Jemena Gas Networks (NSW) Ltd

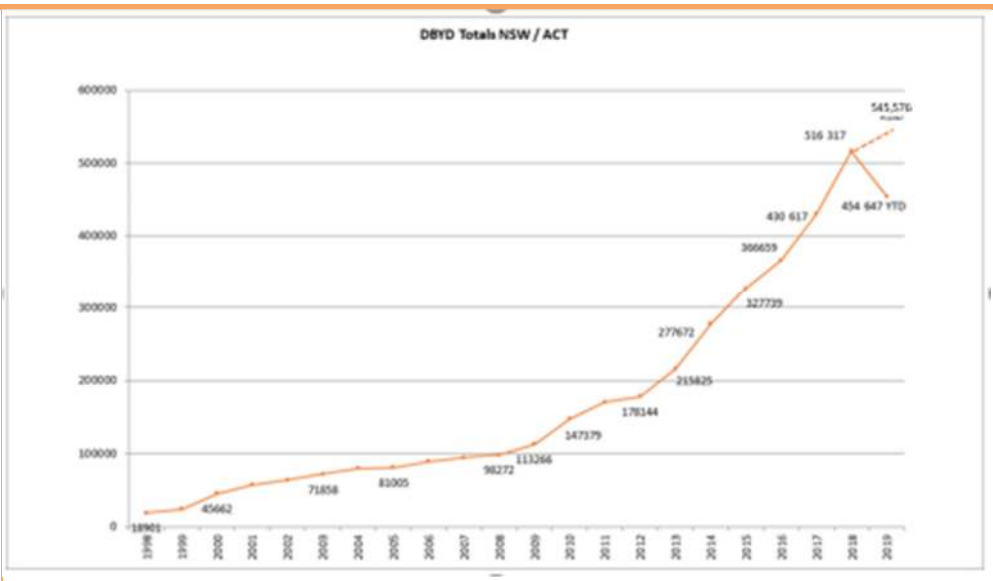
Investment Brief
GIS Dial Before You Dig (DBYD)

Glossary

2020-25 regulatory period	The period covering 1 July 2020 to 30 June 2025
AER	Australian Energy Regulator
Current regulatory period	The period covering 1 July 2015 to 30 June 2020
DBYD	Dial Before You Dig
GIS	Geographical Information System
ICT	Information and Communications Technology
JGN	Jemena Gas Networks (NSW) Ltd
NGR	National Gas Rules
RYxx	Regulatory year covering the 12 months to 30 June of year 20xx. For example, RY20 covers 1 July 2019 to 30 June 2020.
SME	Subject Matter Expert
SQL database	SQL is an abbreviation for structured query language and is a standardized query language for requesting information from a database.

1. Dial Before You Dig

Introduction	The Gas Supply Act requires that Jemena Gas Networks (NSW) Ltd (**JGN**) be a member of a designated information provider to enable organisations or persons undertaking civil works to obtain accurate information about the location of the JGN network. Currently in NSW, Dial Before You Dig NSW/ACT Incorporated is the specified designated information provider. The vast majority of the JGN assets (25,000 km of pipe and the majority of facilities) are buried and unable to be visually sited prior to civil construction works that require excavation. All civil constructors need to be able to plan and safely execute their construction activities which relies on an understanding of these assets they cannot see. Dial Before You Dig (**DBYD**) delivers a service designed to assist in preventing damage and disruption to Australia's vast infrastructure networks. Any project, irrespective of size, has the potential to damage assets located around the work site, leading to service interruptions, delays, costly repairs and in the worst case scenario, injury or death. Obtaining information from DBYD members significantly minimises these risks by providing information about the work site. On 1 July 2010 New South Wales became the first Australian jurisdiction to enshrine DBYD in law. The formal name for the legislation is the *Energy Legislation Amendment (Infrastructure Protection) Act 2009* (**Act**). The relevant supporting Regulation is the *Gas Supply (Safety and Network Management) Regulation 2013*. Under this Regulation, DBYD must be notified for: • Almost all work on private property, including work approved by a Council, • Work by a public authority, and • Work on underground utility services. Once an enquiry is lodged, details including the location, date and type of work being carried out are then sent to all listed infrastructure owners with assets in the vicinity of the project. The asset owners will then respond directly to the person enquiring with information on the location of their infrastructure assets. This information is normally provided in the form of plans and is required to be on site to ensure the right information is available before the excavation commences. JGN experiences approximately 200 third party 'hits' to its distribution system per month. Each of these hits has the potential to injure or kill the excavator, a JGN worker or a member of the public and/or lead to the loss of supply of one or more customers. This risk is recognised in JGN's top level risk register as: *If catastrophic public safety incidents occur, then there will be potential fatalities, financial loss, reputational and social licence impacts.*
Objective	The objective of this investment brief is to move the current high risk bespoke DBYD application to a robust industry standard cloud platform (Ticket access) in order to continue to meet JGN's regulatory obligations and meet expectations of stakeholders for quality and timeliness of responses.
Background	JGN's DBYD application manages and responds to over 500,000 annual customer requests with detailed asset location and excavation conditions which is integrated to JGN's Geographic Information System (**GIS**). Over the last 10 years the number of enquiries has been growing at an average of 10% per annum, as more organisations and individuals recognise their regulatory obligations – refer to chart below. The exponential increase also reflects the number and extent of the civil (horizontal) construction activities in New South Wales. JGN is forecasting the continued exponential increase in the volume of requests for the next five years as the technical regulator starts to audit compliance by (following the initial honeymoon period), and as further civil infrastructure projects are planned and delivered (additional road network extensions, additional light rail proposals, western Sydney metropolis, etc.). Current forecasts are for the level of enquiries to exceed 800,000 per annum by 2025.



