

**ID02 Network Operations Systems
Consolidation & Replacement
Preliminary Gate 2 Business Case
2020-25
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Preliminary Gate 2 Business Case

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1 EXECUTIVE SUMMARY

1.1. Background & Business Problem

Safe control and operation of the electricity network are Energex and Ergon Energy's primary responsibilities. With the increasing deployment of Distributed Energy Resources (DER) and markedly changing demand profiles, the complexity of Australia's electricity networks is growing at a rapid rate. This increasing complexity necessitates that Energex and Ergon Energy maintain contemporary network operational control and management capability to ensure energy security for the Queensland community.

Energex has a well established Distribution Management System (DMS) for monitoring, control, switching and outage management of the High Voltage (HV) network. This solution is based on the General Electric (GE) PowerOn product which is currently being upgraded to the latest PowerOn Advantage software version. The companion PowerOn Mobile product is used for the despatch and actioning of switching operations in the field.

Prior to the coming regulatory control period, the PowerOn system will be extended, to support state-wide network management across the Ergon Energy regions. This "Unified DMS" Network Management capability will enable the interoperability of Energex and Ergon Energy network control centres in Brisbane, Townsville and Rockhampton, including support for operational fail-over for effective business continuity management.

Following deployment of the Unified DMS Network Management capability, there will still remain several legacy Network Operations systems requiring consolidation and replacement in the coming regulatory control period. Specifically:

- Ergon Energy uses an aging custom developed in-house system (FeederStat) to support a complex collection of Ergon-specific business processes including outage management and Low Voltage (LV) switching support. Energex also uses an in-house developed LV switching support tool.
- Both companies manage their SCADA network configuration through independent applications (Energex SCADABase and Ergon Energy SSDB).
- Both companies have independent and aging protection configuration management systems.
- Both companies have aging and customised load control systems for managing peak network demand.
- Both companies use an aging "head end" system for non-SCADA distribution monitoring and sensing.

1.2. Investment Overview

This investment will ensure the long term sustainability, supportability and security of the companies' Network Operations systems and processes. This includes:

- Ergon Energy's outage management capability will transition from the FeederStat system to the Unified DMS Outage Management System (OMS).
- Energex and Ergon Energy's LV switching management support will transition from AMS (Energex) and FeederStat (Ergon Energy) to a replacement "Unified LV Switching Management System".
- Energex and Ergon Energy's SCADA network configuration capability will transition from the SCADABase and SSDB systems to a replacement "Unified SCADA Configuration Management System". Both SCADABase and SSDB will then be decommissioned.
- Energex and Ergon Energy's protection configuration capability will transition from the independent IPS Protection Management systems to a "Unified Protection Management System".
- The companies' load control systems will be replaced and consolidated.
- The companies' distribution network metering "head end" system will also be replaced or renewed for sustainability.

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Together with the consolidation and replacement of the above capabilities, Energy Queensland will leverage the opportunity to standardise onto Common Operating Procedures (COP) across the state for improved productivity and operational service performance.

1.3. Options Analysis

Three options are considered in this business case:

- Option 1 – Proceed with the Network Operations Systems Consolidation & Replacement (Preferred)
- Option 2 – Independent Energex and Ergon Energy Network Operations Systems Replacement
- Option 3 – Do Minimal

“Option 1 - Proceed with the Network Operations Systems Consolidation & Replacement” is the preferred option as 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 is also an 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.

“Option 2 - Independent Energex and Ergon Energy Network Operations Systems Replacement” is viable but requires duplication of costs across the two distributors, with less opportunity for process improvement.

“Option 3 - Do minimal” defers renewal of the companies’ legacy Network Operations systems. It therefore represents a material risk to the companies’ continued delivery of their network operations and management service obligations.

1.4. Financial Summary¹



1.4.1 Energex Option Comparison



1.4.2 Ergon Energy 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. Investment Benefits

The preferred option delivers the benefit of sustaining the companies' critical Network Operations systems and business processes, specifically including outage management, LV switching management, SCADA network configuration management and protection management.

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 Operations systems supports this productivity improvement through benefits including:

- Reduced ICT application support associated with maintenance of highly aged custom built applications requiring specialist skills.
- Operational performance improvement through consolidation of Energex and Ergon Energy network control and operational work practices, reducing duplication and enabling improved productivity.

1.6. Investment Risks



1.7. Customer Focus

Through effective outage management systems and processes, Energex and Ergon Energy have the ability to accurately and efficiently identify affected customers of planned and unplanned outage events, particularly including life support customers. Effective switching management capability and processes enable quicker outage rectification, including during emergency response events.

Together, the combination of contemporary Unified DMS Network Management, Outage Management and Switching Management as well as SCADA and Protection Configuration Management enable Energex and Ergon Energy to operate the Queensland distribution networks safely and reliably, as expected by the community.

2. INVESTMENT OVERVIEW

2.1. Background and History

Safe control and operation of the electricity network are Energex and Ergon Energy's primary responsibilities. With the increasing deployment of Distributed Energy Resources (DER) and markedly changing demand profiles, the complexity of Australia's electricity networks is growing at a rapid rate. This increasing complexity necessitates that Energex and Ergon Energy maintain contemporary network operational control and management capability to ensure energy security for the Queensland community.

Energex has a well established Distribution Management System (DMS) for monitoring, control, switching and outage management of the High Voltage (HV) network. This solution is based on the General Electric (GE) PowerOn product which is currently being upgraded to the latest PowerOn Advantage software version. The companion PowerOn Mobile product is used for the despatch and actioning of switching operations in the field.

Prior to the coming regulatory control period, the PowerOn system will be extended, to support state-wide network management across the Ergon Energy regions. This "Unified DMS" Network Management capability will enable the interoperability of Energex and Ergon Energy network control centres in Brisbane, Townsville and Rockhampton, including support for operational fail-over for effective business continuity management.

2.2. Business Problem and Rationale

Following deployment of the Unified DMS Network Management capability, there will still remain several legacy Network Operations systems requiring consolidation and replacement in the coming regulatory control period. Specifically:

- Ergon Energy uses an aging custom developed in-house system (FeederStat) to support a complex collection of Ergon-specific business processes including outage management and Low Voltage (LV) switching support. Energex also uses an in-house developed LV switching support tool.
- Both companies manage their SCADA network configuration through independent applications (Energex SCADABase and Ergon Energy SSDB).
- Both companies have independent and aging protection configuration management systems.
- Both companies have aging and customised load control systems for managing peak network demand.
- Both companies use an aging distribution network metering "head end" system for non-SCADA distribution monitoring and sensing.

This investment will ensure the long term sustainability, supportability and security of the companies' Network Operations systems and processes. It will also support consistency and efficiency in the corresponding work practices across the state.

Without this investment, Energex and Ergon Energy would continue to endure the cost of maintaining aging inconsistent platforms, while failing to realise the efficiencies of consistent state-wide Network Operations systems and common operating procedures.

2.3. Investment Objectives

This investment in Network Operations systems consolidation and replacement will deliver on the following objectives.

- Ensure the supportability, sustainability and security of critical network control and operation systems and business processes according to sound ICT Asset Lifecycle Management practices.
- Meet customer expectations for accurate assessment of outage impacts and efficient outage resolution, including expediting the location of faults and restoration of supply to improve CAIDI and SAIDI.

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- Consolidate Energy Queensland's outage management, load control, SCADA configuration and protection management systems and processes into a common software suite and business processes for the Energy Queensland group, thus enabling state-wide efficiencies and improved performance.
- Improve network control and operation resilience and continuity through full Operational Control Centre (OCC) fail-over capability between Energex and Ergon Energy regions.
- Mitigate safety risks during emergency event response, through consistency of control systems and work practices.
- Mitigate security and safety risks through accurate and consistent recording and management of SCADA and protection configuration settings.

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
<p>1. Community and customer focused</p> <p>Maintain and deepen our communities’ trust by delivering on our promises, keeping the lights on and delivering an exceptional customer experience every time.</p>	<p>Through effective outage management systems and processes, Energex and Ergon Energy have the ability to accurately and efficiently identify affected customers of planned and unplanned outage events, particularly including life support customers.</p> <p>Effective switching management capability and processes enable quicker outage rectification, including during emergency response events.</p> <p>Together, the combination of contemporary DMS Network Management, Outage Management and Switching Management as well as SCADA and Protection Configuration Management enable Energex and Ergon Energy to operate the Queensland distribution networks safely and reliably, as expected by the community.</p>	<p>High</p>
<p>2. Operate safely as an efficient and effective organisation</p> <p>Continue to build a strong safety culture across the business and empower and develop our people while delivering safe, reliable and efficient operations.</p>	<p>Consistency of control systems and work practices will serve to mitigate safety risks during emergency event response, through consistency of control systems and work practices across the Energex and Ergon Energy regions.</p> <p>Accurate and consistent recording and management of SCADA and protection configuration settings further ensure the security and safety of network operations.</p>	<p>High</p>
<p>3. Strengthen and grow from our core</p> <p>Leverage our portfolio business, strive for continuous improvement and work together to shape energy use and improve the utilisation of our assets.</p>	<p>Consistency of network control and management across the Energy Queensland group enables improved network resilience through operational fail-over between Energex and Ergon Energy OCCs.</p> <p>Consistency of work practices across the state also maximises the opportunity for process optimisation through continuous improvement.</p>	<p>High</p>
<p>4. Create value through innovation</p> <p>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.</p>	<p>Consistent Network Operations systems can serve as the future basis for innovations through new and emerging technologies and techniques (not in scope of this specific investment).</p> <p>E.g. Fault Detection Isolation & Restoration (FDIR) / Automation Power Restoration Schemes (APRS).</p>	<p>Medium</p>

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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
<p>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>	<p>This business case proposes the consolidation and replacement of Energex and Ergon Energy’s legacy outage management, load control, SCADA configuration and protection management systems and work practices.</p> <p>Through this replacement, Energex and Ergon Energy can maintain the required safe and efficient operation of their networks (standard control services), maintaining network security and compliance with all regulated, legislative and policy obligations.</p>
<p>6.5.7 (a) (3) The forecast capital expenditure maintains the quality, reliability and security of supply of standard control services</p>	<p>Through sustainable and supportable outage management, load control, SCADA configuration and protection management systems and processes, Energex and Ergon Energy can maintain the quality, reliability and security of standard control services.</p> <p>Failure to ensure the sustainability of these aging platforms could result in system outage or failure, growing inaccuracies or deteriorating network reliability and security.</p>
<p>6.5.7 (c) (1) (i) The forecast capital expenditure reasonably reflects the efficient costs of achieving the capital expenditure objectives</p>	<p>Costs for this investment have been forecast based on knowledge of recent and historical market procurements for equivalent capability and services 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. However, Network Operations systems will typically not be served from the cloud for reasons of critical infrastructure security and operational performance requirements [REDACTED]</p>
<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>	<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 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>

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NER Objective Alignment	Rationale
<p>6.5.7 (c) (1) (iii)</p> <p>The forecast capital expenditure reasonably reflects a realistic expectation of the demand forecast and cost inputs required to achieve the capital expenditure objective</p>	<p>Costs for this investment have been forecast based on knowledge of recent and historical market procurements for equivalent capability and services 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 competitive market procurement processes, sourcing analysis and peer consultation.</p>

3.3. Alignment with the Digital 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 Operations Systems are classified as Systems of Record or Systems of Differentiation according to the Energy Queensland’s Digital Application Asset Management Guidelines.</p> <p>These guidelines describe key defining criteria for Systems of Record including:</p> <ul style="list-style-type: none"> • Supports core business processes – “running the core business” • Business process is understood and stable • Contain information that is core to the business • Have high data integrity requirements <p>These guidelines describe key defining criteria for Systems of Differentiation including:</p> <ul style="list-style-type: none"> • Supports a differentiating or new business process • Business process is developing, ambiguous and dynamic • Utilises information that is core to the business <p>On the above basis, the guidelines forecast that these systems should maintain currency, supportability and effectiveness through the following investment lifecycle.</p> <ul style="list-style-type: none"> • Minor Upgrade – 2-3 years after implementation • Major Upgrade – 5-7 years after implementation • Replacement – 7-12 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 outage management, load control, SCADA configuration and protection management systems proposed for replacement through this investment will meet the criteria for replacement identified in the guidelines. The proposed investment is planned to conclude in FY23.</p>

3.4. Regulatory Implications

Efficient and reliable network control and management is essential for Energex and Ergon Energy's compliance with legislative and regulatory obligations as distribution network service providers (DNSPs).

These obligations include:

- Obligation to provide distribution network services in accordance with the Minimum Service Standards (MSS) prescribed through Energex and Ergon Energy's Distribution Authorities (DAs).
- Obligations under the National Energy Customer Framework (NECF) regarding outage notification and management.
- Obligations under the Workplace Health and Safety Act (2011) to ensure the safe performance of work and provision of services.
- Obligations under the Security of Critical Infrastructure Act (2018) with strong controls and security of data regarding the configuration and operation of the companies' networks.

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 Operations Systems Consolidation & Replacement is essential for the ongoing efficient, sustainable support of many of Energy Queensland’s business areas and functions as listed below.

