

**ID15 Network Planning Tools
Consolidation & Replacement
Preliminary Gate 2 Business Case**

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Preliminary Gate 2 Business Case

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1 EXECUTIVE SUMMARY

1.1. Background & Business Problem

Energex and Ergon Energy's networks, and the environment in which the companies operate, are very different to what they were when Energex implemented the network planning tools DINIS, PSS-SINCAL and NetPlan [REDACTED] and when Ergon Energy implemented PSS-SINCAL [REDACTED] and built the Distribution Feeder Database DFD [REDACTED]

Distribution forecasting is the first step in the Network Planning process. Energex and Ergon Energy's Forecasting Group uses algorithms to predict the network capacity requirement needs of the future. Thereafter, in Energex the Planning Group uses DINIS (distribution level) and PSS-SINCAL (sub-transmission level) and in Ergon Energy Powerfactory (distribution) and PSS-SINCAL (sub-transmission levels) to model different network scenarios and to determine the best option to deliver the forecast load.

The existing DINIS, Powerfactory and PSS-SINCAL modelling and analysis functionality supports company operations in the following areas:

- Network optimisation and configuration;
- Network upgrades and modifications;
- Planning customer connections;
- Contingency planning;
- Fault investigations;
- Protection scheme design, modification and upgrade; and
- Regulatory reporting.

Energex's NetPlan and Ergon Energy's Distribution Feeder Database (DFD) are repositories and tools for the planning, monitoring, analysis and reporting of distribution feeder assets. Each network feeder is listed in NetPlan and DFD including their historical performance and current status. Network Managers raise capital projects considering analysis of feeder limitation data in NetPlan and DFD. In addition to providing a repository for Energex's feeder data, NetPlan also holds forecast information for feeder assets (e.g. future load, planned projects) and gives the asset manager a feedback mechanism for forecasts. Furthermore, Ergon Energy's DFD provides reliability performance data and penetration levels of new technologies and PV systems on a feeder basis.

This investment proposal primarily responds to the need for sustainable and fit-for-purpose ICT solutions to support Energex and Ergon Energy's distribution network planning processes. As such, it is closely dependent on the accompanying investment in Distribution Forecasting Tools Consolidation & Replacement (business case ID06). At the time of the planned replacement, the legacy planning tools will be between 15 and 23 years of age. The existing tools no longer support the growing need for more sophisticated engineering analysis (e.g. summarising feeder constraints and performances on a more granular network and customer levels, providing more information about the impact of PV systems and new technologies and alignment with RIN and DAPR requirements).

[REDACTED]

The current situation therefore represents a supportability and business continuity risk in relation to Energex and Ergon Energy's network planning functions and to the companies' compliance with regulatory obligations.

1.2. Investment Overview

This investment proposal ensures the ongoing supportability, sustainability, security and suitability of Energex and Ergon Energy's network planning tools and processes.

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1.3. Options Analysis

- Option 1 – Proceed with the consolidation and replacement of planning tools (preferred)
- Option 2 – Independent Energex and Ergon Energy network planning tools replacement
- Option 3 – Do minimal

“Option 3 – Do minimal” defers renewal of the companies’ legacy network planning tools. It therefore represents a material risk to the companies’ continued delivery of their network operations and service delivery obligations.

1.4.1 Energex Option Comparison

¹ Bracketed figures indicate negative values.

1.4.3 Energex Expenditure Summary (Option 1 – Preferred)



1.4.4 Ergon Energy Expenditure Summary (Option 1 – Preferred)



1.5. Benefits

The preferred option delivers benefits including:

- Sustainment of the companies' network planning tools for ongoing supportability, serviceability, security and suitability.
- Continues to meet AER asset reporting requirements, as well as all other regulatory obligations.
- Improves consistency of network planning at all relevant levels of the network.
- Sustains network reliability, utilisation and performance as network load becomes less predictable in nature into the future due to increasing numbers of PV, EV, storage and technology changes in the network.

Sustains network reliability, utilisation and performance as network load becomes less cyclic in nature into the future due to increasing numbers of PV, EV, storage and other network DERs being connected to the network. The investment is also a critical enabler of Energy Queensland's planned productivity improvements which result in a forecast 10% reduction in indirect costs and 3% improvement in program of work labour costs.

The consolidation of network planning tools supports this improvement with benefits including:

- Labour intensive set-up and validation of the DINIS and PSS-SINCAL models is reduced through integration of planning tools with the Unified GIS.
- Productivity improvement through improved planning process automation.
- Reduction in costs from third party providers conducting network studies on behalf of Energex and Ergon Energy.
- Through improved network data and analysis capability, network investment plans can be tailored and optimised.
- Improved accuracy in network investigations at the low voltage and small area network level, resulting in Energex and Ergon Energy's ability to integrate new technologies, such as Microgrids.

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1.6. Investment Risks



1.7. Customer Focus

With more granular planning, capital investment expenditure in the electricity network is optimised for the benefit of the customer and the community.

The existing types of study tools (DINIS and PSS-SINCAL) and related planning tools and databases, such as NetPlan and DFD, are essential for modelling of current and future scenarios and planning accordingly, ensuring safe and reliable electricity supply to the customer. The investment in network planning tools replacement ensures the sustainability of this capability, supporting the increasing rollout of new and maturing network customer technologies (including solar PV, batteries, electric vehicles, energy efficient appliances etc.).

2. INVESTMENT OVERVIEW

2.1. Background and History

Energex and Ergon Energy's networks, and the environment in which the companies operate, are very different to what they were when Energex implemented the network planning tools DINIS, PSS-SINCAL and NetPlan [REDACTED] and when Ergon Energy implemented PSS-SINCAL [REDACTED] and built the Distribution Feeder Database DFD [REDACTED]

The complexity of the networks has grown significantly and the ways that customers use energy has also changed. There has been a significant increase in the deployment of advanced power electronic devices embedded in the network, changing power flows and demand profiles.

Energex and Ergon Energy have an obligation to perform network forecasting and network planning to ensure that future network load requirements are appropriately anticipated and that the electricity network infrastructure prudently accommodates the future need.

Distribution forecasting is the first step in the planning process. Energex and Ergon Energy's Forecasting Group uses algorithms to predict the network capacity requirements of the future. Thereafter, in Energex the Planning Group uses DINIS (distribution level) and PSS-SINCAL (sub-transmission level) and in Ergon Energy Powerfactory (distribution) and PSS-SINCAL (sub-transmission levels) to model different network scenarios and to determine the best option to deliver the forecast load.

The existing DINIS, Powerfactory and PSS-SINCAL modelling and analysis functionality supports company operations in the following areas:

- Network optimisation and configuration;
- Network upgrades and modifications;
- Planning customer connections;
- Contingency planning;
- Fault investigations;
- Protection scheme design, modification and upgrade; and
- Regulatory reporting.

DINIS has been in operation at Ergon Energy until recently. In the current regulatory control period, Ergon Energy transitioned from DINIS to a more modern platform (DigSILENT PowerFactory). Energex still uses the DINIS tool, [REDACTED]

[REDACTED]

Energex's NetPlan and Ergon Energy's Distribution Feeder Database (DFD) are repositories and tools for the planning, monitoring, analysis and reporting of distribution feeder assets. Each network feeder is listed in NetPlan and DFD including their historical performance and current status. The Forecasting Group enters the feeder forecasts into NetPlan (manually) and subsequently Asset Managers, based on local knowledge, accept the forecast or makes adjustments (e.g. customer connection requests, large land developments etc).

Network Managers raise capital projects considering analysis of feeder limitation data in NetPlan and DFD along with detail load flow and fault study analysis performed by DINIS or PSS-SINCAL. In addition to providing a repository for Energex's feeder data, NetPlan also holds forecast information for feeder assets (e.g. future load, planned projects) and gives the asset manager a feedback mechanism for forecasts.

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Furthermore, Ergon Energy's DFD provides reliability performance data and penetration levels of new technologies and PV systems on a feeder basis.

Users of NetPlan and DFD, such as Network Planners, Asset Managers and Connection Officers, rely on accurate feeder asset information and reports, making NetPlan and DFD vital repositories across the organisation.

Both NetPlan and DFD are in-house built tools that have grown organically and are now at end-of-life.

This investment proposal primarily responds to the need for sustainable and fit-for-purpose ICT solutions to support Energex and Ergon Energy's distribution network planning processes. As such, it is closely dependent on the accompanying investment in Distribution Forecasting Tools Consolidation & Replacement (business case ID06). At the time of the planned replacement, the legacy planning tools will be between 15 and 23 years of age. The existing tools no longer support the growing need for more sophisticated engineering analysis (e.g. summarising feeder constraints and performances on a more granular network and customer levels, providing more information about the impact of PV systems and new technologies and alignment with RIN and DAPR requirements). In the case of the key legacy NetPlan system and DFD, there is requirement for engagement of different resources and limited available skills to continue maintaining the in-house developed platforms, with key system designers and subject matter experts having left the organisation.

The current situation therefore represents a supportability and business continuity risk in relation to Energex and Ergon Energy's network planning functions and to the companies' compliance with regulatory reporting obligations.

2.2. Business Problem and Rationale

The proposal is justified on the basis of compliance, sustaining current capability and providing suitable capability for the changing electricity network and customer environment into the future.

Key issues include:

- **Aging ICT assets**

This investment proposal primarily responds to the need for a sustainable and fit-for-purpose ICT solution to support Energex and Ergon Energy's network planning processes. At the time of the proposed investment, the existing legacy forecasting tools will be between 15 and 23 years of age.

[REDACTED]

[REDACTED]

The current situation represents a business continuity risk in relation to Energex and Ergon Energy's network planning function, renewable generation connections and to the companies' compliance with regulatory reporting obligations.

- **Supportability risk results in network protection business continuity risks**

It is industry standard practice to determine network protection requirements and designs through modelling, ensuring safe and reliable network operations.

The Energex and Ergon Energy's Protection Group are daily users of the DINIS/PSS-SINCAL modelling packages. The work includes modelling of network protection settings, new protection schemes and conducting fault analysis.

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- **Lack of automation in an increasingly complex business function**

All interactions with the DINIS models involve a large amount of manual processing and interpretation of input and output data. [REDACTED]

Users of the PSS-SINCAL and DINIS applications rely on timely and accurate updates from the Network Data teams. Each time the network is augmented, Network Data personnel update the DINIS model manually. This is a major limitation and opportunity area for productivity improvement.

The sub-transmission modelling tool, PSS-SINCAL, is also used for 10-year period studies. Staff have developed their own models of what a section of the network will look like at a certain point in the future. [REDACTED]

Annual RIN and Reset RIN reports source significant amounts of data, either directly or indirectly from the Planning Tools. The nature and volume of regulatory requirements and reporting has changed such that significant effort is now required to extract, calculate and assemble data and information in a timely manner to ensure compliance.

- **Regulatory obligation business continuity**

The replacement [REDACTED] will ensure that Energex and Ergon Energy can meet their obligations for accurate and timely network planning reporting, including:

- **Distribution Annual Planning Report (DAPR)**

Energex and Ergon Energy must each prepare a Distribution Annual Planning Report (DAPR). It includes a distillation of the network feeder limitations which is sourced from NetPlan (Energex) and DFD (Ergon Energy) as well as forecasting tool (see the ID06 Distribution Forecasting Tools business case).

- **Regulatory Information Notice (RIN) Reporting**

Energex and Ergon Energy have an obligation to submit network asset health and performance information through RIN reporting (Annual RIN and Reset RIN). DINIS, PSS-SINCAL, NetPlan and DFD are key tools supporting the companies' compliance e.g. reporting on maximum feeder demand and other feeder related characteristics, modelling to identify constraints, etc. This information is combined with information sourced from forecasting tools (see the ID06 Distribution Forecasting Tools business case) and consolidated through the Enterprise Intelligence Platform (see the ID08 Information Repositories business case).

- **Distribution Loss Factor Report**

The National Electricity Rules (NER) require that a Distribution Network Service Provider (DNSP) determines the Distribution Loss Factors (DLFs) for all connection points on its distribution network either individually or collectively. The modelling activities in DINIS (Energex) and PSS-SINCAL (Energex/Ergon Energy) provide the data and information to prepare the DLF report.

- **Network planning tools for the modern electricity network**

In recent years, there has been a significant shift in how and where electricity is produced and stored. Customers have taken a much greater interest in their energy consumption and there is an increased awareness about climate change impacts. Solar PV installations on commercial and residential rooftops are common, the penetration of batteries is increasing and electric vehicles are a significant consideration for the future.

This drives the need to conduct planning analysis for both larger and smaller geographical areas and at all levels of the network, compared to the approach for traditional electricity distribution (centralised, large scale generation supplying large geographic areas).

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Energex and Ergon Energy's current network modelling and planning tools are limited to load flow and fault analysis studies. [REDACTED]

[REDACTED] Therefore, the organisation lacks capability to understand how the network will behave as new technologies are connected to the network. The current modelling capabilities are no longer sufficient for the changing network environment.

This investment proposal will implement a toolset that enables network planning activities for the modern network.