Stakeholder demographics range from the domestic homeowner, professional services, trades or large developments and emergency services all requesting responses for asset information 24/7.

JGN's current DBYD capability is delivered by a bespoke SQL database / script solution based upon legacy scripted business rules. This bespoke SQL database is an inherently a higher risk to the ongoing provision of the JGN DBYD service due to limited capability to:

- Manage the forecast increase in future DBYD inquiries – the current bespoke SQL database and scripting was originally implemented in 2016 as an interim solution due to the significant escalation in the number of inquiries and isn't a scalable solution for the volume of enquiries forecast.
- Track what information was provided to the stakeholder, including:
  - Identifying any non-standard information that has been supplied to a stakeholder
  - Tracking of any revisions to drawings that have been supplied
  - Tracking and matching additional requests for related infrastructure works.
- Develop *bots*[1] to minimise manual input, confirm legitimacy of information supplied (eg address and location) or enhance the information provided to the stakeholders.
- Provide visual representation of proposed works in the GIS, enabling our control centre to prioritise or highlight areas of works that may affect JGN's gas distribution network.
- Visually display in the GIS where DBYD inquires have been made in relation to asset damages by 3rd parties for analysis to allow for opportunities to identify and enhance customer communications targeting reductions in asset damage and subsequent increase in safety of the network.
- Implement an "impact assessment and permitting system" that is consistent across the NSW utility industries, for the management of 3rd party excavations and encroachments within the vicinity of high-risk assets to minimise the likelihood of damage and ensure safety requirements are followed.

These are required to improve response times, data capture for DBYD management tools to drive reduction in asset damages, customer education and ultimately increase the safety of the public and 3rd parties working in and around JGN's critical gas networks.

Safety	The ability for JGN to effectively, efficiently and accurately respond to DBYD enquiries is a key risk for JGN. The key risks to be managed relate to maintaining the safety of the gas distribution network due to 3rd party activities (generally civil construction). With over 500,000 enquiries per annum, if only one per cent were not effectively answered and led to third party hits, the number of hits would increase by a multiple of 25 compared to current level. This would have the potential to lead to a significant increase in injuries and potentially deaths, and costs.

[1] A **bot** is an automated application used to perform simple and repetitive tasks that would be time-consuming, mundane or impossible for a human to perform with the large transaction volumes that are forecast.

Effect on Customers	Third party hits to JGN's network threaten the integrity (leading to loss of supply occurrences) of JGN's gas distribution network which have the potential to lead to a significant increase in loss of supply incidents for customers. Therefore, it's important that JGN provides relevant information to 3rd parties to avoid damage to its network.
Regulatory Obligation	As outlined in the introduction above, JGN has a regulatory obligation to participate in the DBYD process under the Act and supporting Gas Supply (Safety and Network Management) Regulation 2013. Through its' Safety and Operating Plan JGN has committed to the NSW Government to respond to all DBYD enquiries within 48 hours.
Strategic Approach	The JGN DBYD application and GIS are intrinsically linked must be invested in to ensure they are fit for purpose. The GIS is the repository of the drawings and maps that are provided as indication of the locations of the JGN underground (and aboveground) assets. Should the DBYD system fail, the impacts to the DBYD community, JGN's operations and the risk of damage are unacceptable for the reasons outlined above. As the current bespoke DBYD platform has reached its useful life, the strategic approach is to move into a robust industry standard cloud platform (Ticket access) with full vendor support of the solution. The strategy will also be to address current gaps within the bespoke system to fully integrate both DBYD and GIS into existing work practices to improve network safety and stakeholder communications. there is a pressure from stakeholders to reduce the response time to 24 hours to provide better flexibility in scheduling works. The majority of other utilities have now adopted the 24 hour level of service expectations of stakeholders. Storage of records is also required to comply with audit and reporting requirements.
Current IT systems	**DBYD Gas Response System** – developed bespoke solution utilising custom code, SQL data bases, web service integration to GIS, emailing solution and workflow to select a response type. The application has limited vendor support and required Jemena IT to maintain specialist skills in order to maintain support to server hardware/software. **GIS** – is an out of the box gas specific GIS system with configuration items to received DBYD requests, create the applicable maps using DBYD configured layers and colours and passing back to the DBYD application. The application is current and fully supported by the vendor and Jemena IT.
Options	JGN has considered the following two options: • Continue to use the existing systems • Replace the DBYD platform. **Option 1: Continue to use existing systems** **Description** This option will involve continuing to maintain the existing DBYD system and manual processes over the 2020-25 regulatory period. This is the business as usual ('counter-factual') option and provides no benefits to JGN, its customers or risks to support and network operations. It will result in a deteriorating stakeholder experience, will increase safety risks and degrade level of customer service (due to supply interruptions) as the platform fails or, earlier, if the current business support SME leave the business. **Direct Unescalated Costs (mid-year 2018)** JGN's costs for this option are outlined in the table below.