Business Area	Business Function	Business Reference Model Description
Network Operations	Network Monitoring and Control	A function for the real time monitoring of alarms and events, watching for inconsistencies and operation of the network via remote operational controls. This is to ensure that systems are operating within agreed tolerances.
	Network Outage Management	A function to identify, evaluate, prioritise and manage the restoration of network outages. This includes the dispatch of planned/unplanned outage work to work crews and the notification of customers.
	Integrated Secondary Systems Operations	A function for the real-time operational monitoring, security monitoring, operational intervention and provision of first-level support services for secondary networks and systems.
	Secondary Systems Operations Support	A function that complements the Integrated Secondary Systems Operations function with secondary and further level support for secondary systems. As such, it also supports other functions under Works Execution and Network Operations, as well as provides advice to business capabilities under Network Asset Management. This function includes expertise in secondary systems and their programming / configuration and therefore supports business processes that change these systems or their programming / configuration. This also includes the testing of device configurations.
	Network Operational Standards	A function that develops and manages strategies, policies, procedures and standards associated with the day-to-day operations of the network and network assets, in accordance with regulation, safety/security requirements and other enterprise objectives.
	Network Operations Planning	A function to plan the operation of the network on the basis of historic data and various forecasts (e.g. weather, demand, special events), in accordance with Operational Standards and contractual arrangements
	Network Access Management	A function to manage safe access to parts of the network for the purposes of executing work.

4.2. Solution Overview

4.2.1 Current State (2018)

Energy Queensland's Network Operations Systems span the following system functions:

1. Network Management

Situational awareness and visibility of the HV network in real time, to enable control, automation, communication and security. Includes:

- Interface with field sensors, switches and devices through the SCADA network;
- Mastering of the "as operated" electricity network model;
- Electronic pinboards and tag management;
- Alarm management;
- Automated process control;
- Real-time calculations; and
- Historical data management.

2. Switching Management

Preparation and management of network switching operations. Includes:

- Lodgement of switching applications;
- Switching scheduling;
- Switching definition and support;
- Switching sheet generation and validation;
- Authorisation workflows;
- Switching sheet despatch (including mobile switching)
- Tagging and switching execution management; and
- Audit functions.

3. Outage Management

Network fault identification and restoration management. Includes:

- Fault identification through use of SCADA data, network model analysis and customer trouble call details;
- Identification of affected customers; and
- Integration with public-facing customer and stakeholder interfaces including the Energex and Ergon Energy Internet Websites, the Interactive Voice Recognition (IVR) Contact Centre Technology (CCT), text message updates, social media and other channels.

4. Load Management

Management of controllable load, including:

- Emergency and rotational load shedding and restoration;
- Temporal load modelling for calculation of available (shedtable) and return loads; and
- Manual, time-of-day, load based and emergency switching of controlled loads.

5. Network Operations Reporting

Operational information provision, including:

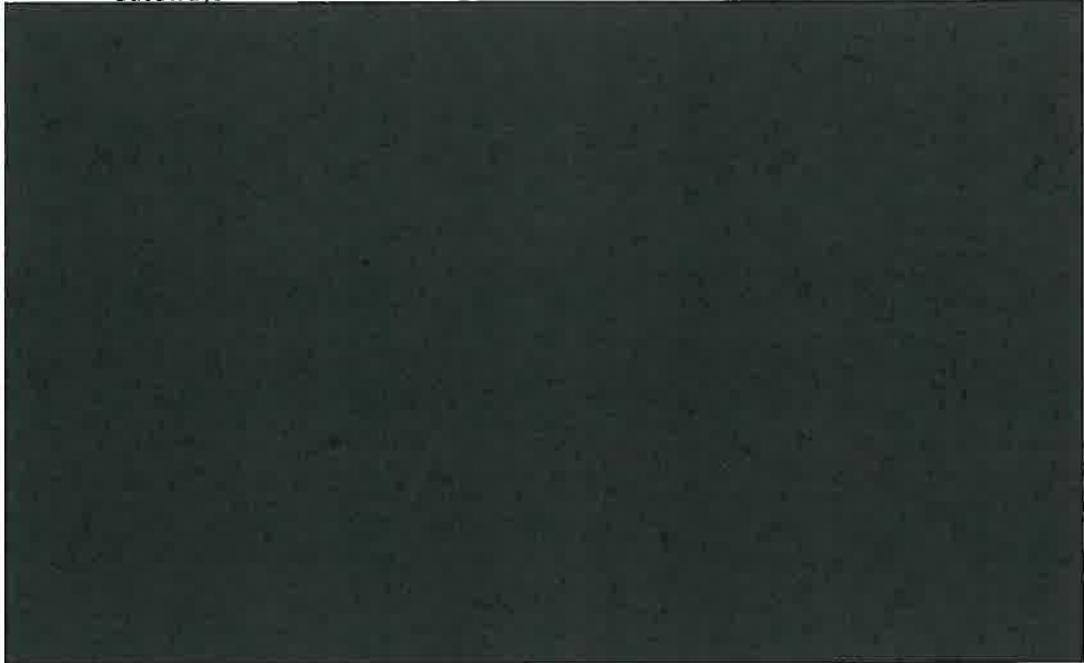
- Network performance reporting;
- Outage management reporting; and

- Key Performance Indicator (KPI) reporting.

6. SCADA Network Configuration Management

Configuration management of the operational SCADA communications network, including:

- Master record of network device configuration. I.e.
 - Remote Terminal Units (RTUs)
 - Intelligent Electronic Devices² (IEDs)
 - Remote Data Concentrators (RDCs)
 - Master Data Concentrators (MDCs)
 - Gateways



- Synchronisation of device configuration settings with the DMS to enable Network Operations Management functions and mapping to the data historian.

7. Protection Configuration Management

Configuration management of the operational protection network, including:

- Master record of protection relay data and settings.
- Relay setting model generation, supported by industry library of relay setting models.
- Protection configuration testing and test management.
- Protection relay firmware management.

8. Network Monitoring Head End

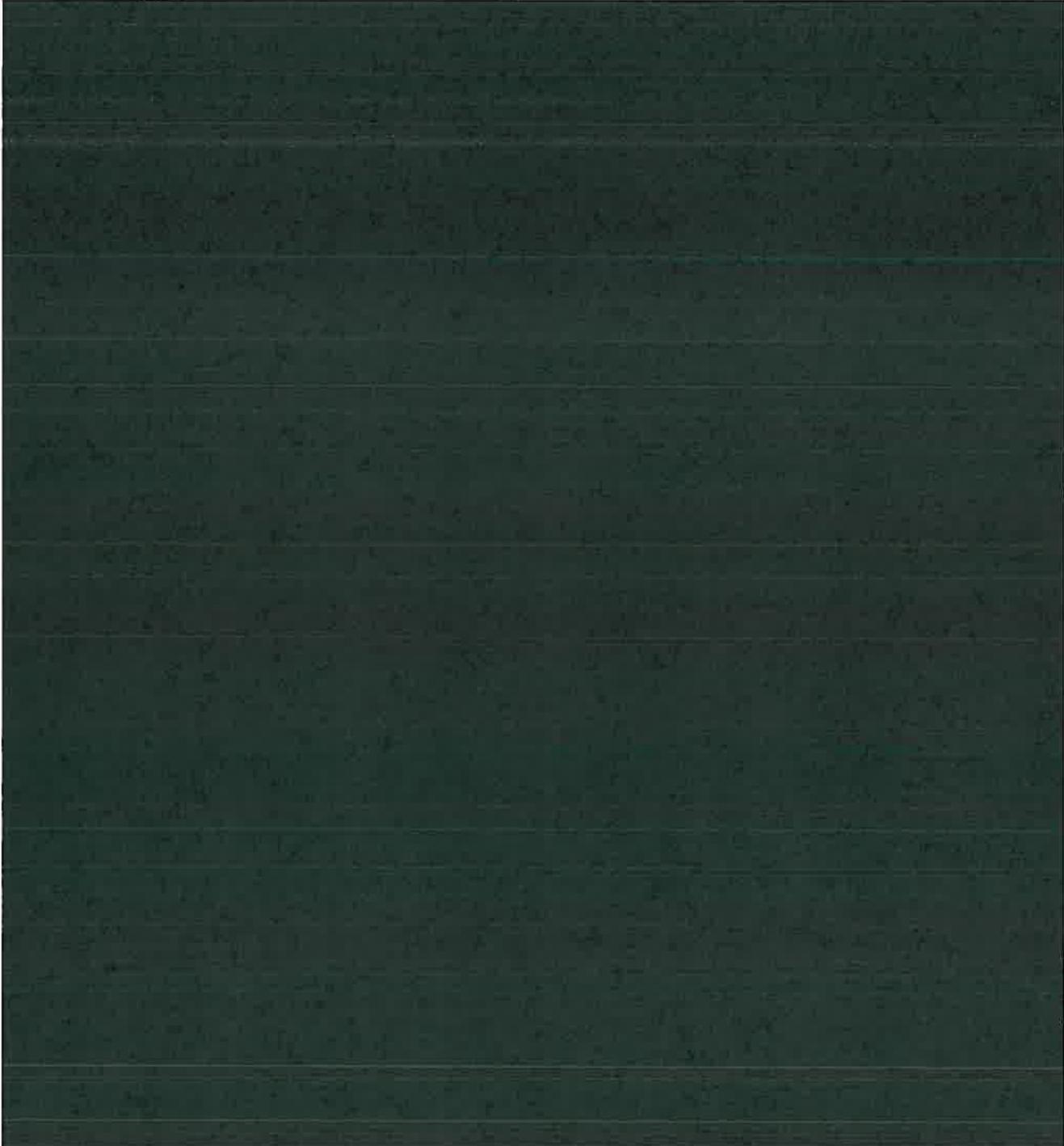
Communications and data aggregation tool for non-SCADA network meters and sensors.



² An IED is distinguished from an RTU by being smaller, less flexible/more specialised and less configurable than an RTU. Existing IEDs can stand alone as “small” RTUs, but are more commonly encountered as distributed substation interface peripherals of an RTU.