2.3. Investment Objectives

This investment in network planning tools consolidation and replacement will deliver on the following objectives:

- Ensure ongoing supportability and sustainability of ICT platforms to support the network planning process.
- Replace and consolidate the network planning tools, enabling consistent state-wide processes and network planning optimisation.
- Deliver required capability to plan for demand and energy requirements at all relevant levels of the network.
- Deliver required capabilities to plan small area networks.
- Support productivity improvement through reduced manual process intervention (e.g. manual data sourcing, data preparation and uploading).
- Support improved network utilisation and capital investment planning, through enhanced scenario modelling capabilities with contemporary methods and tools.

3. STRATEGIC ALIGNMENT

3.1. Alignment to Energy Queensland Strategic Objectives

This investment aligns with the Energy Queensland Strategic Objectives in the following ways:

Strategic Objective	How this investment contributes to the Strategic Objective of EQL	Impact
1. Community and customer focused Maintain and deepen our communities' trust by delivering on our promises, keeping the lights on and delivering an exceptional customer experience every time.	With more granular planning, capital investment expenditure in the electricity network is optimised for the benefit of the customer and the community. Planning tools are essential for modelling of current and future scenarios and planning accordingly, ensuring safe and reliable electricity supply to the customer. The investment in network planning tools replacement ensures the sustainability of this capability, supporting the increasing rollout of new and maturing network customer technologies (including solar PV, batteries, electric vehicles, energy efficient appliances etc.).	Medium
2. Operate safely as an efficient and effective organisation Continue to build a strong safety culture across the business and empower and develop our people while delivering safe, reliable, and efficient operations.	This investment improves productivity through reducing labour intensive work (e.g. manual entry of data into tools) and improves network investment modelling and analysis capabilities. This investment delivers improved network protection analysis to support safe and reliable network operation.	High
3. Strengthen and grow from our core Leverage our portfolio business, strive for continuous improvement and work together to shape energy use and improve the utilisation of our assets.	This investment delivers modelling capabilities at the low voltage level network, resulting in better network utilisation and reduced cost to the customer through a more accurate understanding of the infrastructure requirements and available solutions.	Medium
4. Create value through innovation Be bold and creative, willing to try new ways of working and deliver new energy services that fulfil the unique needs of our communities and customers.	The investment will provide the capabilities to simulate the effects of prospective generation and behaviour (e.g. simulation of network tariff change impacts, demographic developments, changes in technology penetration or effectiveness). This can ultimately result in supporting the modelling of dynamic pricing for energy, demand and potentially transport / storage capacity, depending on the time and the specific local characteristics of the network.	Medium

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3.2. Alignment with National Electricity Rules (NER)

The table below details the alignment of the proposed solution with the NER capital expenditure objectives as regulated by the AER.

NER Objective Alignment	Rationale
6.5.7 (a) (2) The forecast capital expenditure complies with all applicable regulatory obligations or requirements associated with the provision of standard control services	<p>This investment is required to maintain Energex and Ergon Energy's capabilities to plan for future network investment appropriately, enabling prudent capital network expenditure through optimised network plans.</p> <p>The proposed ICT expenditure ensures compliance with AER reporting requirements, such as compliance with the Annual Planning Report reporting requirement, RIN obligations and Distribution Loss Factor Report.</p>
6.5.7 (a) (3) The forecast capital expenditure maintains the quality, reliability and security of supply of standard control services	<p>The investment in network planning tools responds to the need to replace aging ICT assets and the need for planning capability which recognises the impacts of current and potential network utilisation trends (e.g. Solar PV, batteries, electric vehicles).</p> <p>Through accurate planning, Energex and Ergon can continue to ensure the quality, reliability and security of standard control services.</p>
6.5.7 (c) (1) (i) The forecast capital expenditure reasonably reflects the efficient costs of achieving the capital expenditure objectives	<p>Costs for this investment have been forecast based on knowledge of recent and historical market procurements for equivalent capability and services, experience from previous investments, as well as through specialist advice and internal subject matter expertise.</p> <p>Energy Queensland undertakes competitive market procurement processes to ensure cost efficiency in project cost and operational expenditure.</p> <p>Energy Queensland also has a cloud services strategy which assesses each potential investment to ensure the optimal use of cloud and internal services with considerations of cost, risk, service requirements and other parameters.</p>
6.5.7 (c) (1) (ii) The forecast capital expenditure reasonably reflects the costs that a prudent operator would require to achieve the capital expenditure objectives	<p>The requirement for this investment is premised on industry typical ICT Asset Lifecycle Management principles to prudently and efficiently ensure the supportability, serviceability and security of Energex and Ergon Energy's network planning systems.</p> <p>Currently this investment has been analysed to a "Preliminary Gate 2" level. Prior to investment, a Gate 3 business case will be prepared with further detail to be assessed in accordance with the established investment governance processes.</p>
6.5.7 (c) (1) (iii) The forecast capital expenditure reasonably reflects a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objective	<p>Costs for this investment have been forecast based on knowledge of recent and historical market procurements for equivalent capability and services, experience from previous investments, as well as through specialist advice and internal subject matter expertise.</p> <p>Further detailed cost build up will take place in development of the Gate 3 business case. This detailed cost build up may be subject to further competitive market procurement processes, sourcing analysis and peer consultation.</p>

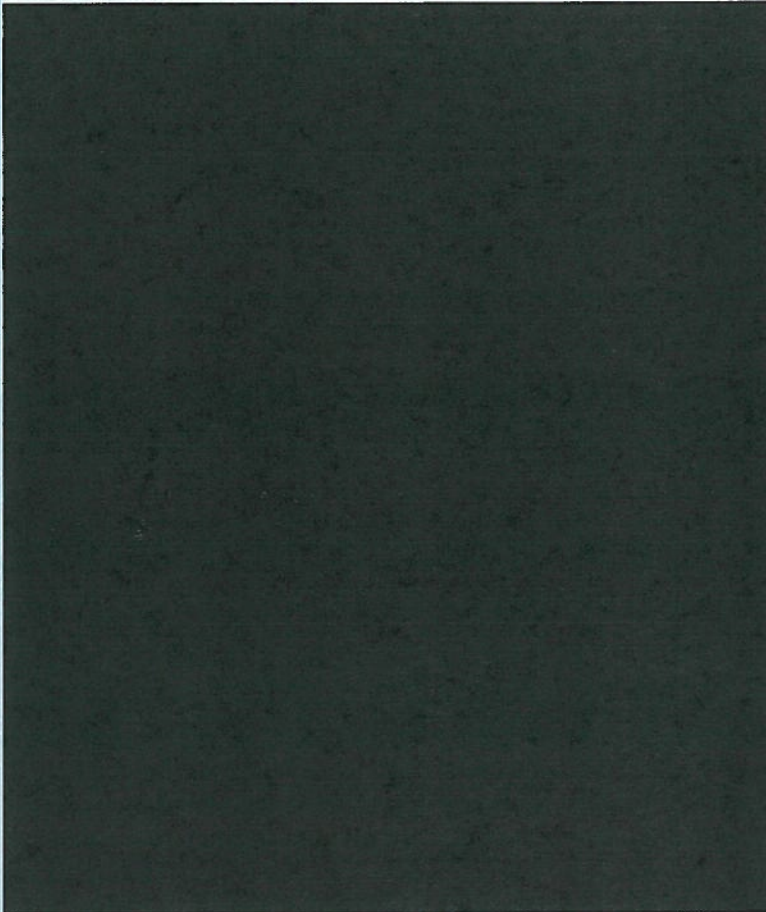
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3.3. Alignment with the Digital Office Application Asset Management Guidelines

The table below indicates alignment of the solution with the **Digital Application Asset Management Guidelines**:

Digital Application Asset Management Guidelines Assessment	Rationale
<p>Network planning tools are classified as Systems of Differentiation according to the PACE layer categorisation described in Energy Queensland's Digital Application Asset Management Guidelines.</p> <p>These guidelines describe key defining criteria for Systems of Differentiation including that they:</p> <ul style="list-style-type: none">• Support business processes which are understood and dynamic.• Utilise information that is core to the business and other information that is sourced externally or generated as part of the process. <p>On the above basis, the guidelines forecast that Systems of Differentiation should maintain currency, supportability and effectiveness through the following investment lifecycle.</p> <ul style="list-style-type: none">• Minor Upgrade – 2 years after implementation• Major Upgrade – 5 years after implementation• Replacement – 7 years after implementation <p>The guidelines further describe that Upgrade and Replacement investments should consider the extent of "obsolescence" of the solution. E.g.</p> <ul style="list-style-type: none">• Technical Obsolescence – The solution is still functional but not supportable.• Financial Obsolescence – The cost of maintaining the solution outweighs the value derived from it.• Asset Obsolescence – The asset has reached the end of its reasonable functional life as indicated through failure rates, inability to meet business requirements etc.	<p>The Network Planning Tools proposed for consolidation and replacement through this investment will meet the criteria for replacement identified in the guidelines.</p> <p>The proposed investment is planned to conclude in FY25.</p> 

3.4. Regulatory Implications

Network planning tools are an essential enabler of Energex and Ergon Energy's compliance with legislative and regulatory obligations as DNSPs.

These obligations include:

- **DAPR Reporting**

Energex and Ergon Energy have an obligation to publish DAPRs in accordance with the NER. The planning tools in the scope of this proposal contribute as follows to the DAPR:

- Distribution Feeder Capacity and Ratings [REDACTED]
- Distribution Feeder Forecast and Capacity Tables [REDACTED]
- Sub-transmission Feeder Forecast and Capacity Tables [REDACTED]
- Fault Level Analysis [REDACTED]
- Distribution Feeder Limitation Forecast [REDACTED]

- **RIN Reporting**

Energex and Ergon Energy have an obligation to submit forecasts, network performance data and asset health data as part of the annual RIN report and Reset RIN report. DINIS, PSS-SINCAL, NetPlan and DFD directly or indirectly provide data to comply with RIN reporting obligations.

- **Distribution Loss Factor (DLF) Reporting**

Energex and Ergon Energy have an obligation to prepare annual Distribution Loss Factor reports. The DLF report relies on datasets from DINIS (Energex) and PSS SINCAL (Energex), supported by the feeder data stores NetPlan and DFD.

4. INVESTMENT SCOPE

4.1. Functional Scope

Energy Queensland comprises multiple business areas and functions as defined in the organisation's Business Reference Model.

The proposed investment in Network Planning Tools Consolidation & Replacement is essential for the ongoing efficient, sustainable support of several Energy Queensland's business areas and functions as listed below.

Business Area	Business Function	Business Reference Model Description
Network Forecasting and Planning	Infrastructure and Markets Forecasting	A function that pulls together all relevant external inputs and trends (e.g. regulatory, demographic, policy, climate, land use, resource availability, location, cost, price, economic and technology) used as input to model probable outcomes.
	Network Reporting	A function to report on network performance, forecasts and investment plans. This includes the production of regulatory reports. This function is not represented explicitly in the organisational chart of Energex or Ergon Energy, but rather embedded in various functions across the Network Forecasting and Planning business capability.
	Network Strategy and Policy	A business capability to develop the detailed plan for the physical network, based on the Network Strategy and Policy. The capability analyses the current asset capability, develops, analyses and compares network and non-network options and delivers optimised plans to meet future requirements derived from a variety of forecasts.
Enterprise Information Management	Business Analytics Management	This function focuses on collecting, storing and presentation of data to support decision-making. This includes activities such as reporting and analytics.
	Enterprise Data Management	This function focuses on data modelling, analysis, design and the implementation of those models including testing, migration and deployment.
Network Information Management	Network Information Governance	A function to enact the enterprise information governance framework for Network Information.
	Network Information Operational Management	A function to ensure the execution of plans developed by the Network Information Standards and Planning function. This is an operational function. Certain operational aspects of management of network information (e.g. GIS data, Information Quality Assurance etc) may be directly allocated to this function, others may be allocated to other functions across Network Asset Management or Service Delivery.
	Network Information Standards and Planning	A function to provide standards for the management and provision of network information, in alignment with and within the frameworks of the Enterprise Information Management function. Such standards include: Definition of Information Lifecycle, Quality Standards, Security Classification, Logical Modelling, and Information Services provided to the rest of the organisation
	Enterprise Data Management	This function focuses on data modelling, analysis, design and the implementation of those models including the testing, migration and deployment.