$2018	RY21	RY22	RY23	RY24	RY25
DBYD	20,000	20,000	20,000	20,000	20,000
Total	**20,000**	**20,000**	**20,000**	**20,000**	**20,000**

This option will incur recurrent costs for the maintenance of existing DBYD system.

These costs were estimated using the current running costs for providing this service. During the 2020-25 regulatory period JGN would incur $0.1m of ICT capital expenditure under this option.

Risks

This option will expose JGN to the following safety and operational risks:

- System failure – Significant DBYD inquiry increase is forecast over the next five years that places an unacceptable risk on the current bespoke solution and is likely to contribute to an increase in asset damage, public safety risk and response times noting that we have a regulatory requirement to respond within 48 hours to all DBYD inquiries.
- Inability to integrate to the "Impact Assessment and Permitting System" to effectively manage 3rd party encroachments for increased network safety.
- Inability to capture DBYD locations in the GIS for analysis against network damage to identify opportunities/strategies for a reduction in 3rd party asset damage.
- Inability to identify high risk customers to trigger customer contact.
- Inability to have a fully vendor supported out of the box DBYD system.
- Inability to implement custom workflows based on GIS data within the vicinity of a DBYD location.

Benefits

There are no benefits associated with this option.

NPV Analysis

This option has an NPV of $-87k.

See attachment "NPV for GIS DBYD Investment Brief"– NPV Calc|Option 1.

Summary

Option 1 has the lowest cost and involves minimal recurrent ICT capex during the 2020-25 regulatory period. However, it also does not deliver any benefits and results in JGN being exposed to unacceptable operational and safety risks. It is presented as the 'counter-factual'.

Option 2: Replace the existing DBYD platform

Description

This option is to invest in replacing the JGN DBYD platform and enhanced integration with the GIS ecosystem to provide better functionality, supportability, increased safety of the network and an improved experience to stakeholders and maintain level of service (supply) for customers.

This project comprises:

1. Consolidation of DBYD onto a platform interacting across the GIS ecosystem (Project ID ITSE04). This project element is critical for the capturing, delivery and reporting of regulatory obligations for the DBYD response times, and artefacts provided in response to customer / developer requests including any additional revisions and the management of 3rd party encroachments.
2. Lifecycle upgrade to the JGN DBYD platform (Project ID ITSD01). Upgrades are provided by vendors regularly and versions need to be kept current to access the proper support channels and maintain security. This project was originally submitted as non-recurrent expenditure in JGN's Access Arrangement proposal dated June 2019. In consideration of the recently released (November 19) Australian Energy Regulator (AER) Non-network ICT capex assessment approach,[2] JGN has re-categorised the capex as 'recurrent ICT capital expenditure' given that the expenditure relates to ongoing lifecycle upgrades.

[2] AER Framework for Forecasting ICT Capex

Direct Unescalated Costs (mid-year 2018)

The table below shows JGN's bottom-up analysis of the work that will be required.

$2018	RY21	RY22	RY23	RY24	RY25
DBYD System Consolidation	144,544	144,544			
GIS DBYD Consolidated System Lifecycle					225,797
Total	**144,544**	**144,544**			**225,797**

This option will incur total capex of $0.515M (non-recurrent capex of $0.289M and recurrent capex of $0.226M) over the 2020-25 regulatory period which will displace some recurrent expenditure (compared to Option 1). The cost of the individual projects was estimated using JGN's standardised estimator tool for IT projects as described in the Technology Plan under the section on Forecasting Method.