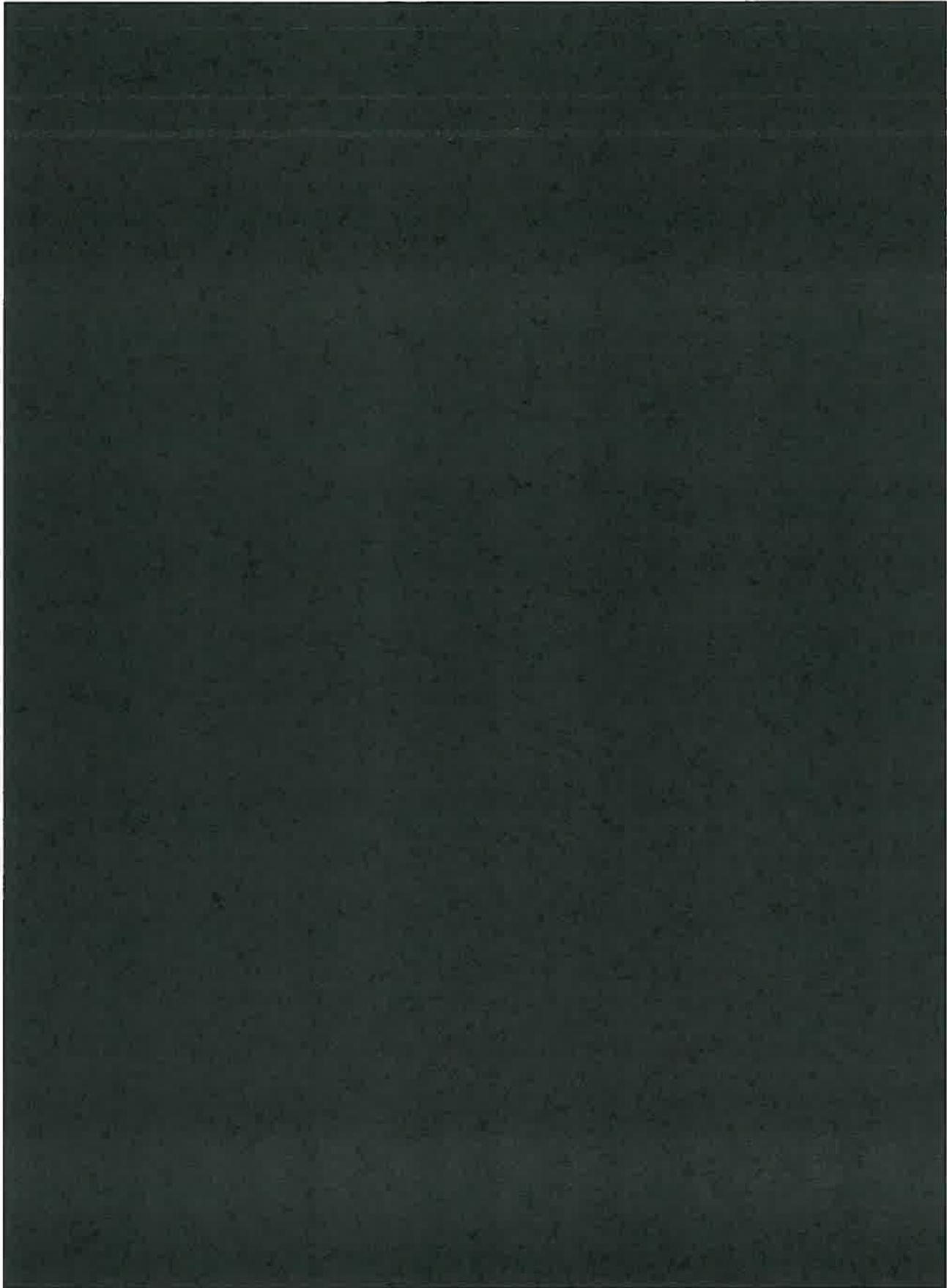
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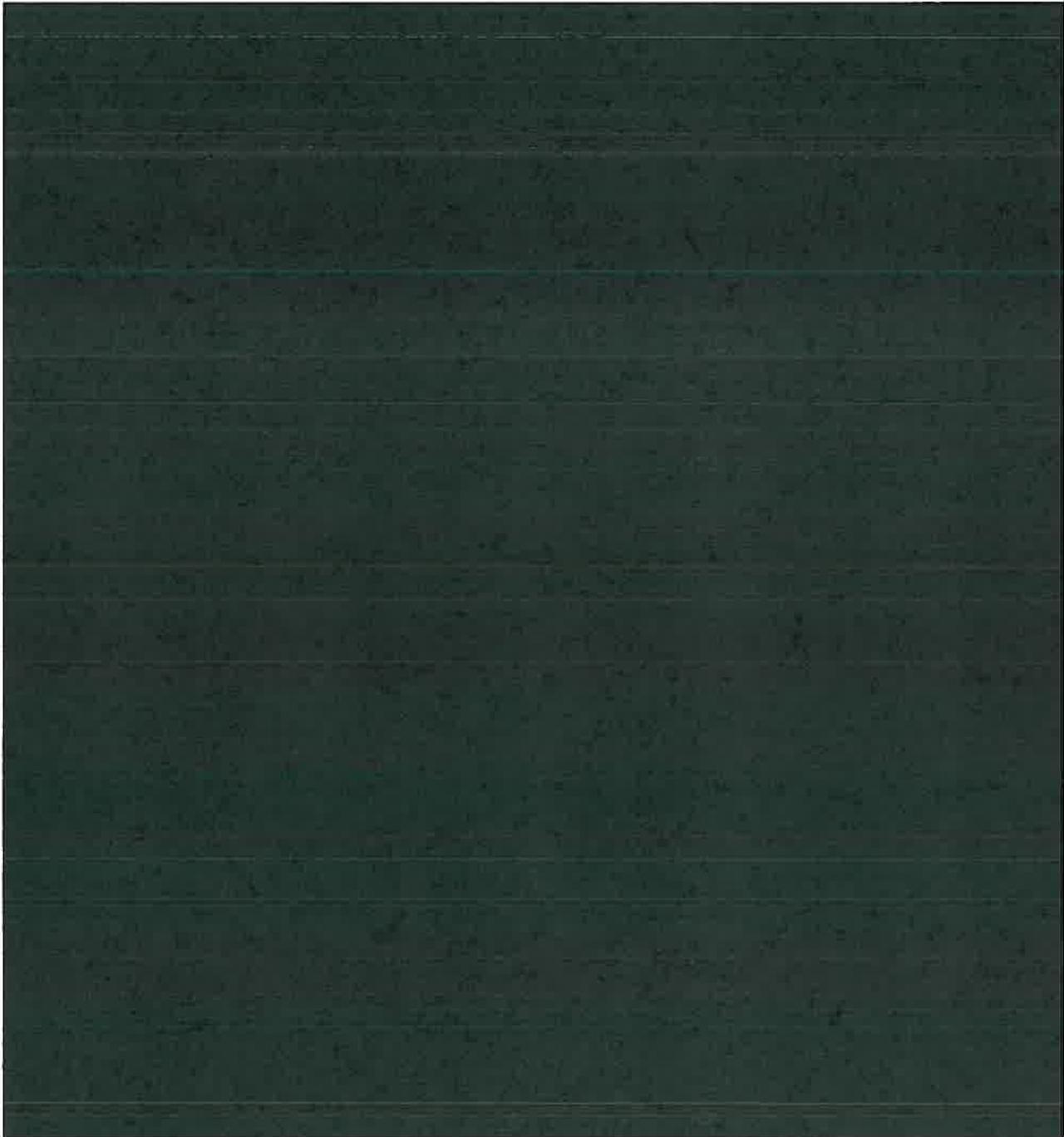
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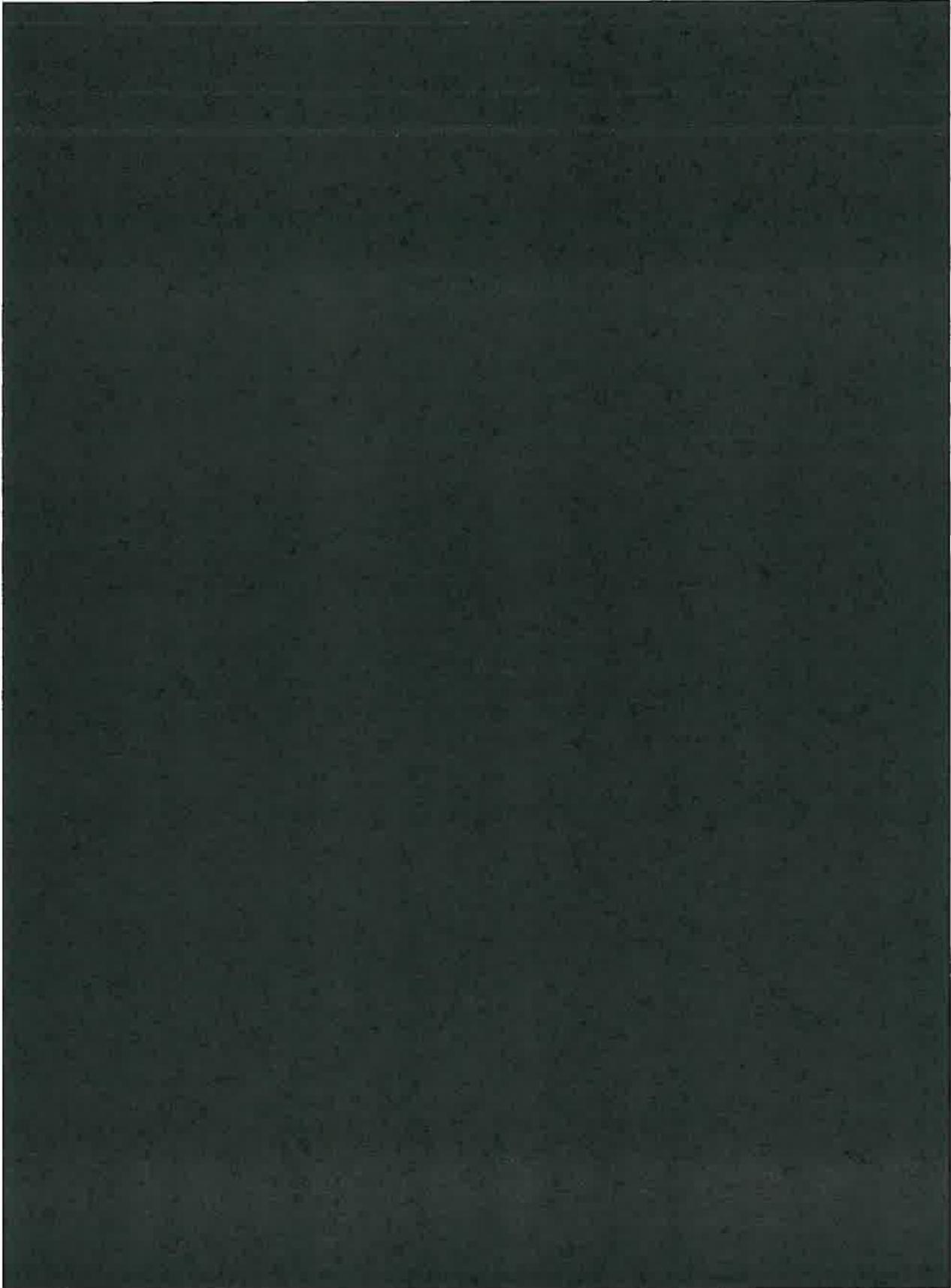


4.2.2 Interim State (start of the proposed investment)



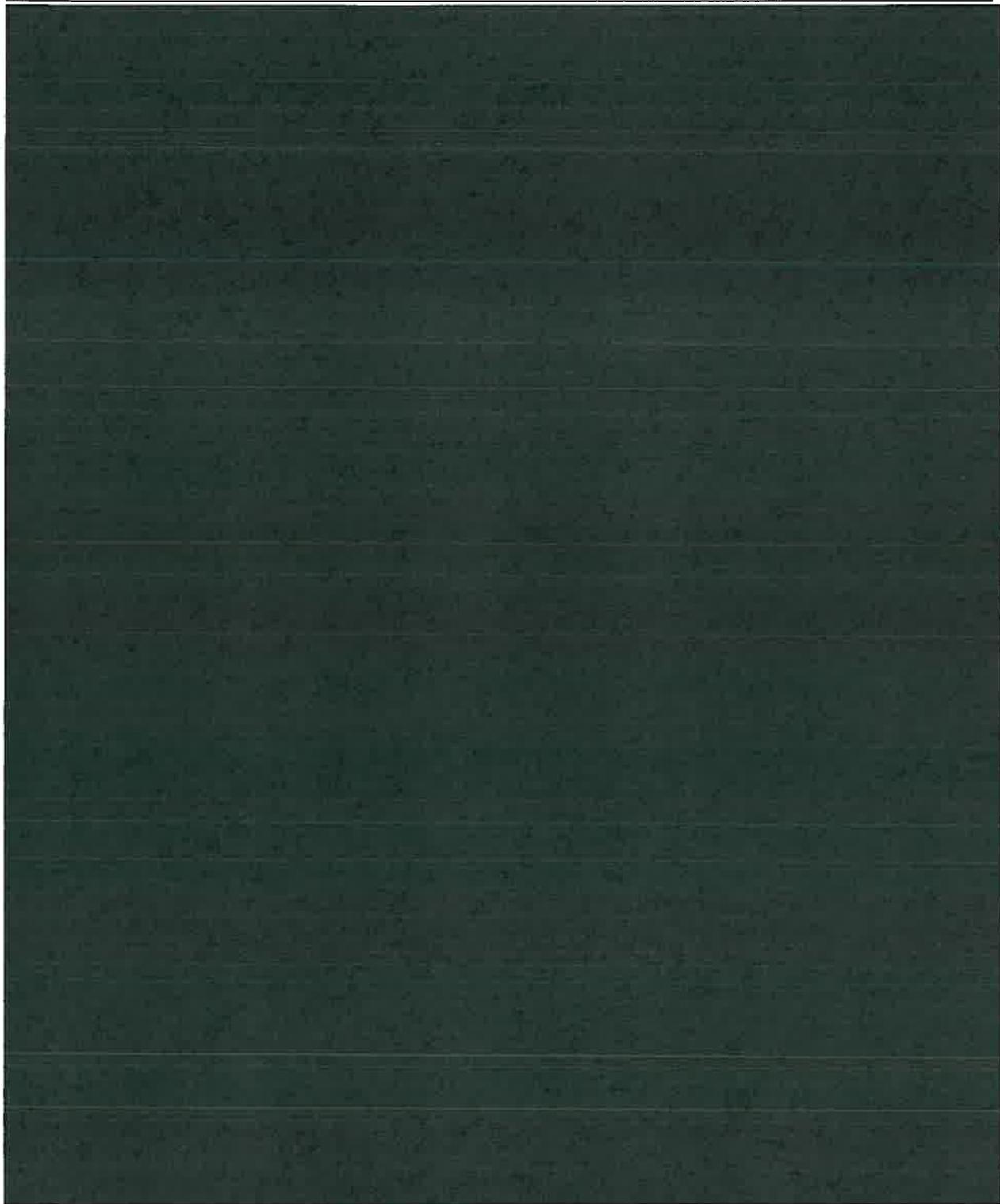
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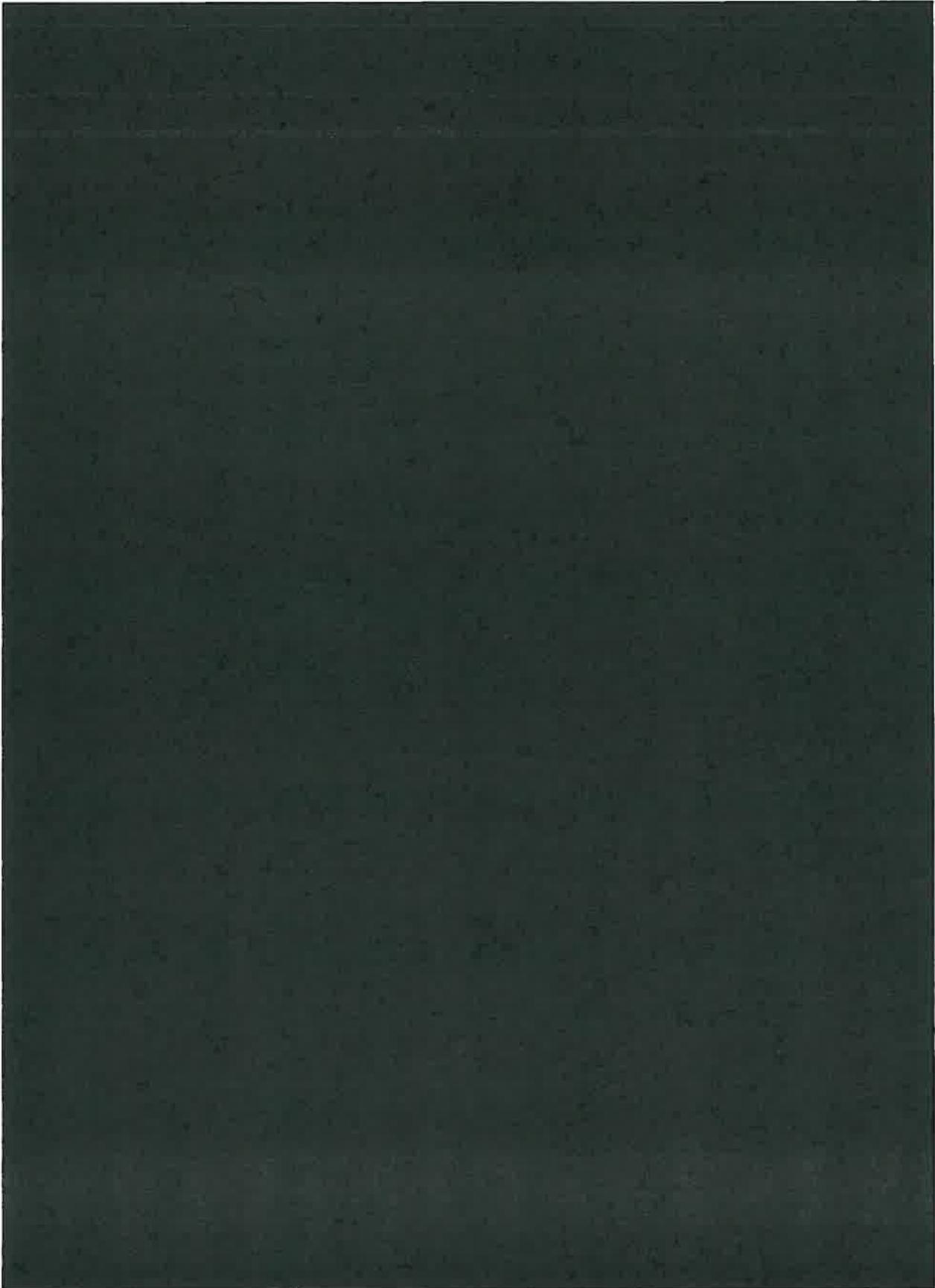
4.2.3 Target State (end of the proposed investment)

