Q. **Reference: PUB-NLH-008**

Further to the response to PUB-NLH-008, page 1, lines 22-23, please provide a copy of the preliminary Greeman Asset Management Solutions report.

A. Please refer to PUB-NLH-065, Attachment 1.

Asset Management Needs and Readiness Assessment

Overview

October 20, 2023

A report to the Board of Commissioners of Public Utilities

newfoundland labrador hydro

Contents

List of Attachments

Attachment 1: "Technical Report - Asset Management Needs and Readiness," Greeman Asset Management Solutions, March 22, 2022.

1.0 Introduction and Background

As part of the Capital Budget Application ("CBA") Guidelines review by the Board of Commissioners of Public Utilities ("Board"), Midgard Consulting Inc. ("Midgard") recommended that Newfoundland and Labrador Hydro ("Hydro") and Newfoundland Power Inc. be required to adopt formalized asset management processes and standardized reporting but stated that they were leaving ". . . it to the utilities to assess their current state of asset management maturity, identify gaps, and then propose and justify their asset management program choices before the Board over the coming years."[1] Midgard noted that the timeline for implementation of a formal asset management system would likely take several years, and noted that most Canadian utilities do not have fully mature formalized asset management programs.[2]

Independent of the CBA Guidelines review, as a part of Hydro's continuous improvement efforts to evolve its asset management strategy and build upon its existing asset management systems, Hydro initiated an assessment of its current asset management practices in 2020, with an intention to take steps toward a more formalized asset management program. Hydro commissioned Greeman Asset Management Solutions ("Greeman") to undertake an "Asset Management Needs and Readiness Assessment" ("Readiness Assessment").

A readiness assessment is a tool used as the prudent first step an organization will undertake to understand the ability of the organization to take on transformational change, such as would be the case in adopting a major organization wide system implementation such as a more formalized asset management system. Implementation of a new system has far reaching implications and risks to an organization, in particular if the organization is already undergoing change. A readiness assessment informs the preparation so that a thoughtful multi-year plan can be determined. It also helps identify risks to the implementation or risks to other aspects of the running of the organization so that all risks can be identified and managed. Therefore, Hydro determined this readiness assessment was especially required in light of the major changes that were already underway in the company – the integration of the Muskrat Falls assets which was the largest electricity system change in the province since the 1960s,

[1] "Newfoundland and Labrador Board of Commissioners of Public Utilities – Capital Budget Application Guideline Review," Midgard Consulting Inc., October 29, 2020, sec. 8.1.3, p. 65.
[2] "Newfoundland and Labrador Board of Commissioners of Public Utilities – Capital Budget Application Guideline Review," Midgard Consulting Inc., October 29, 2020, p. 63.

and the merging of the various Nalcor companies into a single operating entity. Further, the complexity of Hydro's assets are a complicating factor in ensuring the correct steps are taken before moving ahead with an asset management solution. Hydro's asset base is significantly varied, from major large generation assets of varying types (eg., Churchill Falls, Holyrood Thermal Generation, combustion turbines), to the transmission backbone of the province, to distribution assets to remote isolated diesel systems.

The purpose of the Greeman Readiness Assessment was to review Hydro's current asset management practices to determine whether it was feasible, appropriate and risk-manageable to take steps toward continued asset management system maturity and potential alignment with ISO 55000 philosophies.

It should be noted that Midgard, within the CBA Guideline Review report, does align with the readiness assessment results in that ". . . [Hydro] is in the relatively early stages (of) the best asset management practice continuum (relative to many European and some North American electric utilities), . . . [but] already apply some of the asset management practices utilized by other Canadian jurisdictions."

This overview provides the methodology and process for the Readiness Assessment, provided as Attachment 1, as well as Hydro's perspective on its conclusions. Hydro has made significant progress in improving its asset management systems; Section 3.0 of this document provides further details on Hydro's actions to date, and ongoing next steps that Hydro is taking to improve its system and processes to benefit customers.

2.0 Greeman Readiness Assessment

As indicated in the report, the Readiness Assessment was intended to be one of six primary tasks for consideration of implementation of an evolved asset management system:

1) Project Kick-Off;

2) Team Initiation;

3) Asset Management Needs and Readiness Assessment;

4) Asset Management Framework Development and Policy Revision;

5) Asset Management System Implementation Plan and Road Map; and

6) Project Closeout.

It must be noted that all steps were expected to take many years and would typically translate into continual improvement as opposed to a start and finish of what could typically be interpreted as "a project."

As identified by Greeman, five complimentary tools, in various combination, were used to establish the organizational context for the Readiness Assessment:

1) Standard business analysis tools;

2) Surveys;

3) Secondary data analysis—reviewing key organizational documents;

4) Focus groups to review findings and provide cross-functional perspectives; and

5) Interviews with key personnel.

The Readiness Assessment looked holistically at asset management practices across all functional groups (including non-regulated entities as well as non-operational groups) to establish Hydro's needs based on its unique context and its readiness to implement wide-scale change. A considerable amount of the information contained within the report was based on data gathered from focus groups and interviews with personnel. Participants had varying degrees of knowledge and understanding of current asset management policy and practices. As a result, the information presented in the Readiness Assessment is a combination of organizational asset management knowledge and current Hydro asset management practices, however, was also exposed to a level of individual subjectivity. It is also noteworthy that the timing of this assessment and employee engagement sessions coincided with a period of intense organizational uncertainty and change, with the announcement of Nalcor operations coming under Hydro and change to executive structure and personnel, which may have influenced the assessment of Hydro's readiness to undertake such a large scale project and such organization wide change.

The Readiness Assessment provided an evaluation of the maturity of Hydro's existing asset management practices, much of which was assessed as being in the early stages of maturity, and proposed a prioritized plan of action to further mature certain elements of Hydro's asset management approach, exploring gaps between Hydro's current asset management practices and where Greeman believed that they need to be to deliver additional long-term stakeholder value and financial health.

As outlined in Section 8 of the report, Greeman made a total of 39 recommendations to improve Hydro's asset management maturity and its readiness to undergo wide scale change as it relates to asset management. These recommendations were made across six categories:

1) Asset Management Strategy and Planning;

2) Asset Information Management;

3) Asset Management Decision-Making;

4) Organization and People Capability;

5) Live Cycle Value Delivery; and

6) Risk and Review.

Due to the unexpected passing of the chief asset management consultant and associated dissolution of the Greeman company in May 2022, Greeman was unable to participate and provide further support into the proposed implementation of the improvement plan in later project task phases. As a result of this sad event, Hydro had to pause and revaluate how to proceed.

3.0 Hydro's Assessment, Actions, and Next Steps

As a result of the dissolution of Greeman in 2022, Hydro has taken its own steps to further the work that Greeman had started. Hydro has reviewed the Readiness Assessment in detail and has considered its findings in determining its next steps in its commitment to asset management improvement.

The Readiness Assessment provided was Greeman's interpretation of Hydro's needs and readiness for large-scale implementation of a formal asset management system generally in line with ISO 55000 principles. Hydro has recognized that the completed Greeman readiness assessment was performed in 2020, during a period of significant organizational uncertainty, with changes in executive leadership and organizational structure related to the integration of Nalcor and Hydro, and significant changes in operations at the time due to the emergence of COVID-19 at the time of the assessment. It is Hydro's opinion that the Readiness Assessment primarily reflects a snapshot of the sentiments and opinions of employees across all levels and disciplines across the organization, with varying levels of knowledge of asset management and Hydro's asset management systems, at that time of the assessment.

Hydro therefore believes that, while the assessment does not necessarily fully reflect the degree of maturity of Hydro's asset management systems today, this report provides valuable insight for consideration in determining Hydro's next steps. In determining these next steps, Hydro considered the Readiness Assessment, as well as Hydro's organizational knowledge, and the current regulatory environment including the asset management requirements set out by the Board in the Provisional Capital Budget Guidelines. Hydro has existing asset management systems and practices, and as a step of continual improvement in asset management, Hydro has selected to prioritize actions that are achievable within the current organizational context without injecting risk to other operations or other major proceedings, and that are impactful and provide value to stakeholders. The actions emphasized and selected will be those which will aid in improving compliance with the requirements set out in the Provisional Capital Budget Guidelines. While not necessarily a comprehensive list of all actions Hydro has taken to improve its asset management, a summary of Hydro's actions and planned actions, particularly as they relate to the recommendations made by Greeman, is provided below.

Asset Management Decision-Making

In the area of Asset Management Decision-Making, Greeman recommended that Hydro improve the use of Life Cycle Costs for major asset management decisions, and to develop a multi-criteria decision framework to align decision making processes and practices with stakeholder value. Hydro is in the process of reviewing its cost-benefit analysis practices to better incorporate the Provisional Capital Budget guidelines, positively benefitting capital budget decision-making as it relates to life-cycle costs and stakeholder value.

Organization and People Capability

In the area of Organization and People Capability, Greeman recommended that Hydro ensure that its Office of Asset management is appropriately located in the organizational structure, create an asset management culture that encompasses employees, employee representatives, all levels of management, and its Board of Directors. Hydro has taken significant steps towards addressing these recommendations. Since the assessment, Hydro has relocated the Office of Asset Management ("OAM") within its organizational structure, with the OAM now residing within Hydro's engineering group. This change provides the OAM with clear line-of-sight to Hydro's key asset management functions. Hydro has recruited a senior manager of the asset management with industry experience in successful asset management. These changes emphasize the priority Hydro has placed on asset management

improvement, and Hydro is confident these changes will enable success as it continues to take steps towards this goal.

Asset management improvement is aligned with Hydro's strategic goal of delivering reliable, environmentally responsible electricity to our customers at the lowest possible cost. It is highlighted as a strategic initiative in Hydro's late 2022 published 3-year corporate strategic plan, demonstrating the renewed commitment by Hydro's senior leadership team. The initiative is to:

> *"Improve our asset management planning practices to ensure our decision-making processes integrate a balance of risk, performance and cost. We will review and standardize our asset management processes across our company, as required, ensuring they promote effective asset life-cycle activities and associated decision-making."* Hydro's strategic plan, including Hydro's goal to improve its asset management planning practices, has the full support of Hydro's executive leadership team and Board of Directors.

Risk and Review

In the area of Risk and Review, Greeman recommended that Hydro align its Asset Management Systems with its Enterprise Risk Management System and ensure the development of standard templates for risk analysis and registers. Hydro has made significant progress in this area, particularly as it relates to Capital planning. Beginning with the 2023 Capital Budget Application, Hydro developed and implemented a new Risk Evaluation framework which considers key stakeholder values, including reliability, safety, and environmental responsibility. This framework enables the evaluation of risk across its diverse asset classes, and aids in investment decision-making and prioritization.

Asset Information Management

In the area of Asset Information Management, Greeman noted that there are opportunities to better manage risks and improve efficiency and effectiveness through the improvement of its Asset Information Management System. Hydro agrees with this assessment, and is commencing Phase 1 of its plan to improve its Computerized Maintenance Management System ("CMMS"). The value of any asset management system is limited to the quality of its inputs, particularly asset data. Hydro believes that focusing its effort to increase CMMS maturity will improve Hydro's asset data, lead to more successful implementation of future asset management improvements, and better align its systems with its data requirements, such as those set out in the Provisional Capital Budget Guidelines.

The first phase of Hydro's program will initially focus on a select group of business units to determine the extent and effort required to bring Hydro's current CMMS system toward best practice functionality. Once requirements are well understood, decisions will be made to determine the next steps or rollout of these best practices organization wide.

The goals of the plan are as follows:

- **Improve Data Management**: The creation of a tagging standard for equipment and projects to enable better linkage of CMMS data to assets, improve field usage of asset tags when completing work, and ensure consistency of data entry.
- **Standardization of Data Collection**: The goal of the standardization is to improve the efficiency of maintenance plans downstream and provide improved input to capital expenditure decisions.
- **Focus on Education, Training, and Increasing Functionality of the Existing CMMS System**: Work with teams to improve JD Edwards functionality and usability, implement underutilized functionalities, and more easily extract data.
- **Cleansing and Verification of System Data**: Identify and close information gaps within system.
- **Determine Key Performance Indicators ("KPI")**: Utilizing available information, identify any additional KPIs Hydro would like to measure.

While the program will primarily focus on improvement of Hydro's Asset Information Management, it will inherently touch on a number of recommendations across all of the categories identified by Greeman, including Life Cycle Value Delivery, Asset Management Decision-Making, Organization and People Capability, and Risk and Review.

Hydro anticipates the initial phase of the program taking a minimum of 24 months to complete. These initiatives will provide value and internal efficiency prior to full scale Asset Information Management improvement. Ultimately, the timeline for full-scale implementation will be determined by issues identified, the preparation for and therefore acceptance of large-scale organizational process change, and the level of risk tolerance given other operational activities. Hydro is committed to providing an update on its progress within its annual capital budget application filing.

Asset Management Strategy and Planning

Hydro recognizes that, while it has taken significant steps towards improving its asset management system, and has outlined plans for further improvement, these efforts will continue over the next several years as is expected for any entity improving its asset management capability. The readiness assessment was intended to be one component of a six-part plan for asset management improvement, to be led by Greeman. Full implementation of this specific plan as originally intended is no longer possible following the dissolution of the consultant; Hydro has therefore taken steps to provide material improvement in the areas in which it sees the clearest path to providing value to its stakeholders. As it continues to improve, Hydro recognizes that there will be a need for further assessment, whether internal or external, to determine future steps in the next phase of its asset management journey. Hydro believes that the steps it is taking, as outlined herein, are foundational and critical to the success of any future assessments and initiatives.

4.0 Conclusion

The Readiness Assessment is Greeman's interpretation of Hydro's needs and readiness for large-scale implementation of a formal asset management system generally in line with ISO 55000 principles at the time Greeman completed the review. It is necessary to consider Greeman's Readiness Assessment in the context of the period of significant organizational uncertainty through 2020 and 2021, during which the assessment was conducted. Hydro has reviewed this document in detail and has considered its findings in determining its next steps. Potential alignment to ISO 55000 philosophy would require a thoughtful approach as to ensure effective change throughout the organization and in Hydro's view, full alignment to ISO 55000 is not a requirement to make cost-conscious impactful changes to asset management practices.

Due to the significant risks and costs associated with wide scale implementation, Hydro has focused on identifying primary and practical areas of improvement that would have the most significant impact. Based on Greeman's Readiness Assessment, the requirements set out in the provisional Capital Budget Guidelines, and Hydro's own assessment of its needs and resources, Hydro has decided to target its asset data management, beginning with its CMMS Improvement Program as outlined in Section 3.0. Hydro will remain focused on quality improvements throughout its asset management journey and remains committed to strengthening its asset management practices and proactively moving toward a life cycle asset management philosophy.

Hydro has already started its journey of strengthening its asset management program with the readiness assessment, beginning in 2020. Since that time, Hydro has made progress in prioritizing improvements to aspects of its asset management approach that the readiness assessment concluded should be advanced. Hydro remains committed to further improvements in line with expectation of the Board and intervenors, and Hydro will continue to update the Board on its progress within its annual Capital Budget Application.

Attachment 1

Technical Report – Asset Management Needs and Readiness Assessment

Greeman Asset Management Solutions

March 22, 2022

Greeman
Asset Management Solutions

TECHNICAL REPORT - ASSET MANAGEMENT NEEDS AND READINESS

newfoundland labrador hydro

ASSET MANAGEMENT NEEDS AND READINESS ASSESSMENT

Status: Final and Confidential
March 22, 2022

TECHNICAL REPORT - ASSET MANAGEMENT NEEDS AND READINESS

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Revision 1.0 - First Draft

NOTICE

This report (the "**Report**") is provided to Newfoundland and Labrador Hydro ("**Hydro**" or "**Corporation**") pursuant to our engagement to conduct an asset management needs and readiness assessment (the "**Assessment**") for the implementation of an Asset Management System.

If this Report is received by anyone other than Hydro, the recipient is placed on notice that the attached Report has been prepared solely for Hydro for its own internal use and this Report and its contents may not be shared with or disclosed to anyone by the recipient without the express written consent of Hydro and Greeman Asset Management Solutions Inc. ("**Greeman**"). **Greeman** does not accept any liability or responsibility to any third party who may use or place reliance on our Report.

Our scope was to use our procedures to assess Hydro's assessment needs and its level of readiness to implement an Asset Management System. The procedures we performed will not necessarily disclose all matters about Hydro's function, policies, and operations, or reveal errors in the underlying information.

Our procedures consisted of inquiry of primary data from surveys and interviews and analysis of secondary data provided by Hydro or from publicly available data. In addition, we considered leading asset management practices globally. No potential savings are outlined in this Report.

The procedures we performed do not constitute an audit or examination, and we have not otherwise verified the information we obtained or presented in this Report. We express no opinion or any form of assurance on the information presented in our Report and make no representations concerning its accuracy or completeness. We also express no opinion or any form of assurance on potential savings that Hydro may realize should it decide to act on the contents of this Report. Hydro is responsible for the decisions to implement any recommendations and for considering their impact.

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1 EXECUTIVE SUMMARY

1.1 BACKGROUND

Based on the analysis and risk factors in its external context, Newfoundland and Labrador Hydro (Hydro) has a determined need to improve its asset management system and practices. Hydro contracted with **Greeman** as its asset management consultant, to develop an Asset Management Needs and Readiness Assessment, to formulate an Implementation Plan, and to provide recommended revisions to the Asset Management Policy.

The primary objectives of this **Assessment** were to:

1. Assess Hydro's asset management needs and readiness by:
    a. Analyzing Hydro's internal and external contexts, including stakeholders and risk factors;
    b. Assessing the organization's readiness for change; and
    c. Evaluating and baselining the maturity of asset management practices.
2. Review the AM Policy and recommend suitable revisions,
3. Utilize industry best practices to create a plan that leads to the implementation of an asset management system that aligns with the requirements of ISO 55001,
4. Facilitate widening the Corporation's asset management approach to an enterprise-wide endeavor, incorporating all the functional groups of the Corporation,
5. Leverage and build on previous work completed by Hydro.

This effort was focused on identifying gaps, making recommendations, and developing a plan for a phased implementation. This Technical Report is the culmination of that work and serves to document and communicate the business requirements, gap assessment findings, and **Greeman's** recommendations for improvement. The findings and recommendations introduced in this Technical Report will be further defined and incorporated into an Implementation Plan and Road Map containing the prioritized needs, targeted maturity, and specific projects or initiatives to improve maturity. The Implementation Plan and Road Map will be delivered as the final task of this Project.

1.2 SUMMARY OF PREVIOUS WORK

Hydro has an established Asset Management System. This section summarizes the asset management effort to sustain its AMS:

AM Policy

The Corporation has an AM Policy that came into effect on February 12, 2016.

Executive Sponsor

An Executive Sponsor has been informally appointed for the AM Needs and Readiness Assessment.

Office of Asset Management

The Corporation established a dedicated Office of Asset Management to lead its asset management efforts internally.

Steering Group

A Steering Group has also been informally appointed for the AM Needs and Readiness Assessment. This Group currently comprises three members including the Executive Sponsor.

Long Term Asset Planning

The Corporation executes long term asset planning via dedicated planning groups and makes regular submissions to the Regulator on investment plans.

Asset Inventory

The Corporation maintains inventory of its assets in it Computerized Maintenance Management System.

Asset Management Training

Several team members have received asset management training.

1.3 Concept of the Asset Management System (AMS)

The **Asset Management System (AMS)** is Hydro's integrated business management system for managing the assets entrusted to its care, through formalized, standardized processes and methodologies aimed at creating stakeholder value. The AMS comprises the Asset Management Policy, Strategy, and the planning and processes required to achieve asset management objectives. Leadership, culture, and governance are fundamental to the AMS. Improving the AMS will entrench consistent and holistic asset management practices across the Corporation.

1.4 Purpose

This Technical Report serves to record and report on the needs expressed through the various processes of inquiry and discussions with the Hydro team. This Report further explores gaps between where Hydro's asset management practices are currently and where they need to be to deliver long-term stakeholder value and financial health. Throughout the report, **Greeman** offers

additional insight into asset management needs and recommendations based on leading industry trends in asset management, global best practices, and our experience in industry.

1.5 AM Needs and Readiness Assessment Approach

To establish Hydro's asset management needs and readiness, the following approach was used:

- Analysis of Hydro's internal and external contexts to understand strategic direction, define key risk factors, understand stakeholders, and create risk profiles for the Corporation.
- Assessment of asset management maturity to understand how current practices need to be improved and the gaps that need to be addressed to achieve an AMS that is aligned with ISO 55001.

Greeman used five complimentary tools, in various combination, to establish the organizational context:

1. Standard business analysis tools;
2. Surveys;
3. Secondary data analysis by reviewing key organizational documents;
4. Focus groups were used primarily to review findings and provide cross-functional perspectives; and
5. Interviews with key personnel.

1.6 Key Needs Assessment Findings

During the maturity assessment, secondary data analysis, and interviews with internal stakeholders, several common themes emerged as key findings and requirements. Key Needs Assessment Findings and Requirements include:

Approach to Asset Management	Hydro's internal and external stakeholders are interested in formalizing and standardizing their asset management practices; aligning with the requirements of ISO 55001; and in systems that allow for consistent deployment of asset management practices, through collaboration and information management across the Corporation.
Internal Context Analysis	It is notable that all internal risk factors fell in the high and medium categories. Internal risk factors of note that were identified include size/scale/complexity of asset portfolio, overall asset condition, importance of asset portfolio to Regional and North American Economy, management controls and governance, competence management, accountability, information management, asset care delivery, and risk functions assessment.

External Context Analysis	It is notable that all external risk factors fell in the high and medium categories. External risk factors of note that were identified include changing policies by Federal, Provincial or Municipal Governments, state of Provincial economy and economic opportunities, supply chain stability, rates, and tariffs risks, shrinking labour pool, community involvement with Energy Assets, emerging technologies, cybersecurity, climate change, and changing regulations and regulatory tone.