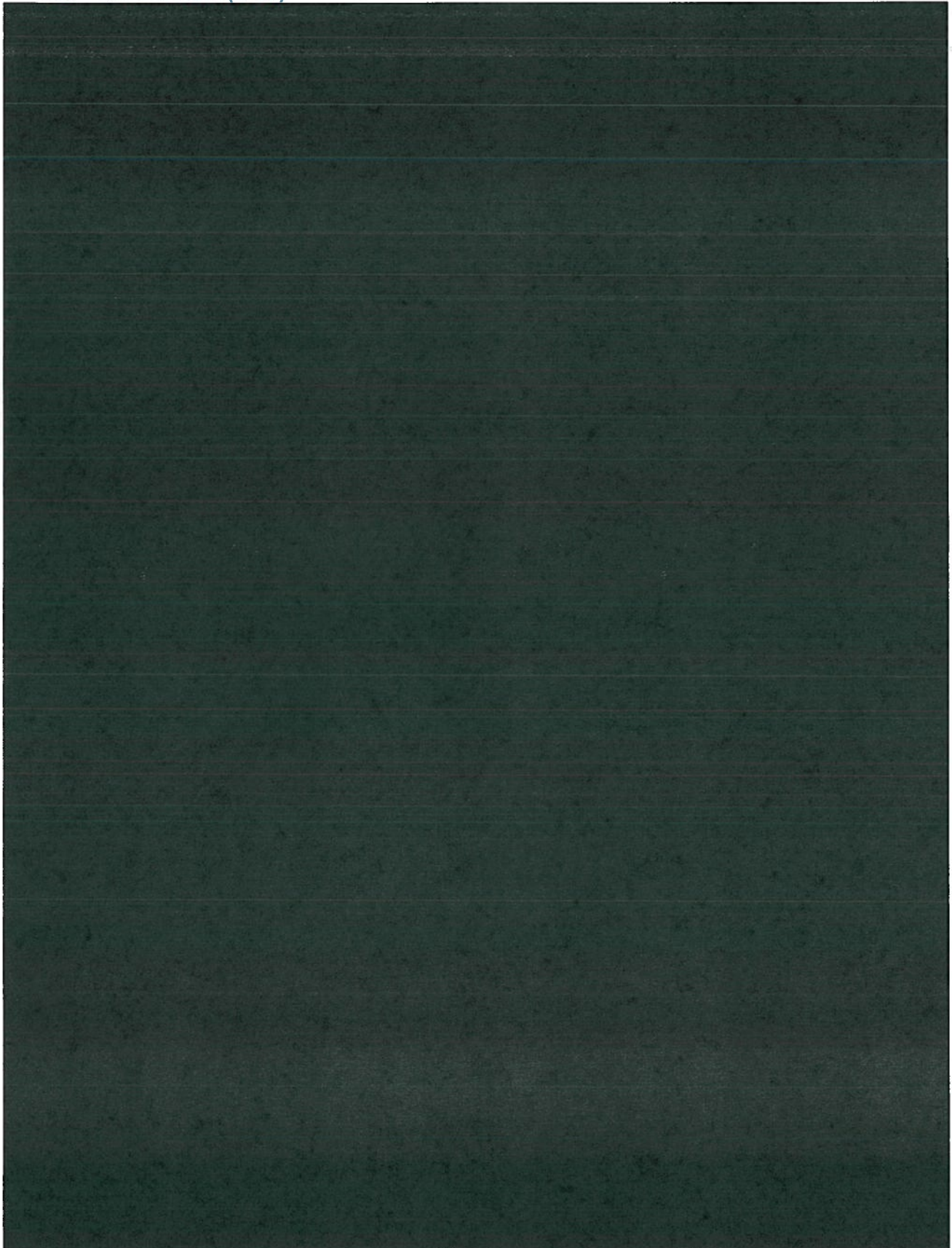
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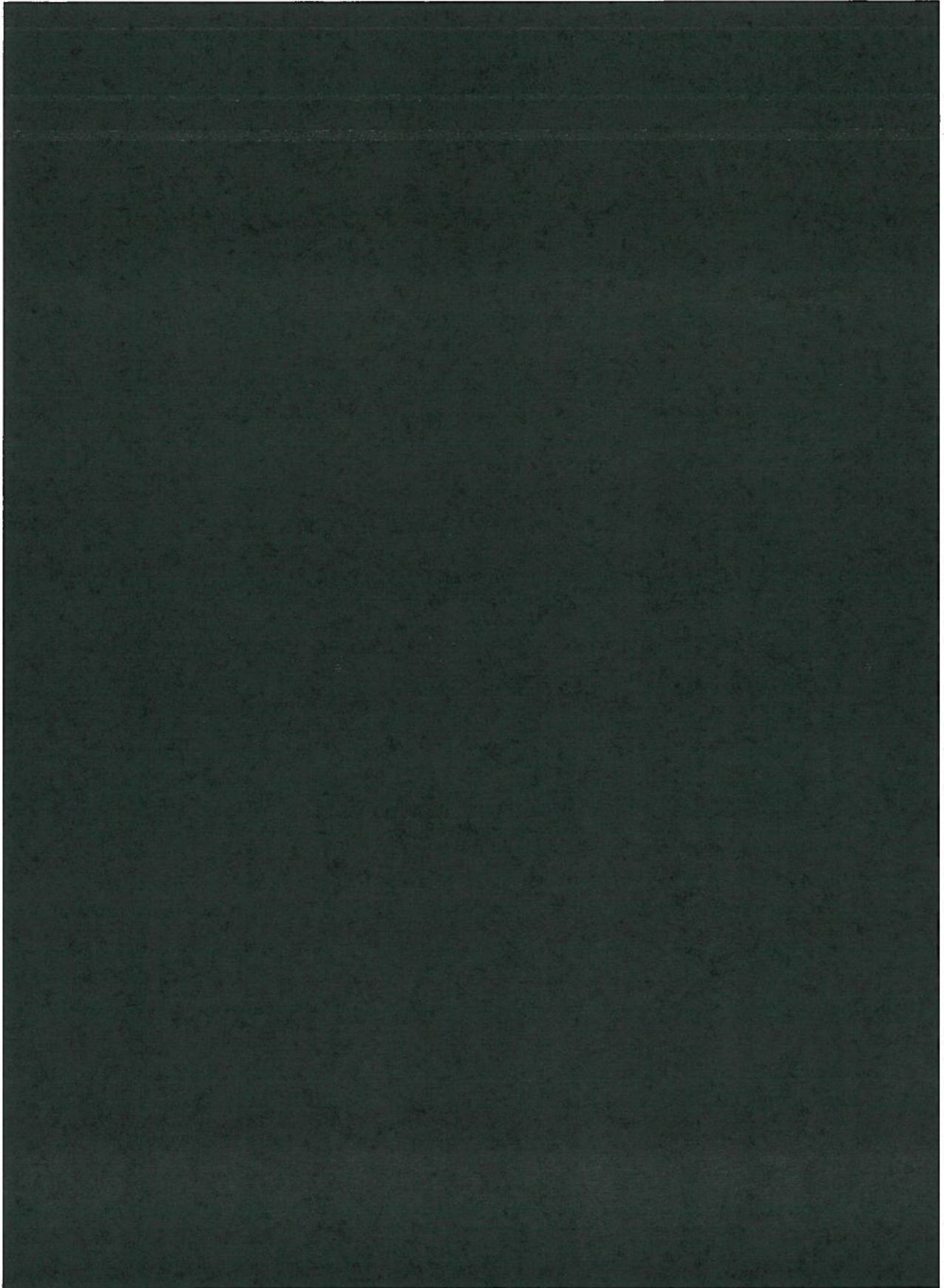
4.2. Solution Overview

4.2.1 Current State (2018)



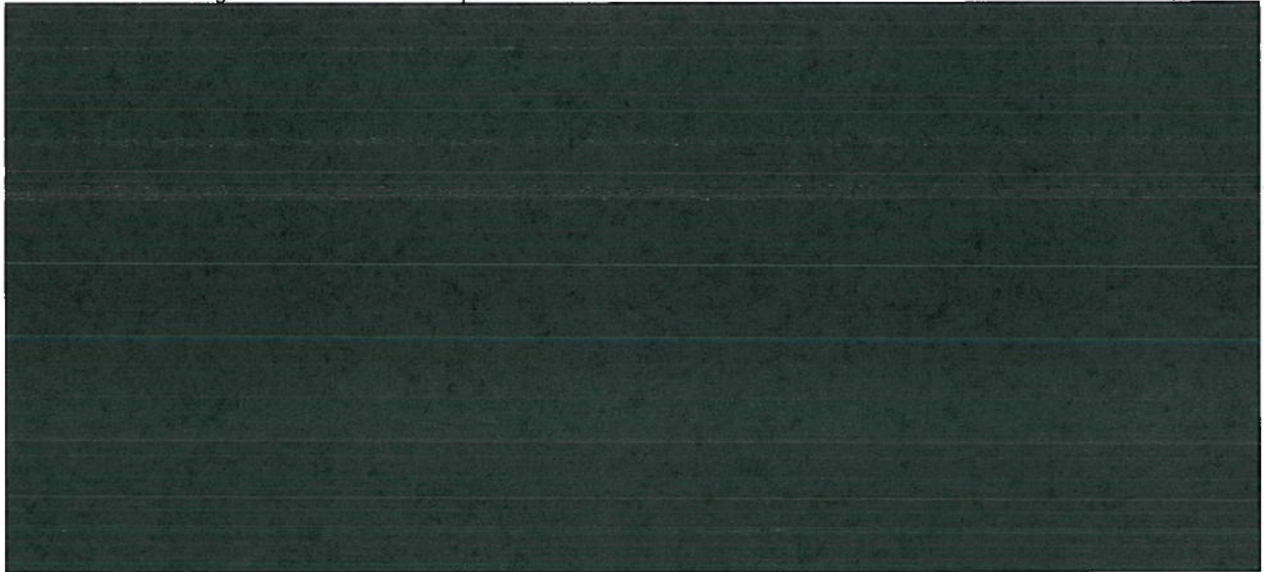
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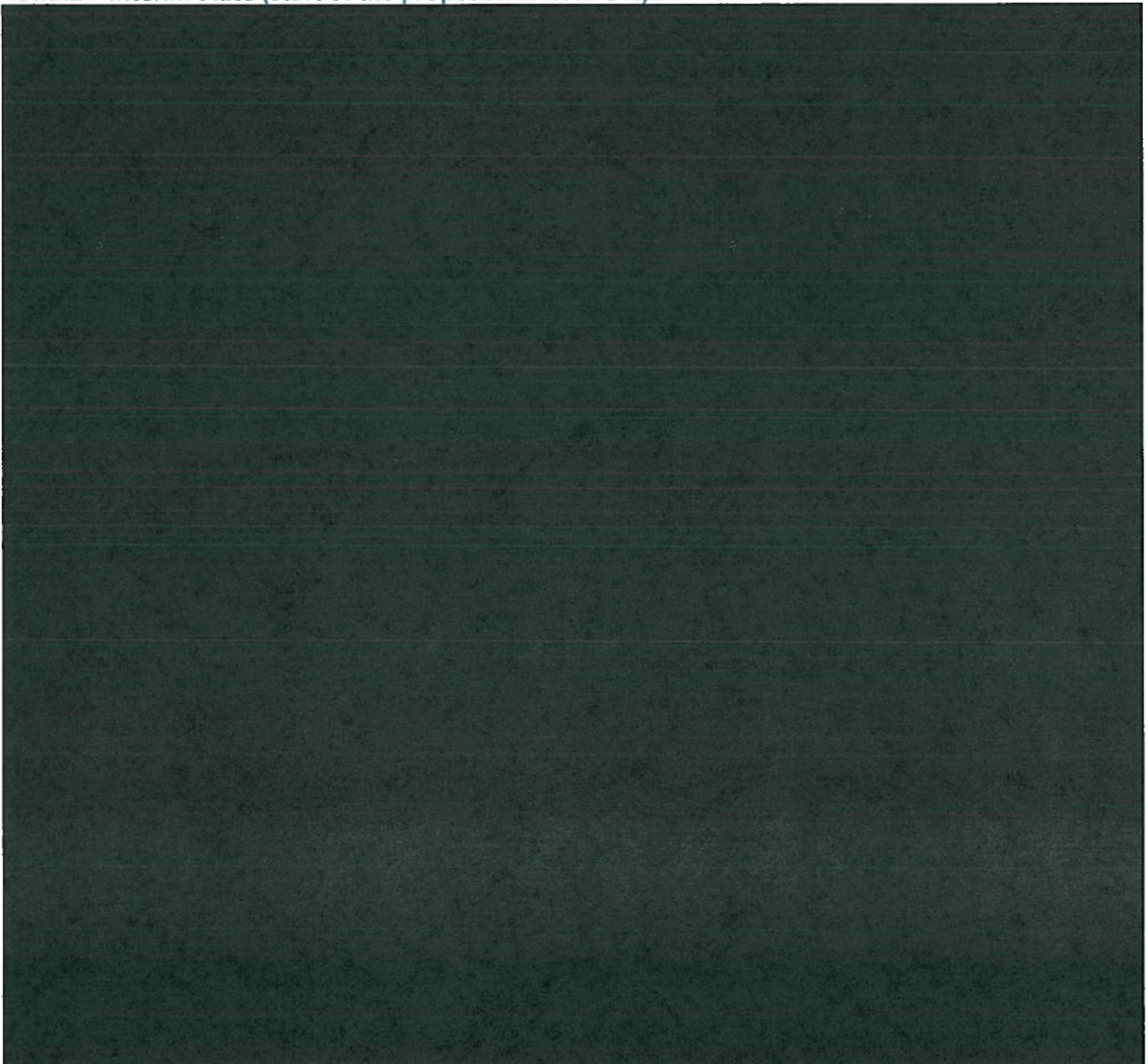