This business case investment will consolidate and replace the companies' residual Network Operations Systems functions for ongoing supportability, sustainability and security, leveraging the state-wide UDMS as the primary platform for efficient and safe business processes.

³ The coordination of SCADA Configuration Management replacement with the rollout of Unified DMS capability is still under consideration.

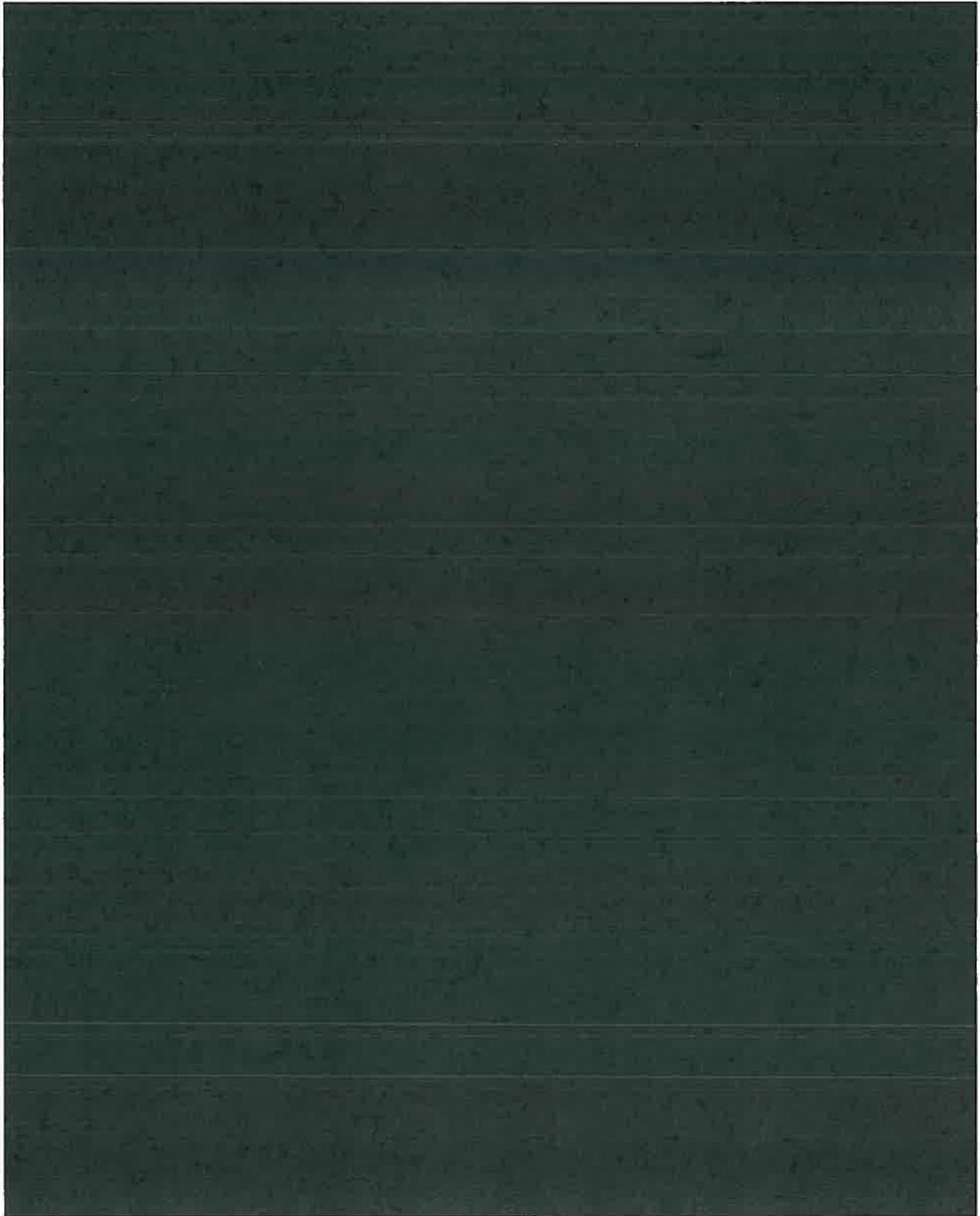
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4.3. Assumptions

This business case is based on the following assumptions.

- 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.

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- Commercially available “off the shelf” solutions will be used in preference to custom developed software wherever prudent.

4.4. Dependencies

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

Program/Project	Dependency	Effect
Energex PowerOn Advantage Upgrade	<p>Energex is currently upgrading its existing PowerOn Fusion DMS to the newest version of the software, known as PowerOn Advantage.</p> <p>This new version ensures the long term sustainability of the platform for Energex and it will also serve as the basis for extending the Unified DMS (UDMS) capability into the Ergon Energy regions (see the next dependency below).</p>	<p>The Network Operations Systems Consolidation & Replacement is dependent on completion of the Energex PowerOn Advantage upgrade.</p>
Unified DMS Network Management Deployment	<p>Following upgrade of the Energex DMS to PowerOn Advantage, the Unified DMS Network Management capability will be extended for use in the Ergon Energy regions.</p> 	<p>The Network Operations Systems Consolidation & Replacement is dependent on completion of the Energex DMS upgrade and transition of Ergon Energy to the Unified DMS Network Management capability.</p> <p>The rollout of Unified DMS Network Management capability will be phased across the Ergon Energy regions and will complete early in the coming regulatory control period.</p>
Common Operating Procedures (COP)	<p>Rollout of unified Network Management, Outage Management and Switching Management capability requires common operating procedures. These procedures are under development through the COP initiative.</p>	<p>Network Operations Systems Consolidation and Replacement could proceed without common operating procedures, but the intended state-wide efficiencies and benefits may not be achieved.</p>
ERP EAM Program	<p>ERP EAM Program initiatives 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 the Enterprise Intelligence Platform.</p> <p>ID02 Network Control System Consolidation & Replacement involves the transition of capability from Ergon Energy's legacy in-house network operations systems FeederStat and ECorp into the Unified DMS platform. Both of these legacy systems are coupled with the EAM. The ERP EAM Program will transition data mastering from the legacy platforms, but maintain data synchronisation (where necessary) in the interim period.</p>	<p>The Network Operations Systems Consolidation & Replacement will transition from the interim state for data mastered in EAM, ultimately enabling decommissioning of ECorp and FeederStat on completion of the initiative.</p>

Preliminary Gate 2 Business Case

ID02 Network Operations Systems Consolidation & Replacement



Program/Project	Dependency	Effect
ID03 Field Force Systems Consolidation & Replacement	<p>It's planned that the Unified Field Force Automation (FFA) platform to delivered through ID03 Field Force Systems Consolidation & Replacement will be integrated with the Network Operations Systems delivered through this business case.</p> <p>These two initiatives are mutually dependent and should occur in parallel with close coordination.</p>	<p>The Network Operations Systems Consolidation & Replacement could proceed without ID03 Field Force Systems Consolidation & Replacement, however it would then need to integrate with Energex and Ergon Energy's disparate legacy field force systems rather than the single unified solution.</p>

Other programs or projects are dependent on this investment:

Program/Project	Dependency	Effect
ID01 GIS Consolidation & Replacement	<p>ID01 GIS Consolidation & Replacement will transition Energex and Ergon Energy to a single "Unified GIS" and network model, appropriately integrated with the EAM.</p> <p>The GIS serves as the master of the "as designed" network model. This model is synchronised with the DMS which masters the "as operated" network configuration.</p>	<p>Safety and productivity benefits of ID01 GIS Consolidation & Replacement are reduced without the ability to integrate with a unified sustainable Unified DMS capability, including sustainable Outage Management capability.</p>
ID03 Field Force Systems Consolidation & Replacement	<p>It's planned that the Unified Field Force Automation (FFA) platform to delivered through ID03 Field Force Systems Consolidation & Replacement will be integrated with the Network Operations Systems delivered through this business case.</p> <p>These two initiatives are mutually dependent and should occur in parallel with close coordination.</p>	<p>ID03 Field Force Systems Consolidation & Replacement could proceed without Network Operations Systems Consolidation & Replacement, however it would then need to integrate with Energex and Ergon Energy's disparate legacy Network Operations Systems rather than the single unified solution.</p>
ID04 Market Systems Consolidation & Replacement	<p>It's planned that Unified Market System platform planned for delivery through ID04 Customer Market Systems Consolidation & Replacement will be integrated with the Network Operations systems delivered through this business case.</p>	<p>ID04 Customer Market Systems Consolidation & Replacement could proceed without completion of Network Operations Systems Consolidation & Replacement, however it would then need to integrate with Energex and Ergon Energy's disparate legacy Network Operations Systems rather than the single unified solution.</p>

5. OPTIONS ANALYSIS

This section considers the following options:

- Option 1 – Proceed with the Network Operations Systems Consolidation & Replacement (Preferred)
- Option 2 – Independent Energex and Ergon Energy Network Operations Systems Replacement
- Option 3 – Do Minimal

5.1. Option 1 – Proceed with the Network Operations Systems Consolidation & Replacement (Preferred)

The existing Energex and Ergon Energy legacy outage management, load control, SCADA configuration and protection management systems will be consolidated and replaced for ongoing supportability, sustainability and security as described in Section 4.2.

State-wide consolidation and alignment of business processes will also be implemented for best practice efficiency, supporting Energy Queensland's planned 10% reduction in indirect costs and 3% improvement in program of works labour costs.

5.2. Option 2 – Independent Energex and Ergon Energy Network Operations Systems Replacement

The existing Energex and Ergon Energy legacy outage management, load control, SCADA configuration and protection management systems will be replaced independently. However, they will remain duplicated and inconsistent across the businesses.

No state-wide consolidation or alignment of business processes would occur.

5.3. Option 3 – Do Minimal

The existing Energex and Ergon Energy legacy outage management, load control, SCADA configuration and protection management systems will remain as is without consolidation, upgrade or replacement. This is not a "Do Nothing" option, in that while these legacy environments remain operable, they will require further patching and remediation for service continuity and business change.

These options are further described in the table over page.