1.7 KEY READINESS ASSESSMENT FINDINGS

Hydro's internal stakeholders completed a Change Readiness Survey aimed at capturing the knowledge base of the business, confidence in management's ability to lead the organization through the AMS improvement initiative, anticipated obstacles, and key success factors. The results are summarized below (Figure 4.0):

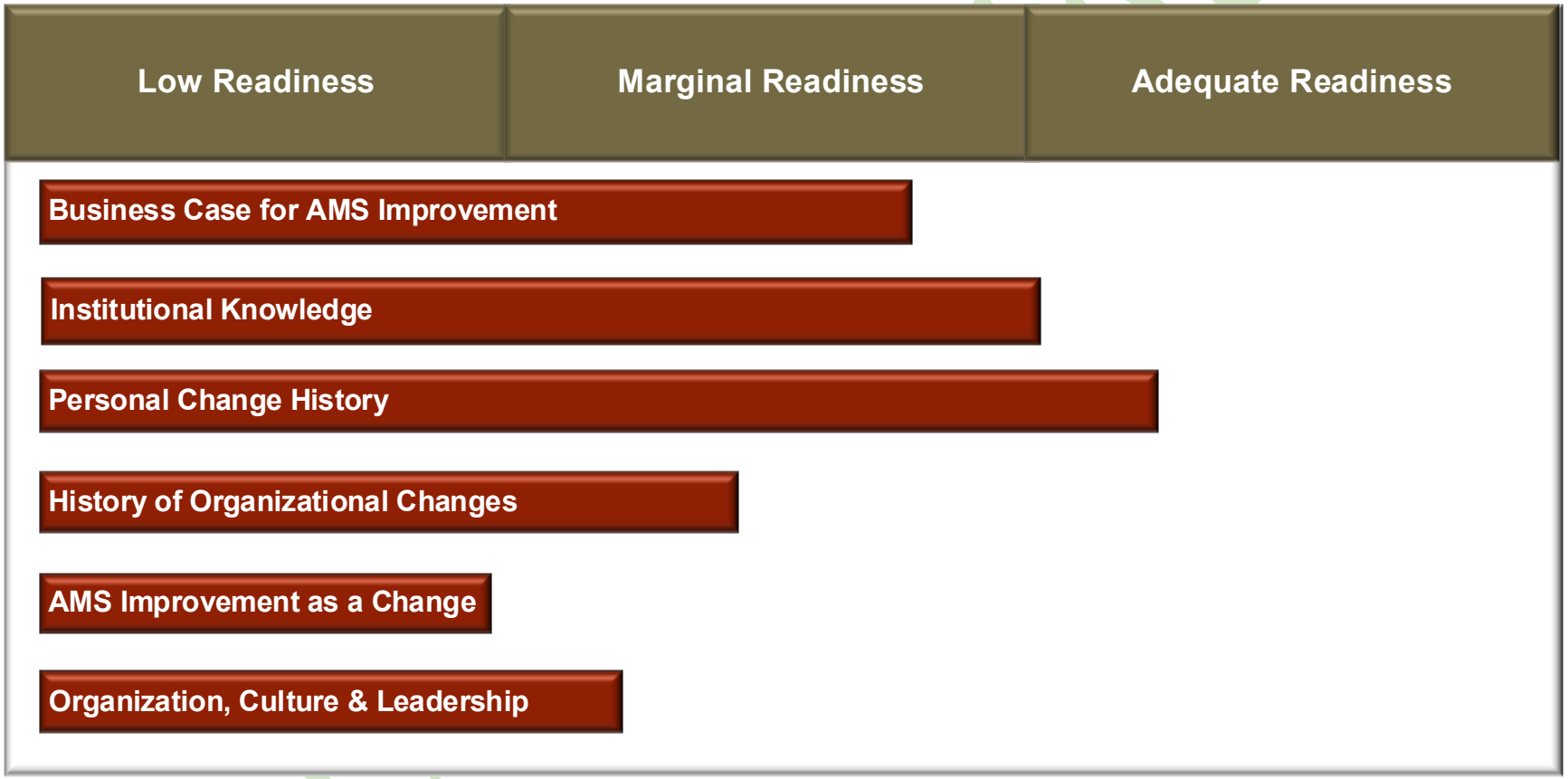

Figure 1.1 – Change Readiness Assessment Results

1.8 KEY AM MATURITY GAPS & RECOMMENDATIONS

The maturity assessment revealed developing practices, partially installed as localized practices in specific groups that are not organizationally deployed in the areas of long-term asset planning and supply chain management. Notable gaps presented in the areas of AM Policy, Strategy, building asset management capability, and asset information management. The findings of the maturity assessment aligned with the context analyses and the change readiness assessment, and generally validated each other.

Asset Management Strategy and Planning	It is commendable that Hydro aspires to improve its asset management practices and this effort should continue until the AMS is fully implemented and self-sustaining. Hydro should deepen its effort to formalize its AM practices with the roll out of an authorized AM Policy, AM Strategy, and a SAMP.
Asset Management Decision-making	Hydro should formalize its definition of stakeholder value, create an Asset Investment Framework, and create line-of-sight between the decision-making criteria and stakeholder value.
Organization and People Capability	Hydro should deploy the AM Governance Framework at the Board and Executive levels and across the Corporation. There is also a need to review the resourcing of the Office of Asset Management with a view to ensuring it has the right level of staff resources, experience, seniority, and authority across the corporation. Hydro should implement the Stakeholder Engagement and Communication Plan to create a supportive and collaborative culture. The Corporation should undertake significant educational efforts to upskill decision makers at all levels in asset management principles and concepts. The Corporation should also implement a Competence Management Framework.
Asset Information Management	Hydro should develop and implement an Asset Information Management System that includes asset information and digitalization strategies, documented information standards, and good data management practices.

Life Cycle Delivery	Strategy for asset reliability, operations, maintenance, and aging assets have been identified as needing improvement. Hydro should implement a formal Management of Change (MOC) system to ensure that configuration changes are appropriately managed and user requirements are incorporated.
Risk and Review	Hydro needs to create line-of-sight between asset risk management and the Enterprise Risk Management System. There is a need to improve systems to identify asset risks in a multi-dimensional way that allows them to be appropriately treated. There is a need to improve continuous monitoring and review of management systems including formalizing the use of process audits. Hydro should implement systems to create line-of-sight between operational and financial information to ensure that asset costs accrue appropriately through asset information system. Stakeholder Management efforts need to be deepened to impact stakeholders identified in the analyses according to their interest and power.

2 INTRODUCTION

Hydro contracted with **Greeman** to carry out an Asset Management Needs and Readiness Assessment, develop an implementation plan for improving the AMS, and recommend revisions to the AM Policy (Figure 2.1).

The Asset Management Needs and Readiness Assessment did not focus on a specific Department or Division. Rather it looked holistically at asset management practices across all functional groups to establish the Corporation's needs based on its unique context and its readiness to implement wide-scale change. The Implementation Plan will be developed to best fit the needs of Hydro stakeholders.

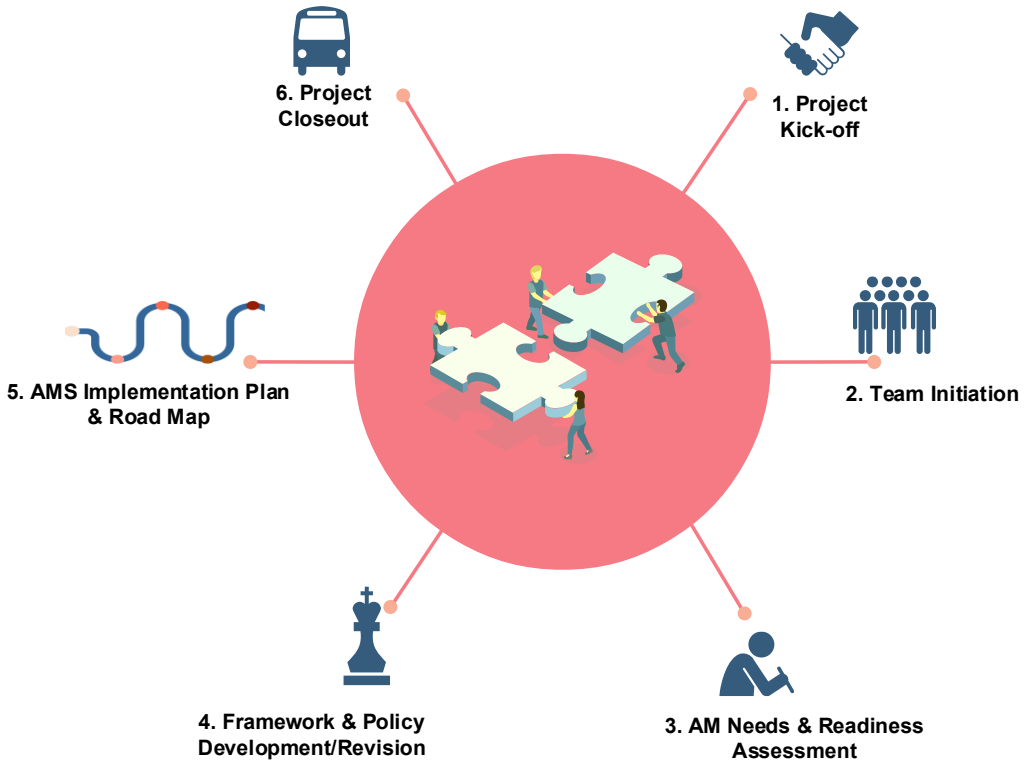

Figure 2.1 – Approach to Assessing Hydro's Asset Management Needs and Readiness

The **Assessment** was executed with six primary tasks:

- Task 1.0 - Project Kick-off
- Task 2.0 - Team Initiation
- Task 3.0 - AM Needs and Readiness Assessment
- Task 4.0 - AM Framework Development and Policy Revision
- Task 5.0 - AMS Implementation Plan and Road Map
- Task 6.0 - Project Closeout

This Technical Report is the result of completing Task 3.0 - Asset Management Needs Assessment and serves to document the key findings of this assessment task.

A revised Asset Management Policy, including an Asset Management Framework was delivered in fulfillment of Task 4.0 - AM Framework Development and Policy Revision.

Task 5.0 - AMS Implementation Plan and Road Map and Task 6 - Project Closeout, will follow this Report.

This Report is divided into the following six main sections:

- Asset Management System - This section provides an overview of enterprise asset management, key enterprise asset management concepts, and key enterprise asset management considerations for Hydro.
- Approach and Methodology - This section details the approach taken to establish the Corporation's asset management needs and readiness.
- Internal Context Definition - This section describes Hydro's internal context, stakeholder analysis, and risk profile.
- External Context Definition - This section describes Hydro's external context, stakeholder analysis, and external risk profile.
- Asset Management Maturity Assessment - This section addresses the gap between the current state of asset management at Hydro and established good practice. This section is broken down into the maturity assessment approach and findings.
- Recommendations - **Greeman** provides recommendations to accomplish the desired improvement that Hydro seeks. The recommendations are at the system or business process level as the Implementation Plan will define specific projects and initiatives.
- Appendices - The appendices contain the detailed analyses that informed the conclusions and findings documented in this report.
    - Appendix 1.0 - Internal Stakeholder Analysis
    - Appendix 2.0 - Internal Risk Profile
    - Appendix 3.0 - External Stakeholder Analysis
    - Appendix 4.0 - External Risk Profile
    - Appendix 5.0 - PAP Maturity Assessment Pyramid
    - Appendix 6.0 - Internal Risk to Recommendation Map
    - Appendix 7.0 - External Risk to Recommendation Map

3 ASSET MANAGEMENT SYSTEM (AMS)

Hydro owns and manages approximately **$19.3 b** of capital assets (2020 Annual Report). The **AMS** is Hydro's integrated business management system for managing Energy Assets across the entire organization through formalized, standardized processes and methodologies aimed at creating stakeholder value. Building long-term, sustainable financial health of the organization requires a holistic approach to managing its assets to meet required levels of service at an acceptable level of risk, while optimizing life cycle costs (Figure 3.1).

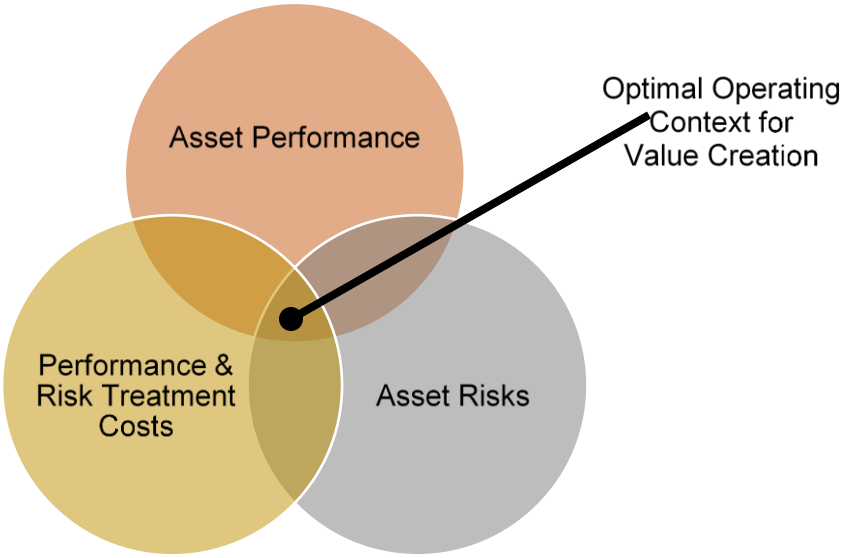

Figure 3.1 – Optimal Operating Context for Value Delivery

Hydro recognizes that improving their AMS means utilizing asset management practices in a consistent way across the various functional groups and divisions. This includes implementing processed-based methodologies, backed by cultural engagement and capacity building to assure sustainability of the AMS.

Building on the current AMS will create an integrated approach to enable the efficient deployment of capital and operational investments over the long term (Figure 3.2). An improved AMS will also improve the transparency of asset management decisions to Regulators, Investors and Strategic Partners, Energy Asset Users, and other external stakeholders, creating confidence in the Corporation.

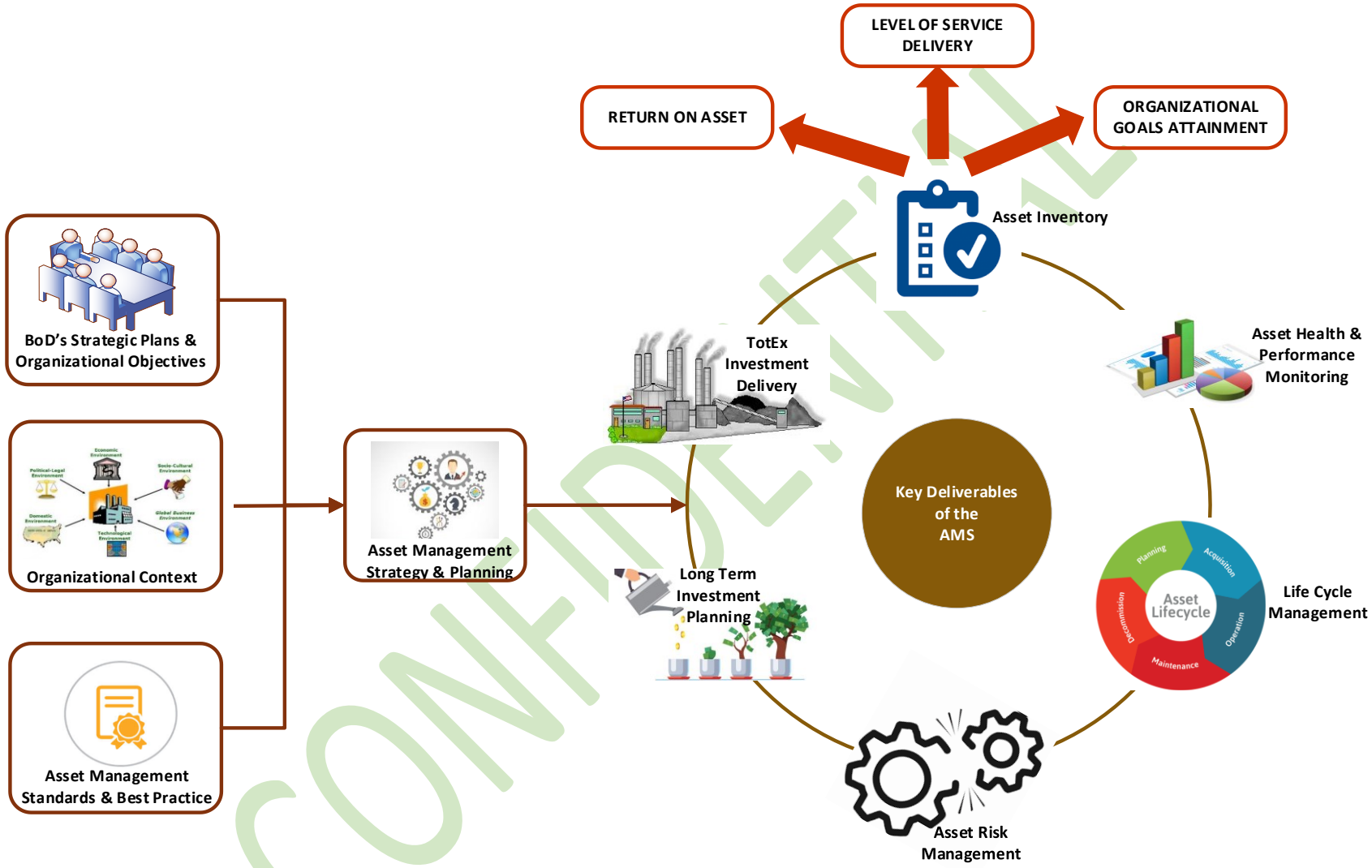

Figure 3.2 – Depiction of how the AMS contributes to the Achievement of Organizational Goals

4 APPROACH AND METHODOLOGY

4.1 GENERAL PROJECT APPROACH

In general, this Project aimed to assess the Corporation's needs and combine those with global good practices contained in asset management standards, supplemented by expert guidance from **Greeman** to create a Road Map for full implementation of the AMS (Figure 4.1).

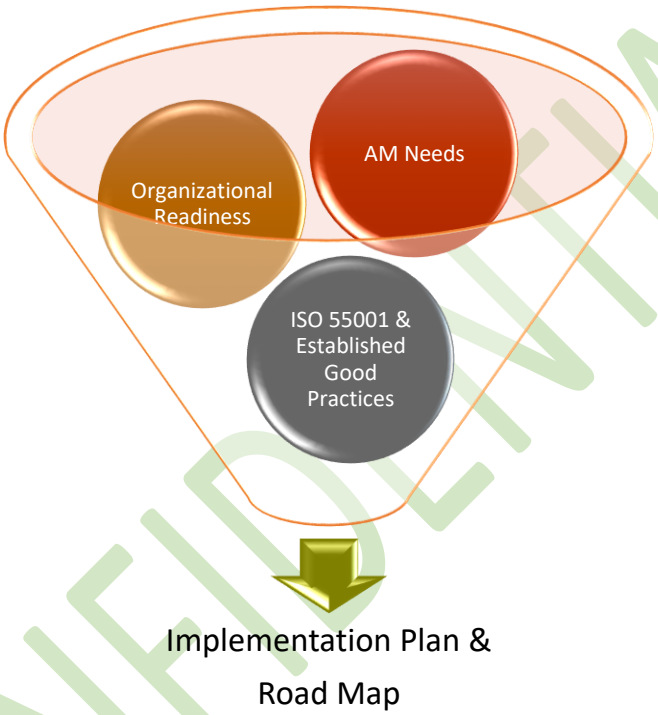

Figure 4.1 - General Project Approach

As a part of its risk management approach, and to assure stakeholder confidence, it is recommended that Hydro aligns its AMS with the requirements of ISO 55001. Given that the Corporation is focused on asset management maturity improvement, it **will not** be seeking certification at this time.

In order to achieve their goal, Hydro will be required to commit to a multi-year, phased approach (Figure 4.2) to establish, entrench, and sustain the AMS.