The cost estimates for each project shared between JGN and Jemena Electricity Networks (**JEN**) have been determined as follows:

- DBYD System Consolidation (ITSE04) - Based on out of the box install with configuration items including web services to GIS, GIS mapping output development and configuration, business validation rules, integration to GIS and drawing management systems to create a DBYD solution which then becomes robust industry standard software fully supported by the vendor. Based on this, Jemena assesses that this is small to medium level project that will take up to 12 months to implement and is of significant complexity.
- GIS DBYD Consolidated System upgrade (ITSD01) – Based on a standard out of the box upgrade predominantly completed by the vendor with GIS configurations performed by Jemena IT. Based on this, Jemena assesses that this is small-medium level project that will take less than 6 months to implement and is of medium complexity.

Conforming capital expenditure

Rule 79(1)(a) of the National Gas Rules (**NGR**) states:

> *The capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.*

Undertaking this project, the proposed capital expenditure is consistent with the NGR rule 79 as it is:

1. Prudent – The expenditure is necessary to maintain and improve the safety of services and maintain the integrity of services to customers and personnel and is of a nature that a prudent service provider would incur. The expenditure will ensure JGN has a robust industry standard system to manage the significant increase in DBYD inquiries predicted over the next five years and the subsequent system impacts, risks and opportunities for improvement this will invariably create.
2. Efficient – The option selected is the most cost-effective long-term option that meets the necessary operational requirements in order to meet the compliance with legislative, regulatory obligations and Australian Standards.
3. Consistent with accepted and good industry practice – Addressing the risks associated with effectively managing large volumes of DBYD inquiries and the system impacts is accepted as good industry practice. In addition to the reduction of risk as low as reasonably practicable in a manner that balances cost and risk is consistent with Jemena Risk Management Manual and AS2885.

The project is also consistent with NGR rule 79 (2)(c), because it is necessary to:

1. Maintain and improve the safety of services (79(2)(c)(i)) – By implementing proven industry standard solutions including the integration to an "impact assessment and permitting system" for

the effective management of 3rd party excavations and encroachments within the vicinity of high risk assets. This allows for the effective end to end management of the initial DBYD inquiry where locations have a higher risk and therefore minimise the likelihood of damage and ensure safety requirements are followed.

2. Maintain the integrity of service (79(2)(c)(ii)) – By implementing proven industry standard and stable solutions to manage large volumes of inquiries 24/7 that has a direct correlation to the safety of the network.

3. Comply with a regulatory obligation (79(2)(c)(iii)) – JGN is required by the Act to ensure the network is operated in a safe manner and a continuous supply of gas to customers is maintained at all times.

Benefits

There are no direct, quantifiable benefits for this option. The qualitative benefits include:

- Full vendor supported industry standard application reducing current bespoke system risks.
- Capture, storage and retrieval of original and revision of DBYD information supplied.
- Ability for 'bot' development to minimise manual input and enable processes to support operational activities for the sole aim of minimising asset damage.
- Ability to use industry standard communication protocols to integrate and communicate to the IT ecosystem.
- Visual display of DBYD inquiry locations in the GIS with age profiles and links back to the DBYD inquiry. Provides benefits with asset damage investigations visually and allow for further data analytics.
- Artificial Intelligence to alert of possible opportunities for customer contact to enhance network, public and customer safety and gas supply reliability.
- Reduction of risk associated with system stability and supportability within the context of forecast significant growth of DBYD inquiries over the next five years rising from 500,000 to >800,000 inquiries per year.
- Ability to integrate DBYD and GIS to a Gas industry standard "Impact Assessment and Permitting System" for the active management of 3rd party excavations and encroachments within the vicinity of high risk assets to minimise the likelihood of damage and ensure safety requirements are followed.
- Maintain customer and DBYD expected response times within the agreed 48 hours. Current industry standard for most asset owners exceeds the minimum timeframes to less than 1 hour. Option 2 will support the continuation of these expectations.
- Continue to provide 24/7 response times supporting emergency services with critical information when and where its required.

NPV Analysis

The NPV of this option is $-442k.

See attachment "NPV for GIS DBYD Investment Brief" – NPV Calc|Option 2.

Summary

Option 2 is expected to establish a robust and compliant DBYD capability which is using all of the pertinent and contemporary source data to respond to requests and post response requirements.

Options Summary

The table below summarises the quantitative and qualitative differences between the options.

	NPV $2018 (Cost)	Qualitative Risks (Risk)	Qualitative Benefits (Level of Service)
Option 1	$-86k	Unacceptable (high)	Nil (counterfactual)
Option 2	$-442k	Low	Substantial improvement

What We Are Recommending	Option 2 is the preferred option. This option will reduce risks to an acceptable level by ensuring that DBYD remains an effective control, reduce customer exposure to loss of supply and maintain compliance with JGN's regulatory obligations.
Relationship to ICT Capital Forecast	The preferred option for this business case is contained in the ICT investment plan as a non-recurrent project ITSE04 followed by a recurrent project ITSD01for life-cycling.