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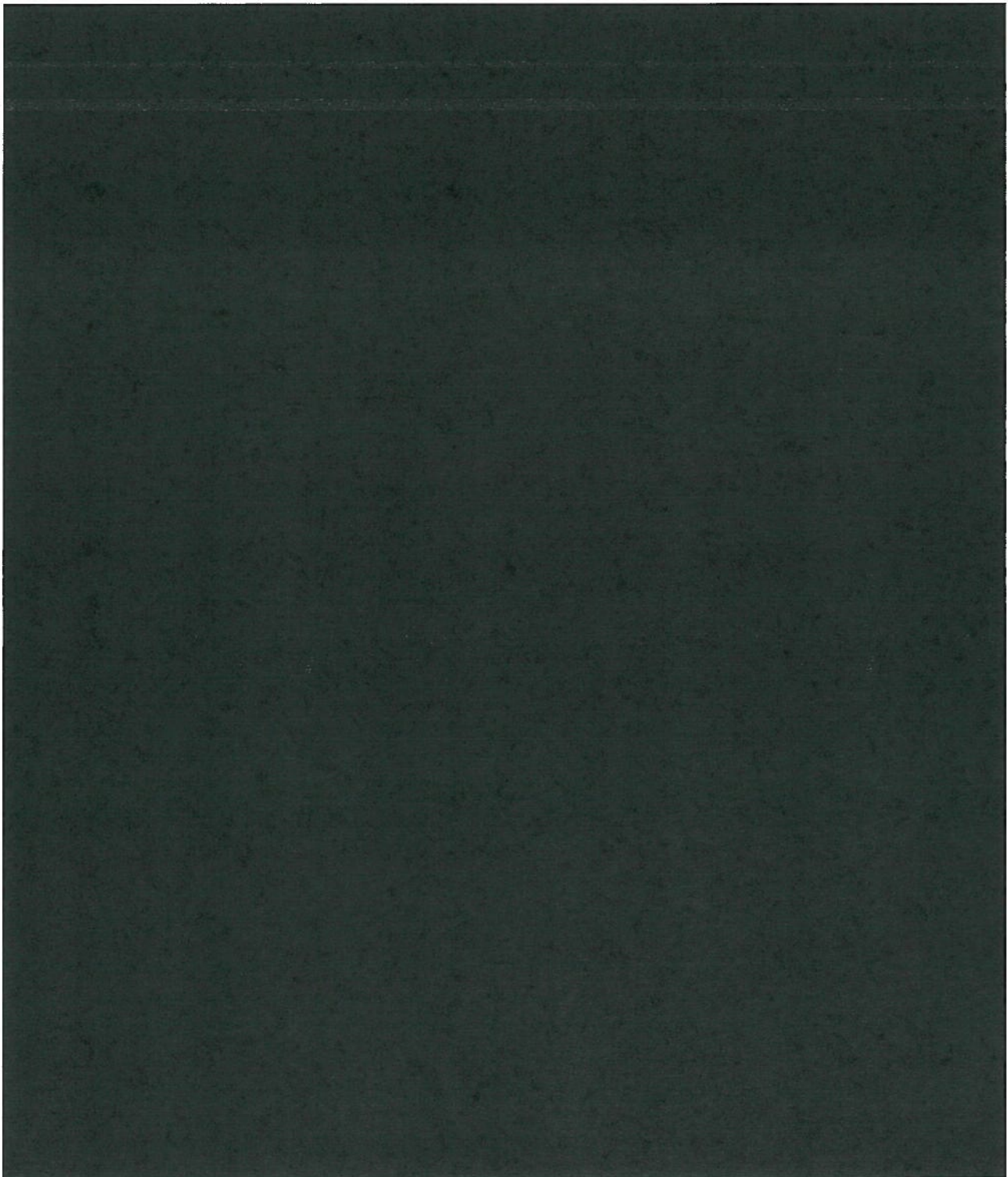
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4.2.2 Interim State (start of the proposed investment)



4.2.3 Target State (end of proposed investment)



4.3. Assumptions

This business case is based on the following assumptions.

- The initiative will be delivered following completion of the ERP EAM Program.
- The initiative will be delivered following completion of the Unified GIS Project, given the strong dependency on the network connectivity model that is mastered in the GIS. [REDACTED]

Preliminary Gate 2 Business Case

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- The scope, inclusions, exclusions, costs, and impacts of the initiative will be further detailed through the Gate 3 business case prior to investment. This may be subject to competitive procurement processes as appropriate to ensure cost efficiency of delivery.
- Previous investments shall be leveraged where possible.

4.4. Dependencies

This investment is dependent on the following programs, projects or business activities.

Program/Project	Dependency	Effect
ERP EAM Program	<p>The ERP EAM program will migrate the companies' Asset, Works, Finance, HR, Payroll and Procurement processes and data mastering from the existing Ellipse platforms and repositories to the new unified ERP EAM solution and Enterprise Intelligence Platform.</p> <p>The ERP EAM system is a key data source for network planning.</p>	<p>Network planning requires various data from the Unified ERP EAM system (Asset Counts, Capacities, Program of Work Projects).</p> <p>ID15 Network Planning Tools Consolidation & Replacement could proceed prior to completion of the ERP EAM program, but this would require greater expense due to the need to integrate with the two legacy ERP EAM systems.</p>
ID01 GIS Consolidation & Replacement	<p>The ID01 GIS Consolidation & Replacement initiative will re-platform the companies' GIS spatial network model management capability.</p> <p>The GIS platforms are key data sources for network planning.</p>	<p>Network planning requires various data from the Unified GIS (Reliability Performance, Feeder Classification, Customer Numbers per Feeder, Conductor Types, Network Configuration, Fault Levels).</p> <p>ID15 Network Planning Consolidation & Replacement could proceed prior to ID01, but this would require greater expense due to the need to integrate with the two legacy GIS systems.</p>
ID06 Distribution Forecasting Consolidation & Replacement	ID06 will replace the existing distribution forecasting tools (SIFT and Network Load Forecasting NLF).	<p>Ideally, ID015 and ID06 should be scoped in parallel, to identify optimal off-the-shelf solutions that integrate seamlessly.</p>
ID08 Information Repositories Consolidation & Replacement	ID08 Information Repositories Consolidation & Replacement transitions existing datasets and tooling to the Enterprise Intelligence Platform. It also aligns corresponding business processes for state-wide consistency and efficiency.	<p>The network planning process imports data from numerous data sources for modelling and analytics purposes.</p> <p>NetPlan and DFD are repositories for feeder asset data, accessed by asset managers, connection officers, planners, protection engineers and other teams.</p> <p>The solution delivered through the Network Planning Tools Consolidation & Replacement will leverage the Enterprise Intelligence Platform, which is delivered by ID08.</p>

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Program/Project	Dependency	Effect
ID04 Customer Market Systems Consolidation & Replacement	It's planned that ID04 Customer Market Systems [REDACTED] Consolidation & Replacement will deliver a Unified Customer Market solution.	[REDACTED] ID15 Network Planning Consolidation & Replacement could proceed prior to ID04, but this would require greater expense due to the need to integrate with the two [REDACTED] systems.
ID02 Network Operations Consolidation & Replacement	ID02 Network Operations Consolidation & Replacement builds on the companies' Unified DMS platform, and consolidates Energex and Ergon Energy's outage management, switching, SCADA configuration management and protection configuration management capability.	Ergon Energy's planning tools import data from FeederStat [REDACTED], which is planned for consolidation and replacement in the scope of the ID02.

5. OPTIONS ANALYSIS

This section considers the following options analysis:

- Option 1 – Proceed with the consolidation and replacement of network planning tools (Preferred Option)
- Option 2 – Independent Energex and Ergon Energy network planning tools replacement
- Option 3 – Do Minimal

5.1. Option 1 – Proceed with the consolidation and replacement of network planning tools (Preferred Option)

The existing Energex and Ergon Energy legacy network planning tools will be replaced for ongoing sustainability, supportability and security as described in section 4.2. State-wide consolidation and alignment of business processes and models will also be implemented for best practice efficiency and effectiveness.

5.2. Option 2 – Independent Energex and Ergon Energy network planning tools replacement

The existing Energex and Ergon Energy legacy network planning tools will be replaced for ongoing supportability, security and serviceability.

No state-wide consolidation or alignment of business processes, models and calculations would occur.

5.3. Option 3 – Do Minimal

No significant investments in Energex or Ergon Energy's network planning tools or processes would occur in the FY21-25 regulatory control period, with replacements deferred until the FY26-30 period.

The existing platforms would therefore be locked down without further change to minimise risk.

A comparison of these options is provided over page.

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5.4. Option Comparison

Each option has been assessed against key assessment criteria contained in the table below.

Assessment Criteria	Option 1 - Proceed with the consolidation and replacement of network planning tools (Preferred Option)	Option 2 - Independent Energex and Ergon Energy network planning tools replacement	Option 3 - Do Minimal
Advantages	<p>Consistent with the business case objectives, this option:</p> <ul style="list-style-type: none"> Ensures ongoing supportability and sustainability of ICT platforms to support the network planning process. Replaces and consolidates the network planning tools, enabling consistent state-wide processes and network planning optimisation. Delivers required capability to plan for demand and energy requirements at all relevant levels of the network. Delivers required capabilities to plan small area networks. Supports productivity improvement through reduced manual process intervention (e.g. manual data sourcing, data preparation and uploading). Supports improved network utilisation and capital investment planning, through enhanced scenario modelling capabilities with contemporary methods and tools. 	<p>Partly consistent with the business case objectives, this option:</p> <ul style="list-style-type: none"> Ensures ongoing supportability and sustainability of ICT platforms to support the network planning process. Delivers required capability to plan for demand and energy requirements at all relevant levels of the network. Delivers required capabilities to plan small area networks. Supports productivity improvement through reduced manual process intervention (e.g. manual data sourcing, data preparation and uploading). Supports improved network utilisation and capital investment planning, through enhanced scenario modelling capabilities with contemporary methods and tools. 	<p>This option does not effectively achieve any of the objectives of the business case.</p> <p>It does however represent the lowest near-term expenditure on network planning tools by deferring replacement investment into the FY26-30 period.</p>

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ID15 Network Planning Tools Consolidation & Replacement



Assessment Criteria	Option 1 - Proceed with the consolidation and replacement of network planning tools (Preferred Option)	Option 2 - Independent Energex and Ergon Energy network planning tools replacement	Option 3 - Do Minimal
Disadvantages	<p>This option meets all of the objectives of the business case. However, the following disadvantage is recognised:</p> <ul style="list-style-type: none"> The consolidation of network planning tools requires significant input from subject matter experts. This includes settling common methodologies, models and input sources. 	<p>This option does not meet the following objective of the business case:</p> <ul style="list-style-type: none"> Does not replace and consolidate the network planning tools, enabling consistent state-wide processes and network planning optimisation. Therefore, this option does not support the forecast Energy Queensland 10% reduction in indirect costs and 3% improvement in program of works labour costs. <p>Furthermore, this option involves material investment in the parallel Energex and Ergon Energy solutions which has the following additional disadvantages:</p> <ul style="list-style-type: none"> The transition from existing legacy systems to parallel independent replacement solutions involves substantial cost and complexity, for an outcome, which may not represent the optimal target-state solution. Like-for-like replacement of DFD and NetPlan are not feasible. Therefore, the Network Planning Tool replacement activity included in Option 1 is effectively duplicated in Option 2 for both companies. 	<p>This option does not meet any of the business case objectives and will not provide the tools that are essential to appropriately plan network investments of the future.</p> <p>Based on significant change in network usage (including customer energy usage trends, changing energy demand profiles, energy efficiency technologies, DER and other new network technologies), this is an unacceptable option.</p> <p>This option does not support the forecast Energy Queensland 10% reduction in indirect costs and 3% improvement in program of works labour costs. This will impact the companies' FY26-30 revenue requirements, resulting in a negative price outcome for customers.</p>

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Assessment Criteria	Option 1 - Proceed with the consolidation and replacement of network planning tools (Preferred Option)	Option 2 - Independent Energex and Ergon Energy network planning tools replacement	Option 3 - Do Minimal
Key Identified Risks	<p>As the "preferred option", a specific implementation risk assessment is provided in section 10.2. Key amongst these risks are:</p> <ul style="list-style-type: none"> Resource capacity and availability – mitigated through the use of market-provisioned services and established practices, tools and techniques. Energex / Ergon Energy alignment – mitigated through current work practice alignment focus, with the recognition that some differences in Energex and Ergon Energy's respective operating environments exist. 	<p>Similar to Option 1, this option involves a substantial investment. Therefore, the risks are similar as follows:</p> <ul style="list-style-type: none"> Resource capacity and availability – mitigated through the use of market-provisioned services and established practices, tools and techniques. <p>Also, the following additional risk exists for this option:</p> <ul style="list-style-type: none"> Continued development of disparate Energex and Ergon Energy systems and tools is not supported by the merged business structure of Energy Queensland and the newly aligned business processes of the group. Therefore the value derived from future investments is reduced. Continued planning process and system inconsistencies may result in sub-optimal Energex and/or Ergon Energy network capital works programs through lack of alignment on effective best-practice planning methods. 	<p>See the organisational risk assessment in section 10.1 for information.</p>