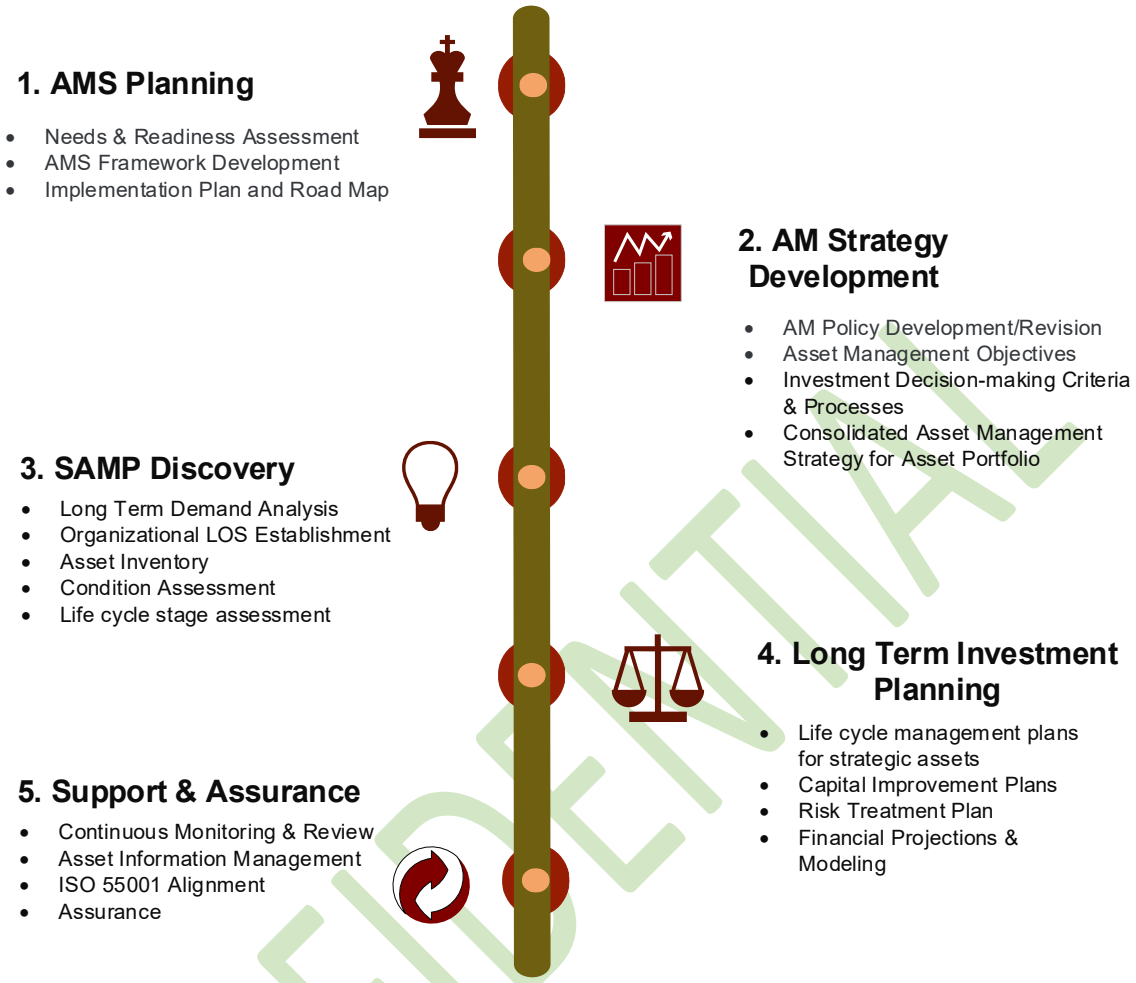

Figure 4.2 – Hydro's Road Map to an ISO-55001-aligned Asset Management System

Greeman utilized a collaborative methodology with Hydro, underpinned by asset management, systems engineering, and quality management principles to develop a tailored approach to obtain the objectives of the **Assessment**. This approach is aimed at creating sustainable solutions that deliver value and facilitate knowledge transfer to the Corporation.

Key Project Tasks are broken down in the sections that follow (Figure 4.3).

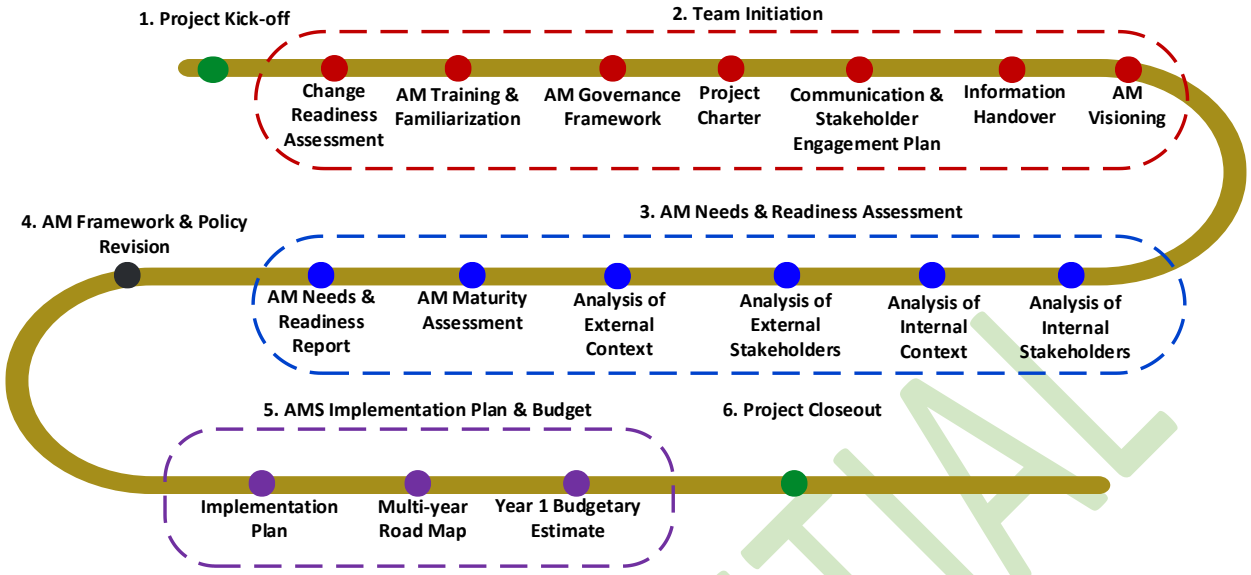

Figure 4.3 – Detailed Project Tasks

4.2 TEAM INITIATION

The following activities were included in the **Assessment**:

Change Readiness Survey

The first step was to conduct a Change Readiness Survey to ascertain the extent to which the Corporation is positioned to undertake wide-scale change of this nature.

AM Training & Familiarization

Two types of asset management training sessions were conducted in the initial stages of the Project. The first training session, "***Asset Management Principles***" was delivered to a wide audience that included the Office of Asset Management, Executive Sponsor, AM Steering Group, and other members of the management team. The second training session, "***Asset Management Strategy & Planning***", was an advanced training on asset management systems and the related artefacts delivered to the Office of Asset Management, the AM Steering Group, and other members of the management team.

Asset Management Visioning

Hydro team members participated in a Visioning Exercise in recognition that employees perform better in the context of higher purpose and meaning. The purpose of the Visioning Exercise was to:

- Align organizational energy around the future AMS,
- Get Leaders on the same page about the asset management effort to reduce the possibility of conflicts arising from multiple agendas being introduced and the effort being pulled in multiple directions, and
- Provide Leaders with a tool to help coherently articulate to employees why Hydro is seeking to improve its asset management practices and to inspire their involvement in improvement efforts.

Asset Management Governance

A Governance Framework was created to align asset management governance with the prevailing system of corporate governance.

Project Charter

Greeman provided a Project Charter with a detailed project schedule outlining all the deliverables that were developed. The core AM Team provided input to the timelines.

Stakeholder Engagement & Communication Plan

A Stakeholder Engagement and Communication Plan was developed to create avenues for the Leaders to proactively engage internal stakeholders on asset management, the AMS, and asset management activities.

Document Handover

Key pieces of relevant information were requested and delivered to **Greeman** under a signed Non-Disclosure Agreement. This NDA extended to all documents that were requested or otherwise provided. **Greeman** provided a checklist of required documents in the form of a Request for Information (RFI).

4.3 AM Needs Analysis

To establish Hydro's asset management needs, the following approach was used:

- Analysis of Hydro's internal and external contexts to understand strategic direction, define key risk factors, understand stakeholders, and create risk profiles for the Corporation.
- Assessment of asset management maturity to understand how current practices need to be improved and the gaps that need to be addressed to achieve an AMS that is aligned with ISO 55001.

Greeman used five complimentary tools, in various combination, to establish the organizational context:

1. Standard business analysis tools;
2. Surveys;
3. Secondary data analysis by reviewing key organizational documents;
4. Focus groups were used primarily to review findings and provide cross-functional perspectives; and
5. Interviews with key personnel.

4.4 AM Policy Revision

Revisions to the current AM Policy were recommended to align it with the requirements of ISO 55001. Notable revisions include, the incorporation of the organizational context, inclusion of an Asset Management Framework, inclusion of the various governance groups including Executive Sponsor and Steering Group, requirement for authorization by the President and endorsement by the Board, and the requirement for broad and regular communication to employees.

Two versions of the AM Policy were created:

1. A detailed version to guide the implementation of the AMS; and
2. A summarized two-page version for circulation within the organization.

5 INTERNAL CONTEXT ANALYSIS

5.1 INTERNAL CONTEXT DEFINITION

Greeman created the definition of the Corporation's Internal Context based on established business tools. Hydro's Internal Context is defined through three key forces as outlined below. These three forces align with the typical lines of defense for the organization against risks and form the basis for the analysis of the Internal Context. The strengths and weaknesses of these three internal forces were analyzed and the weaknesses used to develop the Internal Risk Profile.

Table 5.1 – Internal Context Definition

Internal Forces	Elements / Components
Asset Portfolio	Size/Scale/Complexity
	Importance of Asset Portfolio to Regional and North American Economy
	Overall Asset Condition
	Technology
Internal Stakeholders	Management Controls & Governance
	Organizational Design & Structure
	Leadership Approach
	Asset-centeredness
	Composition of Human Resources
	Competence Management
	Organizational Culture
	Accountability
	Risk Attitude
	Financial Attitude
Management Systems & Business Processes	Organizational Policies
	Management Systems & Frameworks
	Performance & Compliance Management
	Multi-functional Teams
	Information Management
	Asset Care Delivery
	Management of Change
	Continuous Monitoring & Review
	Process (Non-Financial) Audits
	Management Review
	Risk Functions Assessment

5.2 INTERNAL STAKEHOLDERS

Internal stakeholders are groups within Hydro who the AMS will directly affect or whose business processes and activities have a direct impact on Energy Assets and the AMS. Internal stakeholders are the first line of defence for the Corporation, acting as risk owners.

Internal Stakeholder Register

Members of Hydro's management team, drawn from various organizational functions and levels, participated in workshops conducted by **Greeman** to validate the Internal Stakeholder Register and define the interest of the various groups.

Hydro's internal stakeholders have been identified in Table 5.2.

Table 5.2 – Internal Stakeholder Register

Stakeholder Category	Internal Stakeholder Type
Top Management	Board of Directors
	Executive Committee
Middle Management	Directors
	Managers
Employees	Front Line Supervisors
	Front Line Employees
	Union(s)
Functional Groups	Departments / Divisions

A complete analysis of Internal Stakeholders is contained in Appendix 1.0 of this report.

5.3 ORGANIZATIONAL READINESS FOR CHANGE

Hydro's Board, Executives, Management team, and other employees, drawn from various organizational functions, participated in Change Readiness Survey conducted by **Greeman** to create an understanding of the organization's readiness for wide-scale change.

The sections that follow summarize the results of that Survey.

Business Case for AMS implementation

Based on the analysis, Hydro has a strong business case for improving its asset management practices. Importantly, the Corporation believes that the change is needed to improve long-term asset performance and efficiency, manage future risks, and improve the alignment between stakeholder needs and investment deployment.

Institutional Knowledge

Stakeholder profile collects tenure demographics to determine the extent of organizational experience and institutional knowledge. 77% of respondents have been with the organization for 6 or more years with 58% having a tenure of 11 years or more. This indicates well preserved institutional memory. Although institutional knowledge may be a source of resistance, it also represents organizational glue on which the AMS can capitalize. Institutional knowledge can be affected by employee and management changes. This turnover could impact moral and continuity of this project and future improvement initiatives.

Personal Change History

Personal change history collects data on the individual experience with implementing management systems like the AMS.

- 71% have participated in the implementation or revision of a management system. This indicates that management and staff are experienced with implementing and revising management systems, working on cross-functional teams, and implementing projects. These results indicate that management and staff are already familiar with the approaches that will be used to implement the AMS.
- 79% have participated in a cross-functional team, largely as departmental representatives, or team leaders.

History of Organizational Changes

History of organizational change collects data on how employees perceive past changes, key success factors and obstacles that prevented successful change. Lessons learned from past changes will be incorporated into planning the implementation of the AMS.

- 52% felt that there were too many changes; 27% felt that the number of organizational changes were about right; and 21% felt that the business needed more changes.
- 56% of respondents believed that changes undertaken in the past have been relevant, successful, and produced effective results.
- Overwhelmingly, business processes and systems were thought to change most frequently at Hydro followed by frontline staff turnover.

- In the last 10 years, Hydro has implemented or revised the Safety Management System (SMS), Environmental Management System (EMS), Enterprise Risk Management (ERM) System, or other such management system.
- Some major changes were typically supported by consultants (56%). Consultants largely provided strategic advice, participated in implementation, and provided personnel and one-off training.
- JD Edwards Upgrade, ERM, and the SMS were selected as the most successful changes in the last 3 years.
- JD Edwards, EMS, ERM, SMS, and Efficiency & Effectiveness (EEP) were deemed to have enjoyed the highest level of support. Stakeholders made their support evident by participating in those projects, leadership engagement and participation, active cross-functional collaboration from departmental representatives, regular communication, strong executive sponsorship, and consultation and engagement of frontline workers.
- JD Edwards, EMS, SMS, EEP, and ERM were deemed to have had the greatest levels of planning.

Asset Management as a Change

Understanding how employees view the need to implement the AMS is an important indicator of the level of engagement that will be needed and the pace at which it will percolate through the organization.

- 94% felt that the asset management change should have already started.
- The main change drivers selected were cost of operations; long-term investment planning; increased oversight from regulators; and increasing financial risks.
- Data and information management; decision-making; asset risk management; asset planning and lifecycle activities were the areas deemed to be most in need of change.
- 40% thought the support would start slowly and ramp up; 35% thought that the change will be supported off the bat; 23% felt that while there would be initial support, the support would not be sustained; while 2% felt that it would not be supported at all.
- Overwhelmingly, people and money, data and information were suggested as the biggest obstacles, closely followed by time and training.
- 62% of persons believed that the organization would allow the time to create asset management deliverables.
- 58% disagreed that the organization would willingly make the changes to other management systems as required by asset management.
- Involvement and engagement, improved relationship with Regulator, information about the change, adoption of ISO 55001, process simplification, consistent approach across the company, clear vision and a well thought out plan for the change, strong leadership and executive support from President and Operations Management, were deemed to be the biggest drivers of individual support for the AMS.

Organization Culture and Leadership

Organization and leadership collect data on current landscape of changes, employees' perception of Hydro culture and leadership attitudes towards changes. The results provide indications as to whether they think that the change will have executive and managerial support.

- Survey respondents were split on whether the organization is supportive of change in general in a 54% to 46% ratio.
- There are several other changes happening currently including EEP, SMS, database upgrades, and Muskrat Falls operational readiness, which were mentioned as activities which could impact the organization's ability to support the improvement initiative. Significantly, several organizational restructurings have already taken place and are anticipated in the near future. In the external context, there have been changes at the political directorate level that could trigger further internal restructurings. This turnover could directly disrupt future improvement initiatives. Increased oversight from the Regulator, could create a positive change driver for future improvement initiatives.
- There is strong confidence (88%) in Hydro's willingness to measure progress and continuously improve its asset management processes.
- 75% of persons agreed that the organization would be able to reinforce and reward positive teamwork behaviors and improvements in processes.
- Only 46% believed that the organization would provide sufficient staff with the necessary time and resources to actively support asset management improvement.
- Hydro team is moderately confident (69%) that its leaders will support the change and the effort required to implement and sustain the asset management system.

Anticipated Obstacles and Uncertainties

The following obstacles and uncertainties have been anticipated:

- Lack of resources, specifically people to serve as departmental representatives and time to participate in asset management improvement activities given the number of other on-going changes.
- Management's unwillingness to reinforce and reward positive behaviours and improvements.
- Management's unwillingness to make changes in other systems to facilitate asset management requirements.
- Inadequate data and information to support asset management activities.
- Insufficient training.
- Lack of executive support.

Key Success Factors

The Change Readiness Survey revealed that successful changes at Hydro have had the following factors in common that will be adopted for the AMS implementation. These factors align with best-in-class practices for change management:

- Clear definition of Hydro's AM needs, aided by data and effective tools and templates to prevent reaching premature or other inappropriate conclusions.
- Executive support and sponsorship accompanied by executive-driven effort and communication.
- Corporate-wide communication with specific communication to those affected by the change.
- Corporate-wide endorsement with participation and engagement of frontline staff. The results indicate that internal stakeholders, especially front-line staff expect to be involved

in the AMS improvement initiative. This is an organizational strength on which the initiative can capitalize.

- Dedicated resources and departmental representatives to champion the effort and produce deliverables.
- Phased implementation to manage workload and organizational burden supported by change management processes. Specific emphasis on internal engagement and communication as well as engagement of external stakeholders.
- A clearly defined Road Map, a well thought out Project Charter, and an effective project tracking and program management for asset management improvements.
- The AMS premised on established ISO 55001 principles with active support and validation by external expertise.

Readiness Conclusion

We can therefore conclude that Hydro is ready to improve its AMS and asset management practices and that the Corporation has recognized that this improvement requires a multi-year commitment, that the ***key success factors*** identified above shall be deliberately incorporated, and that mitigation plans are created for the ***anticipated obstacles.***

5.4 INTERNAL RISK PROFILE

Members of Hydro's Executive and Management team, drawn from various organizational functions, participated in a workshop to define the Internal Risk Profile of the Corporation.

These internal risks have been identified in an inverted Risk Pyramid (Figure 5.1) to represent the internal Risk Profile of the organization. The Pyramid is graduated, with the highest risks at the top and the lowest at the bottom. The Internal Risk Profile is attached in Appendix 2.0.

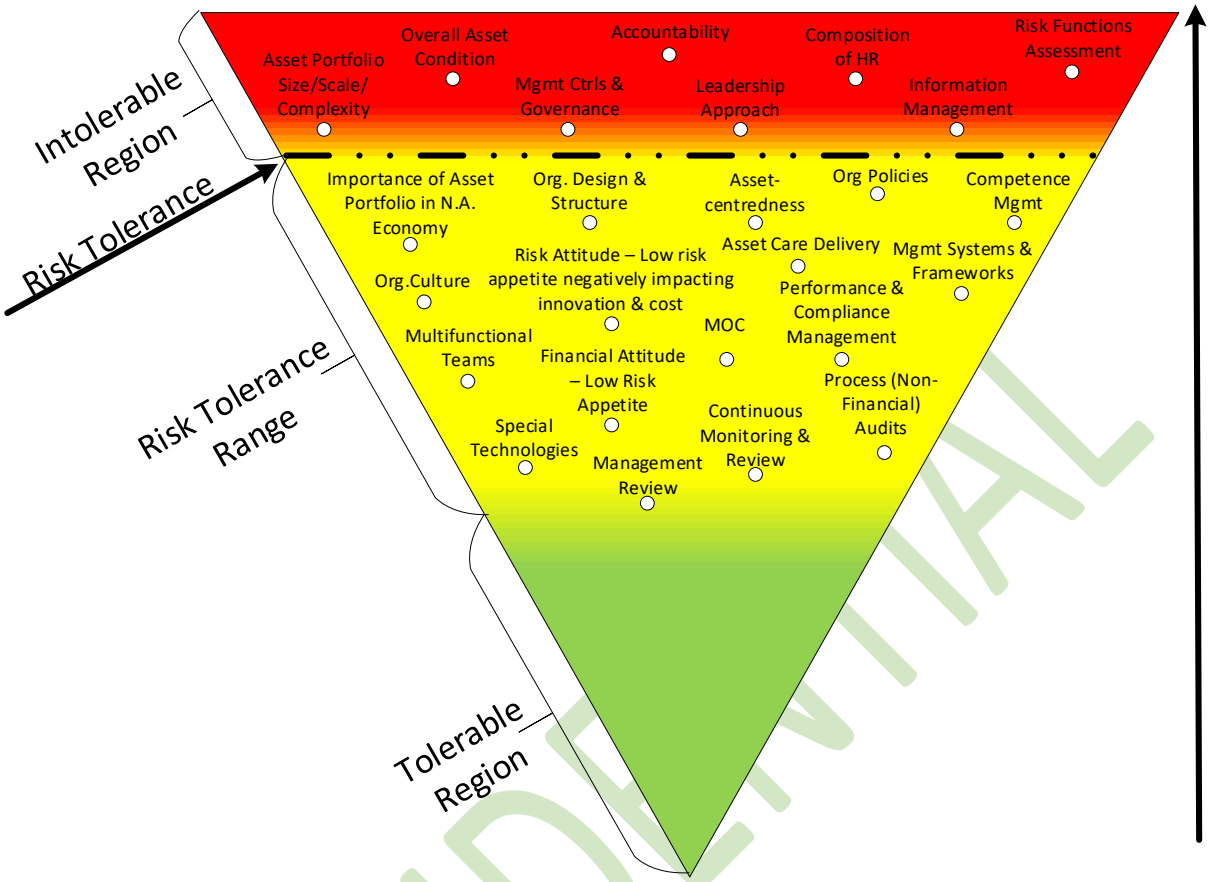

Figure 5.1 - Hydro's Internal Risk Profile

5.4.1 INTOLERABLE INTERNAL RISK FACTORS

Intolerable risk factors are those high-risk factors that are unacceptable and unjustifiable, except in extraordinary circumstances. These risks must be reduced, regardless of cost. They sit at the top of the Risk Pyramid.

The following high-risk factors were identified in the Internal Context:

- ***Overall Asset Condition***

  Asset condition is well managed, however, there is evidence that management of assets is more reactive than proactive. There is a large aging asset population, and increased levels of maintenance and investment are required to ensure sustainable energy services.

  Maintaining adequate operating and capital expenditure levels to preserve the condition, levels of service, and reliability of the asset portfolio is essential. Analysis did not reveal strong evidence of an enterprise-wide approach to long-term, risk-based planning. This presents a severe risk to be addressed over the short term (3-5 years) due to the impact selected by the organization.

- ***Asset Portfolio Size, Scale, and Complexity***

  The regulated vs. non-regulated asset mix, high level of interconnectivity dependence, and a large, geographically dispersed asset portfolio, create complexities, such as operational and business process management, deploying effective asset management strategies, managing critical spares inventory, and require broad areas of expertise and knowledge.

  The size, scale, and complexity of the asset portfolio will create a challenge in developing enterprise level programs that work at all asset levels. This has been identified as a significant risk to be managed over the immediate term (1-3 years).

