Customer Importance	The JEN GIS and related systems play a critical role in enabling JEN to deliver safe, secure, reliable and affordable services to its customers. This enables JEN to provide a high-quality service that is expected by electricity customers. The GIS impacts on all facets of JEN's business and is therefore critical to the supply of electricity distribution services to customers.

	To maintain current service levels, the GIS System—that stores, analyses and reports on JEN's asset and GIS information—must have a high level of integrity and reliability.
Strategic Approach	JEN's approach to managing ICT Asset and specifically, GIS systems, is to continue the rationalisation and consolidation of asset-related applications and to leverage a common platform across all of Jemena's network assets to minimise the overall whole-of-life capital and operating costs. JEN's approach to maintaining the GIS is based on continuing the successful management practices in place during the current regulatory period; this will ensure that capabilities are maintained so that JEN will retain savings derived from the GIS. To deliver against this objective, investment in the GIS to ensure it is fit for purpose; that is, as changes to other systems and network assets in the ICT eco-system change, modification of the GIS will also be required to ensure it operates within the broader ICT ecosystem. (Note: This service is ordinarily provided by vendors through system updates, however, as JEN's GIS is customised, these vendor updates do not occur). The continued widespread use of the GIS is necessary for JEN to meet service levels contained in the next regulatory period.
Investments	JEN has proposed nine non-recurrent projects for the GIS. Four projects are once-off or low-frequency lifecycle updates to maintain existing capabilities. They deal with how the GIS based data is correctly represented in other systems such as SAP asset management modules, the reporting systems and the customer portal. The remaining five projects add new systems (land management and project portfolio management) or new capabilities to the JEN asset management and geographical information systems. The projects and cost breakdown are outlined in the tables below:

Non-recurrent - maintain

Project Title ($2021)	Project ID	RY22	RY23	RY24	RY25	RY26
Asset Data Structures & Data Optimisation	ITEG01	408,910	136,790			
GIS Creating ZSS Objects in GIS interface to SAP	ITEG12		358,260			
GIS Data Warehouse Trend Analysis	ITEG14	428,382		431,518		
Public Lighting Portal CX Hub Integration & Lifecycle - PK1	ITEF14	162,266			164,069	
Total - Maintain		**999,557**	**495,050**	**431,518**	**164,069**	**0**

Non-recurrent – new capability

Project Title ($2021)	Project ID	RY22	RY23	RY24	RY25	RY26
Land Management System	ITEG17	324,532				
GIS Communications Data In the GIS	ITEG11		227,984	457,671	229,696	
GIS High Definition Data Sources (new capability)	ITEG16			137,301	275,635	138,338
Integrated Project Portfolio Management - New System	ITSE05		375,371			
SSN SIQ Performance Uplift for Power Quality Management	ITEF24	467,325				
Total – New Capability		**791,857**	**603,355**	**594,972**	**505,332**	**138,338**

		Total – Non-recurrent		1,791,414	1,098,405	1,026,490	669,400	138,338

These costs were estimated using JEN's standardised estimator tool for IT projects as described in the Technology Plan under the section on Forecasting Method.

Benefits	The proposed projects will increase the data storage capabilities of the GIS, ensure a high degree of data quality and enhance the analysis the GIS is capable of being used for. This will drive long term efficiencies in the maintenance, augmentation and replacement of the network, which are already embedded within our forecasts.
	The 'maintain' projects seek to address known problems and risks to the quality of the data within the GIS and simplify the processes required for JEN's analysts to interrogate and analyse the available data. This will remove potential sources of error to prevent inefficient asset management decisions being made.
	The 'new capability' projects will add new data sources to JEN's existing asset management datasets and enable JEN to collect more detailed geographic data that can be used to derive service delivery benefits in subsequent regulatory periods (i.e. after the next regulatory period).
Risks	There are no material risks associated with the deployment of these projects; the small size of the individual projects reduces delivery and capacity risks. However, not deploying the projects will not allow JEN to meet the growing and changing customer expectations and better manage safety risks.
	As an operator of utility infrastructure, generally in the public environment, JEN faces several risks related to the consequences to the public, often from circumstances that are not in JEN's control – such as excavation by third parties damaging buried assets. Buried assets are effectively hidden to both JEN, and third parties and knowledge of their locations is dependent on an accurate and reliable GIS. The GIS ecosystem is a fundamental tool that supports the effectiveness of several critical controls against risks.
	JEN manages this risk through the provision of a GIS ecosystem consisting of integrated systems and asset data, which provides the basis for information as to the nature of JEN assets, including location, type, etc. This information supports such activities as a response to incidents and emergencies, DBYD enquiries, growth planning, standby activities (supervision of high-risk civil works), etc. Unlocking this information so that it is accessible and transferable is essential, and the ongoing enhancement of the GIS ecosystem is targeted at these principles. Additionally, ensuring the information provided is as accurate as possible is another driver in enhancing the GIS ecosystem – especially as the linkage between the elements of the ecosystem will provide cross-check and validation of the data, improving the accuracy for stakeholders.
	The JEN GIS is the single source of truth for the network model, and system performance and availability, and the availability and accuracy of the model is fundamental to the effectiveness and capabilities of downstream systems such as the OMS and DMS. Incorrect or out of date network data used by OMS/DMS can have ramifications to customers through inefficient management of operations, planned and unplanned outages, faults and emergencies.
	Without the continued enhancement of the GIS, JEN may be unable to meet customer and stakeholder expectations for the safe and reliable operation of the electricity network.