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ID15 Network Planning Tools Consolidation & Replacement



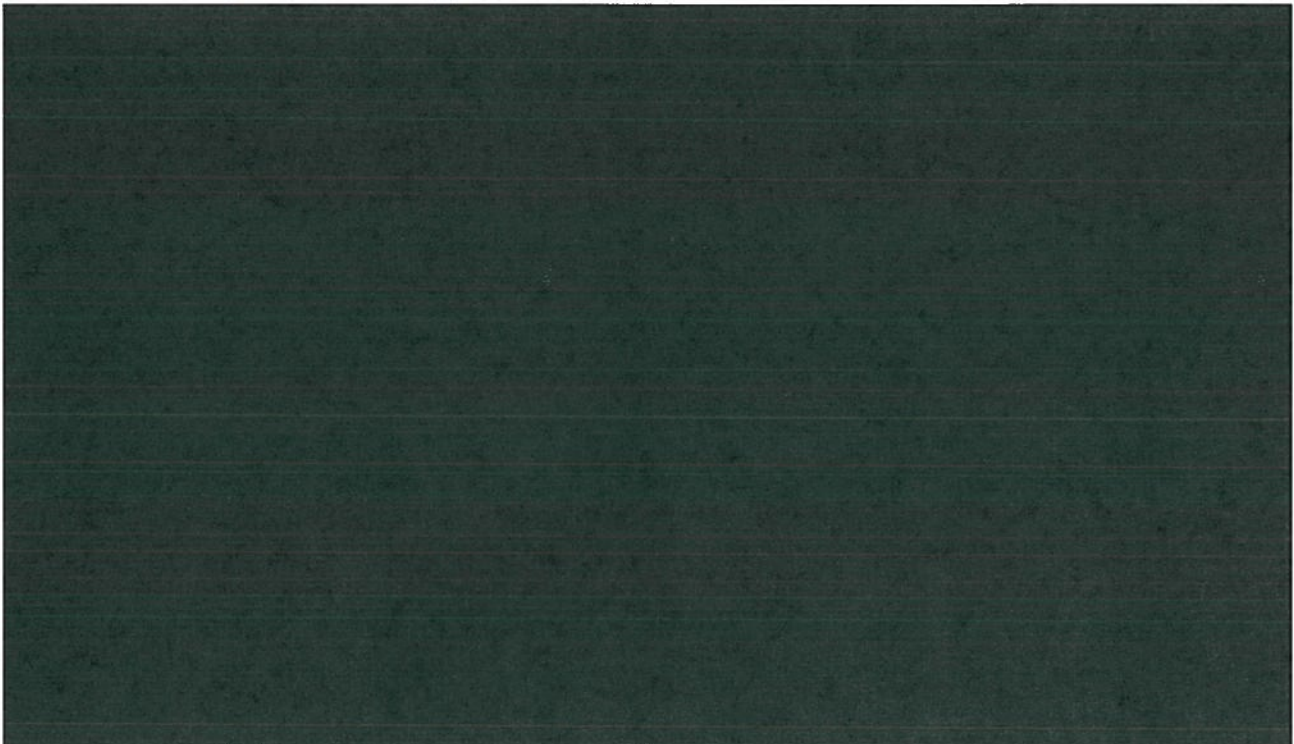
6. PREFERRED OPTION

"Option 1 - Proceed with the consolidation and replacement of network planning tools is the preferred option" as it ensures sustainability, supportability and security of the companies' network planning practices while providing the required capabilities to respond to the changing customer energy usage behaviours. It meets all the business case objectives, it is aligned with Energy Queensland's strategic objectives and is consistent with Energex and Ergon Energy's obligations under the National Electricity Rules. This option also supports Energy Queensland's planned productivity improvements which result in a forecast 10% reduction in indirect costs and 3% improvement in program of work labour costs.

"Option 2 - Independent Energex and Ergon Energy network planning tools replacement" is viable, but requires duplication of costs across the two distributors, with limited opportunity for process alignment and improvement.

"Option 3 - Do minimal" defers renewal of the companies' legacy network planning tools. It therefore represents a material risk to the companies' continued delivery of their network operations and service delivery obligations.

6.1. Delivery Timeline and Approach



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ID15 Network Planning Tools Consolidation & Replacement



7. INVESTMENT BENEFITS OVERVIEW

This section outlines the benefits associated with the investment. This business case has currently been analysed to a "Preliminary Gate 2" level. As such, the benefits will be further detailed, tested, and verified in preparation of the Gate 3 business case prior to investment.

This initiative is primarily an ICT Asset Replacement of legacy systems, required to ensure the ongoing sustainability, supportability and security of business critical capability. Energy Queensland will leverage the opportunity associated with this ICT replacement to also enable planned productivity improvements, resulting in a forecast 10% reduction in indirect costs and a 3% improvement in program of works labour costs. The benefits listed below represent contributions to the overall Energy Queensland productivity improvement targets.

7.1. Financial and Other Benefits

Area	Benefits Identified	Value
Financial Benefits		
Network Planning Productivity	<ul style="list-style-type: none">• Labour intensive set-up and validation of the DINIS and PSS-SINCAL models is reduced through integration of planning tools with the Unified GIS• Productivity improvement through improved automation• Reduction in costs from third party providers conducting network studies on behalf of Energex and Ergon Energy	
Capital Works Program Optimisation	<ul style="list-style-type: none">• Through improved network data and analysis capability, network investment plans can be tailored and optimised• Improved accuracy in network investigations at the low voltage and small area network level, resulting in Energex and Ergon Energy’s ability to integrate new technologies, such as Microgrids	
Other Benefits		
ICT Asset Management	<ul style="list-style-type: none">• Sustainment of the companies’ network planning tools for ongoing supportability, serviceability and security. Failure or extended outage of the current solutions would have significant safety, operational and compliance impacts.	Sustainment
Safety & Risk	<ul style="list-style-type: none">• Continuous improvement in safety risk mitigation through effective assessment of protection devices and network protection schemes and accurate assessment of network constraints.• Reduced operational risks through improved fault analysis, reliability studies and contingency studies.	Risk mitigation
Compliance	<ul style="list-style-type: none">• Continue to meet AER asset reporting requirements.• Meet all other regulatory requirements as itemised in section 0.	Compliance

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8. FINANCIAL ANALYSIS

The table below summarises the potential cost inclusions to deliver the outcomes described in this business case.

Phase	Description / Rationale
All Phases	Project management
	Project support
	Internal corporate logistics / overheads
	Communications and engagement
	Review and assurance (excluding normal Internal Audit functions)
Planning & Procurement Phase	Tender facilitation, probity management and legals
	Gate 3 business case development
	Development of planning deliverables (e.g. PMP, Stakeholder, and Communications Plan etc.)
	Software licences, hardware purchases, cloud services procurement
Design Phase	Software, infrastructure, and information design
	Data profiling and migration design
	Solution architecture
	Integration design
	Business process design
	Organisational change design and change management planning
Build, Integrate, Test and Deploy Phase	Data migration and ETL (Extract, Transform, Load) build
	Data migration execution (incl. Trial Migrations, Dress Rehearsals, Verification etc)
	Software, infrastructure, and environment configuration
	Integration build
	Business process design and organisational change implementation
	Testing (incl. information consistency, capacity, performance, and load, security etc.)
	Training
	Production deployment
Warranty Phase	Post- implementation operational support
	Transition to business-as-usual (BAU) support
	Post- implementation review

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8.1. Cost Assumptions

The table below summarises the key cost assumptions for the initiative.

#	Assumption	Description / Rationale
1	Project phasing and deployment	<p>The initiative will be delivered over an 18 month elapsed period with an up-front design phase followed by multiple deployments. The deployment plan will be structured with consideration of:</p> <ul style="list-style-type: none">• Alignment with other dependent initiatives.• Sequencing to maximise business performance benefit.• Intention to progressively transition to the new solution through a sequence of capability deployments.
2	Use of market services	<p>The initiative will be delivered through a team comprising internal subject matter experts and external solution delivery specialists, to ensure project cost efficiency and mitigation of project risk.</p>
3	Energex and Ergon Energy costs	<p>The project costs for Energex and Ergon Energy are consistent with the effort and complexity of transitioning each company from their respective current state to the common target state. The respective estimates (CapEx and OpEx) are as described in the following section.</p>
4	Option 2 (Independent Energex and Ergon Energy network planning tools replacement)	
5	Option 3 (Do Minimal)	

8.2. Financial Summary²

8.2.1 Energex Option Comparison



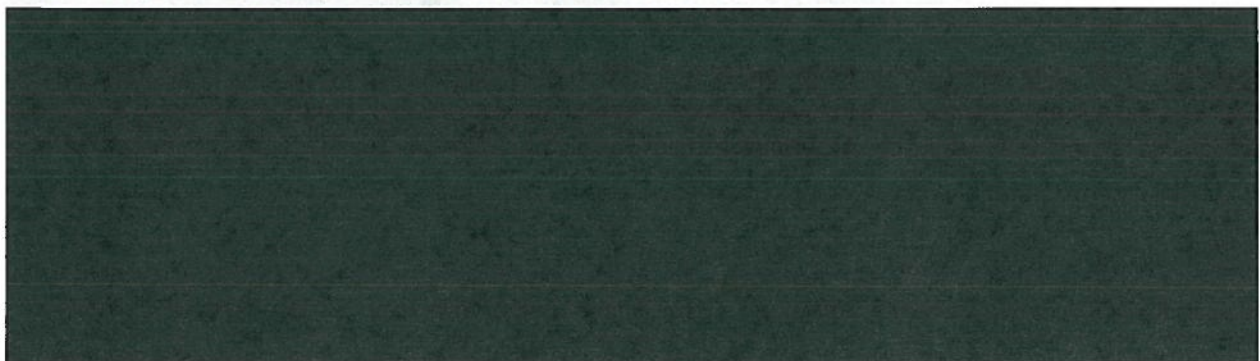
8.2.2 Ergon Energy Option Comparison



8.2.3 Energex Expenditure Summary (Option 1 – Preferred)



8.2.4 Ergon Energy Expenditure Summary (Option 1 – Preferred)



8.3. NPV Calculation Parameters

The above NPV and financial calculations are based on the following parameters.

- The Energy Queensland Net Present Value (NPV) model has been used to calculate the NPV calculations for this business case.
- The financial analysis has been based over a 10 year period after an 18 month phased implementation period.
- 5.40% Regulated Rate of Return/WACC is applied with present values discounted to FY17/18.

² Bracketed figures indicate negative values.

9. PROGRAM DELIVERY

9.1. Program Governance & Delivery

The governance and delivery model depicted in Figure 4 (below) is planned to be used for delivery of the initiative.

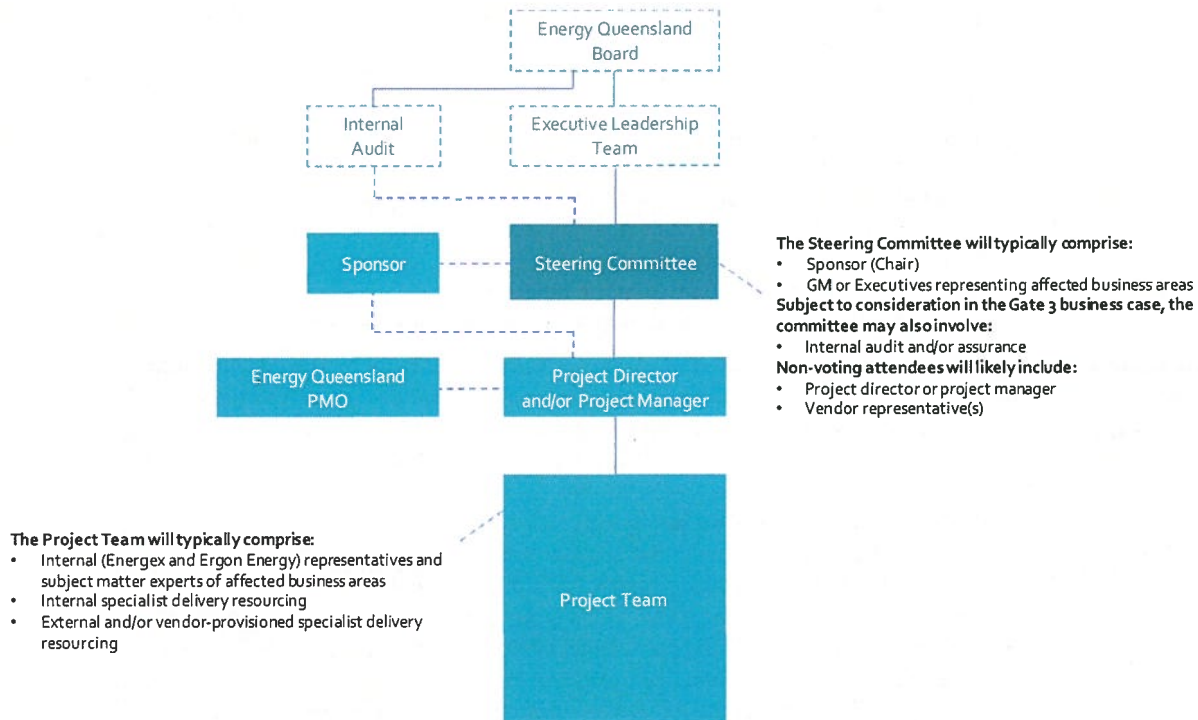


Figure 4 Governance and delivery model

Role	Key Accountabilities
Steering Committee	<p>Provides a single point of accountability for delivery of the initiative in accordance with the business case, as well as decision making aligned with strategic directions of the company. The committee governs the initiative with appropriate balance between delivered outcomes (time, fitness for purpose, cost), risk, business impact, and enabled business value.</p> <p>Responsibilities</p> <ul style="list-style-type: none"> • Attend and be an active participant in committee meetings • Foster positive communications outside of the committee regarding the initiative • Be the voice of the initiative, including communications where appropriate to the Group Executive, Energy Queensland Board, and other key stakeholders • Review and approve/reject any request for change (change requests) to the agreed scope, budget, schedule, or deliverables. • Ensure all approved change requests align with the program objectives • Ensure program quality outcomes are balanced with other competing priorities • Review each completed phase (or defined stages or gates) and provide go/no-go direction after consideration of quality, risk, cost, and schedule • Undertake a Post Implementation Review (PIR) • Ensure the appropriate independent auditing and review of the program is undertaken at the logical stage gates of the program