- ***Management Controls and Governance***

  There is a strong management structure which provides strategic direction on keeping the corporation on the same path towards achieving objectives as well as managing stakeholder expectations. There is an Asset Management Policy supported by established Risk, Quality, and Environmental Management Policies. There are several layers of governance with multiple stakeholders, which adds complexity to decision-making.

  Analysis did not reveal a strong relationship between strategic planning and long-term asset management planning, nor the presence of mechanisms to align asset management decision-making to defined stakeholder value. This presents a significant risk over the immediate term (1-3 years).

- ***Leadership Approach***

  The current leadership approach is effective in communicating the goals and objectives of the corporation, as well as fostering a culture of ownership and open communication, and the importance of the AMS is understood.

  Consistent leadership responsibilities for asset management are not well defined at the executive level. There is concern that organizational uncertainty may distract leaders from their asset management roles, and that leaders new to their roles may be hesitant in making key asset management decisions. The Maturity Assessment also supports the need to deepen executive and board level engagement and participation in the AMS. This presents a significant risk that should be addressed in the immediate term (1-3 years).

- ***Composition of Human Resources***

  The workforce is comprised of highly skilled and resilient people. They are respected and believed to be key to achieving organizational objectives.

Upcoming retirements, inconsistent approach to succession planning, and constant organizational turnover, will prove challenging for knowledge transfer, and may also lead to a lack of focus, engagement, and trust among employees. This presents a significant risk when coupled with external factors such as the reducing availability of skilled labour. This should be addressed in the immediate term (1-3 years).

- ***Accountability***

  In general, individuals tend to believe there is a high degree of accountability felt across the corporation. People feel very accountable for their own areas and work diligently to achieve their department goals.

  There is concern that accountability is too siloed and sometimes results in decisions that are good for the respective department but not necessarily for the corporation. The risk of promoting the creation of silos can be mitigated through defined business processes. This area presents a significant risk to the corporation and should be addressed in the immediate term (1-3 years).

- ***Information Management***

  There is a common understanding that the Corporation needs better information management processes. Analysis did not reveal a structured, enterprise-wide approach to asset information management. There is still a considerable amount of asset information in analog (non-digital) formats which presents several levels of risks to the Corporation.

  Continued development of related tools is necessary, but this must be done against the backdrop of an Asset Information Management Strategy. This is a significant risk and should be addressed in the immediate term (1-3 years) by implementing an Asset Information Management System.

- ***Risk Functions***

  Formal risk functions have been defined in alignment with the Enterprise Risk Management System. A risk maturity assessment was completed and there are several formal risk registers for the Corporation. There have been efforts to influence asset planning with risk assessments. There is concern that assessments are not performed regularly or applied consistently across all areas of the Corporation. Assessment did not reveal a strong relationship between the Enterprise Risk Management System and the Asset Management System.

  Process audits are not routinely conducted on business processes, and where conducted, the assessment exercises are seen as time and resource burdens. This is also impacted by structural changes to the organization. Additionally, findings and recommendations,

sometimes result in conflict and negatively affect future collaboration efforts. Risk function is a significant risk that should be addressed in the immediate term (1-3 years).

5.4.2 INTERNAL RISK APPETITE

The risk appetite comprises those risks that Hydro manages in pursuit of delivering stakeholder value. These risks should be managed closely to prevent them increasing in magnitude. Hydro's internal stakeholders actively (and should continue to) manage them as a part of their risk ownership responsibilities. These residual risks are tolerable only when further risk reduction is not practical, or the cost is disproportional to the benefit. Risk owners should make strategic risk treatment decisions accordingly.

The following risks are deemed to be included in the active portion of Hydro's risk appetite:

- ***Organizational Structure and Design***

  The organization was recently restructured and there is concern that succession planning needs to be improved to mitigate the high risk of attrition in some key positions.

  A dedicated Office of Asset Management is in place and included in the organizational structure. The current structure of the Corporation does not include asset management roles other than the Office of Asset Management. There is a need to examine the growing asset management portfolio to ensure that the Office of Asset Management is appropriately located in the structure, has the appropriate level of authorization, and is appropriately staffed.

  Over the next 1 to 3 years, emphasis should also be placed on creating a structure and framework that harmonizes processes and practices between the regulated and non-regulated sides of the business.

- ***Importance of asset portfolio to Regional and North American Economy***

  Energy Assets generate more than 80% of the electrical energy consumed by Newfoundlanders and Labradorians and create more than $702 million in revenues from regulated and non-regulated activities.

  The push for green and clean energy in North America was seen as an opportunity that could result in more demand for export of clean, renewable electricity, and generate additional revenues for the local Region. Over the next 3 to 5 years, emphasis needs to remain on delivering security and reliability of supply, and on managing the complex network of related stakeholders.

- ***Organizational Culture***

  There is evidence of overall strong pride in work and commitment, and a shared passion that leads to engaging people in discussion regarding achieving asset management objectives.

  There is concern that intense focus on departmental objectives and a lack of aligned understanding of what is important to the Corporation's stakeholders reduces cross-functional collaboration, resulting in siloed asset management approaches and varied asset management cultures.

  Over the next 3 to 5 years, emphasis needs to be placed on defining stakeholder value, improving employee engagement, and cross-functional collaboration. The Maturity Assessment also supports the need to address culture and engagement.

- ***Multi-functional Teams***

  The use of multifunctional teams improves decision-making by leveraging broad knowledge of the Corporations assets and processes to proactively manage asset risks and reduce inefficiencies.

  There is concern that multiple competing priorities and decision makers, as well as scheduling conflicts may impede progress in achieving asset management objectives. Over the next 3 to 5 years, multi-functional teams should be an area of focus.

- ***Competence Management***

  The Corporation has multiple training programs and procedural guidelines to support employee development and work execution. Management of training and competence is decentralized to the portfolios of the various team managers.

  Over the next 3 to 5 years, emphasis should be placed on developing an asset management Competence Framework to define the required competencies for the Corporation, and to identify skills and training gaps.

- ***Management of Change***

  Some management of change processes are in place, however, there is a concern that these processes may not go deep enough and may not be enterprise wide.

  Over the next 3 to 5 years, emphasis should be placed on developing a formal management of change system for the Corporation.

- ***Asset Centeredness***

  The Corporation has committed improving its asset management practices and has established an AMS and has formed an Office of Asset Management.

  Full implementation of the AMS and value-based decision-making framework over the next 3 to 5-year horizon will create an asset management vision that positions Energy Assets at the centre of the management of the Corporation.

- ***Risk Attitude***

  The Corporation has an Enterprise Risk Management Framework and recently completed a maturity assessment of its risk management practices. Cost-cutting exercises have been seen as the driver for asset management decisions, rather than rigorous analysis of long-term risks, leading to long-term performance and reliability issues. This has led to a perceived risk avoidance approach and hesitancy to undertake improvement initiatives.

  Over the next 3 to 5 years, emphasis should be placed on supporting the consistent use of risk management in asset management decision-making.

- ***Financial Attitude***

  There is a high degree of visibility of financial performance, focusing on cost control. There is a considerable amount of stakeholder scrutiny to make least cost financial decisions that deliver reliable energy services to its customers.

  There is concern that Energy Asset plans seem to be driven by financial constraints rather than by long-term risk and performance management. This makes it difficult for the organization to take advantage of opportunities to innovate or mitigate risks.

  Over the next 3 to 5 years, emphasis should be placed on transitioning from reactive budgeting to long-term asset planning with a focus on risk mitigation.

- ***Management Systems and Frameworks***

  Some management systems are in place that capture the information required, and readily available to anyone to allow for collaboration and sharing of information across the organization. The current asset management system is maintenance driven not deployed enterprise wide.

  Over the next 3 to 5 years, emphasis should be placed on transitioning the asset management system from its current maintenance-based system to a holistic management system that interprets and delivers stakeholder value through Energy Assets and become a ‘single source of truth’.

- ***Performance and Compliance Management***

  Performance is communicated to the Board of Directors and to select external stakeholders. Regulatory processes create visibility of the Corporation's decision-making processes and plans to external stakeholders and allow it to comply with regulatory requirements. There is concern that these mechanisms are not communicated well enough to be understood at all levels of the Corporation.

  Over the next 3 to 5 years, emphasis should be placed on implementing a regulatory compliance framework to ensure that compliance requirements are consistently met, and effectively communicated across the Corporation.

- ***Organizational Policies***

  The organizational policies are an important form of risk management, providing a consistent framework with clear guidance for key processes and programs, keeping employees informed and aligned, and facilitating compliance with laws and regulations.

  There is an asset management Policy, however, over the next 3 to 5 years, emphasis needs to be placed on updating the Policy to become a core element of the Corporation's business model, to align with the ISO 55001 standard, and to reflect established asset management practices.

- ***Asset Care Delivery***

  The connection between quality of asset care and reliability of energy supply is understood to have a direct impact on stakeholders, business, and regulatory requirements. Energy Assets are generally well cared for, which ensures asset downtime is minimized, and reliability is maintained.

  Concerns over the short term include insufficient performance, cost, and risk data to make informed decisions around asset care leading to inappropriate intervention, areas of over-care, and areas of under-care, overall increasing risks, and costs. Asset care delivery is a significant risk requiring ongoing focus over the next 3 to 5 years.

- ***Management Review***

  Responses to the reviews are required for Internal Audit. The Board and the Executive Committee is presented with all audit findings and consultant reports. This allows for gaps to be identified, implementation plans to be developed, and creates focus. Audits not performed by the audit committee do not always benefit from the same level of executive focus and are not always actioned with the same level of urgency.

  Over the next 3 to 5 years, emphasis should be placed on formalizing management review of the asset management system and related asset management processes.

- ***Special Technologies***

  Adoption of technological advances such as remote monitoring, SCADA in the Energy Control Center, and VISTA for water has had significant impact and are currently utilized to support efficient business operations and planning.

  Over the next 5 to 10 years, focus should be placed on identifying requirements for new technology and upgrades to ensure that the introduction of new technology is deliberately planned, and includes considerations for risk management, such as, cyber protection and legacy and proprietary technologies.

- ***Process (Non-Financial) Audits***

  Internal audits are routinely completed to provide insight into organizational culture, policies, procedures, and to aid management oversight by verifying internal controls. External auditors are brought in from time to time when required.

  The value of audits and corrective action plans are not clearly understood across the Corporation. Over the next 5 to 10 years, focus should be placed on continuous improvement activities such as audits, process re-design, and benchmarking.

- ***Continuous Monitoring and Review***

  Both internal and external audit processes exist. KPI's for major business processes are published regularly. The Corporation should prioritize asset management process improvement over KPI tracking.

  Over the next 5 to 10 years, emphasis should be placed on designing control points into the asset management system, and defining the data required to support continuous monitoring and review.

5.4.3 LOW INTERNAL RISK FACTORS

Low Risk Factors are the non-dynamic portion of Hydro's Risk Appetite. Risks that have been ranked as **Low** are either already appropriately managed or the impact is negligible in relation to other risks, or the urgency with which the risk needs to be addressed is low, or are those which the cost of reduction outweighs any minimal benefit.

No low risk factors were identified in the Internal Context based on the severity of the impact and levels of urgency selected by participants.

6 External Context Analysis

6.1 External Context Definition

Greeman created the definition of the Corporation's External Context based on established business tools. Hydro's External Context is defined by six key external force categories as outlined below. The components of these six forces were analyzed to determine the opportunities and threats that they present to Energy Assets and to Hydro. The threats were used to determine the External Risk Profile.

Table 6.1 – External Context Definition

External Forces	Elements / Components
Political	Federal, Provincial or Municipal Governments
	Geo-political Issues
	Legal Shelter and Protection
Economic	Economy and Economic Opportunities
	Key Exchange Rates Stability
	Supply Chain Stability
	Rates & Tariffs Risks
	Labour Pool
Social	Community Involvement with Energy Assets
	Reputation & Brand
Technological	Emerging Technologies / Digitization / Cyber Security
Environmental	Climate Change & Adverse Weather
	Recycling and Renewable Energy Technologies
	Society's Green and Clean Posturing
	Waste & Effluent Management
	Endangered Species Protection
Legal	Regulations
	Employee Protection & Shelter
	Intellectual Property Protection

6.2 External Stakeholders

External stakeholders are groups that are outside of the direct control of Hydro but may have power over the activities or whose activities may be affected by the AMS and asset management activities.

Members of Hydro's management team, drawn from various organizational functions and levels, participated in workshops conducted by **Greeman** to validate the External Stakeholder Register and define the interest of the various groups.

Hydro's external stakeholders have been identified and categorized as shown in Table 6.2.

Table 6.2 – External Stakeholder Register

Stakeholder Category	Stakeholder Type	Stakeholder Name
Legislators and Regulatory Bodies	Governments	Federal Government of Canada, NL Government, Other Maritime Provincial Governments, Quebec Government, US Federal Government, New England Government.
	Governmental Departments and Agencies	Federal - Department of Fisheries and Ocean, Transport Canada, Office of Indigenous Affairs and Reconciliation, National Parks Canada; NL - Department of Industry, Department of Transportation and Infrastructure, Department of Energy and Technology, Department of Finance, Department of Environment and Climate Change, Department of Fisheries, Forestry and Agriculture, Department of Tourism, Culture, Arts and Recreation, Digital Government and Service NL, Office of fire Commissioner, Office of Indigenous Affairs and Reconciliation, Department of Municipal and Provincial affairs, Occupational Health and Safety, Department of Labor Relations, Public Procurement Agency,
	Provincial, Federal & International Regulatory Bodies	Public Utilities Board (PUB NL) & Liberty Consultants, Canadian Dam Associations, North American Electric Reliability Corporation (NERC), Spectrum Canada, Labor Relations Board,
	Facility and Asset Activities Insurers	Allianz and others

	Professional Bodies	PEGNL (Professional Engineers and Geoscientists of Newfoundland), Certified General Accountants association of Newfoundland, Association of Chartered professional accountants of Newfoundland, International Accounting Standards Board (IASB), International Standards Organization (ISO), Canadian Standards Association (CSA), Institute of Electrical and Electronic Engineers (IEEE), National Electric Code (NEC), National Research Council (NRC), National Energy Board (NEB), Canadian Electricity Association (CEA).
Investors & Strategic Partners	Shareholder	Province of Newfoundland and Labrador (Department of Industry, Energy, and Technology); Emera (Nova Scotia Power); Hydro-Quebec;
	Strategic Partners	Multi-Party Pooling Agreement (MPPA) Partners, Fortis Inc. (Newfoundland Power, Liberty Power), Enel Green Power North America (St. Lawrence Wind Farm), Elemental Energy (Fermeuse Wind Farm), Deer Lake Power, Frontier Power,
Energy Asset Users (Customers)	General Customers	Residential Customers
		Governmental (Municipal and Provincial) Customers
		Commercial & Industrial Customers: Anaconda Gold, Marathon Gold, Cornerbrook Pulp and Paper, North Atlantic Refining Limited (NARL) Partnership, Vale, Praxair Canada Inc, Teck Cominco Ltd, Wabush Mines, Iron Ore Company of Canada (IOC), Tacora Resources Incorporated), Mills, Lumber Yards,
	Wholesale Energy Buyers & Retailers	Fortis Inc. (Newfoundland Power), Emera (Nova Scotia Power)
Non-Energy Asset Users (Joint Use Agreements)	Telecom and CATV	Bell Aliant, East Link, Telus, Community Cable Companies
	Other Utilities	
Supply Chain Partners	Suppliers of Goods and Services	Large Scale Suppliers, Equipment OEMs/resellers, Professional & Other Service Providers, Construction Contractors
Society at Large	Public	General Public, Future Generations, Tourists and International Public, Potential Future Workers,
	First Nations Communities	Mushuwa First Nation, Inuit, Natuashish, Miawpukek (Conne River).
	Local Communities	Service Districts, Other communities
	Press/Media	Local, national, and international press/media, social media

	Special Interest Groups	Non-Governmental organizations (NGOs), Conservation Corps of Newfoundland and Labrador, Nature Conservancy of Canada, Glenburnie-Birchy Head-Shoal Brook, Wildlife Boards, Other Special Interest groups,

A complete analysis of External Stakeholders is contained in Appendix 3.0 of this report.

6.3 External Risk Profile

Members of Hydro's Executive and Management team, drawn from various organizational functions, participated in a workshop to define the External Risk Profile of the Corporation.

External risks have been identified in an inverted Risk Pyramid (Figure 6.1) to represent the external Risk Profile of the organization. The Pyramid is graduated, with the highest risks at the top and the lowest at the bottom. The External Risk Profile is attached in Appendix 4.0 of the Report.

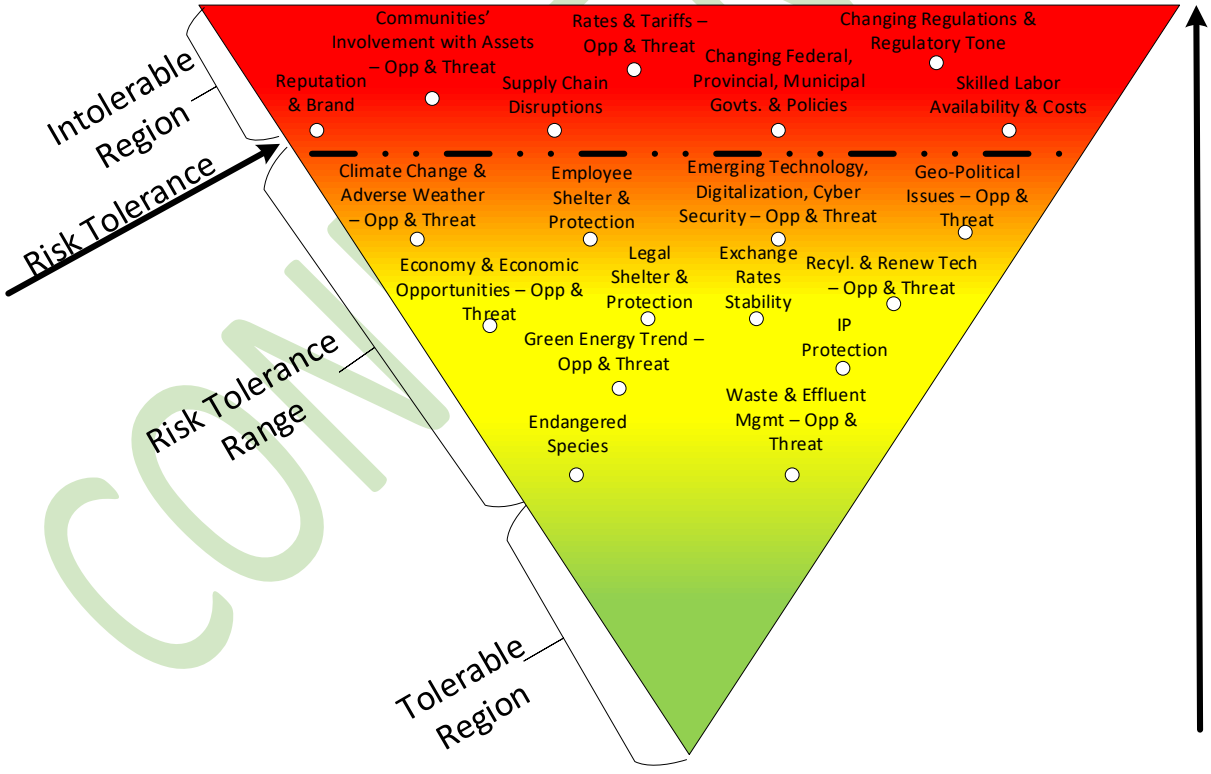

Figure 6.1 - External Risk Profile

6.3.1 INTOLERABLE EXTERNAL RISK FACTORS

Intolerable risk factors are those high-risk factors that are unacceptable and unjustifiable, except in extraordinary circumstances. These risks must be reduced, regardless of cost. They sit at the top of the Risk Pyramid.

The following high-risk factors were identified in the External Context:

- ***Federal, Provincial or Municipal Governments***

  The Provincial Government is a shareholder, and a political entity, with significant influence over the Corporation. Future policy changes may foresee the inclusion of environmental costs in capital projects resulting in additional complexities and costs. Changes in tax rates could trigger an increase in fuel costs and additional overhead recoveries by suppliers.

  This presents a significant risk over the next 1 to 3 years.

- ***Supply Chain Stability***

  There is a significant long-term threat on supply chain stability. Pressure from environmental groups globally to address greenhouse gas emissions may result in cost increases due to carbon tax, as well as impact on movement of goods due to activism. Black swan events such as COVID-19 have proven to cause havoc with the supply chain, and changes in international trade policies may impact traditional sourcing strategies, affecting cost and scheduling. China and European relations could impact Regional and National supply chain stability. This poses a significant risk to the Corporation and should be addressed over the next 1 to 3 years.

- ***Rates & Tariffs***

  There is growing concern of increased domestic pressure on rates, which could result in cost cutting, impacting the quality of asset care, and re-investment capabilities. Lowering rates and tariffs could possibly increase demand for energy services, particularly in the export market. Rates and tariffs are a significant risk to the Corporation and should be addressed over the next 1 to 3 years.

- ***Labour Pool***

  There is a significant threat around the growing inability to attract skilled labour, when coupled with loss of critical people with key skills and knowledge and adoption of new technologies that may require new skills. This may trigger increasing costs of talent acquisition or may require significant upskilling/reskilling of existing employees, and improved succession planning. This is a significant risk that should be addressed over the next 1 to 3 years.

- ***Community Involvement with Energy Assets***

  Community Involvement risk centers around the alignment of community expectations with the needs of the broader utility operation. Indigenous relations, disruption of community life, and the expectations of special interest groups could add complexity and delays in planning and executing asset management activities. Given the threat of losing freedom to operate and outright stoppages, stakeholder engagement efforts need to target community groups that interface with Energy Assets. This is rated as a significant risk (1 to 3 years).