Capital Expenditure Criteria	Rule 6.5.7(c)(1) of the National Electricity Rules (**NER**) state the AER must:
	subject to subparagraph (c)(2), accept the forecast of required capital expenditure of a Distribution Network Service Provider that is included in a building block proposal if the AER is satisfied that the total of the forecast capital expenditure for the regulatory control period reasonably reflects each of the following (the capital expenditure criteria):
	(i) the efficient costs of achieving the capital expenditure objectives;
	(ii) the costs that a prudent operator would require to achieve the capital expenditure objectives; and
	(iii) a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objectives
	Undertaking the GIS enhancements, the proposed capital expenditure is consistent with the NER as it is:
	1. Efficient – The option selected is the most cost-effective long term option that meets the necessary operational requirements to meet the compliance with legislative, regulatory obligations and Australian Standards. Expenditure forecasts are based on observed historical costs for similar JEN projects under incentive schemes that incentivise efficient investment.
	2. Prudent – The expenditure is necessary to maintain and improve the safety of services for JEN's customers, employees and contractors requiring access to JEN's network. The expenditure will ensure robust industry-standard systems within a GIS ecosystem are available to effectively manage network safety through the improvements to existing data quality, the capture of new network equipment, workforce mobilisation and integration of integrity management and DBYD systems.
	3. Capital expenditure objectives – The expenditure will enable JEN to meet regulatory obligations and maintaining the safety of the distribution system.
Relationship to ICT Capital Forecast	The proposed projects are contained in the ICT investment plan as seven separate non-recurrent projects. These are Project IDs: ITEG01, ITEG12, ITEG14, ITEF14, ITEG17, ITEG11, ITEG16, ITSE05 and ITEF24.
ITEG01	**Asset Data Structures & Data Optimisation**
	The scope of this project is to investigate known issues with the existing GIS data structures. This will require resetting the data hierarchy and architecture in JEN's SAP system (in particular the modules related to ERP and IS-U which hold the data models for how information is stored around the assets and the interaction between assets and customers). Resetting the data hierarchy is an *enabler*, that provides the foundation for enhancements – for the GIS and more importantly, between the GIS and the eco-system of asset data systems within which the GIS operates.
	The original data hierarchy was designed as part of the SAP (enterprise system) implementation, which was influenced by the structure of the legacy ERP, and before the development of the GIS. This hierarchy was continued into the GIS to ensure consistency and to ensure that the GIS was implemented without undue complexity. The data hierarchy for SAP is based upon a fiducial logic; concerning the nature of utility assets, it is not structured in a way that fully exploits the capabilities of a geographical tool such as GIS.
	This project will provide an ability to identify opportunities for future maintenance improvements to systems more effectively. The formal scoping and project definition includes the review of accepted and good industry practice.
	The cost estimate is based on JEN's understanding of the data structures in the GIS and SAP systems and the size and complexity of the interfacing requirements that this is likely to incur. Based on this,