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Role	Key Accountabilities
Sponsor	<p>The Sponsor is accountable for delivering the business value enabled by the initiative and meeting the objectives set through the business case.</p> <p>Responsibilities</p> <ul style="list-style-type: none"> • Oversee development of the business case • Oversee development of the project management plan (PMP) working closely with the Project Director • Monitor and advise on delivery outcomes working closely with the Project Director and/or Project Manager • Ensure that any proposed changes of scope, cost or delivery timeline are checked against possible impacts to program benefits • Approve Change Requests within delegated authority levels • Ensure Change Requests have been endorsed by all impacted parties (Business Change, Design, Delivery, Finance, and BAU) • Brief Executives and Board on program progress • Ensure that the benefits realisation plan is realistic and achievable
Project Director and/or Project Manager	<p>The Project Director and/or Project Manager has responsibility for the delivery of the overall initiative while maintaining the balance of competing priorities and alignment with initiative objectives as specified in the business case and as directed by the Steering Committee.</p> <p>Responsibilities</p> <ul style="list-style-type: none"> • Deliver the overall initiative outcomes • Agree delivery strategies with the Sponsor and the Steering Committee • Develop the PMP and oversee specification of all initiative deliverables including assessment of interdependencies and appropriate sequencing across the initiative • Manage development of the communications plan and ongoing communications with guidance and feedback from key stakeholders • Manage mobilisation of the initiative, including resource provision and procurement • Oversee technical delivery of solution design, development, implementation, integration, testing, and data conversion • Oversee the delivery of training, deployment, organisational change management, and business process re-engineering • Resolve all issues concerning project plans, schedules, budgets, risks, and issues as they relate to the initiative • Manage cross-project dependencies, scope, and resourcing issues • Ensure audit feedback is actioned in a timely, verifiable manner and validated
Program Management Office	<p>The Program Management Office is a centralised Energy Queensland business function, which provides coordination, standards, administrative support, and end-to-end reporting for Energex and Ergon Energy's business transformational and ICT initiatives.</p> <p>Responsibilities</p> <ul style="list-style-type: none"> • Provide a central repository and framework for all program and project issues and risks • Co-ordinate and manage all project plans under guidance from the Project Managers and/or Project Directors • Overall program / project risk mitigation management • Overall program / project issue management • Program financial tracking and reporting • Deliverables monitoring • Program key performance monitoring and reporting

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Role	Key Accountabilities
Project Team Members	<p>The Project Team undertakes the core delivery of the project under the direction of the Project Director and/or Project Manager. The team typically comprises internal representatives and subject matter experts of affected business areas as well as internal and vendor-provisioned delivery resourcing.</p> <p>Responsibilities</p> <ul style="list-style-type: none"> • Develop and deliver assigned project deliverables • Identify issues and record, monitor, and report status • Manage issues with appropriate actions • Escalate issues as required • Attend reference groups and other forums as required

9.2. Stakeholder Management

The following tables summarise the key internal and external stakeholders for the investment. A detailed stakeholder management plan will be developed as part of delivery planning for the initiative.

9.2.1 Key Internal Stakeholders

Stakeholder	Interest
Executive General Manager Asset Safety and Performance	<ul style="list-style-type: none"> • Oversight of the Asset Management business processes, systems and people.
Asset Management Group	<ul style="list-style-type: none"> • Efficient and effective asset management business processes, systems and tools.
Network Planning Group	<ul style="list-style-type: none"> • The network planning group will be the primary user of the toolset. • Efficient and effective tools for network scenario modelling and analysis. • Network planning tools that are “fit for purpose” and easy to use.
Network Forecasting Group	<ul style="list-style-type: none"> • Efficient and effective tools integration with the planning process. • Timely and accurate feedback on network planning activities, which impact the forecasting process (e.g. major customer connections, major developments, etc.).
Protection Group	<ul style="list-style-type: none"> • Efficient and effective modelling and fault analysis tools for protection design, upgrade and augmentation.
Network Design Group	<ul style="list-style-type: none"> • Easy access to accurate, up-to-date network planning information and data for network design activities.
Network Performance and Reporting	<ul style="list-style-type: none"> • Compliance with Regulatory reporting requirements. • Effective reporting for improved decision-making.

9.2.2 Key External Stakeholders

Stakeholder	Interest
Regulators	<ul style="list-style-type: none"> • Investment decisions to address the future network limitations are prudent and incorporate new technologies to drive improved customer outcomes. • Timely delivery of DAPR and RIN reporting.

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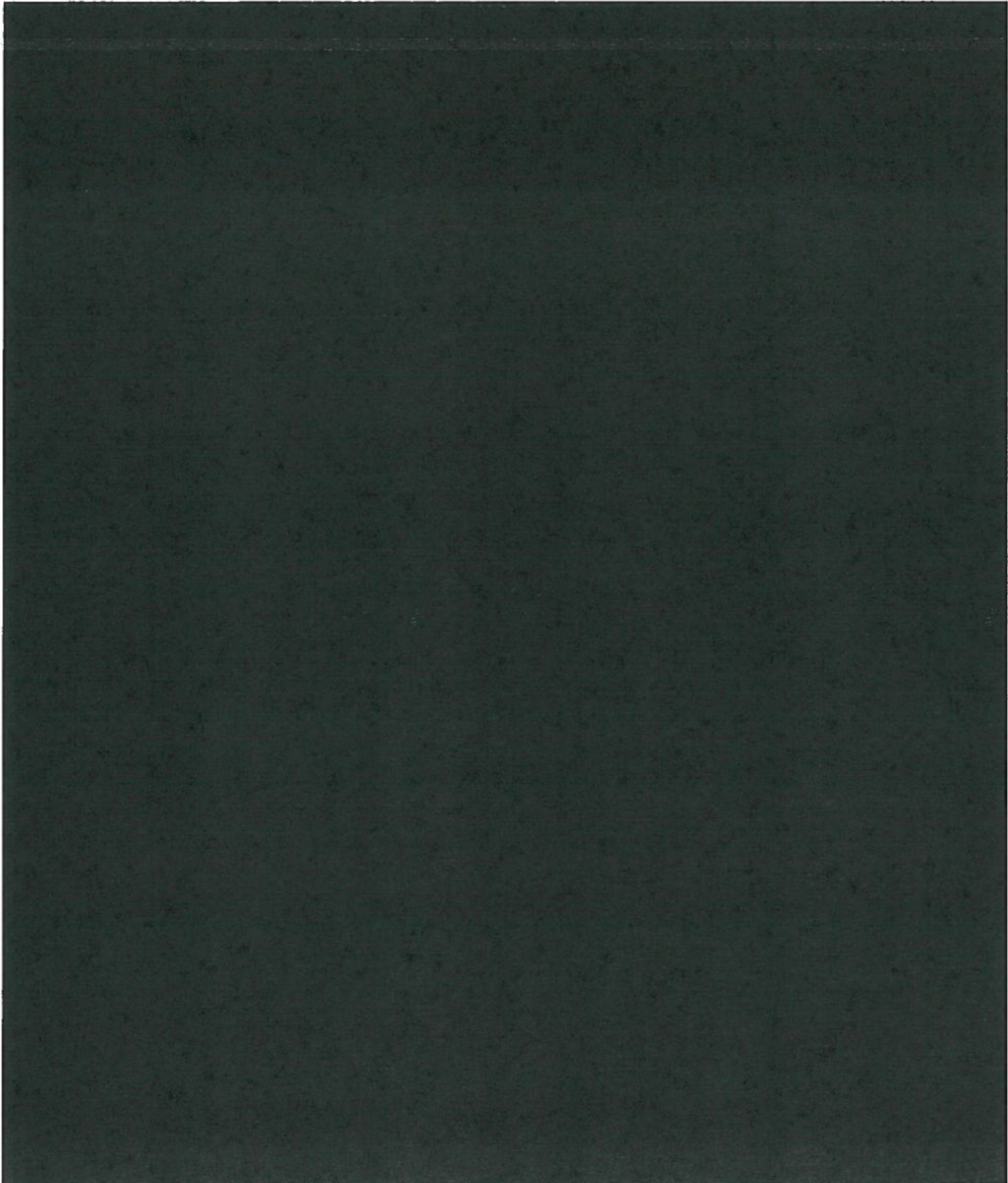
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Stakeholder	Interest
Community	<ul style="list-style-type: none">• Optimised network investment plans which maintain energy security based on prudent and efficient expenditure.• Interest in the Energex and Ergon Energy's DAPR.• Optimised assessment times for load and generation connections.