- ***Reputation & Brand***

  Risks to reputation and brand may arise from actions (or interpretation of actions) of the Corporation in relation to its treatment of customers, employees, employee representatives, suppliers, and non-customer users of Energy Assets, as well as indirect actions of employees. This is rated as a significant risk and should be addressed over the next 1 to 3 years.

- ***Regulations***

  The Corporation is highly regulated including, susceptibility to policy changes, compliance requirements, regular reporting, and decision-making oversight for expenditures. The regulatory environment and tone are anticipated to change, in that, the Corporation may be subject to additional regulations or increased oversight by regulators. This includes possible changes to the Public Utilities Act. Recent environmental laws such as the Carbon Tax (Bill C-74 Part 5) should be monitored for future impact.

  This is rated as a significant risk and should be addressed over the next 1 to 3 years.

6.3.2 EXTERNAL RISK APPETITE

The risk appetite comprises those risks that Hydro manages in pursuit of delivering stakeholder value. These risks should be managed closely to prevent them increasing in magnitude. Hydro's internal stakeholders actively manage them as a part of their risk ownership responsibilities. These residual risks are tolerable only when further risk reduction is not practical, or the cost is disproportional to the benefit. Risk owners should make strategic risk treatment decisions accordingly.

The following risks are deemed to be included in the active portion of Hydro's risk appetite:

- ***Geo-Political Issues***

  NAFTA was replaced by CUSMA in 2020 creating agreement on some trade policies.

Recently, there has been a higher emphasis placed on curbing greenhouse gases and hydro power is being looked at as the offset for oil and coal fired plants, coupled with recent American policies on clean energy, and coal phase-out, this may provide opportunities for increased exports of clean energy.

"America First" policies may lead to perceived protectionism of US jobs in industries such as photoelectric generation and battery storage. Recent American Presidential Elections could create further changes to trade and environmental policies which could impact energy exports. Over the next 3 to 5 years, geo-political issues should be an area of focus.

- ***Climate Change and Adverse Weather***

  Energy Assets interact directly with the natural environment and as such, climate change and adverse weather presents risks both to the main source of energy, and to the physical assets that are in the natural environment. A formal assessment of the Energy Asset portfolio was recently completed, and resilience planning and mitigating actions have begun. Over the next 3-to-5-year horizon, further assessment of adverse weather impacts, resilience planning, and mitigating actions should be regularly undertaken.

- ***Emerging Technologies, Digitalization and Cyber Security***

  The rapid growth of distributed generation technologies has been identified as a threat. Many of the asset systems, operational networks, asset data and information have also been assessed for cyber security risks.

  The following emerging technologies may present opportunities to transform the business digitally in the next 3 to 5 years: artificial intelligence (AI), Industrial Internet of Things (IIoT), 5G, Drones, Augmented Reality/Virtual, distributed generation, Blockchain, Biometrics, Serverless Computing. There are also opportunities to digitize asset data and information that still exists in non-digital formats such as hand-written logbooks, and tacit knowledge. Legacy information systems could limit operational resilience.

- ***Employee Protection & Shelter***

  Changes in occupational safety regulations, wage legislations including minimum wage and overtime, discrimination law, and employment law may be anticipated in the next 3 to 5 years but is expected to have negligible impact given the HR systems already in place.

- ***Key Exchange Rates Stability***

  The Canadian dollar is expected to fluctuate in relation to the US Dollar, Euro, and British Pound within the next 5 to 10 years generally affecting the cost and movement of goods, and revenues from export sales of energy. This is rated as a moderate risk requiring continued monitoring.

- ***Economy and Economic Opportunities***

  The recession in the provincial economy is a driver for several risks faced by the Corporation, including, pressures on rates. Electrification of vehicles and expansion of energy exports are potential opportunities for the Corporation to increase revenues from Energy Assets. Increased revenue from energy exports may also have a positive effect on local energy rates, creating more economic opportunities.

  There is concern that if the export of energy declines, this could reduce revenues and increase constraints on operating costs as well as asset re-investment capability. This needs to be addressed over the next 5 to 10 years.

- ***Society's Green and Clean Posturing***

  Society is expected to increase its posturing for green and clean technologies, products, and operations. This could create increased demand for hydro power as it is deemed to be a more environmentally friendly and create more energy export opportunities.

  There is concern that small renewable integration may be a challenge for the Corporation as it is not least cost, and that it may require an increase in capital investment to meet "green targets". This is a moderate risk to the Corporation, to be addressed over the next 5 to 10 years

- ***Waste & Effluent Management***

  Utility operations produce waste and effluent that are either already regulated, could become more regulated or could attract focus from Special Interest Groups. Waste and effluent are deemed to be appropriately treated by existing management systems. Changes to policies for waste and effluent management are anticipated in the short to medium term horizon. This is rated as a moderate risk to the Corporation, to be addressed over the next 5-10 years.

- ***Endangered Species Protection***

  Utility operations do interface with species of plants or animals and wildlife corridors, that are protected by law or have been identified as endangered species. In the 5–10-year horizon it is anticipated more reporting and interactions with regulators, governmental agencies, and special interest groups will be required. This is rated as a moderate risk, manageable by existing management systems.

- ***Recycling and Renewable Energy Technologies***

Recycling and renewable energy technologies present opportunities and threats to the Corporation in the next 5 to 10 years. Development opportunities for further green projects could drive growth in the renewable energy being produced by Hydro today.

There is concern that renewable energy sources that link to the grid, and alternate sources of energy may have an impact on the Corporations future revenues. Recycling and composting policies and regulations could lead to business process changes. This is rated as a moderate risk.

- ***Intellectual Property Protection***

  Hydro stores or handles data that may be impacted by changing intellectual property laws, including data protection, copyright patents, and privacy. Changes in these laws and policies may be anticipated in the next 5 to 10 years. This is rated as a moderate risk.

6.3.3 LOW EXTERNAL RISK FACTORS

Low Risk Factors are the non-dynamic portion of Hydro's Risk Appetite. Risks that have been ranked as low are either already appropriately managed or the impact is negligible in relation to other risks, or the urgency with which the risk needs to be addressed is low or are those which the cost of risk reduction outweighs any minimal benefit from the reduction.

No low risk factors were determined in the External Context based on the severity of the impact and levels of urgency selected by participants.

7 ASSET MANAGEMENT MATURITY ASSESSMENT

7.1 ASSESSMENT METHODOLOGY

Maturity assessment is a mechanism for objectively assessing the asset management practices of an organization. The assessment was conducted using **Greeman**'s proprietary software **PAP**^{TM} which focuses on the organization's **P**eople, **A**ssets, and business **P**rocesses.

The **PAP**^{TM} assessment tool aligns with the requirements of ISO 55001 and other prevailing asset management standards and facilitates the Corporation demonstrating capability in the six asset management areas (Figure 7.1).

Figure 7.1 - Asset Management Groups Assessed for AM Maturity

Members of Hydro's Management team, drawn from various organizational functions, participated in a workshop to establish the maturity of the Corporation's asset management practices.

The maturity assessment results are evaluated and displayed as a stacked pyramid (Figure 7.2) with individual blocks representing best practices in the various asset management subjects and groups. Each tier of the pyramid represents a group of affiliated subjects and are labelled in teal colour. Each block is controlled by its own set of evaluators and uses stoplight colors to indicate maturity improvement from **red**-to-**yellow**-to-**green**. Maturity in each subject was measured against six levels ranging from Non-Existent to Highly Optimized as follows in Table 7.1 below:

Table 7.1 – Asset Management Maturity Assessment Rubric

Maturity Level	Maturity Level Description	Weighting	Color Code
Does Not Exist	No process or awareness in place.	0	
Awareness	Awareness of the asset management practice area and/or informal process exists, but practices may be unpredictable and reactive, resulting in ad hoc implementation.	1	
Practicing	Simple set of practices have been agreed and are partially installed or implemented as specific initiatives that are not organizationally deployed.	3	
Defined	Proactive practices exist and are fully implemented. Organization-wide standards provide guidance across all departments.	5	
Information Inter-Operability	Measured and controlled. Organization is data-driven with quantitative performance improvement objectives that are predictable and align to meet the needs of internal and external stakeholders. High reliance on digitally derived data & system reports.	7	
Optimized	Processes stably deployed & organization focused on continuous improvement. The organization has feedback mechanisms in place to continuously improve the asset management practice area and new processes are emerging to respond to opportunities and changes.	10	

The Maturity Assessment Survey was administered in a workshop consisting of a cross-functional, multi-hierarchal team from Hydro.

The following Hydro staff participated in the Asset Management Maturity Assessment exercise:

NAME	TITLE
Rob Collett	VP Hydro Engineering and Newfoundland Labrador System Operations
Rick Spurrell	Sr Manager of Asset Management and Reliability
Kevin Lewis	Asset Management Specialist
Sam Rose	Director of Utility Performance
Brad English-Barbour	Manager, Business Systems
Brent Peddle	Manager Long Term Asset Planning
Cara Ryan	Human Resources/ Labor Relations Lead
CarolAnne Lutz	Financial Controller, Hydro
Chris Warren	Sr Manager Asset Management and Long-Term Planning
Dana Higdon	Supply Chain Manager and Admin Manager
Dana Pope	Financial Controller, CF
Dawn Layden	Director of Engineering
Dena Kavanagh	Sr Manager of AC Terminal stations & HVDC Specifications (Power Supply)
Gail Randell	Director of Engineering
Hughie Ireland	Sr Manager of Engineering (Electrical)
Janice Butt	Sr Manager of Financial Reporting and Compliance
Jenelle Witherall	Manager of Risk Controls and Planning
Matthew Halloran	Manager of Regulatory Engineering
Michael Churchill	Sr Manager, Transmission and Rural Operations Island
Paul Dillon	Sr Manager of Engineering (Civil)
Perry Taylor	Sr Manager Soldiers Pond
Peter Robbins	Sr Manger of Hydro Generation
Phillip Tarrant	Financial Risk and Enterprise Risk Management Lead
Renee Smith	Sr Manager of Resource Production and Planning
Rick Kennedy	Sr Manager of Transmission and Rural Operations (Labrador)
Scott Crosbie	VP Hydro Operations
Stephen Gourmand	Sr Manager of Site Services, Churchill Falls
Terry LeDrew	Director of Production, Churchill Falls

7.2 ASSESSMENT RESULTS

The maturity assessment results are shown in Figure 7.2 below. The detailed results are contained in Appendix 5.0 of this Report.

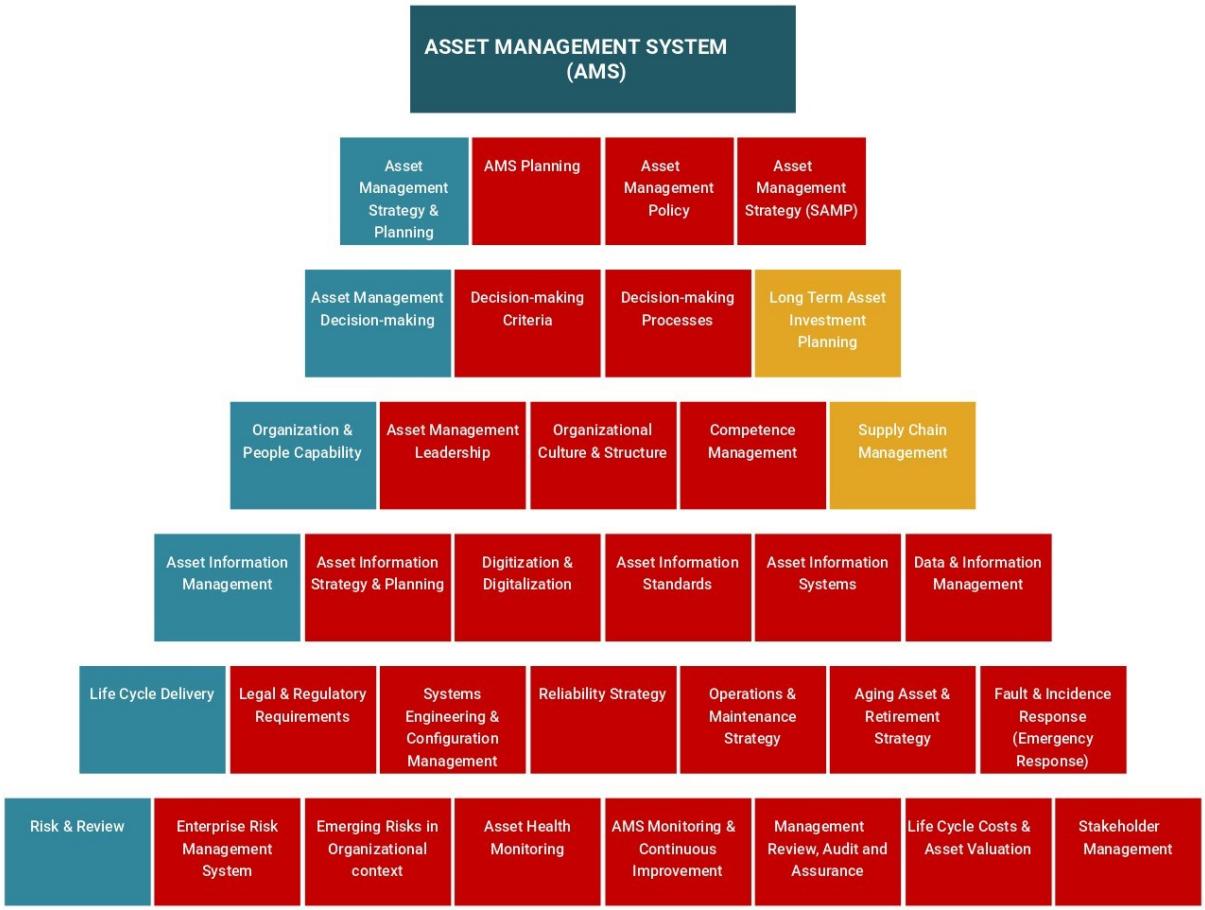

Figure 7.2 - Pyramid depicting the maturity of AM Practices at Hydro

7.2.1 GENERAL STATEMENT ON FINDINGS

This project is representative of Hydro's willingness to evaluate current asset management practices to assess if there are more appropriate and efficient ways to address performance and risks within the limit of financial constraints.

In general, the results reflect that many of the asset management processes are in place, but to varying degrees and in a siloed manner. The gaps reflect a lack of a systems-based approach, rather than a lack of actual processes.

The gaps largely emerged in the following ways:

- Lack of a holistic, integrated philosophy to managing Energy Assets, resulting in multiple, splintered asset management approaches across the various divisions, departments, and functional groups,

- Current asset management efforts have been limited to members of the Office of Asset Management and other ad hoc contributors,
- Lack of formalization of processes including frameworks to guide procedures and tools,
- Lack of documentation to enable consistent and global deployment across the Corporation,
- Lack of alignment between processes that are interrelated, and
- Lack of alignment with external standards.

A high level of correlation was found between the findings of the internal context analysis, the external context analysis, the readiness assessment, and the asset management maturity assessment.

7.2.2 ASSET MANAGEMENT STRATEGY & PLANNING

The following findings were observed in Asset Management Strategy and Planning:

- ***AMS Planning***
  The assessment revealed a maturity level of **22%** indicating that there is an awareness of the need for AMS planning, but practices are not proactively developed. Gaps exist around having a defined multi-functional, multi-hierarchal governance team, and assessment of asset management maturity. A formal implementation plan does not currently exist but will be proposed as a part of the Road Map developed during this Assessment.

  Practices that have been partially implemented as localized initiatives include:
  - AM Program Executive Sponsor and AM Program Lead have been assigned,
  - A formal Office of Asset Management exists,
  - A Governance Framework has been developed as part of this Project,
  - Formal assessment of asset management maturity,
  - A Stakeholder Engagement and Communication Plan has been developed as part of this project.

- ***AM Policy***
  The assessment revealed a maturity level of **26%** indicating that an AM Policy exists and has been implemented. However, a gap exists around a defined AM Framework, and the AM Policy needs to be improved to align with established asset management practices, and with ISO 55001. A new recommended AM Policy has been issued.

- ***AM Strategy and Strategic AM Plan (SAMP)***
  The assessment revealed a maturity level of **22%** indicating awareness of the AM Strategy and SAMP, but practices are not proactively developed. For example, the Corporation has inventories of its assets, but gaps include AM Strategy, formal State of Asset Report (SOAR), and SAMP to drive long-term asset management improvement.

Practices that have been partially implemented through this project include:

- Analysis of the Corporation's internal and external stakeholders, and
- Analysis of the business environment for emerging risks.

7.2.3 ASSET INFORMATION MANAGEMENT

The following findings were observed in Asset Information Management:

- ***Asset Information Strategy***
  The assessment revealed a maturity level of **18%** indicating awareness of the need to manage asset information, but practices may be unpredictable and reactive, resulting in ad hoc implementation. Processes with gaps include a documented asset information strategy and defined information requirements.

- ***Digitalization Strategy***
  The assessment revealed a maturity level of **13%** indicating the awareness to have a strategic approach to digitalization and digitization. Gaps exist around a formal digitalization strategy and digitization of tacit knowledge and analog data.

- ***Asset Information Standards***
  The assessment revealed a maturity level of **23%** indicating awareness of the need to deploy asset information standards across the Corporation, but practices are not proactively developed. Gaps exists around the enterprise-wide formalization of information standards including, an Asset Management/Information Manual, standard design criteria, use of information requirements and templates in procurement processes.

- ***Asset Information Systems***
  The assessment revealed a maturity level of **25%** indicating awareness of the need to effectively deploy asset information systems, but practices are not proactively deployed. Practices in place include the use of asset information systems to record asset activities and defined ownership and access rights. In recent years the Corporation has taken steps to improve its Computerized Maintenance Management System (CMMS). Gaps exist around defined location for various types of information, system-to-system interfaces, and adequate cyber protection for OT systems.

- ***Data and Information Management***
  The assessment revealed a maturity level of **22%** indicating awareness of the importance of data and information management practices for asset information, but practices are not proactively developed. Practices in place include management of change protocols, however, gaps exist around KPIs to define information quality, regular information audits, and information quality management.

7.2.4 ASSET MANAGEMENT DECISION-MAKING

The following findings were observed in Asset Management Decision-making:

- ***Decision-making Criteria***
  The assessment revealed a maturity level of **25%** indicating the need for agreed enterprise-wide decision-making criteria, but practices are not proactively developed. There is no large-scale framework tied to stakeholder expectations, on which to base investment decisions. Practices in place include financial justification using defined parameters, however, gaps exist around alignment with defined stakeholder value, the use of standardized multi-criteria prioritization, and enterprise-wide standards for consistent decision-making.

- ***Decision-making Processes***
  The assessment revealed a maturity level of **26%** indicating the awareness of the need for decision-making processes, but practices are not proactively developed. Practices in place include investment prioritization that includes risks, use of multi-functional input, and processes to identify when investments are needed. There is no automated decision-making system, so significant human intervention is required. Gaps also exist around documented decision-making processes and iterative decision-making that allows deferred investments to be retained in a structured way.

- ***Long-Term Asset Investment Planning***
  The assessment revealed a maturity level of **32%** indicating that a simple set of practices have been agreed and are partially installed or implemented as specific initiatives that are not always fully deployed across the Corporation. Proactive practices exist around defined capitalization threshold, long-term asset planning, and defined investment periods. Gaps exist around the analysis of asset performance as a part of long-term planning, and the harmonization of capital and operational planning through Life Cycle Management Plans.

7.2.5 ORGANIZATION & PEOPLE CAPABILITY

The following findings were observed in Organization and People Capability. Findings around leadership and culture correlate with the findings of the readiness survey and internal context analysis.

- ***Asset Management Leadership***
  The assessment revealed a maturity level of **23%** indicating that some elements of senior level asset management leadership is in place. Commendably, an informal Executive Sponsor and Steering Group have been assigned for the AM Needs and Readiness Assessment. Practices in place include senior management regularly receiving feedback on asset management activities. Gaps exist around formalization of the Executive Sponsor role as an organizational role and the formation of a robust, representative Steering Group. Gaps also exist around Board and Executive involvement to ensure that

asset management decisions align with Corporate Strategies and resolves conflicts between asset management approaches and organizational culture.

- ***Organizational Culture and Structure***
  The assessment revealed a maturity level of **21%** indicating awareness of the importance of culture and structure, but practices are not proactively developed. Practices in place include defined asset management roles in the organizational structure and some asset management practices are integrated into organizational business processes. Gaps exist around internal stakeholder engagement, incorporating change management for asset management changes, and building a vibrant and explicit asset management culture. Notwithstanding the need for functional groups, there is an opportunity to build an asset management community of practice to support the entire corporation.

- ***Competence Management***
  The assessment revealed a maturity level of **12%** indicating that there is an awareness of the importance in managing asset management competences, however, practices are informal and unpredictable, resulting in ad hoc implementation. Gaps exists around a defined competence framework that aligns with the AM Strategy, provides the mechanism to assess asset management capabilities, and drives competence improvement and training plans.

- ***Supply Chain Management***
  The assessment revealed a maturity level of **33%** indicating that some practices have been agreed and are partially installed or implemented. Proactive practices in place include senior management oversight of supply chain, a robust tenders' policy, formalized buying practices, and supplier contracts for goods and services. Gaps exist around short-to-medium term inventory management plans based on projected asset management activities.

7.2.6 LIFE CYCLE VALUE DELIVERY

The following findings were observed in Life Cycle Value Delivery:

- ***Legal and Regulatory Requirements***
  The assessment revealed a maturity level of **25%** indicating that some processes exist, such as, proactive practices around defined legal and regulatory compliance requirements. Gaps exist around the alignment with ISO 55001 and monitoring systems to assure and report compliance.

- ***Systems Engineering and Configuration Management***
  The assessment revealed a maturity level of **16%** indicating that informal processes exist, but practices may be unpredictable, resulting in ad hoc implementation. Practices in place include functional specifications defined for the facility. Gaps exist around integration of Reliability, Operability, Availability, Maintainability, and Safety (ROAMS) in functional

requirements at the design phase, defined management of change processes for configuration changes, and routine auditing of asset configuration to manage asset data integrity.