	JEN assesses that this is a small-medium sized level project that will take up to 2 years to implement and is of medium complexity.
ITEG12	**GIS Creating ZSS Objects in GIS interface to SAP** The scope of this project is to simplify the addition of future ZSS assets to the GIS and remove the existing double-entry requirement where assets are entered both into GIS and SAP. This will create a small increase in efficiency in the long run (limited new ZSS assets will be installed in the network between the completion of the project and the end of the next regulatory period, so benefits will mostly be in future periods) and will reduce the risk of data mismatches between GIS and SAP.
ITEG14	**GIS Data Warehouse Trend Analysis** The scope of this project is to develop a capability to assess trends over time in GIS data and ensure the required information for trend analysis is stored rather than deleted to free up space. The benefits of this project will be realised in future periods when multiple periods of information is available to conduct meaningful trend analysis on issues the network faces, such as DER and solar enablement. This capability will allow for the avoidance of future costs and risk that would otherwise be incurred.
ITEF14	**Public Lighting Portal CX Hub Integration & Lifecycle - PK1** The scope of this project is to integrate the public-lighting portal and the GIS (and is consistent with the expectations our local councils told us during our customer engagement sessions). This integration will enable the automation of producing public-lighting fault reports for the Municipal Association Victoria and will allow the integration of public-lighting faults data into public-portals to provide better access to the data for relevant interested parties.
ITEG17	**Land Management System (LMS)** The scope of the project is to provide a digital platform and process for the management of land and property owner related information, including location-based integration with the GIS. JEN currently uses spreadsheets (and other independent packages) and paper-based processes, with no locational context for tracking landowner information, network property interests, easements, leases and the like. Access to this information is problematic, and there is no timely or digital access for field staff. This project scope efficiently leverages the existing LMS in the Jemena (gas transmission) pipes business to provide a new capability that brings together process and data consistency across Jemena's networks. Utilisation of an LMS within JEN would support regulatory compliance, and communication consistency with landowners, property managers, developers, councils etc. The project will require a significant data migration and data cleanse. The proposed project benefits include: • Access to Land Management and GIS data in the field to assist with user location concerning restricted areas which may change over time or be unclear when in the field. • Consolidated location-based view of asset and property-related data to assist in the management of Jemena's interests in the environment surrounding its assets, and the manager of risk from third party activities within the same environment. • Minimise the loss of land and property information and facilitate prompt and efficient recording. The cost estimate is based on experience with Land Management Systems in Jemena's gas pipes business. Based on this, JEN assesses that this is a small to medium project that will take less than three months to implement and is of low complexity.

ITEG11	**GIS Communications Data in the GIS** The scope of this project is to add all communications assets to the GIS and extend GIS functionally to meet business requirements. Currently, only the physical assets are included in the GIS, not information about the electronics and capacity of the assets. This will enable JEN to perform dedicated communications network analytics such as calculations of capacity and improved ability to detect and find faults.
ITEG16	**GIS High Definition Data Sources** The scope of this project is to enable the GIS to store high definition imagery and other data types through the establishment of an appropriate technology/capability (and associated tools) as a central repository to cater for data sources beyond the currently utilised traditional 2D, relational database or file-based GIS vector/raster data sources. The solution will facilitate the management and storage of new spatial data types and its use for analytics and operational decision making. This will increase the availability of and access to these data sources for JEN staff, which is expected to better facilitate long-term decision making, in particular for maintenance and asset replacement. Significant storage and computing capability will be required regardless of the mix of on-premise versus Cloud-based functionality and storage. Potential Data Types include 3D cityscapes and the built environment, LIDAR, geolocated ground penetrating radar (**GPR**), remote sensing, drone patrols/data, aerial photography and satellite imagery and the terrestrial scanning of facilities. The proposed project benefits include: - When overlain with asset location, the use of 3D cityscapes and the built environment provides a high level of situational awareness when making operational decisions in response to faults and emergencies. - In-house capability for high resolution, spatial data sources provides opportunities to combine information and perform analytics from a variety of current and historical information sources which would not be possible if data acquisition and storage was decentralised and outsourced. - Integrity management programs that are supported through the availability of asset condition data from remotely sensed activities such as drones that would otherwise be prohibitive to capture (in location, time or cost where access is severely restricted and at times unsafe. - Management of critical infrastructure can be achived better through greater access to sophisticated data on terrain, floods, bushfires, etc., assessment of threat and the identification of mitigation measures to maintain the integrity of supply. - The use of non-destructive asset location techniques such as GPR minimises the need for physical excavation and disruption and improves the accuracy of underground asset location which is a critical control in reducing third party damage, greatly enhancing the information available for DBYD enquiries.
ITSE05	**Integrated Project Portfolio Management** The scope of this project is to implement a shared Project Portfolio Management (PPM) capability across Jemena. This is not related to the GIS ecosystem but applies to the works and asset management function and the management of the entire program of work for the JEN electricity distribution network. Core functions include: 1. Planning and control including Project Management Office (PMO), reporting, inventory management 2. Resource planning 3. Commercial management of service providers (e.g. Zinfra), and the mechanism of service provider selection and engagement. 4. Reporting:

	a) Portfolio reporting data b) Customer performance data c) Control and process data. The solution will implement a consistent program management view of asset works in both networks to be able to manage and schedule the project work and balance resourcing. This process is currently completed manually or with the aid of simple spreadsheets and Microsoft Project plans. The cost estimate is based on expectations of the size and complexity of the shared solution obtained from Jemena's experiences using a basic cloud-based solution in the current regulatory period. Based on this, Jemena assesses that this is a medium-sized project that will take up to 6 months to implement and is of medium complexity.
ITEF24	**SSN SIQ Performance Uplift for Power Quality Management** The scope of this project is to enable high-frequency data to be added to the GIS. By collecting and analysing this additional data, JEN will be able to analyse to determine how best to meet service challenges.