Preliminary Gate 2 Business Case

ID02 Network Operations Systems Consolidation & Replacement



5.4. Option Comparison

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

	Option 1 – Proceed with the Network Operations Systems Consolidation & Replacement (Preferred)	Option 2 – Independent Energen and Ergon Energy Network Operations Systems Replacement	Option 3 – Do Minimal
<p>Advantages</p> <p>Consistent with the business case objectives, this option:</p> <ul style="list-style-type: none"> Ensures the supportability, sustainability and security of critical network control and operation systems and business processes according to sound ICT Asset Lifecycle Management practices. Meets customer expectations for accurate assessment of outage impacts and efficient outage resolution, including expediting the location of faults and restoration of supply to improve CAIDI and SAIDI. Consolidates Energy Queensland's outage management, load control, SCADA configuration and protection management systems and processes into a common software suite and business processes for the Energy Queensland group, thus enabling state-wide efficiencies and improved performance. Improves network control and operation resilience and continuity through full Operational Control Centre (OCC) fail-over capability between Energen and Ergon Energy regions. Mitigates safety risks during emergency event response, through consistency of control systems and work practices. Mitigates security and safety risks through accurate and consistent recording and management of SCADA and protection configuration settings. 	<p>Partly consistent with the business case objectives, this option:</p> <ul style="list-style-type: none"> Ensures the supportability, sustainability and security of critical network control and operation systems and business processes according to sound ICT Asset Lifecycle Management practices. Meets customer expectations for accurate assessment of outage impacts and efficient outage resolution, including expediting the location of faults and restoration of supply to improve CAIDI and SAIDI. Mitigates security and safety risks through accurate and consistent recording and management of SCADA and protection configuration settings. 	<p>This option does not effectively achieve any of the objectives of the business case.</p> <p>It does represent the lowest near-term expenditure on the companies' outage management, load control, SCADA configuration and protection management systems. However this saving is offset by risk of system failure, extended system outage or unsupportability.</p>	

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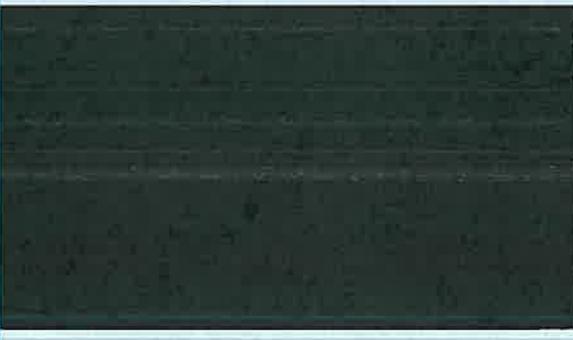
Option 1 – Proceed with the Network Operations Systems Consolidation & Replacement (Preferred)	Option 2 – Independent Energex and Ergon Energy Network Operations Systems Replacement	Option 3 – Do Minimal
<p>Disadvantages</p> <p>None - This option meets all of the objectives of the business case.</p> <p>Energex and Ergon Energy currently operate an aging, highly customised and disparate set of outage management, load control, SCADA configuration and protection management systems.</p> <p>Investing in the consolidation and replacement of these platforms is consistent with the core responsibilities of the companies as distribution service providers.</p>	<p>This option does not meet the following objectives of the business case:</p> <ul style="list-style-type: none"> Does not consolidate Energy Queensland’s outage management, load control, SCADA configuration and protection management systems and processes into a common software suite and business processes for the Energy Queensland group, thus enabling state-wide efficiencies and improved performance. Therefore, this option does not support the forecast Energy Queensland 10% reduction in indirect costs and 3% improvement in program of works labour costs. Does not improve network control and operation resilience and continuity through full Operational Control Centre (OCC) fail-over capability between Energex and Ergon Energy regions. Does not mitigate safety risks during emergency event response, through consistency of control systems and work practices. <p>Furthermore, this option involves material investment in 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 FeederStat, ECorp and some other legacy tooling is not feasible. Therefore, the 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 sustainable, supportable and suitable Network Operations systems essential for the safe and reliable provision of distribution services. This is therefore 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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Preliminary Gate 2 Business Case

ID02 Network Operations Systems Consolidation & Replacement



Key Identified Risks	Option 1 – Proceed with the Network Operations Systems Consolidation & Replacement (Preferred)	Option 2 – Independent Energex and Ergon Energy Network Operations Systems Replacement	Option 3 – Do Minimal
	<p>As the “preferred option”, a specific implementation risk assessment is detailed in section 10.2. Key amongst these risks are:</p> <ul style="list-style-type: none"> • Complexities associated with migration from mission critical, highly customised legacy systems, built on old technologies. This risk increases the longer the migration is deferred. • Resource capacity and availability - mitigated through use of market provisioned services and established practices, tools and techniques. • Energex / Ergon Energy alignment - mitigated through current work practice alignment focus, with recognition that some differences in Energex and Ergon Energy’s respective operating environments exist. 	<p>Similar to Option 1, this option involves substantial investment in Network Operations systems and tooling. Therefore the risks are similar as follows:</p> <ul style="list-style-type: none"> • Complexities associated with migration from mission critical, highly customised legacy systems, built on old technologies. This risk increases the longer the migration is deferred. • Resource capacity and availability - mitigated through use of market provisioned services and established practices, tools and techniques. <p>Also, the following additional risk exist for this option:</p> <ul style="list-style-type: none"> • Continued development of disparate Energex and Ergon Energy Network Operations systems and tooling 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 in information are reduced. 	 <p>See the organisational risk assessment in section 10.1 for further information.</p>

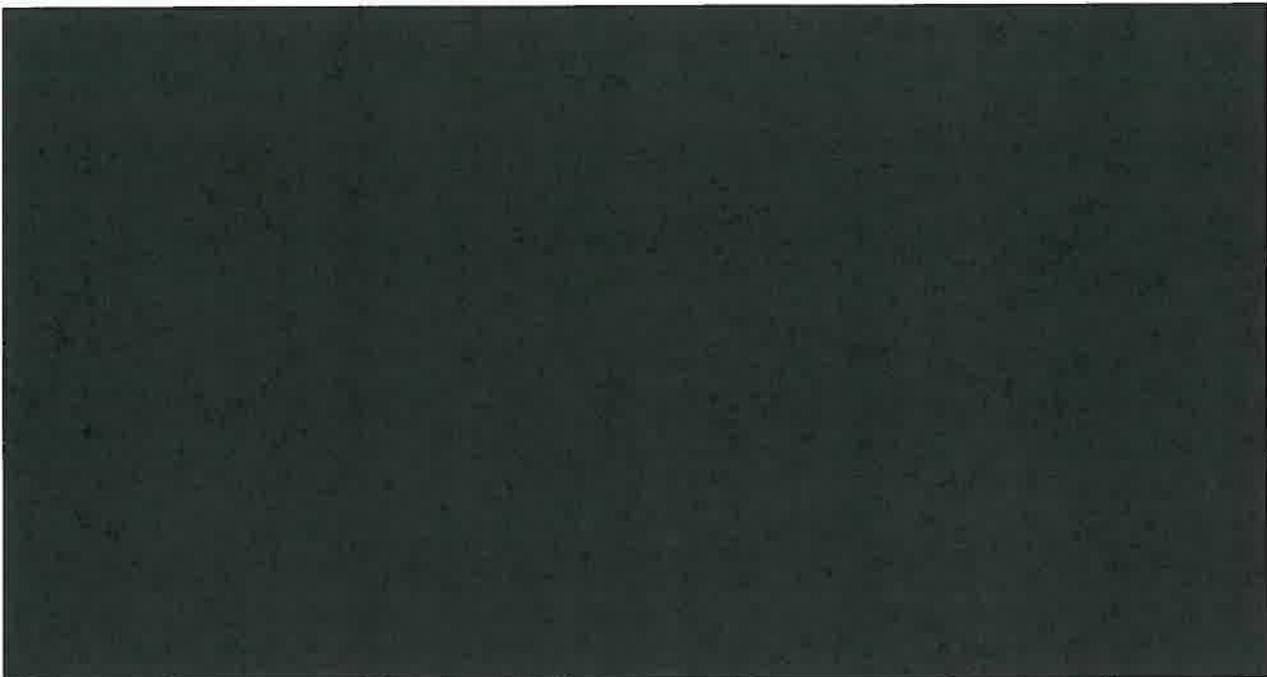
6. PREFERRED OPTION

“Option 1 - Proceed with the Network Operations Systems Consolidation & Replacement” is the preferred option as 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 is also an 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.

“Option 2 - Independent Energex and Ergon Energy Network Operations Systems Replacement” is viable but requires duplication of costs across the two distributors, with less opportunity for process improvement.

“Option 3 - Do minimal” defers renewal of the companies’ legacy Network Operations systems. It therefore represents a material risk to the companies’ continued delivery of their network operations and management service obligations.

6.1. Delivery Timeline and Approach



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ID02 Network Operations Systems 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		
ICT Support Productivity	Reduced ICT custom application support associated with maintenance of highly aged custom built applications requiring specialist skills.	
Operational Performance	Operational performance improvement through consolidation of Energex and Ergon Energy network control and operational work practices, reducing duplication and enabling improved productivity.	
Other Benefits		
ICT Asset Management	Sustainment and security of the companies’ critical network control and operation systems.	Sustainment
Safety, Security & Risk	Mitigation of safety risks during emergency event response, through consistency of control systems and work practices.	Safety
	Mitigation of security and safety risks through accurate and consistent recording and management of SCADA and protection configuration recording and management.	Safety & Security
Customer & Stakeholder	Improved network control and operation resilience and continuity through full Operational Control Centre (OCC) fail-over capability between Energex and Ergon Energy regions.	Resilience
	Meet customer expectations for accurate assessment of outage impacts and efficient outage resolution.	Customer Expectation Management

8. FINANCIAL ANALYSIS

8.1. Scope of Costs

The table below summarises the 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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8.2. 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 a 27 month elapsed period with an up-front design phase followed by multiple deployments.</p> <p>As this initiative comprises the consolidation of multiple disparate systems for Energex and Ergon Energy the deployment will be structured with staged migrations and cut-over of individual systems in a coordinated program.</p> <p>The program will be planned 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 both Energex and Ergon Energy's systems to the new common target state to enable cutover to common state-wide business processes.
2	Use of market services	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.
3	Energex and Ergon Energy costs	
4	Option 2 (Independent Energex and Ergon Energy Network Operations Systems Replacement)	
5	Option 3 (Do Minimal)	

8.3. Financial Summary⁴

8.3.1 Energex Option Comparison



8.3.2 Ergon Energy Option Comparison



8.3.3 Energex Expenditure Summary (Option 1 – Preferred)



8.3.4 Ergon Energy Expenditure Summary (Option 1 – Preferred)



8.4. 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 a 27 month phased implementation period.
- 5.40% Regulated Rate of Return/WACC is applied with present values discounted to FY17/18.

⁴ 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.

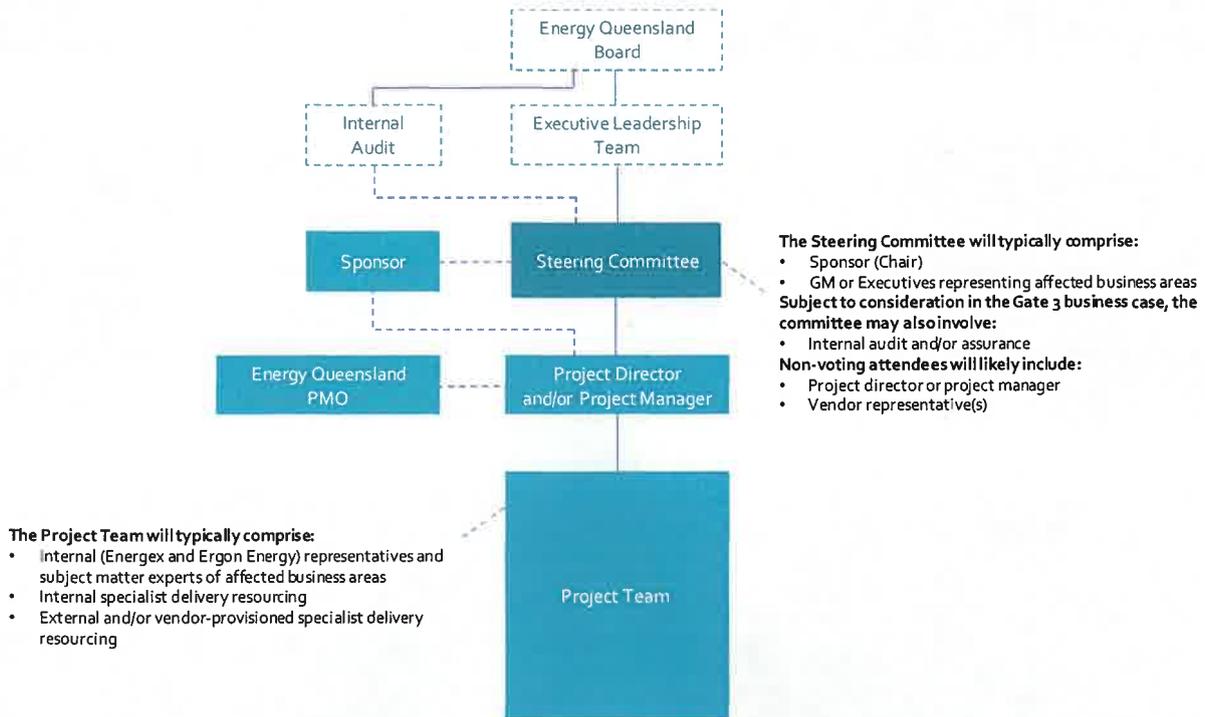


Figure 4 Governance and delivery model

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
<p>Sponsor</p>	<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, BAU) • Brief Executives and Board on program progress • Ensure that the benefits realisation plan is realistic and achievable
<p>Project Director and/or Project Manager</p>	<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 • Ensures audit feedback is actioned in a timely, verifiable manner and validated
<p>Program Management Office</p>	<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