- ***Reliability Strategy***
  The assessment revealed a maturity level of **15%** indicating awareness of reliability artefacts, but practices may be unpredictable and reactive, resulting in ad hoc implementation. Proactive processes in place include the tracking and reporting of reliability indicators. Processes with gaps include having a defined reliability strategy, the use of Reliability Centered Maintenance (RCM) to define failure modes, failure management strategy including defect elimination program, and the use of Failure Mode and Effect Analysis (FMEA) to develop and optimize preventive and predictive maintenance.

- ***Operations and Maintenance Strategy***
  The assessment revealed a maturity level of **23%** indicating that there is planned maintenance routines and annual maintenance master schedules. Gaps were found in the following areas: Defining MRO materials requirements based on maintenance planning and scheduling, backlog management, key maintenance processes, critical spares linked to assets, and alignment of annual maintenance plans with long-term asset plans.

- ***Aging Asset and Retirement Strategy***
  The assessment revealed a maturity level of **22%** indicating awareness of aging asset and retirement strategies, but practices may be unpredictable and reactive. Gaps exist around aging asset strategy, defined rationalization processes, and defined processes to calculate retirement liabilities.

- ***Fault and Incidence Response***
  The assessment revealed a maturity level of **19%** indicating general awareness of the need to manage fault and major asset incidences. For example, Fault and Incidence Management includes major asset faults and incidences, however, gaps exist around failure reporting and corrective action system, and management of change to update asset information after major faults.

7.2.7 RISK AND REVIEW

The following findings were observed in Risk and Review:

- ***Enterprise Risk Management System***
  The assessment revealed a maturity level of **25%** indicating that there is an enterprise risk management system including standard templates for risk analysis and registers. Gaps identified include lack of alignment between the Enterprise Risk Management System (ERMS) and the AMS, and the consistent use of risk management tools and techniques in asset management activities.

- ***Emerging Risks in Organizational Context***
  The assessment revealed a maturity level of **19%** indicating awareness of the need to address risks in the external context, but that systems are needed to continually assess the organizational context to identify and treat emerging risks, and to incorporate risk treatment into the SAMP. Additional gaps identified also include incorporation of sustainable development goals in asset management decision-making.

- ***Asset Health Monitoring***
  The assessment revealed a maturity level of **18%** indicating that efforts are in place to regularly assess asset condition and performance. There are gaps around a formalized State of Asset Report (SOAR) and the integration of overall condition index (OCI) into risk management and long-term asset planning, provisions for ongoing condition assessment and a grading system for asset condition.

- ***AMS Monitoring and Continuous Improvement***
  The assessment revealed a maturity level of **13%** indicating that there are informal continuous improvement processes for the AMS. Gaps were identified around processes to evaluate the effectiveness of the AMS and assess maturity.

- ***Management Review, Audit and Assurance***
  The assessment revealed a maturity level of **15%** indicating the need for levels of assurance, audit and management review. Gaps were identified around audit of AMS and asset management activities, and management review of audit results and non-conformance reports.

- ***Asset Cost Tracking & Asset Valuation***
  The assessment revealed a maturity level of **19%** indicating that asset cost accrual rules have been established and that maintenance and operations costs are identified and regularly analyzed. Gaps were identified around alignment of the Technical Asset Register (TAR) and the Fixed Asset Register (FAR), prompt communication with the FAR for asset activities, alignment of the asset classification system with the FAR, and monitoring of operating cost drivers.

- ***Stakeholder Management***
  The assessment revealed a maturity level of **17%** indicating an awareness of the need to manage stakeholder expectations. Gaps were identified around the consistent and systematic analysis of key internal and external stakeholders, and the incorporation of their expectations in the AM Strategy. These findings align with the external risk profile.

8 RECOMMENDATIONS

8.1 ACTIVITIES TO IMPROVE MATURITY

The following activities reflect recommendations to improve maturity as well as to address risks in the internal and external context.

Asset Management Strategy and Planning (AMSP)

The following recommendations apply to Asset Management Strategy and Planning:

AMS Planning

- **AMSP.1** - Maturity assessments should be regularly conducted using multi-functional, multi-hierarchal teams to evaluate maturity.

- **AMSP.2** - The Governance Framework needs to be clarified by the AM Steering Group and EC and adopted organizationally up to the Board Level to document and formalize the role of top management and others.

- **AMSP.3** - An AMS implementation plan and road map is needed to identify future projects and the acceptable pace of implementation. This will be developed as part of this project.

AM Policy

- **AMSP.4** - The new Policy and Framework needs to be clarified by the AM Steering Group and EC and adopted organizationally.

- **AMSP.5** - As part of the Communication Plan, the Policy is to be communicated broadly across the Corporation, from the Board to the front line.

AM Strategy and Strategic AM Plan (SAMP)

- **AMSP.6** - Establish a formal AM Strategy that outlines the:
  - Organizational context,
  - Drivers for stakeholders' expectations,
  - Strategic asset management objectives,
  - Corporation's approach to risk management,
  - Corporation's approach to long-term demand,
  - Corporation's approach to asset investment management,
  - Key asset management processes, and
  - Corporation's approach to continuous improvement of its asset management practices and processes.

- **AMSP.7** - A SAMP needs to be created to outline the long-term, strategic investment plan for Energy Assets based on long-term demand, forecasted condition, and forecasted asset replacement and renewal cost projections.

Asset Information Management (AIM)

The following recommendations apply to Asset Information Management:

- **AIM.1** - There are opportunities to better manage risks and improve efficiency and effectiveness by implementing a formal Asset Information Management System (AIMS). The AIMS would harmonize practices across the Corporation and would include:
  - An information and digitalization strategy,
  - Defined organizational information standards,
  - Alignment of information systems with data requirements, and
  - Appropriate data governance and quality processes.

- **AIM.2** - There are opportunities to reduce knowledge risks such as labor pool risks identified in the external context, by developing a Knowledge Management Strategy to capture and retain organizational knowledge.

Asset Management Decision-Making (AMD-M)

The following recommendations apply to Asset Management Decision-making:

- **AMD-M.1** - Create a value-based Decision-making Framework that uses multi-criteria prioritization to align decision-making processes and practices with stakeholder value. The Framework will also contain decision-making processes and require multi-functional input to ensure that decisions are iterative and progressively filtering.

- **AMD-M.2** – Formally document and flowchart decision-making processes in an Investment Planning Guide, which would become an information standard for the Corporation.

- **AMD-M.3** – Consider future use of Asset Investment Planning and Management (AIPM) System to integrate and enable a Decision-making Framework and related processes.

- **AMD-M.4** – Improve the use of Life Cycle Costs for major asset management decisions.

Organization and People Capability (OPC)

The following recommendations apply to Organization and People Capability:

- **OPC.1** - Deliberate Board and Executive engagement to prepare Senior Leaders to lead the AMS and asset management improvement effort. This includes C-Suite level asset management training and coaching.

- **OPC.2** - A Governance Framework was developed to give authority to the various governance groups of the AMS. It needs to be clarified and adopted to define roles and

responsibilities of senior leaders and all governance groups, and specifically to authorize the Office of Asset Management.

- **OPC.3 –** Create a more robust Steering Group to better reflect the structure of the Corporation and the various functional groups.

- **OPC.4 –** Examine the growing asset management portfolio to ensure that the Office of Asset Management is appropriately located in the structure, has the appropriate level of authorization, and is appropriately staffed.

- **OPC.5** - Improve the management of competence by implementing a Competence Framework aligned with AM Strategy, multi-year training plan, and skills gap analyses to map competences to individual employees.

- **OPC.6** – Implement a multi-pronged approach to asset management training, including, general asset management familiarization for all managers and senior level staff, specialized training for members of the Office of Asset Management and the AM Steering Group, and Executive Level training in asset management.

- **OPC.7** – Create a dynamic asset management culture that encompasses employees, employee representatives, all levels of management, and the Board through deliberate organizational engagement. A Stakeholder Engagement and Communication Plan was created as part of this project to support cultural engagement. Work needs to be done to clarify and roll it out to the Organization through proper change management activities.

- **OPC.8** – Align asset selection and procurement processes with the AM Strategy. These include incorporating ROAMS and Standardized Design Criteria and the creation of medium-term inventory management plan, based on the SAMP and Life Cycle Management Plans (LCMPs).

Life Cycle Value Delivery (LCVD)

The following recommendations apply to Life Cycle Value Delivery:

- **LCVD.1** - Implement a Regulatory Compliance Framework to provide assurance that appropriate processes are in place to identify regulatory requirements, compliance requirements, define asset management response, and monitor and report compliance.

- **LCVD.2** - The Corporation already has an AMS. The recommendation in that regard is to improve the AMS by aligning with ISO 55001 and takes measures to improve the maturity of the Corporation's asset management practices.

- **LCVD.3** - Standardize functional requirements and integrate reliability, operability, availability, maintainability, and safety functional requirements at the design phase.

- **LCVD.4** - Standardize design criteria and to create standard procurement packages to manage risks stemming from non-standard equipment and components, and to standardize the asset management response.

- **LCVD.5** – Implement a Management of Change (MOC) System to identify the need for changes to asset configuration, include routine auditing of asset configuration, and to ensure that asset information is updated whenever configuration changes.

- **LCVD.6** - Improve Life Cycle Management Plans to align with the SAMP for critical assets including, Major Capital Improvement Plans, Asset Renewal and Replacement Plans, Reliability Strategy and Plans, Maintenance Strategy and Plans, and Operation and Utilization Plans. This also includes the plans identified in LCVD.7, LCVD.8, and LCVD.9.

- **LCVD.7** - Create an integrated Failure Management Strategy, as a part of the Enterprise Risk Management Program, that incorporates identification of failure modes, failure analysis, Failure Reporting and Corrective Action System (FRACAS), and defect elimination. This includes alignment with the AIMS and the MOC system.

- **LCVD.8** – Improve long-term operations and maintenance plans by aligning with the SAMP and by calibrating annually for short-term exigences. Critical spares should be defined and linked to assets, annual maintenance plans should align with long-term asset plans, and focus should be placed on backlog management and key maintenance processes. MRO materials requirements should be based on maintenance planning and scheduling.

- **LCVD.9** – Implement an Asset Rationalization Strategy including processes for identifying aging assets and underutilized assets, and standards for calculating asset retirement liabilities.

Risk and Review (RAR)

The following recommendations apply to Risk and Review:

- **RAR.1** - Align the AMS with the Enterprise Risk Management System (RMS), ensure asset risks assessment and treatment appear on the organization's risk register, include risk management tools and techniques in AM activities, and ensure the development of standard templates for risk analysis and registers.

- **RAR.2** - Create an Asset Risk Management Framework to ensure that there will be a consistent approach to understanding how the risk profile of the organization is changing. This project created an extensive analysis of the internal and external contexts of the Corporation, which may be adopted into the Framework.

- **RAR.3** – Incorporate the management of emerging risks into the SAMP, AM decision-making, and Life Cycle Management Plans.

- **RAR.4** – Formalize a State of Asset Report (SOAR) to provide consistent reporting to external stakeholders on the health of Energy Assets, forecasted expenditures to manage risks, and required re-investment ratios. The SOAR is a precursor document to the SAMP and is used by internal stakeholders to prepare the SAMP.

- **RAR.5** - Develop a continuous improvement strategy to focus resources on iterative evaluation and refinement of the AMS including continuous monitoring processes, audits, corrective actions, KPIs, management review and accountability.

- **RAR.6** – Adopt an Asset Classification System that aligns with ISO 14224 and other information standards to ensure that it aligns with and provides useful information to the Fixed Asset Register (FAR).

- **RAR.7** – Further improve the alignment the Technical Asset Registry (TAR) with the FAR including prompt communication with FAR for assets activities.

- **RAR.8** – Identify and monitor cost drivers for asset management activities using KPIs.

8.2 MAP OF ACTIVITIES TO IMPROVE RISK PROFILES

As a precursor to the Implementation Plan and Road Map, the recommended activities have been mapped to risks in the Internal Context to ensure that the Road Map prioritizes the most effective and the most urgent activities.

Table 8.1 – Internal Risk Treatment

Risk Description				Recommended AM Improvement					
Internal Forces	**Elements/Components**	**Risk Level**	**Risk Horizon**	**AM Strategy & Planning**	**Asset Information Management**	**AM Decision-Making**	**Organization & People Capability**	**Life Cycle Value Delivery**	**Risk and Review**
Asset Portfolio	Size/Scale/Complexity		1-3 Years	x		x	x	x	
	Importance of Asset Portfolio to Regional and North American Economy		3-5 Years			x		x	
	Overall Asset Condition		1-3 Years	x	x	x	x	x	x
	Special Technologies		5-10 Years	x	x	x	x	x	
Internal Stakeholders	Management Controls & Governance		1-3 Years	x	x		x		x
	Organizational Design & Structure		3-5 Years	x			x		
	Leadership Approach		1-3 Years	x			x		x
	Asset-centeredness		3-5 Years	x	x	x	x	x	x
	Composition of Human Resources		1-3 Years				x		
	Competence Management		3-5 Years			x	x		
	Organizational Culture		3-5 Years	x			x		
	Accountability		1-3 Years	x			x		x
	Risk Attitude		3-5 Years	x			x		x
	Financial Attitude		3-5 Years	x			x		x
Management Systems & Business Processes	Organizational Policies		3-5 Years	x	x		x		x
	Management Systems & Frameworks		3-5 Years	x	x		x		x
	Performance & Compliance Management		3-5 Years	x	x		x		x
	Multi-functional Teams		3-5 Years				x		x
	Information Management		1-3 Years		x	x			
	Asset Care Delivery		3-5 Years	x	x	x	x	x	x
	Management of Change		3-5 Years	x					x
	Continuous Monitoring & Review		5-10 Years	x	x		x		x
	Process (Non-Financial) Audits		5-10 Years	x	x		x		x
	Management Review		5-10 Years	x			x		x
	Risk Functions Assessment		1-3 Years	x			x		x

The detailed Internal Risk to Recommendation Map is contained in Appendix 6.0 of this Report.

Table 8.2 – External Risk Treatment

Risk Description				Recommended AM Improvement					
External Forces	**Elements/Components**	**Risk Level**	**Risk Horizon**	**AM Strategy & Planning**	**Asset Information Management**	**AM Decision-Making**	**Organization & People Capability**	**Life Cycle Value Delivery**	**Risk and Review**
Political	Federal, Provincial or Municipal Governments		1-3 Years	x			x	x	
	Geo-political Issues		3-5 Years	x			x		
	Legal Shelter and Protection		5-10 Years	x			x		
Economic	Economy and Economic Opportunities		5-10 Years	x			x	x	
	Key Exchange Rates Stability		5-10 Years	x					
	Supply Chain Stability		1-3 Years	x			x	x	
	Rates & Tariffs Risks		1-3 Years	x	x				
	Labour Pool		1-3 Years	x	x		x	x	
Social	Community Involvement		1-3 Years	x					x
	Reputation & Brand		1-3 Years						x
Technological	Emerging Technologies / Digitization / Cyber Security		3-5 Years	x	x	x	x		
Environmental	Climate Change & Adverse Weather		3-5 Years	x					x
	Recycling and Renewable Energy Technologies		5-10 Years	x		x			
	Society's Green and Clean Posturing		5-10 Years	x					x
	Waste & Effluent Management		10-15 Years	x				x	
	Endangered Species Protection		10-15 Years	x					x
Legal	Regulations		1-3 Years	x	x	x	x	x	x
	Employee Protection & Shelter		3-5 Years				x		x
	Intellectual Property Protection		5-10 Years	x			x		x

The detailed External Risk to Recommendation Map is contained in Appendix 7.0 of this Report.

9 Implementation Plan and Road Map

This Document is an intermediary report containing the Needs and Readiness Assessment. The final phase of this project is the development of Implementation Plan and Road Map.

The main features of the Implementation Plan will be:

- Based on the desired maturity improvement for each year and overall,
- Multi-year plan containing the specific projects and initiatives for each year,
- Allow the implementation to be paced according to organizational burden,
- Prioritize activities allowing the most important activities to be accomplished first while recognizing interdependences, and
- Allow for monitoring, review and reporting of progress made.

10 Attachments

10.1 Appendices

The following documents contain information available in abbreviated format in this document and form part of the overall report.

- Appendix 1.0 - Internal Stakeholder Analysis
- Appendix 2.0 - Internal Risk Profile
- Appendix 3.0 - External Stakeholder Analysis
- Appendix 4.0 - External Risk Profile
- Appendix 5.0 - PAP Maturity Assessment Pyramid
- Appendix 6.0 - Internal Risk to Recommendation Map
- Appendix 7.0 - External Risk to Recommendation Map

10.2 Related Documents

The following documents are referenced in this report and should be consulted when reviewing this Report:

- AM Policy
- Stakeholder Engagement & Communication Plan
- AM Governance Framework

****END****

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Internal Stakeholder Analysis

Asset Management Needs & Readiness Assessment

C =	Current level of commitment
R =	Required level of commitment

Stakeholder Classification		Benefit Analysis		Influence (Power)/Interest Analysis		Engagement Analysis		Commitment Analysis				
Stakeholder Category	**Stakeholder Type**	**Perceived Benefit**	**Perceived Dis-Benefit**	**Influence (Power) Level** H, M, L, or None	**Interest Level** H, M, L, or None	**Perceived Resistance** H, M, L, or None	**Perceived Support** H, M, L, or None	**ACTIVE OPPOSITION** (Actively Against - High Resistance, No Support)	**PASSIVE OPPOSITION** (Passively Negative - Medium-High Resistance, Low Support)	**NEUTRAL SPECTATOR** (Let it happen - Low-No Resistance, No Support)	**CONTRIBUTOR** (Help it happen - No-Low Resistance, Medium Support)	**CHAMPION** (Actively Make it Happen - No Resistance, High Support)
Top Management	Board of Directors	1.Increased confidence of external stakeholders in Nalcor especially regulators such as PUB, primary shareholder and local communities, renewed operating and social licences. 2.Increased cost management supporting increased profitability. Increased capability and reliability of assets to deliver reliable energy to customers. 3.Increased probability of achieving organizational objectives through effective asset management practices. 4.Better visibility of long term asset risks. 5.Increased visibility of AM decision-making. 6.External recognition for proactively implementing an AMS. 7.Creating and sustaining engagement around the AMS may improve overall organizational engagement and performance on engagement survey.	1.BoD may perceive that Nalcor is already great at asset management and this additional effort may not be needed. 2.May not perceive the relationship between asset management and financial performance so AM may seem to be not cost effective. 3.AM may be seem as a lower tiered effort and not as a business approach and as such not requiring Board-level engagement. 4.May not be willing to participate in and endorse AMS and activities. 5.AM may require changes to the organization that they are not willing to make. 6.May consider AM as a distraction from existing initiatives. 7.May believe that the organization may have too many other changes underway to undertake the AM initiative.	**H**	**L**	**L**	**L**			**C** →		**R**
	Executive Committee	1.Increased confidence of external stakeholders in Nalcor especially regulators such as PUB, Shareholder and local communities, renewed operating and social licenses. 2.Increased cost management supporting increased profitability. 3.Increased capability and reliability of assets to deliver reliable energy to customers. 4.Increased probability of achieving organizational objectives through effective asset management practices. 5.Better visibility of long term asset risks. Increased visibility of AM decision-making. 6.External recognition for proactively implementing an AMS. 7.Better management of organizational risks and exposure through improved enterprise learning. 8.Opportunities to improve business systems and processes. 9.Creating and sustaining engagement around the AMS may improve overall organizational engagement and performance on engagement survey. 10.Improved engagement will lead to increased benefit of employees' discretionary effort manifested through timely identification and escalation of asset risks.	1.Executives may perceive that Nalcor is already great at asset management and this additional effort may not be needed. 2.AM may be seem as a maintenance effort and not as a business approach and as such it does not require executive level engagement. 3.May not perceive the relationship between asset management and financial performance. 4.AM may require changes to the organization that they are not willing to make. 5.May not be willing to participate in and endorse AMS and activities. 6.May not be willing to devote resources. 7.Unwilling/unable to communicate the impact and consequences of organizational deficiencies in managing assets. 8.May believe that the organization may have too many other changes underway to undertake the AM initiative. 9.May understate the gravity of missing asset information and its impact on investment decisions.	**H**	**M**	**L**	**M**				**C** →	**R**
Middle Management	Directors, Senior Managers, and Managers	1.Better visibility of asset performance, risks and remaining useful life to guide asset renewal and capitalization decisions. 2.Better visibility of how operational activities and decisions contribute to organizational objectives and financial performance. 3.Opportunities to improve business systems and processes. 4.Improved productivity and efficiency of asset operations and activities such as planning and scheduling, maintenance strategy, work management and improved wrench time. 5.Better visibility of asset risks and ability to prioritize and plan according to risk appetite. 6.Better understanding of how to leverage the assets to mitigate safety and environmental liabilities. 7.Better information to make cost effective decisions with better justification. 8.Improved AM training and exposure with a path to asset management careers. 9.Better management of organizational risks and exposure through improved enterprise learning. 10.Improved engagement will lead to increased benefit of employees' discretionary effort manifested through timely identification and escalation of asset risks.	1.AM may be seen as a maintenance effort that may not require engagement from management team members. 2.AM may require changes to the organization and their roles that they may not be willing to make. 3.May not be willing to participate in and endorse AMS and activities. 4.May lack skills and knowledge to participate and may be unwilling to acquire new skills and ways of doing things. 5.Unaware of the impact and consequences of organizational deficiencies in managing assets. 6.May believe that the organization may have too many other changes underway to undertake the AM initiative. 7.May understate the gravity of missing asset information and its impact on investment decisions. 8.May not be willing to devote resources.	**H**	**L**	**M**	**L**		**C** →			**R**