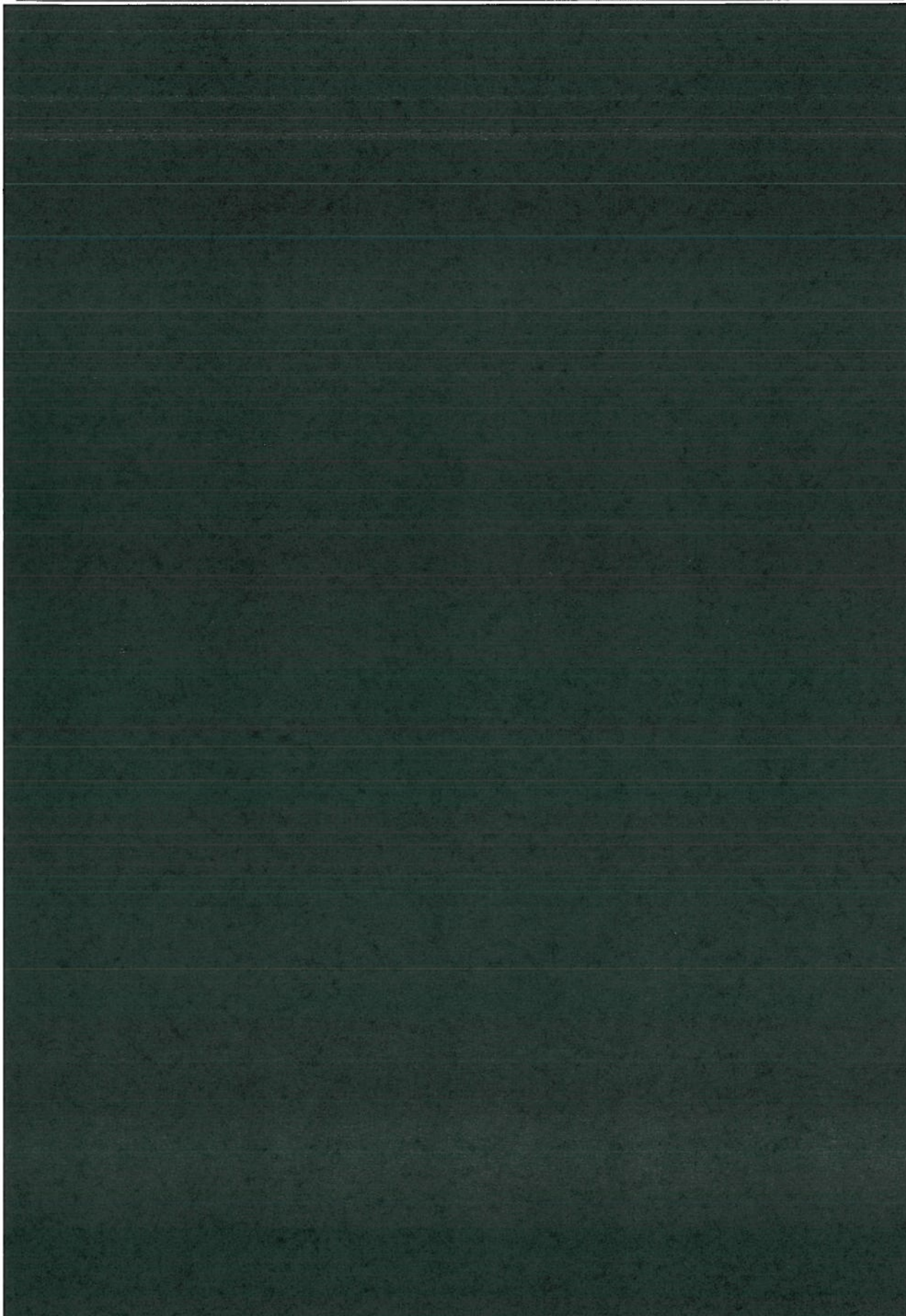
10. RISK ASSESSMENT

10.1. Organisational Risk Assessment



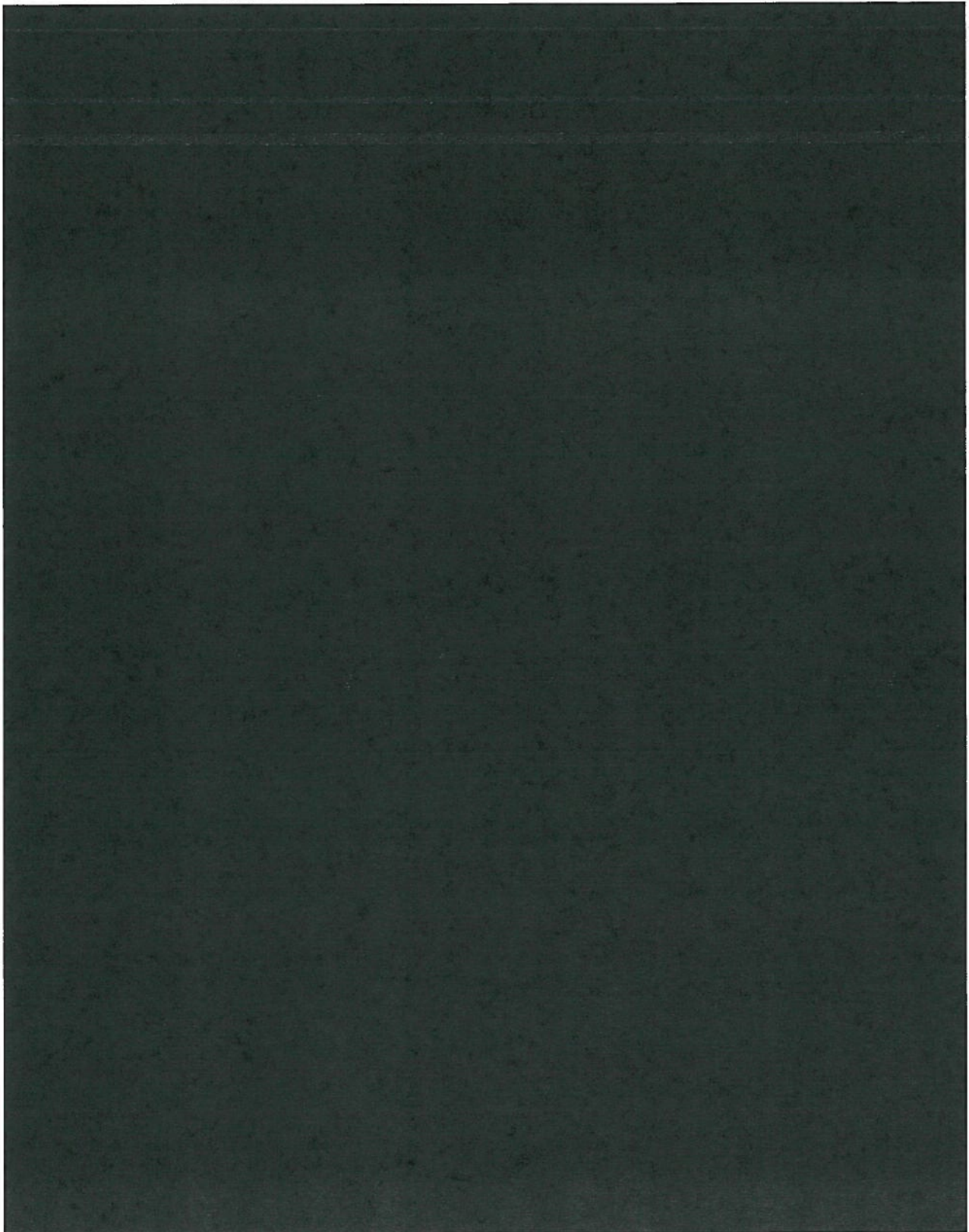
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10.2. Preliminary Implementation Risk Assessment

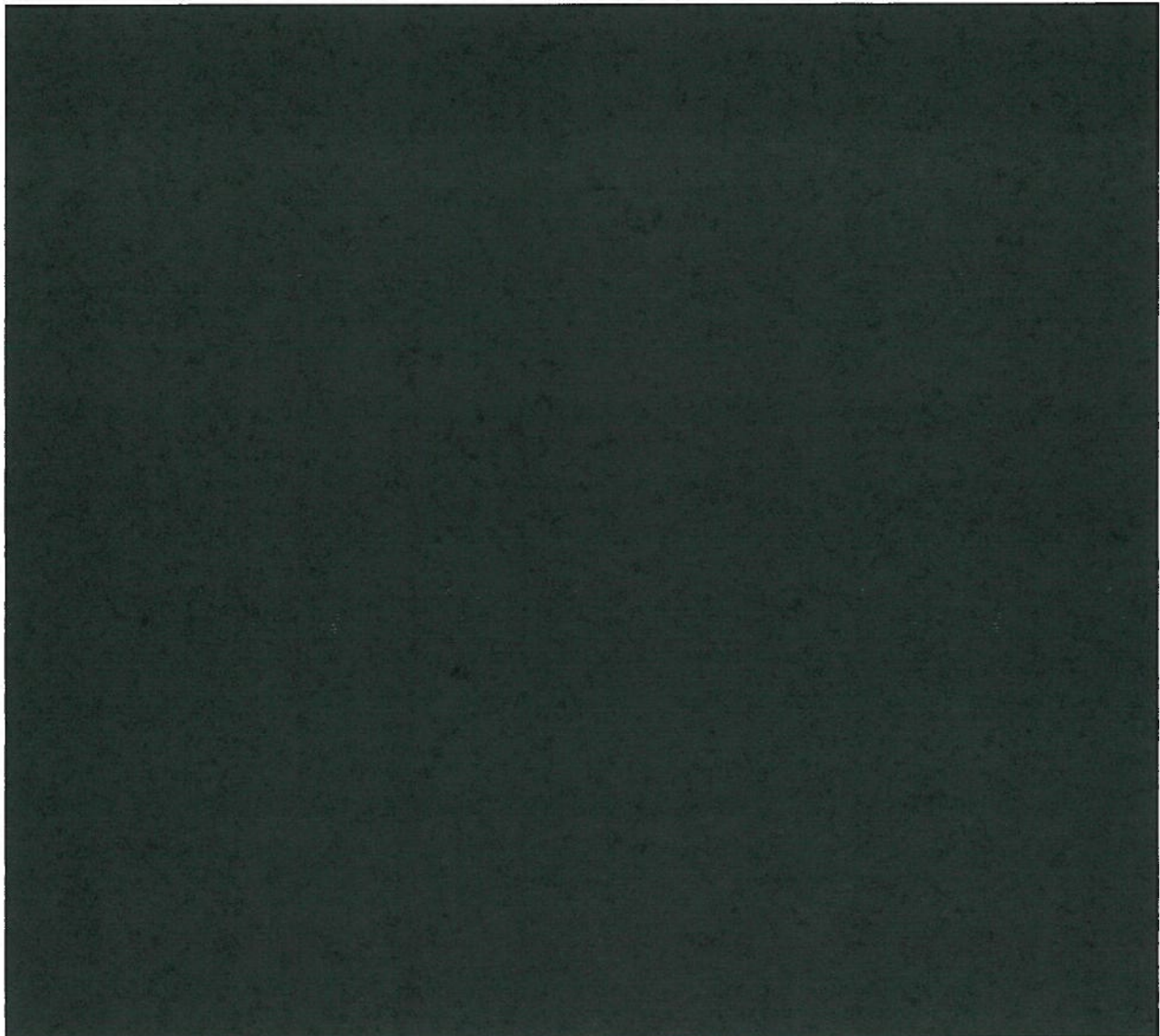
This section provides a preliminary assessment of the key implementation risks of the preferred investment option.

Risk Description	Inherent Risk	Planned Mitigation	Residual Risk
Risk 1. Resource capacity and availability The initiative requires mobilisation of a skilled delivery team comprising internal subject matter experts and external solution delivery specialists. The required internal subject matter experts may be limited in capacity due to other initiatives and organisational change. Availability of required external solution delivery specialists is dependent on the capacity of the market.	Moderate	Continue to perform prudent program management planning to minimise internal resourcing conflicts, ensuring adequate capacity is committed to each initiative prior to delivery. Also prior to delivery, verify the availability of external solution delivery expertise through market procurement processes.	Low
Risk 2. Energex / Ergon Energy alignment Given Energex and Ergon Energy's disparate legacy processes and information holdings, it may prove difficult to achieve the intended alignment and synergy in the target models.	Moderate	Through the establishment of Energy Queensland, Energex and Ergon Energy business units are working methodically to align work practices and procedures for state-wide efficiency and best practice.	Low
Risk 3. Availability of LV network data The modelling, analysis and planning of the LV network requires the availability of an accurate LV network and LV asset data.	High	Energex and Ergon Energy are currently improving LV network datasets through business-as-usual processes. ID01 GIS Consolidation & Replacement will also support the unification of the two LV network models and datasets for consistency of analysis.	Low

11. CHANGE IMPACTS

The below section details the potential impacts to occur across the Energy Queensland environment during and after the implementation of this investment.

11.1. Investment System Impacts

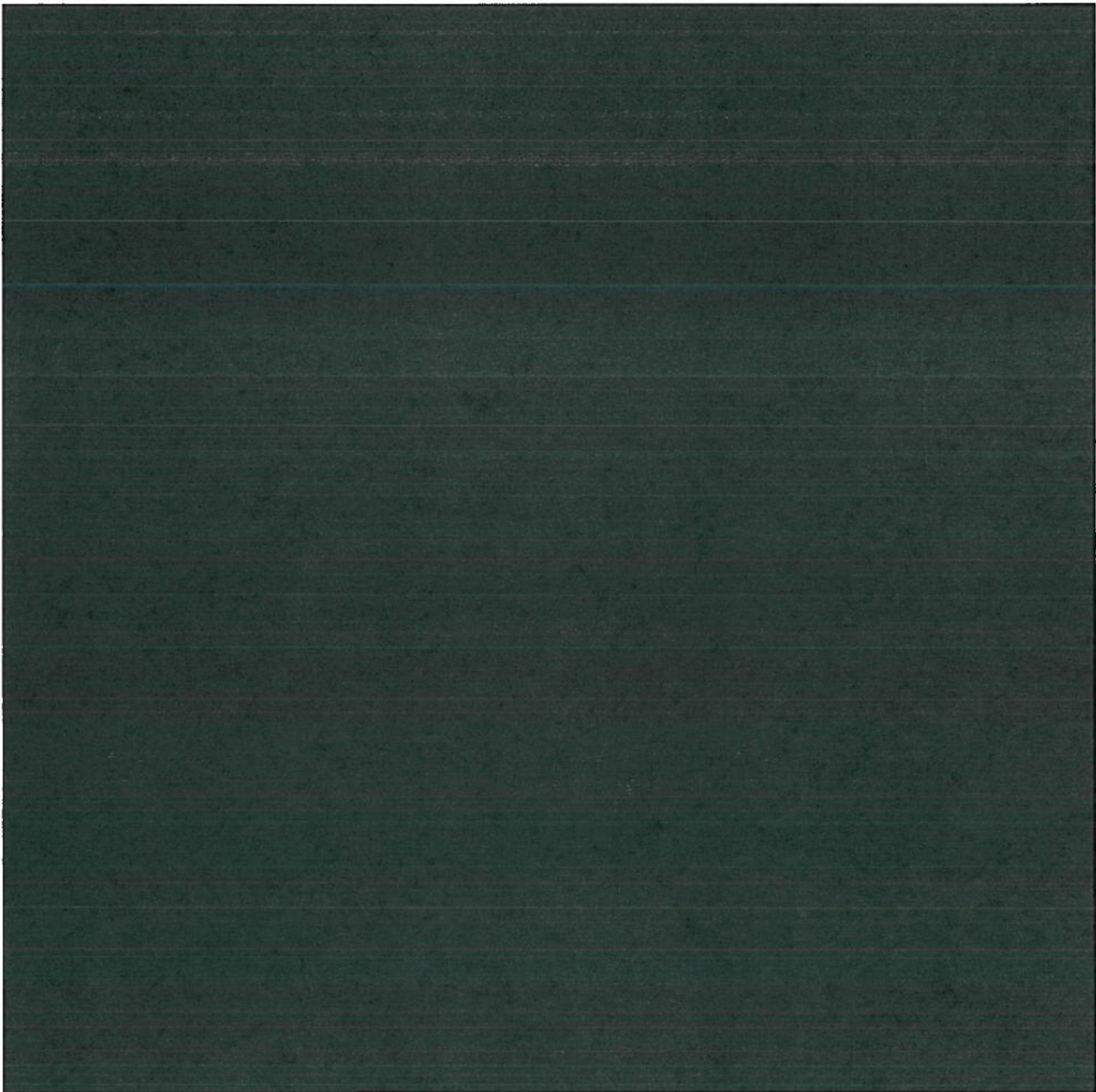


11.2. People & Process Impacts



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APPENDIX A - Glossary

This section describes key terms and acronyms used in this document.