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Role	Key Accountabilities
	<ul style="list-style-type: none"> • Overall program / project issue management • Program financial tracking and reporting • Deliverables monitoring • Program key performance monitoring and reporting
Project Team Members	<p>The Project Team undertakes the core delivery of the project under 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
Energy Queensland Executive Leadership Team (ELT) and Board	<ul style="list-style-type: none"> • Operational network performance, reliability and resilience.
Energex & Ergon Energy OCCs	<ul style="list-style-type: none"> • Reliable and efficient outage management, switching and load control systems. • Effective, workable and safe operational processes which enable the consistent state-wide operation of the network in OCC fail-over scenarios. • Accurate SCADA and protection configuration management.
Contact Centres	<ul style="list-style-type: none"> • Consistent, integrated outage management and trouble call entry capability. • Accurate outage information for communication with affected customers.
Field Staff	<ul style="list-style-type: none"> • Safe and secure network control and operations. • Accurate, safe and efficient network switching procedures and tooling.
Protection Management Team	<ul style="list-style-type: none"> • Suitable, efficient, accurate and effective protection configuration management capability.
SCADA Communications Team	<ul style="list-style-type: none"> • Suitable, efficient, accurate and effective SCADA configuration management capability.

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9.2.2 Key External Stakeholders

Stakeholder	Interest
Regulators	<ul style="list-style-type: none">• Compliance with minimum service standards, WH&S, NECF and all other legislative and regulatory obligations for provision of distribution services.
Community	<ul style="list-style-type: none">• Reliable, safe and cost effective electricity distribution services.• Accurate assessment of outage impacts and efficient outage resolution.

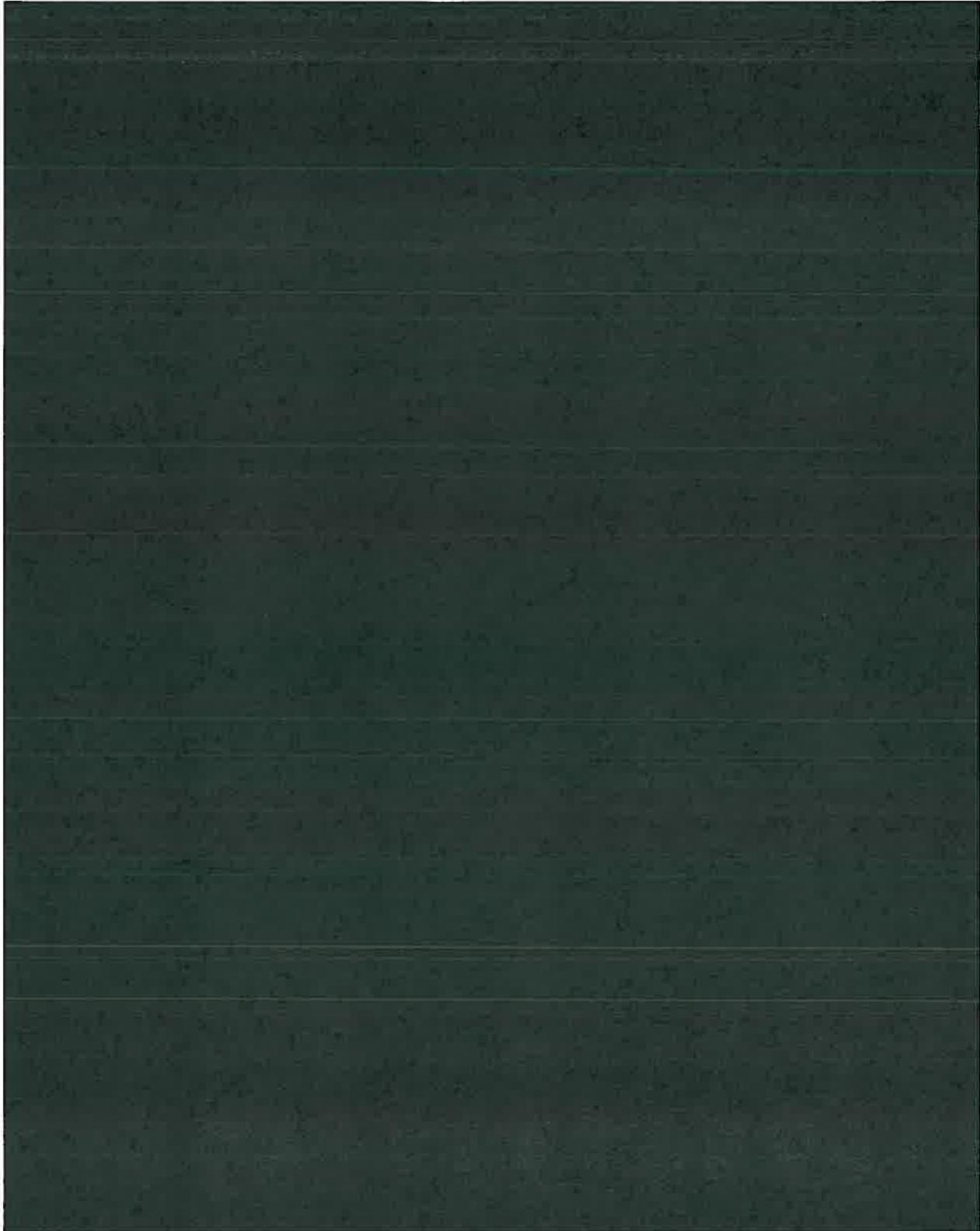
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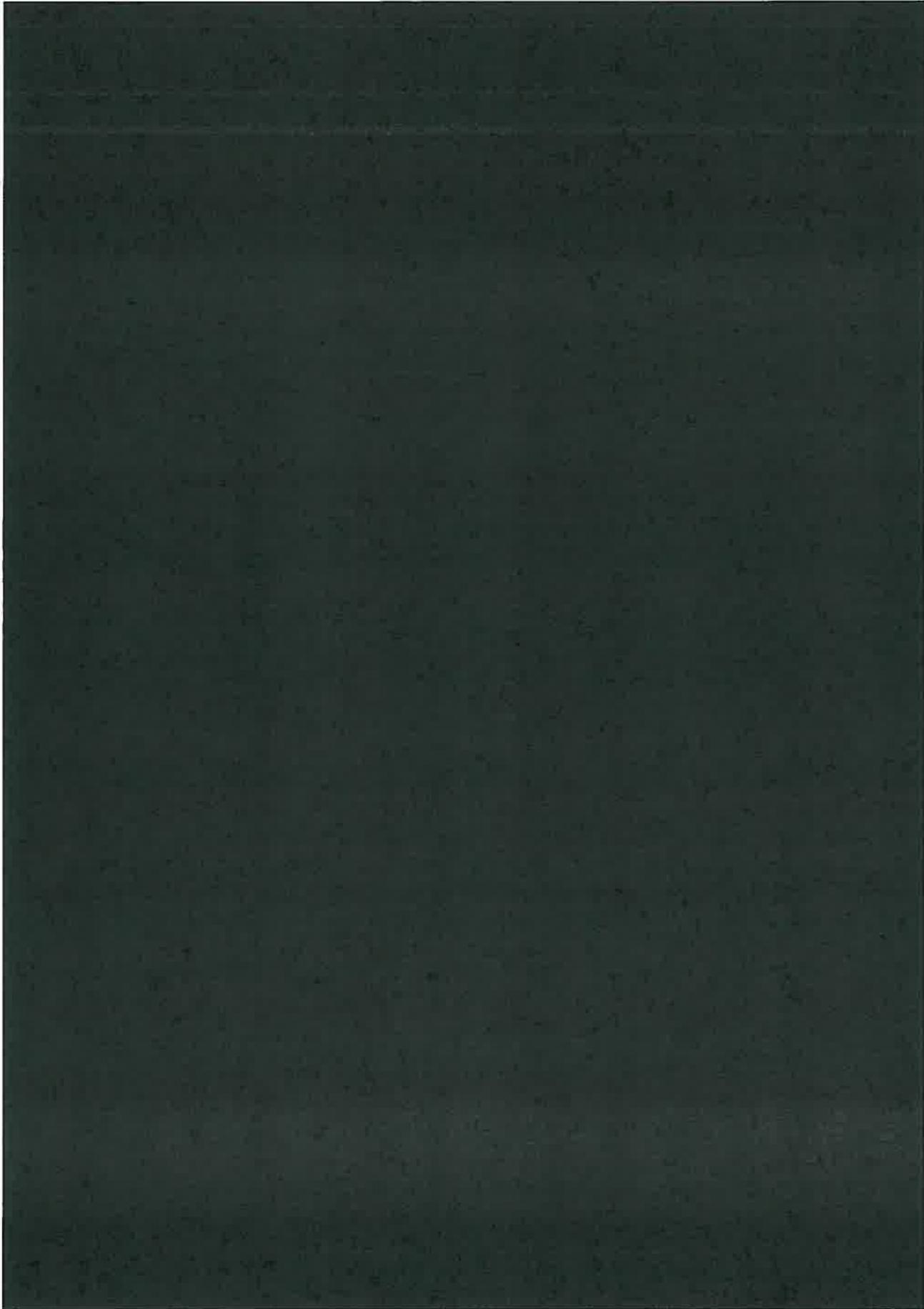
10. RISK ASSESSMENT

10.1. Organisational Risk Assessment



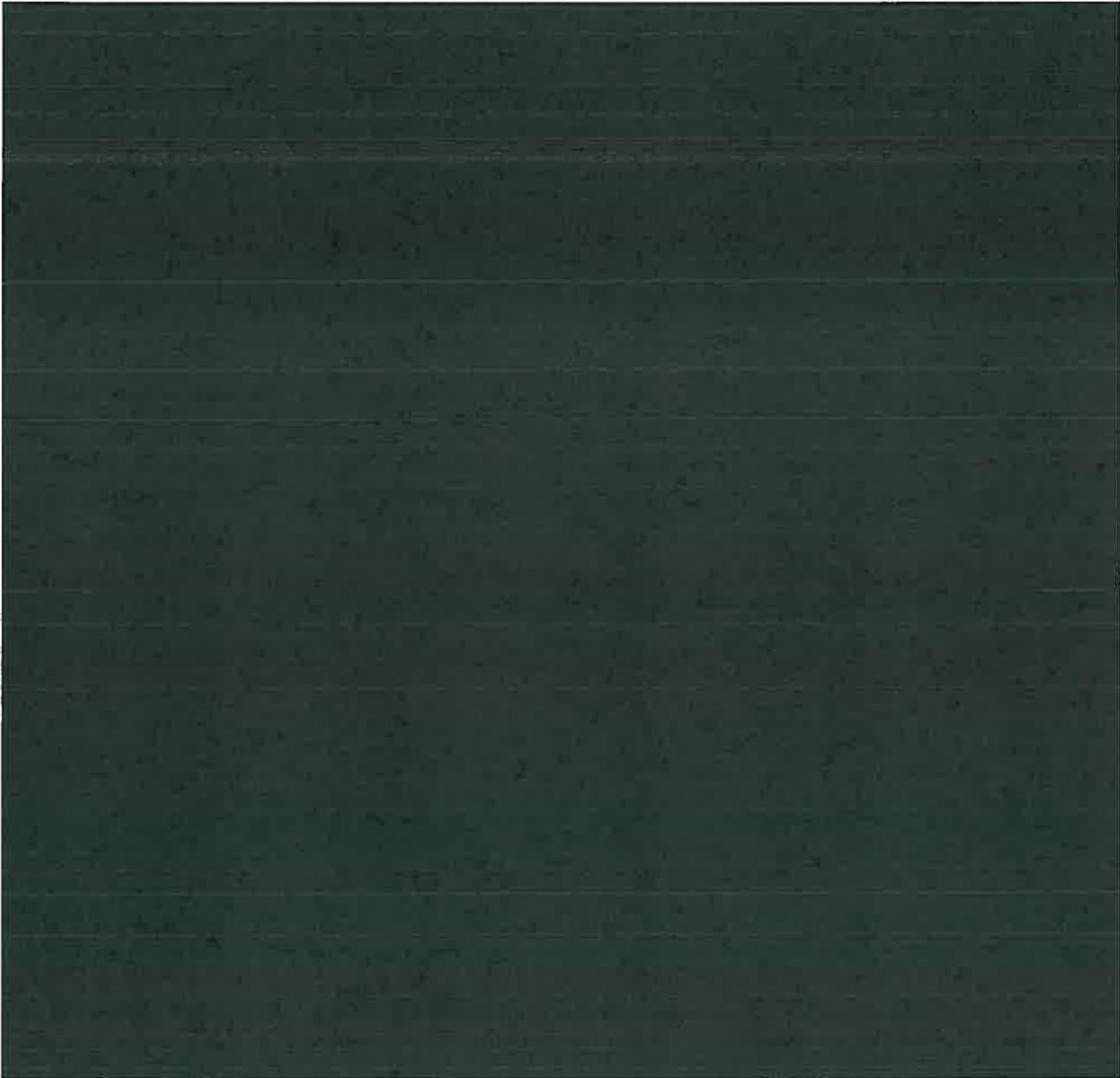
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10.2. Preliminary Implementation Risk Assessment