Internal Stakeholder Analysis

Asset Management Needs & Readiness Assessment

C =	Current level of commitment
R =	Required level of commitment

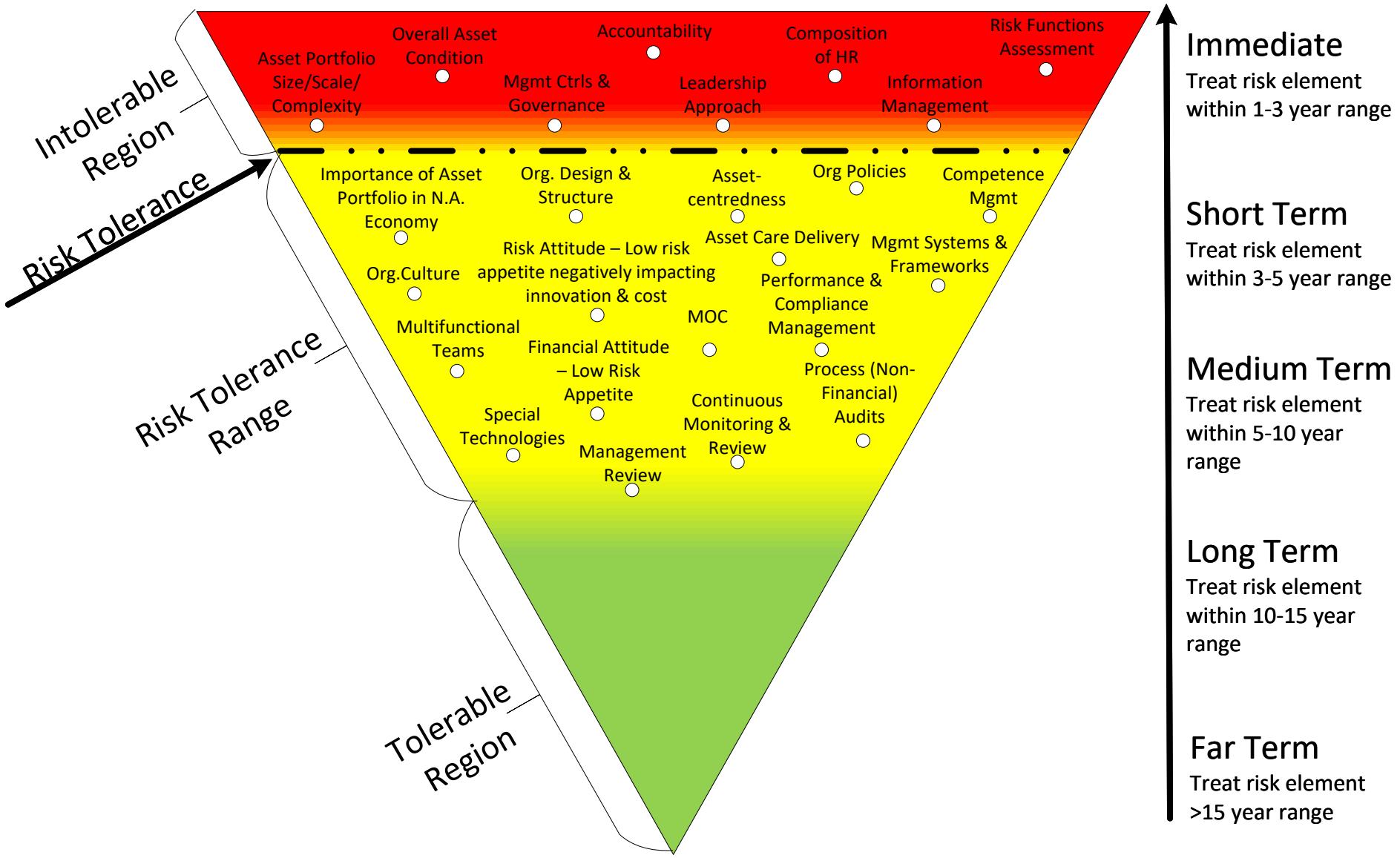
Stakeholder Classification		Benefit Analysis		Influence (Power)/Interest Analysis		Engagement Analysis		Commitment Analysis				
Stakeholder Category	**Stakeholder Type**	**Perceived Benefit**	**Perceived Dis-Benefit**	**Influence (Power) Level** H, M, L, or None	**Interest Level** H, M, L, or None	**Perceived Resistance** H, M, L, or None	**Perceived Support** H, M, L, or None	**ACTIVE OPPOSITION** (Actively Against - High Resistance, No Support)	**PASSIVE OPPOSITION** (Passively Negative - Medium-High Resistance, Low Support)	**NEUTRAL SPECTATOR** (Let it happen - Low-No Resistance, No Support)	**CONTRIBUTOR** (Help it happen - No-Low Resistance, Medium Support)	**CHAMPION** (Actively Make it Happen - No Resistance, High Support)
Employees	Front Line Supervisors	1.Understand the value to stakeholders of improving Nalcor's asset management practices. 2.Better visibility of how operational activities and decisions contribute to organizational objectives and financial performance. 3.Better visibility of asset performance and risks. 4.More defined mechanisms to contribute to AMS and AM activities. 5.Integral to key areas of AM decision-making. 6.Prestige and recognition as AM Departmental representatives and feeling of belonging and contributing to communities of practice. 7.Specific mechanisms to support timely identification of risks and channels to report and escalate. 8.Be supported by robust skills inventory and learning programs. 9.Opportunities for role enrichment through access to capital and operational projects. 10.Improved AM training and exposure with a path to asset management careers. 11.Increased confidence in job security.	1.May be tired of initiatives. 2.Low levels of engagement and/or history of unsuccessful changes may lead to lack of trust in the process and employees may view it as another sugar-coating exercise. 3.Improper communication may lead to employees not understanding the purpose of AM, AMS and AM activities. 4.May see AM activities as more work, tedious and administratively burdensome. 5.May lack skills and knowledge to participate and may be unwilling to acquire new skills and ways of doing things. 6.May be unaware of the impact and consequences of organizational deficiencies in managing assets. 7.May not want to release persons for participation. 8.May struggle to create meaningful balance between AMS implementation activities and line responsibilities. 9.May perceive potential asset management efficiencies as a threat to job security.	**M**	**L**	**H**	**L**	**C** →			**R**	
	Front Line Employees	1.Understand the value to stakeholders of improving Nalcor's asset management practices. 2.Better visibility of how operational activities contribute to organizational objectives and financial performance. 3.Better defined mechanisms to contribute to AMS and AM activities. 4.Prestige and recognition as Departmental AM reps and feeling of belonging and contributing to communities of practice. 5.Specific mechanisms to support timely identification of risks and channels to report and escalate. 6.Better understanding of asset risks. 7.Be supported by robust skills inventory and learning programs. 8.Opportunities for role enrichment through access to capital and operational projects. 9.Increased confidence in job security.	1.May be tired of initiatives. 2.Low levels of engagement and/or history of unsuccessful changes may lead to lack of trust in the process and employees may view it as another sugar-coating exercise. 3.Improper communication may lead to employees not understanding the purpose of AM, AMS and AM activities. 4.May see AM activities as more work, tedious and administratively burdensome. 5.May be unaware of the impact and consequences of organizational deficiencies in managing assets. 6.May lack skills and knowledge to participate and may be unwilling to acquire new skills and ways of doing things. 7.May perceive potential asset management efficiencies as a threat to job security. 8.May be hesitant to engage in activities deemed to be management's responsibility.	**L**	**L**	**H**	**L**	**C** →			**R**	
	Union(s)	1.Recognition for contribution as staff leaders. Increased confidence in job security. 2.Have voice in AMS and AM activities. 3.Opportunities for role enrichment for members through access to capital and operational projects. 4.Respect for participation as employee representatives.	1.Low levels of engagement and/or history of unsuccessful changes may lead to lack of trust in the process and employees may view it as another sugar-coating exercise. 2.Improper communication of AMS and AM processes may cause fear retrenchment & job loss. 3.May not engage without seeing financial benefits to members. 4.May be hesitant to engage in activities deemed to be the responsibility of management.	**M**	**L**	**L**	**N**		**C** →	**R**		

Internal Stakeholder Analysis

Asset Management Needs & Readiness Assessment

C =	Current level of commitment
R =	Required level of commitment

Stakeholder Classification		Benefit Analysis		Influence (Power)/Interest Analysis		Engagement Analysis		Commitment Analysis				
Stakeholder Category	**Stakeholder Type**	**Perceived Benefit**	**Perceived Dis-Benefit**	**Influence (Power) Level** H, M, L, or None	**Interest Level** H, M, L, or None	**Perceived Resistance** H, M, L, or None	**Perceived Support** H, M, L, or None	**ACTIVE OPPOSITION** (Actively Against - High Resistance, No Support)	**PASSIVE OPPOSITION** (Passively Negative - Medium-High Resistance, Low Support)	**NEUTRAL SPECTATOR** (Let it happen - Low-No Resistance, No Support)	**CONTRIBUTOR** (Help it happen - No-Low Resistance, Medium Support)	**CHAMPION** (Actively Make it Happen - No Resistance, High Support)
Functional Groups	Departments/Divisions	1.Benefit from improved business systems and processes. 2.Better understanding how department's activities contribute to organizational outcomes. 3.Better interoperability of asset information between decision-making processes. 4.Improved asset management knowledge and competences. 5.Increased participation in asset management decision-making.	1.May not understand the Nalcor's core value chain and related business systems and inter-related processes of other functional groups, leading to a feeling of insecurity and/or unwillingness to participate. 2.May not want to release persons for participation. 3.May struggle to create meaningful balance between AMS implementation activities and line responsibilities. 4.May be unwilling to change departmental processes. 5.May understate the gravity of missing asset information and its impact on investment decisions. 6.May not understand reasons for engagement. 7.May lack skills and knowledge to participate in a meaningful way. 8.May be unaware of the impact and consequences of organizational deficiencies in managing assets.	L	L	L	L		C →		R	


Intolerable Region
Risk Tolerance
Risk Tolerance Range
Tolerable Region
Asset Portfolio Size/Scale/ Complexity
Overall Asset Condition
Accountability
Composition of HR
Risk Functions Assessment
Mgmt Ctrls & Governance
Leadership Approach
Information Management
Importance of Asset Portfolio in N.A. Economy
Org. Design & Structure
Asset-centredness
Org Policies
Competence Mgmt
Org.Culture
Risk Attitude – Low risk appetite negatively impacting innovation & cost
Asset Care Delivery
Mgmt Systems & Frameworks
Performance & Compliance Management
Multifunctional Teams
MOC
Financial Attitude – Low Risk Appetite
Process (Non-Financial) Audits
Special Technologies
Continuous Monitoring & Review
Management Review
Immediate
Treat risk element within 1-3 year range
Short Term
Treat risk element within 3-5 year range
Medium Term
Treat risk element within 5-10 year range
Long Term
Treat risk element within 10-15 year range
Far Term
Treat risk element >15 year range

External Stakeholder Analysis

Asset Management Needs & Readiness Assessment

Stakeholder Classification			Benefit Analysis		Influence (Power)/Interest Analysis	
Stakeholder Category	**Stakeholder Type**	**Stakeholder Name**	**Perceived Benefit**	**Perceived Dis-Benefit**	**Influence (Power) Level** H, M, L, or None	**Interest Level** H, M, L, or None
Legislators and Regulatory Bodies	Governments	Federal Government of Canada, NL Government, Other Maritime Provincial Governments, Quebec Government, US Federal Government, New England Government, PUB, EMERA, Nunatsiavut, Mushua Innu First Nation, Qualipu, Conne River, other Indigenous governments, Municipal governments, State of New York	1. Financial incentive, reputation, improved performance. 2. Reduced cost for reliable power 3. Better value from assets. This could mean, lower electricity costs, better return for the Governments and more green energy (hydro versus thermal usage). 4. Electricity supply and reliability of our services, revenue, and rates for the Province. Benefit the Province's fiscal situation. 5. Demonstrate effective execution of mandate to ensure least-cost, reliable supply. 6. Increased decision support, understanding of asset risk and performance, reduced costs. 7. Assurance and delivery of what they see as value; regulatory purposes. 8. Proven method of demonstrating the assets are being managed appropriately. Improved performance. 9. Increased value or return or lower cost of goods. 10. Reliable delivery of energy. 11. Long term cost efficiencies, and life expectancy management of key assets. 12. Least cost, reliable service will be enhanced; improved ability to coordinate and consult resulting in more meaningful consultation. 13. Their benefit would be assurance that we are managing our asset risks and reliability appropriately to supply their markets. 14. Reliable service, cost-effective service, input into renewable energy development. 15. Reliability of service; facilitates commerce; wellbeing of citizens; lifestyle. 16. Allow us to communicate appropriately - and consistently to meet their needs. 17. Return on investment, power provided safely and reliably at least cost option. 18. Impact to local economy if assets are not properly maintained. 19. Provides transparent value to these parties in different forms - revenue, economic prosperity to residents of the Province if rates are low. 20. Getting best value out of the assets to ensure least cost reliable power. 21. Improved reliability of power supply, minimizing emissions and maximizing green energy, minimize rate, minimize environmental impact, standardized approach to asset management.	1. Added cost to the customers. 2. Short term perception of increased cost, no long-term view of lowest lifecycle cost. 3. They could see it as another means to slow the operation down ultimately costing more time, effort, and money to complete specified tasks. Costs weigh in heavy here. 4. Cost of implementation need to be tied to the benefits short- and long-term benefits. The current fiscal situation is driving the organization to stay flat in budget. 5. Added cost, increased resources, distraction from other priorities. 6. Cost of implementation. 7. Cost or perceived cost of the implementation of a formal asset management system. 8. perceived potential to increase admin cost. 9. Potential for increased cost of energy. 10. Upfront cost and resource requirements. 11. Perceived cost of the investment; inability to see the benefits without the benefit of more detailed knowledge; change can create concerns for them. 12. Perhaps from a cost perspective and administration of such a system. 13. Perceived added costs, time. 14. Rates and costs. 15. Their needs may not align with the AMS and extracting value from the assets. 16. I can't think of a good reason not to do it… could be a lot of work and have priority conflicts. 17. Perception that less maintenance (ie. age or condition based vs. calendar based) is a lack of commitment from the company, potential loss of economic benefits. 18. Depends on the level of financial investment, level of risk taken etc. 19. I cannot think of why they would not prefer to implement… perhaps the only thing would be the up-front effort to implement…. it is an iterative do/check/do system 20. Cost.	**H**	**M**
	Governmental Departments and Agencies	Federal - Department of Fisheries and Ocean, Transport Canada, Office of Indigenous Affairs and Reconciliation, National Parks Canada; NL - Department of Industry, Department of Transportation and Infrastructure, Department of Energy and Technology, Department of Finance, Treasury Board; Department of Environment and Climate Change, Department of Fisheries, Forestry and Agriculture, Department of Tourism, Culture, Arts and Recreation, Digital Government and Service NL, Office of fire Commissioner, Department of Municipal and Provincial affairs, Occupational Health and Safety, Department of Labor Relations, Public Procurement Agency, Natural Resources, NL Cabinet, Executive Council, NRCan, Schools Act, Canadian Free Trade Agreement (CFTA), Human Resources Secretariat	1. Improvement in performance. 2. Service areas, dividends payment, joint work areas. 3. The benefits range in value from reduced refined costs, lower electrical rates and better reliability for system generation needs. 4. Same as previously stated. 5. Improved reliability. 6. Asset risk and performance, cost management. 7. Assurance and delivery of what they see as value; regulatory purposes. 8. Proven method of demonstrating the assets are being managed appropriately. Improved performance in safety, environment, finance, etc. 9. Increased confidence in Hydro. 10. Thoughtful approach to management of assets. 11. Least cost, reliable service will be enhanced; improved ability to coordinate and consult resulting in more meaningful consultation. 12. For these stakeholders it would be maximizing the returns and need solid asset system to do so. 13. Reliability, cost management. 14. service for public, facilitates commerce, reliability. 15. Knowing we are managing our asset base appropriately should be well received - we are making the right decisions in our operational context. 16. Standardized approach towards Asset Management, deliberate coordination of activities that supports good asset management decisions. 17. Formal framework, transparent processes. 18. Safety of the people of our province, environmental protection of our lands, and wildlife. 19. Again they would be concerned with ensuring we are getting best value for the assets. 20. Improved reliability of power supply, available power supply to attract industry, manage environmental impacts.	1. Top much time to implement. 2. Viewed as short term cost not long-term lowest life cycle cost. 3. Similar to the past question on governments, they could perceive it as a costly time-consuming initiative. 4. same as previous answer. 5. Increased cost. 6. Cost of implementation. 7. Cost or perceived cost of implementing asset management system. 8. Costs and resource requirements. 9. Perceived cost of the investment; inability to see the benefits without the benefit of more detailed knowledge; change can create concerns for them. 10. Again cost would be a factor. But also, sometimes may lead to spend when they do not want to spend given risk condition of assets. The more known information there is it becomes harder not to act. 11. Costs. 12. Cost and priorities may not align. 13. I cannot think of a reason. 14. Depends on individual stakeholders. 15. Depends on the geographical area where we make changes to assets. 16. Will take some time to fully implement. It is an iterative process. Up front work is required. 17. Cost due to management of system.	**M**	**M**
	Provincial, Federal & International Regulatory Bodies	Public Utilities Board (PUB NL) & Liberty Consultants, Régie de l'énergie Québec, Canadian Dam Associations, North American Electric Reliability Corporation (NERC), Spectrum Canada, Labor Relations Board, ISO 14001 Registration, Fisheries Dept/Environment, Salmonid Associations, NPCC, federal communications regulators, IJARB, Environmental Regulators, Transport Canada, Service NL, Independent Engineer, Union partners IBEW,	1. Improved financial outcomes, reliability improvement, less risks. 2. Compliance and benefits achieved. 3. Better system reliability and reduced risks. This will ultimately help with a better return on investment meaning electrical rates will better balanced. 4. Ensuring that policy, procedures are being followed and that the right investments are being made. 5. Effective fulfillment of mandate to ensure least-cost reliable supply. 6. Asset risk and performance, cost management. 7. Assurance and delivery of what they see as value; regulatory purposes. 8. Proven method of demonstrating the assets are being managed appropriately. Long-term benefit of reduced rates for customers from a well managed assets. Less risk. Evidence based decision making. 9. Increase confidence. 10. PUB: it would be important for us to provide least cost and reliable energy to customers. 11. PUB would be especially keen on the rate of return of assets and their usefulness. AMS would give them assurance that the Company is working diligently to meet their requirements. 12. For PUB: ability to improve our asset management, demonstrate same and provide them with solid tools that we can commit to using to improve customer impacts. 13. Should help provide for better management and smarter decision making which aligns with their mandates. 14. Defined processes. 15. Reliability, rate influence customer service and representing customers, make good investment decisions. 16. Again, knowing the right decisions are made to optimize and manage cost, risk, etc. 17. Help with return on investments, good financial planning for the assets. Balance Performance, risk, and cost. 18. Better framework for managing assets, better use of ratepayer dollars. 19. Same as previous, safety, environmental concerns, PUB would be covering all aspects of financial to operational investment concerns. 20. Ensuring least cost, reliable power for our assets. 21. Help manage cost and risk, ensure assets are in safe running order to maintain public safety. Minimize loss (insurers). Help	1. More cost to the business and customers. 2. Lost in details, wanting to see concise responses to their agendas, patience in getting all the way to great. 3. Can be costly and sometimes time consuming. 4. Cost to establish. 5. Cost to implement. 6. Cost of implementation 7. Cost or perceived cost of implementing formal asset management. 8. Same dis-benefit or dis-incentives. 9. Speed of implementation/cost if it cannot be demonstrated that there is a positive net present value from the work. 10. Cost to implement. 11. Costs and rate impacts. 12. Cost and again their own priorities may not be aligned with ours. 13. Depends on the stakeholder - PUB would see it as a positive; however, Labour Relations board would likely be indifferent. 14. Also depends on the level of investment. 15. I cannot think of why they would not want this. 16. Potential cost to maintain and administer.	**H**	**H**
	Facility and Asset Activities Insurers	Allianz, Workers Compensation Agency, FM Global, AON	1. Reputation, reduced risks, financial. 2. Compliance and lower risk, change management and communications, 3. Better reliability and reduced risk. Insurance companies love this! 4. Ensuring that we are doing what we say we are doing, reduce risk and reduce claims 5. Better management of assets - impact on claims. 6. Better understanding/visibility of asset risk. 7. Assurance and delivery of what they see as value'; regulatory purposes. 8. Reduced risk. Reduced claims. 9. Increased confidence. 10. AMS would be critical to insurer. Great to have assets catalogued, maintenance tracked, and criticality of assets known. 11. Longevity of assets, meeting acceptable maintenance and operation requirements. 12. Improved asset condition and understanding of condition so that risks can be managed effectively (ie: highest risks get addressed) 13. Lower premiums, lower deductibles, better trusting relationship. 14. I have no knowledge of Hydro's insurers - assume the value our assets bring have direct correlation to many aspects of insurance. 15. Less claims, no payouts. 16. Managing risk appropriately is key to insurers. 17. Balance Risk cost and performance reducing potential claims. 19. Increased reliability, safety - reduce our risks of claims. 20. They want to ensure we are doing all we can to provide reliable assets as their costs would increase. 21. Minimize loss.	1. Time to develop and implement, long term sustainable programs, patience, and priority. 2. Higher costs and higher administration due to lack of trusting relationship.	**M**	**H**
	Professional Bodies	PEGNL (Professional Engineers and Geoscientists of Newfoundland), Certified General Accountants Association of Newfoundland, Association of Chartered professional accountants of Newfoundland, International Accounting Standards Board (IASB), International Standards Organization (ISO), Canadian Standards Association (CSA), Institute of Electrical and Electronic Engineers (IEEE), National Electric Code (NEC), National Research Council (NRC), National Energy Board (NEB), Canadian Electricity Association (CEA), Canadian Center for Cyber Security, OGJRE, Certified Professional Accountants of NL, Construction Association, Association of Engineering Technicians and Technologists of Newfoundland (AETTNL), Canadian Dam Association	1. Better governance of all utilities to work from the same set of guidelines. 2. Various depending on the areas. 3. Knowledge sharing, establishment of best practices. 4. Implementation of good industry practise; compliance. 5. Proven method of demonstrating the assets are being managed appropriately. 6. Increased confidence in Hydro's ability to comply 7. Sharing experiences. 8. Learning, knowledge sharing. 9. Standardization. 10. With membership this reputation of our organization is important. 11. Standardized approach, good data to support decisions about assets. 12. Financial reporting compliance, operational reporting, and compliance. 13. Ensures we are meeting the technical requirements and learnings from these professional bodies. 14. Standard approach with plan, do and check philosophy, ability to get standard reports for measuring, repository for asset data capital and O&M cost, track maintenance to asset, track cradle to grave (life cycle) of asset, great for auditing.	1. Maybe cost or resources required to implement the system would be a concern for some bodies if they were to learn from our implementation. 2. Compliance standards - are we truly in compliance with all our regulators. 3. They would want this. 4. Benefits may not be well understood in certain association. Maybe perceived as higher cost.	**L**	**L**