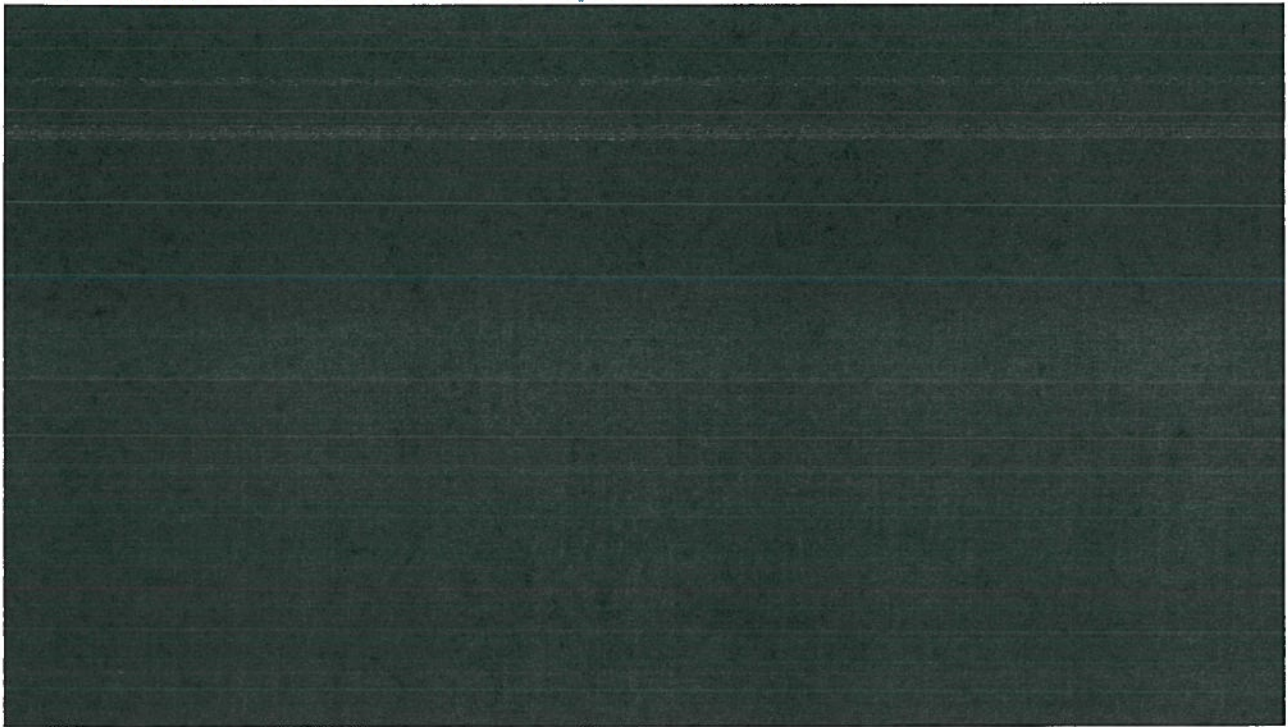
Term	Definition
ACS	Alternative Control Services
CapEx	Capital Expenditure
DAPR	Distribution Annual Planning Report
DFD	Ergon Energy's Distribution Feeder Database
DINIS	A distribution network planning software package.
DLF	Distribution Loss Factor
DMS	Distribution Management System
DNSP	Distribution Network Service Provider (i.e. the Energex and Ergon Energy distribution businesses)
EAM	Enterprise Asset Management system supporting functions including Asset and Works Management
ERP	Enterprise Resource Planning system supporting functions including Finance, Human Resource Management, Payroll and Procurement
GIS	The Energy Queensland Geographic Information and Network Model Management Systems
ICT	Information Communication Technology
LV	Low Voltage
NER	National Electricity Rules
NetPlan	Energex's distribution feeder demand forecasting and planning tool
NLF	Network Load Forecasting database
NPV	Net Present Value
OpEx	Operating Expenditure
PSS-SINCAL	A sub-transmission network planning software package.
PV	Solar Photo-Voltaic
RIN	Regulatory Information Notice
SCS	Standard Control Services
SIFT	Substation Investment Forecasting Tool (Energex built, users are Energex and Ergon Energy)
SMDB	Strategic Metering Database
WACC	Weighted Average Cost of Capital

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APPENDIX B - NetPlan Distribution System Forecast View

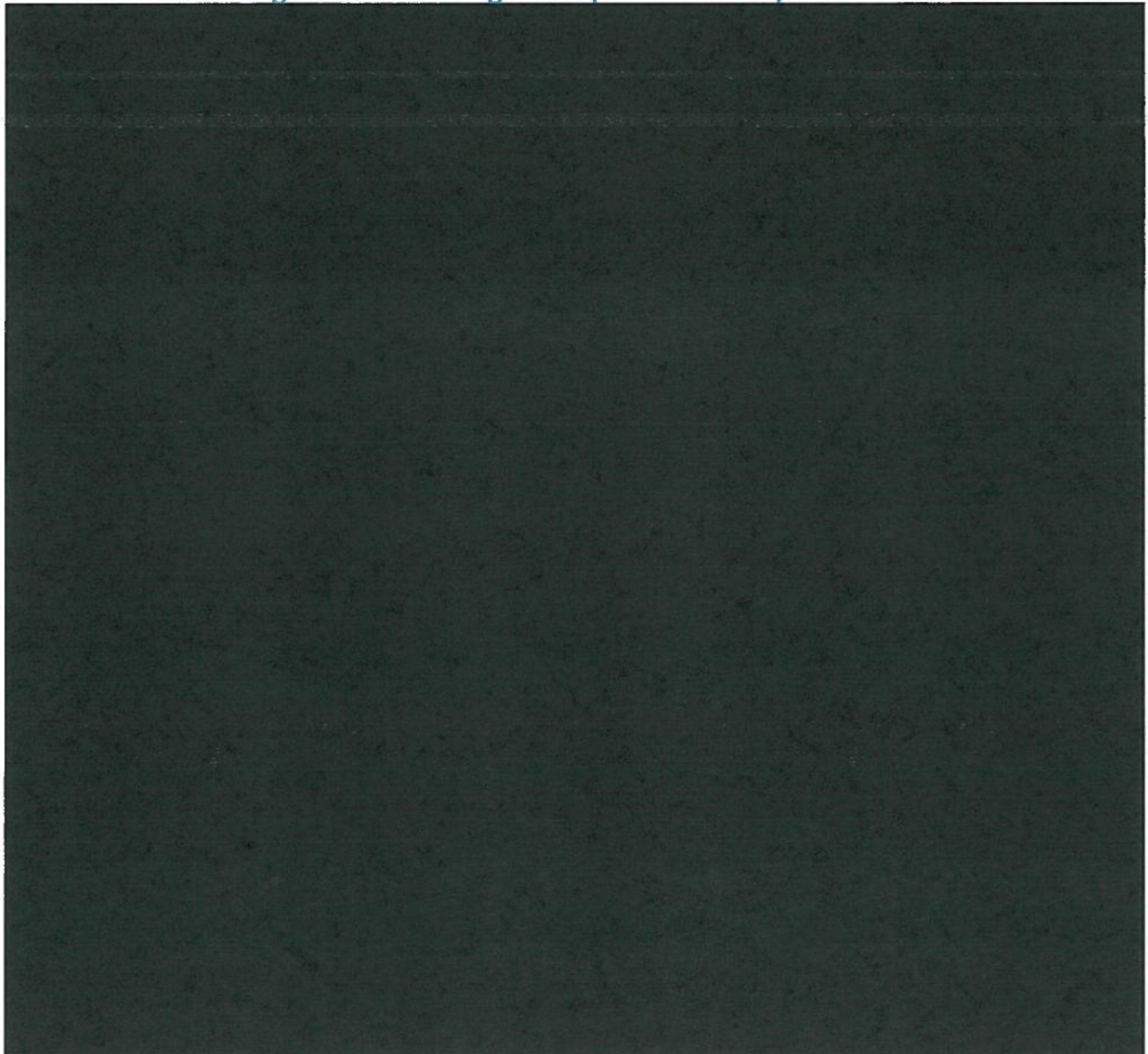


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APPENDIX C - Energex NetPlan Integration (Current State)

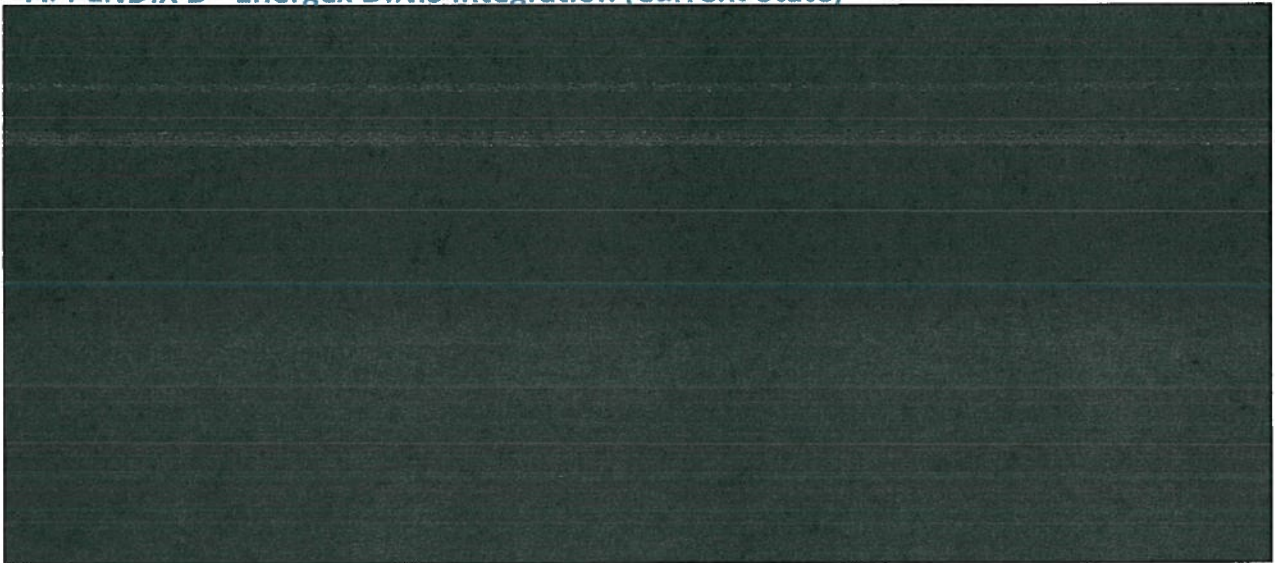


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APPENDIX D - Energex DINIS Integration (Current State)



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APPENDIX E - Ergon Energy DFD Integration (Current State)

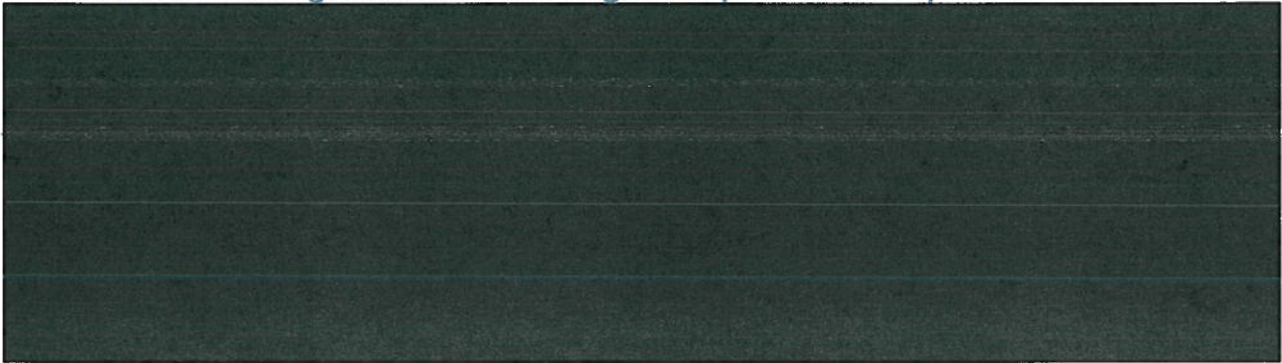


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APPENDIX F - Energex PSS-SINCAL Integration (Current State)



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APPENDIX G - Ergon Energy PSS-SINCAL Integration (Current State)