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

Risk Description	Inherent Risk	Planned Mitigation	Residual Risk
<p>Risk 1. Migration risk</p> <p>There will be substantial complexity in migration from mission critical, highly customised legacy systems, built on old technologies.</p> <p>This risk increases the longer the migration is deferred.</p> <p>This risk is greatest for Ergon Energy's legacy FeederStat system and ECorp database.</p> <p>See Appendix A for further information.</p>	High	<p>Settle the timeframe for the planned migration and agree career plans with existing staffing with knowledge of these legacy systems. Through this pro-active management, the necessary skills are maintained as required for the complex migration activity.</p> <p>Individual staff and specialists are respected with agreed options for their future career steps.</p>	Low
<p>Risk 2. Resource capacity and availability due to competing priorities</p> <p>The initiative requires mobilisation of a skilled delivery team comprising internal subject matter experts and external solution delivery specialists.</p> <p>The required internal subject matter experts may be limited in capacity due to other initiatives and organisational change.</p> <p>Availability of required external solution delivery specialists is dependent on the capacity of the market.</p>	Moderate	<p>Continue to perform prudent program management planning to minimise internal resourcing conflicts, ensuring adequate capacity is committed to each initiative prior to delivery.</p> <p>Also prior to delivery, verify the availability of external solution delivery expertise through market procurement processes.</p>	Low
<p>Risk 3. Energex / Ergon Energy alignment</p> <p>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 solution and processes.</p>	High	<p>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.</p> <p>In some instances, differences in Energex and Ergon Energy's respective distribution service areas and network topologies may necessitate alternative solutions and processes. However this represents a relative minority of functional areas.</p>	Low

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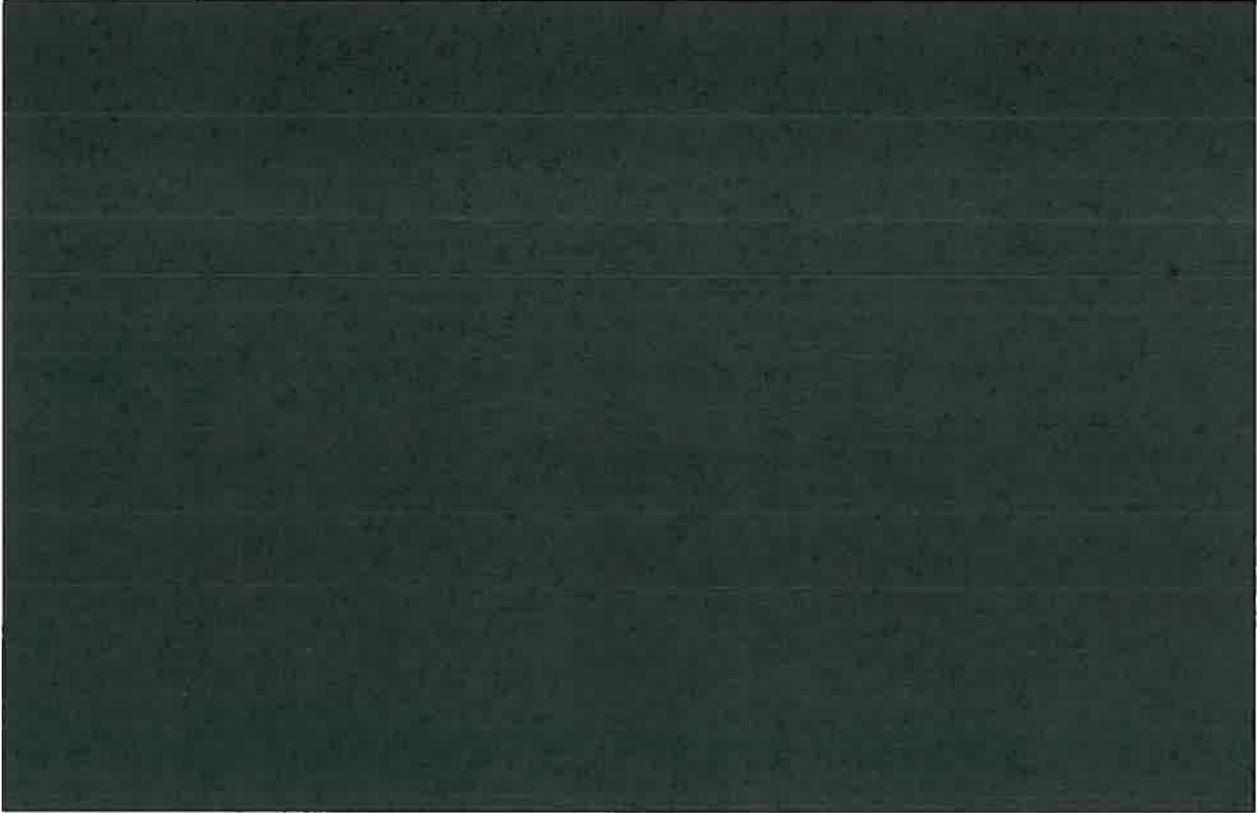
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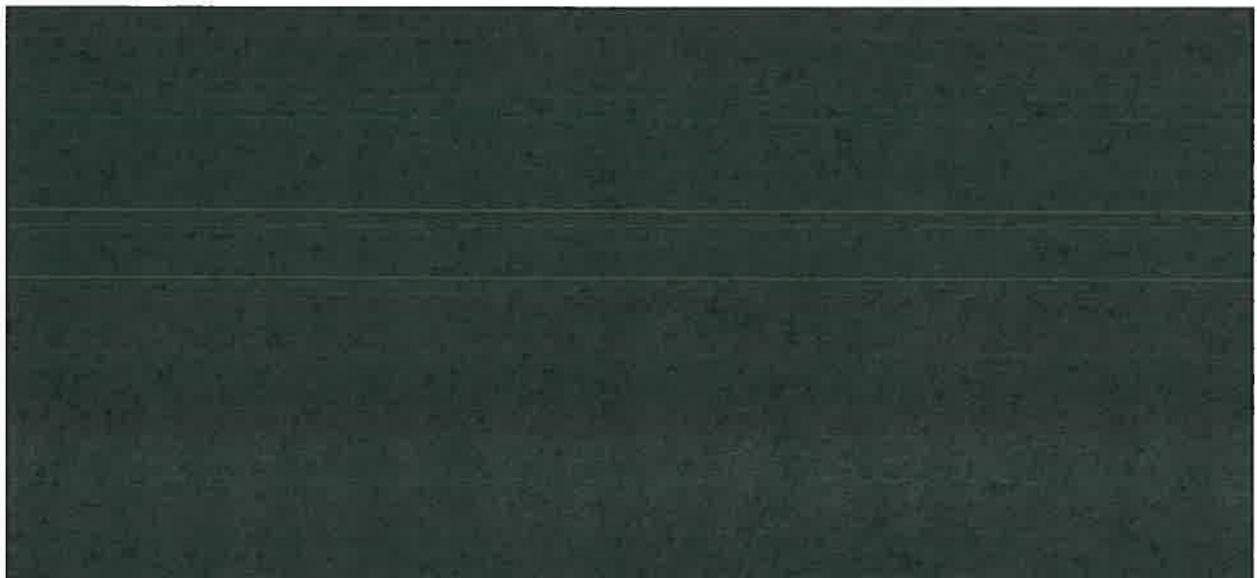
11. CHANGE IMPACTS

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

11.1. System Impacts



11.2. People & Process Impacts

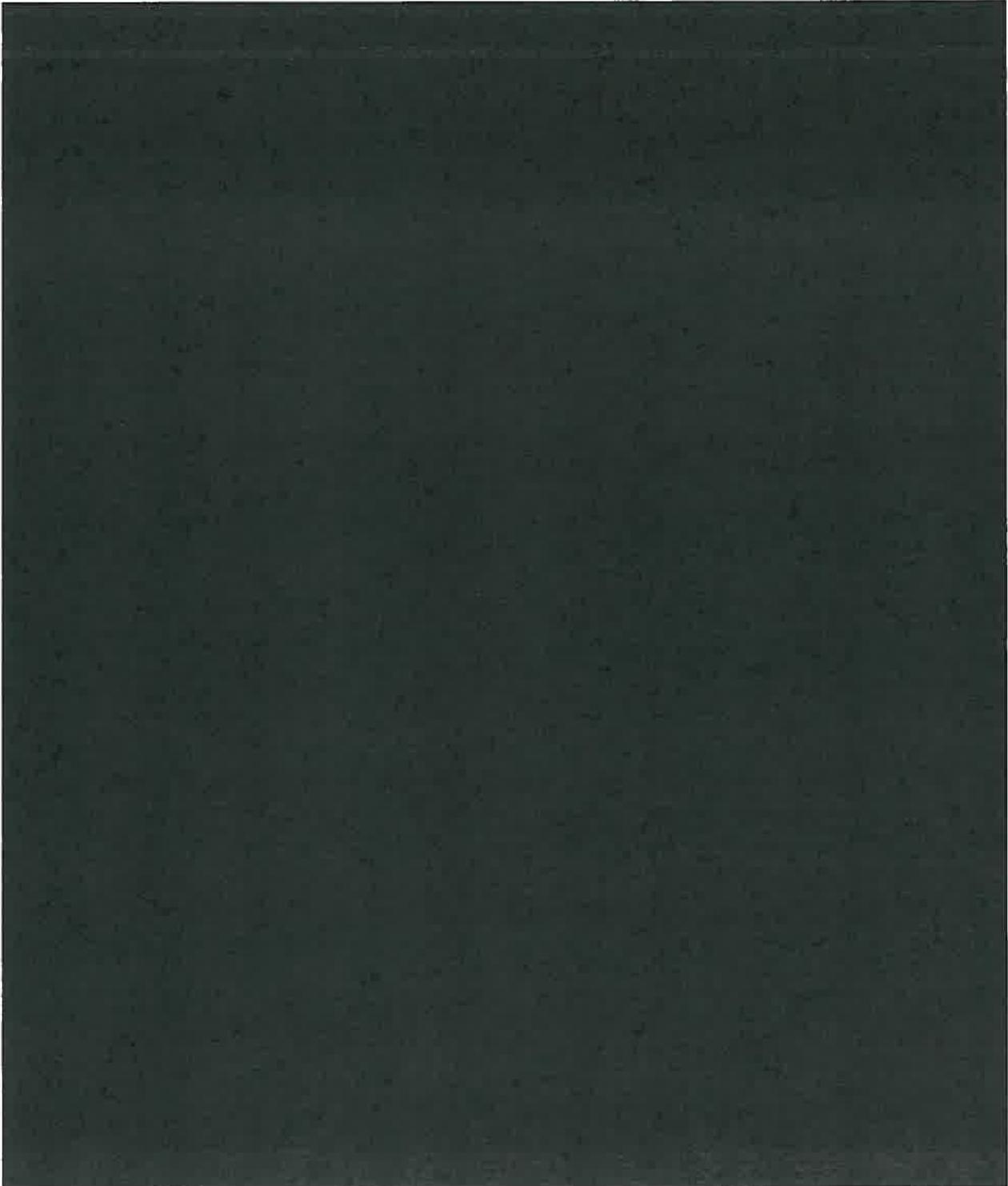


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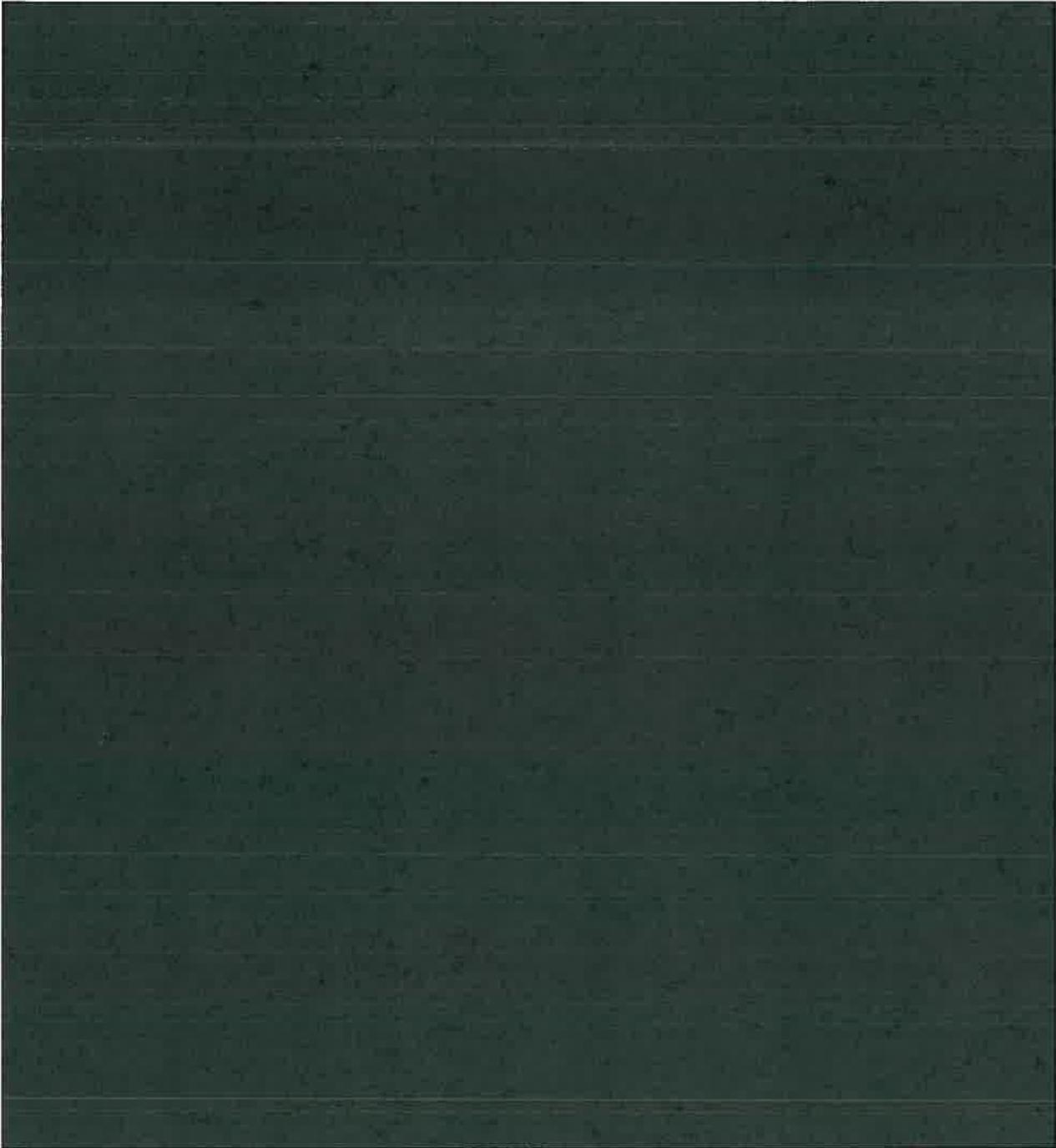


APPENDIX A - FeederStat Design Complexities and Migration Challenges



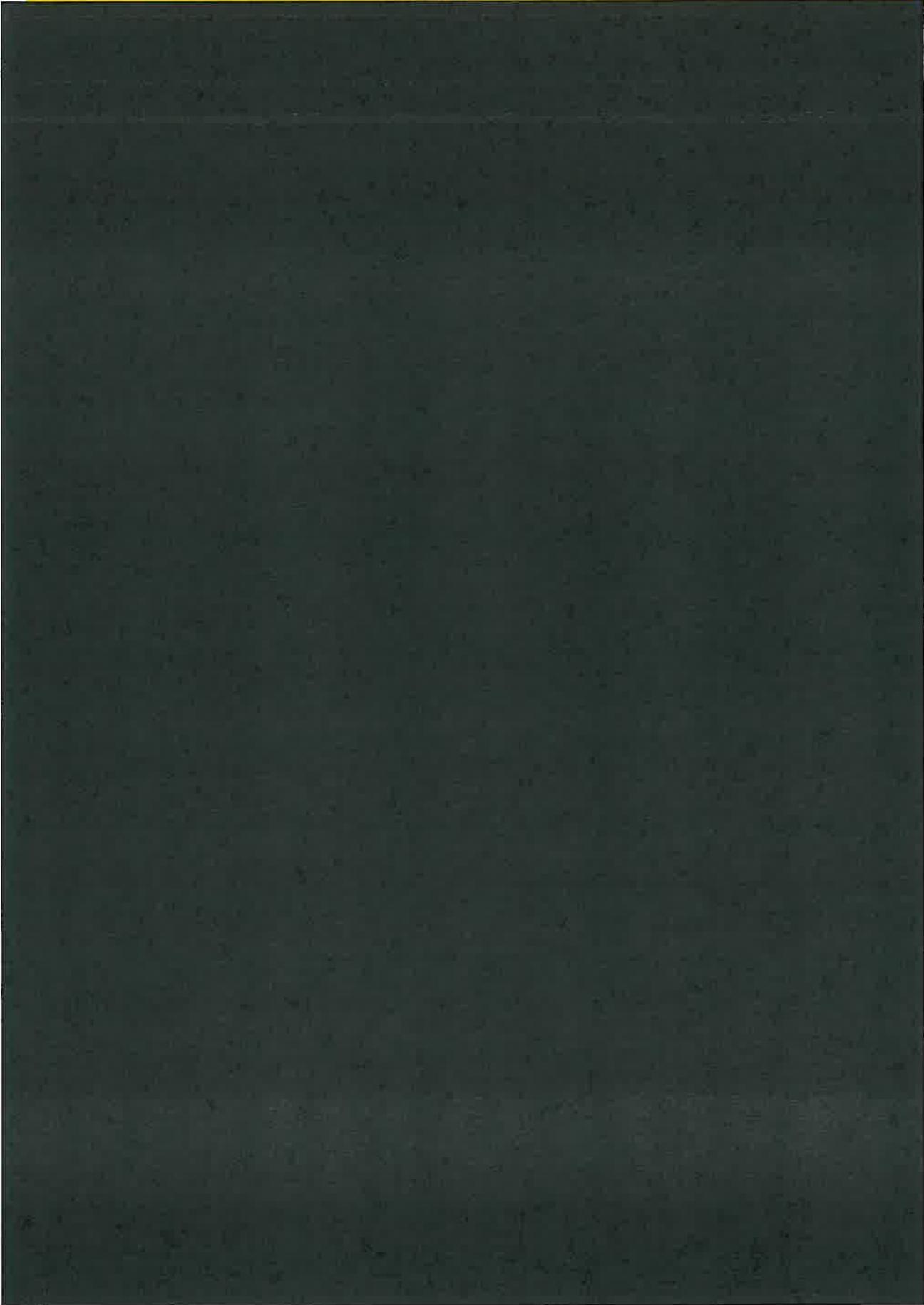
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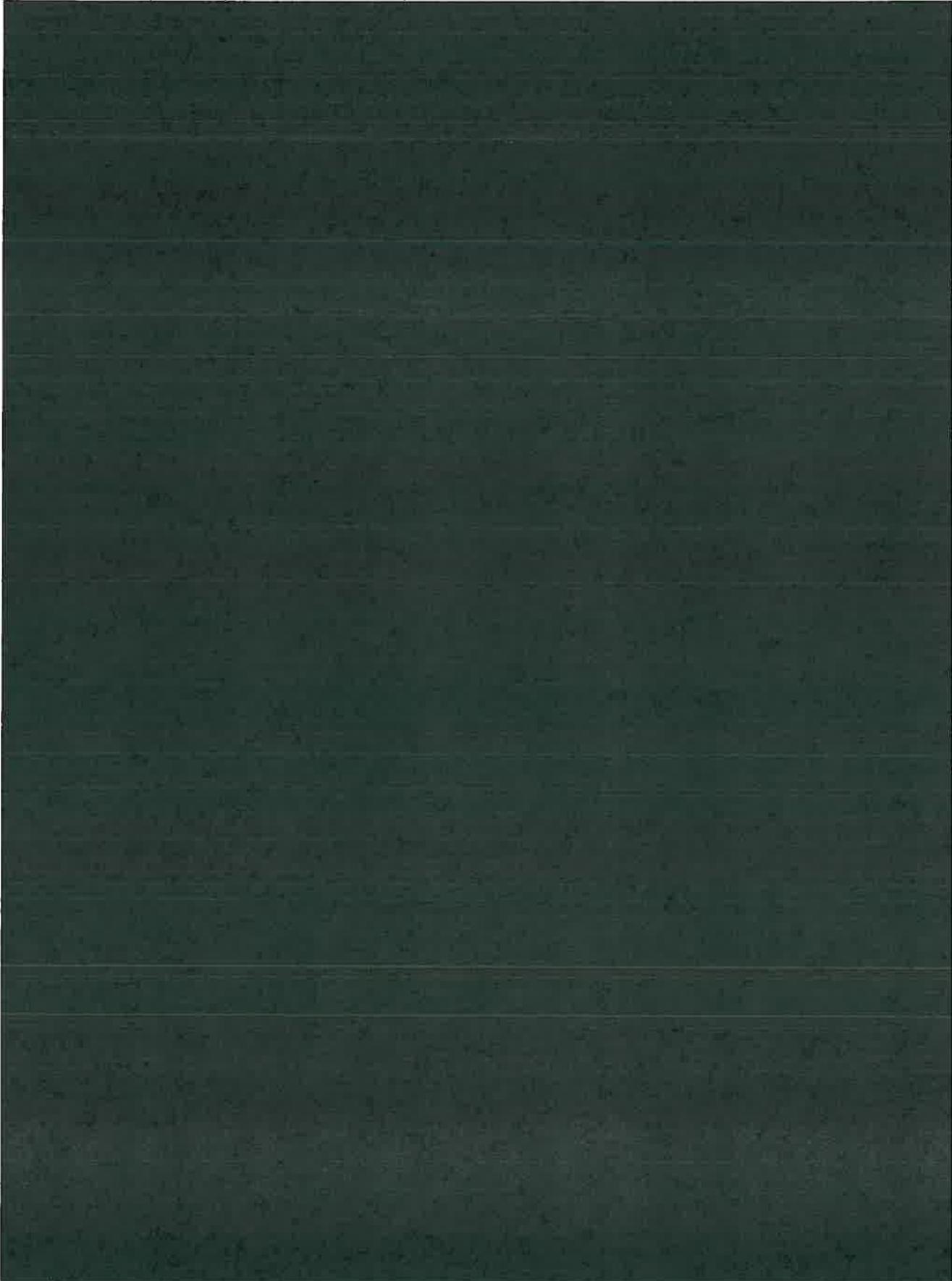
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APPENDIX B - Glossary

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

Term	Definition
ABB	ASEA Brown Boveri - is a multinational corporation that operates mainly in robotics, power, heavy electrical equipment and automation technology areas
AMS	Application Management System
APRS	Automation Power Restoration System
CAIDI	Customer Average Interruption Duration Index
CapEx	Capital Expenditure
CCT	Contact Centre Technology
CLI	Calling Line Identifier
COTS	Commercial Off The Shelf
DA	Distribution Authority
DER	Distributed Energy Resources
DLL	Microsoft Windows Dynamic Link Library
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
ELT	Energy Queensland's Executive Leadership Team
EPIS RELEX	Enterprise Protection Information System
ERP	Enterprise Resource Planning system supporting functions including Finance, Human Resource Management, Payroll and Procurement
FDIR	Fault Detection Isolation & Restoration
FeederStat	Ergon Energy's broad custom built legacy application (see Appendix A)
FFA	Field Force Automation
GE	General Electric
GIS	The Energy Queensland Geographic Information and Network Model Management Systems
HR	Human Resources
HV	High Voltage

Preliminary Gate 2 Business Case

ID02 Network Operations Systems Consolidation & Replacement



Term	Definition
ICT	Information Communication Technology
IDE	Integrated Development Environment
IED	Intelligent Electronic Device
IVR	Interactive Voice Response
KPI	Key Performance Indicator
LCS	Load Control System
MDC	Master Data Concentrator
LV	Low Voltage
MDS	Modular Dynamic Switching
MSS	Minimum Service Standards
NECF	National Energy Customer Framework
NER	National Electricity Rules
.NET	Microsoft software development language (pronounced dot net)
NFM	Network Facilities Management. Energex's custom built in-house network asset and model management system
NOC	Network Operations Centre
NPV	Net Present Value
OCC	Operational Control Centre(s)
OpEx	Operating Expenditure
RDC	Remote Data Concentrator
RTU	Remote Terminal Unit
SAIDI	System Average Interruption Duration Index
SCADA	Supervisory Control And Data Acquisition
SCADABase	Energex's legacy SCADA configuration management system
SCS	Standard Control Services
SSDB	Ergon Energy's legacy SCADA configuration management system
TCEEE	Trouble Call Entry Enterprise Edition
UDMS	Unified DMS (the Queensland state-wide deployment of GE PowerOn Advantage)
VB6	Visual Basic version 6 – a legacy Microsoft software development language
WACC	Weighted Average Cost of Capital
WH&S	Workplace Health & Safety