External Stakeholder Analysis

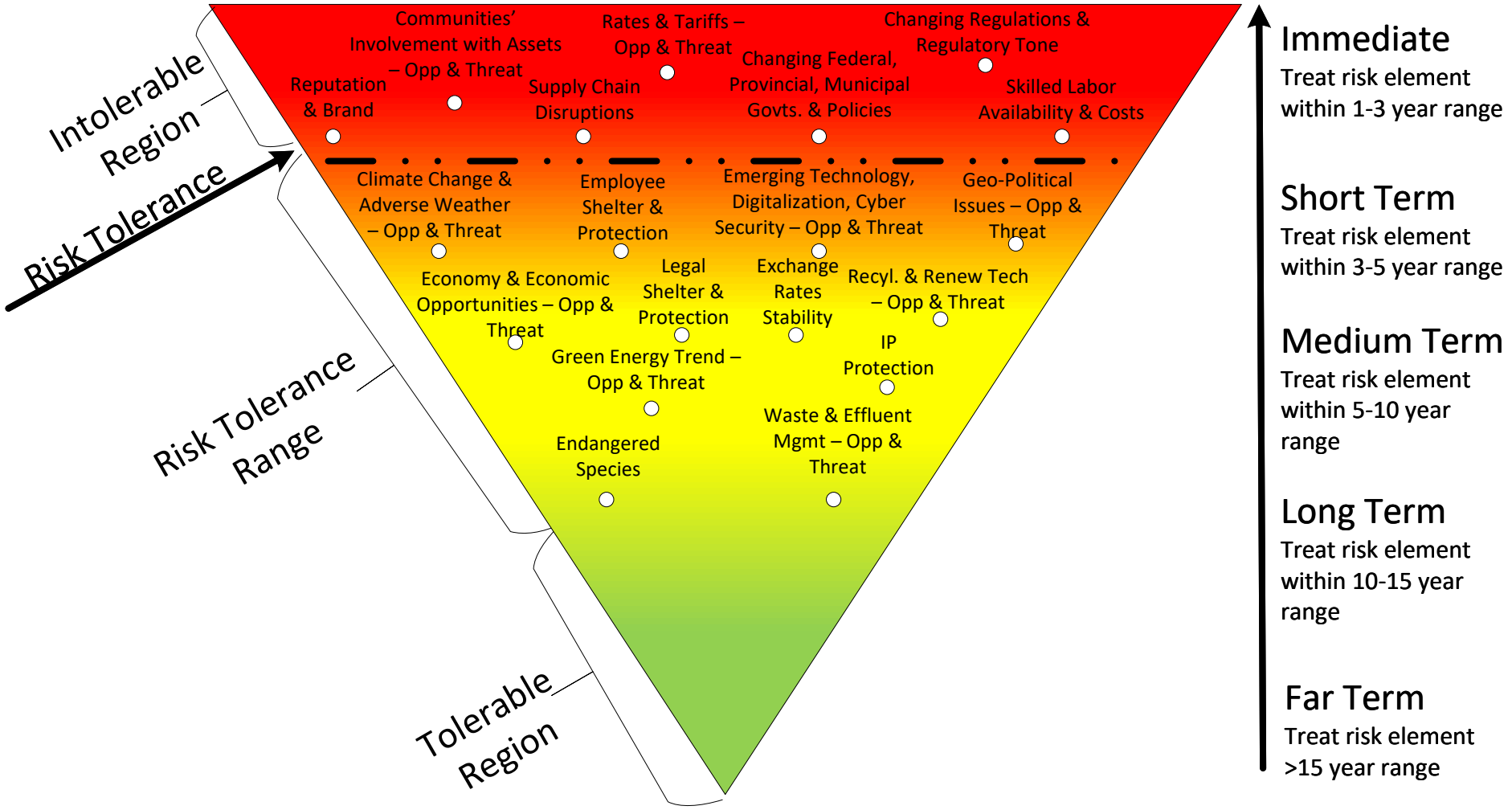
Asset Management Needs & Readiness Assessment

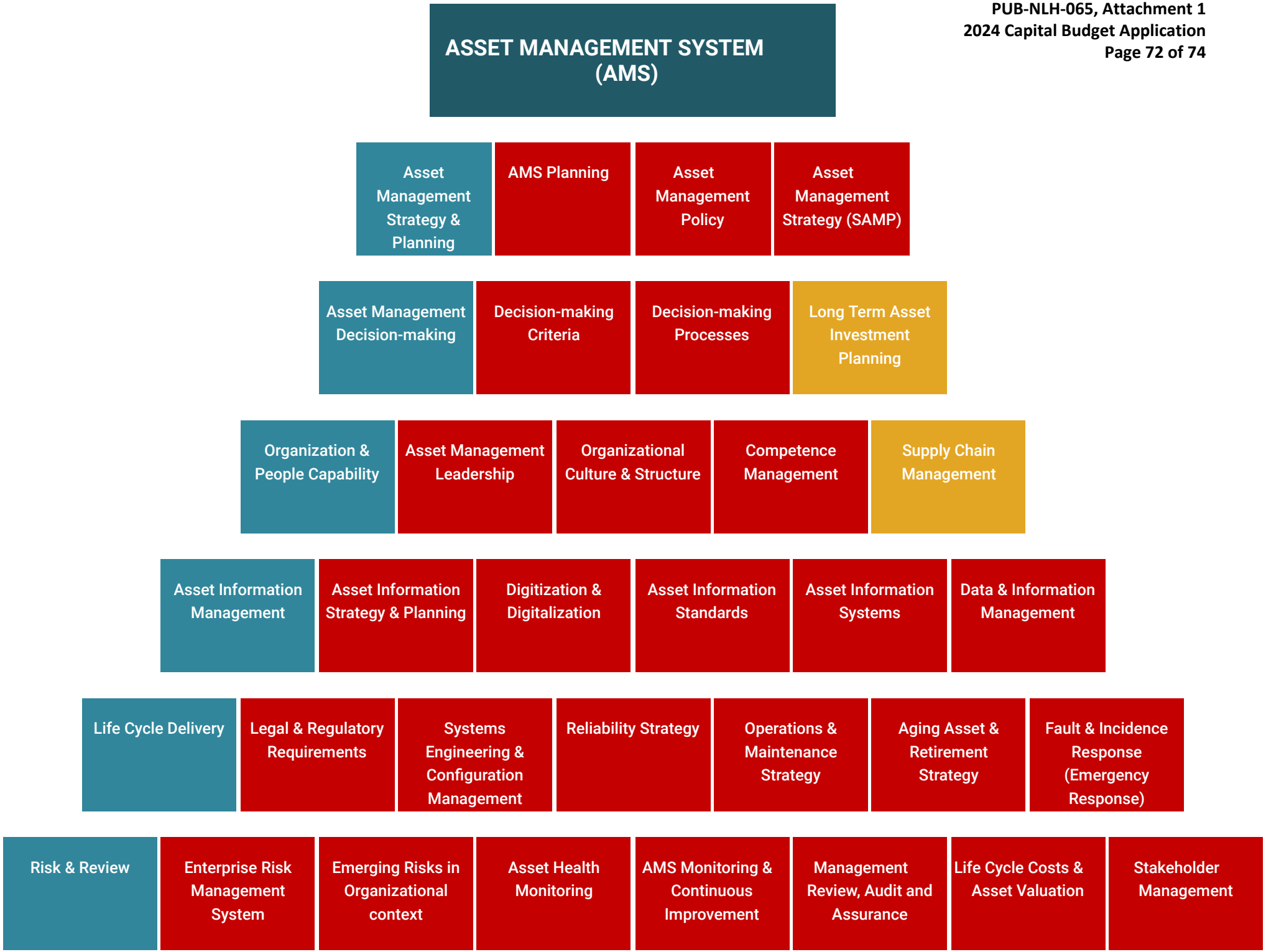
Stakeholder Classification			Benefit Analysis		Influence (Power)/Interest Analysis	
Stakeholder Category	**Stakeholder Type**	**Stakeholder Name**	**Perceived Benefit**	**Perceived Dis-Benefit**	**Influence (Power) Level** H, M, L, or None	**Interest Level** H, M, L, or None
Investors & Strategic Partners	Shareholder	Province of Newfoundland and Labrador (Department of Industry, Energy, and Technology), Emera (Nova Scotia Power), Hydro-Quebec, New Brunswick Power, Bond Holders, Federal Government (Financing of MFS), Innu Nation	1. Improved reliability, improved customer costs. 2. Ability to deliver on contractual obligations. 3. Better asset performance, better value. 4. Better cost-risk-performance balance. 5. Asset performance and risk, cost management. 6. Ensure return on investment, compliance, and assurance; sustainability of assets and services. 7. Proven method of demonstrating the assets are being managed appropriately. Most value from assets (return on investment). Better performance. 8. Lower cost, Higher coordination of life cycle activities, increase returns. 9. Reliable delivery of power. 10. Overall O&M strategies to ensure longevity of assets to improve reliability of interconnected systems. 11. Improved financial results, improved forecasting for financial and system planning purposes. 12. Appropriate management and cost savings, increased reliability and lower risk. 13. Value, cost, reliability. 14. Service for customers, reliable service, facilitates commerce. 15. Shareholder would want to ensure value is maximized - the purpose of the AMS. 16. Acceptable rick level balanced with cost control and also supporting good performance. 17. Better managed assets mean better investments for partners. 18. Reliability, financial value and return on investment (managing assets within long-term risk appetite). 19. They want to ensure our assets are reliable. 20. Help strike balance between cost and reliability, help highlight high risk and manage these risks, minimize rates to customers, have supply and energy available to drive economic growth.	1. Cost to the customer. 2. Time and own unique agendas/objectives. 3. Financial cost to implement. 4. Cost to implement. 5. Cost of a formal asset management system. 6. Cost. 7. Costs. 8. Cost would be the only inhibitor I think. 9. Cost of implementation. 10. Lack of cost comparisons, customer rates. 11. Without good understanding, they may be concerned with costs. 12. Risk of poor change management of evolution to formal AMS could result in internal conflict. 13. Conversely to the above, less reliability and less return on investment. 14. Cost to maintain and manage AMS.	M	M
	Strategic Partners	Multi-Party Pooling Agreement (MPPA) Partners, Fortis Inc. (Newfoundland Power, Liberty Power), Enel Green Power North America (St.Lawrence Wind Farm), Elemental Energy (Fermeuse Wind Farm), Deer Lake Power, Frontier Power, NB Power, Government of Canada, Corner brook pulp and paper, Nunacor (NunatuKavut), IOC and Tacora in Labrador, Vale, New owner of NARL facility, Indigenous representative groups, Liberty Consulting, Indigenous partners, Algonquin Power	1. Reliability. 2. Reliability quality, risk management. 3. Better reliability and reduced risk. Overall system will be operated in a more refined sense. Higher return on investment. 4. Return on investment. 5. Management of Costs, integration with their own assets. 6. Assurance to practise. 7. Increased reliability. Assurance of service. 8. Compliance and confidence. 9. Reliable power. 10. Reliability. 11. Stability of supply and predictability of costs; confidence that assets are managed effectively for investors. 12. Stability of the company. 13. Value, return on investment, $ for provincial investment. 14. Electricity for commerce. 15. Financial value overall. 16. Better management of assets. 17. Sources of energy generation to provide to them. 18. They want to ensure we have reliable assets to reduce the risk to their system. 19. Helps improve confidence in the system, standard approach with plan, do and check philosophy.	1. Cost to customers. 2. Cost to implement. 3. Cost. 4. Cost of implementation. 5. Can't think of a reason they would have. 6. Customer rate impacts. 7. High cost to maintain.	M	M
Energy Asset Users (Customers)	General Customers	Residential Customers Governmental (Municipal and Provincial) Customers Commercial & Industrial Customers: Anaconda Gold, Marathon Gold, Cornerbrook Pulp and Paper, North Atlantic Refining Limited (NARL) Partnership, Vale, Provair Canada Inc, Teck Cominco Ltd, Wabush Mines, Iron Ore Company of Canada (IOC), Tacora Resources Incorporated), Mills, Lumber Yards, Tata Steel, HQ, Hydro Quebec, TSMC, Rambler	1. Reliability, reduced risks, reduced costs. 2. Potential to lower electrical rates and better system reliability. 3. Reliability of service and impact on rates. 4. Reliability, cost, quality of service. 5. Provision of service, certainty, money spent wisely. 6. Balance of cost and reliability. 7. Lower cost of power, increased reliability. 8. Reliable delivery of power. 9. Reliability. 10. Reliability. 11. Reliability, cost management. 12. Reliable service which facilitates commerce. 13. Again, good AM means good value for the customers. 14. Responsible for adding value to service customers, demonstrating responsibility for good asset management. 15. Better utility rates. 16. Reliability. 17. Ensure that they are getting reliable power. 18. Improved reliability, improved outage planning.	1. Increased cost to customers. 2. Perception of added red tape and cost and lack of immediate cost reduction, particularly during gra and rate increase with MF in service. 3. Cost associated with implementation of a system. 4. Fear of impact of cost on rates. 5. Cost to implement. 6. Cost of implementation. 7. Cost of implementing a formal asset management system. 8. Cost as well, their rates could be impacted as a result. 9. Too expensive. 10. Rate impacts. 11. Increased costs/rates without appreciation for risk. 12. Increased utility rates due to poor change management. 13. There will be an upfront cost to implement but then it will result in reduced costs as we are better managing the assets. 14. Increase in cost and increase in rates.	M	M
	Wholesale Energy Buyers & Retailers	Fortis Inc. (Newfoundland Power), Emera (Nova Scotia Power), Hydro-Quebec, Vitol Inc, HQ, Marubeni, NB Power	1. Increased reliability, lower risks, lower costs. 2. Reliable service at reasonable cost. 3. Lower electrical rates and better reliability. 4. Cost impacts and reliable service. 5. Cost, tailability. 6. Provision of service, certainty, money spent wisely. 7. Again, cost and reliability balance. 8. Increased compliance, reliability improvements. 9. Reliable delivery of power. 10. Rate of return. 11. Enhanced security of supply and ability of us to document and prove that we are managing our costs effectively. 12. Reliability of supply. 13. Reliability, cost management. 14. Reliable service. 15. Again, value from assets to keep the supply going. 16. Providing a reliable service at least cost. 17. Better utility rates, more reliable service. 18. Reliability. 19. Reduced costs that are passed on to them, fewer unplanned outages, etc. 20. Improved or maintain reliability.	1. Added costs. 2. See as a cost not a net savings. 3. Cost with implementation offsetting cost gains for electrical rates. 4. Cost impact. 5. Cost of implementing a formal asset management system. Pressure to also implement AMS (Newfoundland Power) 6. Cost. 7. Costs. 8. Competitive advantages for NP could be a consideration. To the extent that we are able to operate more effectively, the comparative bar gets higher for them in front of the regulator. 9. Cost and impact upon rates as a result. 10. Costs and rate impacts. 11. Again, cost without appreciation of the real risks and appropriately managing the risk. 12. Higher utility rates due to poor investment choices.	M	M
Non-Energy Asset Users (Joint Use Agreements)	Telecom and CATV	Bell Aliant, East Link, Telus, Community Cable Companies, Government high speed internet expansion program, Rogers, Hydro Quebec, Big Link - CF	1. Improved reputation. 2. Coordinated activities on joint use poles. 3. Lower electrical rates and increased reliability. 4. Partnerships of joint-use aspects, contracts for sale of telecoms. 5. Reliability of physical infrastructure. 6. Sustainability and resilience of service and supporting assets; risk and cost management. 7. Reliability/cost balance. Resilience and future proof. Failures could result in impacts to their customers. 8. Increase confidence. 9. An AMS would help joint users be confident in utility assets. 10. Reliability of the network. 11. They attach to our plant (poles, buildings etc.) AMS can help improve our asset information which will improve their connection information. 12. Low risk of their connections coming down from poles if they are maintained correctly. 13. Facilitates them to provide service to their customers. 14. Uptime for their services - shared assets are managed well. 15. Revenue for these groups from us a vendor assuming our presence in these communities continue. 16. Our telecom equipment would be included in our asset management activities and they have service agreements in place with us. 17. Reliability of supply. Everyone wants the confidence that hydro is doing a good job, delivering on all expectations of the partnership. They have interest in making sure NL Hydro assets are cared for as it's crucial to deliver their service.	1. Increased costs. 2. Cost to implement a AM system. Cost can impact electrical rates. 3. May loose some work as we will be investing in the right thing. 4. Little that I can think of. 5. Perhaps none given how often their rates are updated. At some point some cost may increase. 6. Costs and rates charged. 7. Cost. 8. If we decommission any of our old sites with assets that are now obsolete, this will be lost revenue for them. 9. Increase in cost and increase in rates.	L	L
	Other Utilities	N/A	1. Same as others. 2. Improved plant info to improve resilience, etc. 3. Proper care for the shared assets. 4. Don't know enough to comment. 5. They are using our assets to ensure their assets are reliable. 6. Same as other utilities.	1. Again, perceived higher costs.	N	N
Supply Chain Partners	Suppliers of Goods &	Large Scale Suppliers, Equipment OEMs/resellers, Professional & Other Service Providers, Construction Contractors, Newfoundland Power, Small Scale Providers, Engineering Consultants, Food Suppliers - CF Community	1. Improved reliability. 2. Visibility on needs, longer lead times, ability to adapt. 3. Better scheduling of tasks which allow for better planning and procurement. 4. Impact on their structure and skills sets - allowing them to be more prepared. 5. Clearer/standardized sets of assumptions. 6. Potential for better integration (inventory, stock, etc). 7. Clearly defined specifications and defined demand for their products and services. 8. Resilience and future proof of the Hydro insures long term business. 9. Ease of collaboration. 10. Organized approach to supply chain needs. 11. Better understanding of the focus of services that we will be looking for from our suppliers. 12. We provide work to these suppliers and impact their ability to operate by providing work. Not sure that the AMS provides them a benefit as we would need them absent an AMS. 13. Better fit for goods and services, clearer relationships, possibility for more valuable contracts, etc. 14. Drives their business as a provider of service, more business for them. 15. Planning, adjusting skews, meeting demands etc. They rely on us to maintain their business. 16. Planning careful - forecasting - supply ordering and inventory management. 17. Better streamlining of maintenance for activities, better time management and outage planning. 18. Revenue. 19. Lets rush jobs... helps them to plan properly. 20. Standard Spec development for ease of bidding. MTG NOTES: Small suppliers are very important to NL Hydro.	1. Increased costs. 2. Better reliability will lead to reduced reactive maintenance which ultimately means reduces spending overall. This will impact supplier financial performance. Some smaller companies may rely upon Hydro for work. 3. Loss of work. 4. May be decrease in business for break in work. Less change orders. 5. Some vendors can benefit from sub-optimal planning on our part. AMS requirements could exclude certain vendors from future business should they not be able to adapt. 6. Potentially less work or less emergency work and therefore lower revenue to those businesses. 7. Processes that may be perceived as cumbersome. 8. Standardization may reduce number of qualified suppliers. 9. There may be a fear that we may invest in some areas less. Recurring failures, etc. If we are better at our game, then there may be less money to spend. 10. Lost emergency work and additional money. 11. Less frequent site visits, less emergency work resulting in less billed time. 12. None - less investments though equal less revenue for them. 13. Some suppliers do better when we are not well organized with planned work. 14. May standardize and certain assets and/or parts and cut some suppliers out of market. MTG NOTES: Could impact local suppliers negatively if they put all their eggs in one basket. Sourcing skilled labour - increasingly putting supplier under pressure as skilled labour is scarce.	L	M

External Stakeholder Analysis

Asset Management Needs & Readiness Assessment

Stakeholder Classification			Benefit Analysis		Influence (Power)/Interest Analysis	
Stakeholder Category	**Stakeholder Type**	**Stakeholder Name**	**Perceived Benefit**	**Perceived Dis-Benefit**	**Influence (Power) Level** H, M, L, or None	**Interest Level** H, M, L, or None
Society at Large	Public	General Public, Future Generations, Tourists and International Public, Potential Future Workers, Interest groups, Groups looking to develop business and/or industry requiring electricity, Public intervener at PUB	1. Dependable, improved cost. 2. Streamlines and efficient access to electricity, consistent and clear process to follow and outcomes. 3. Finical stability for future generations. System reliability and reduced system risks. Easier time when recruiting. 4. Reliable service and cost impacts. 5. Cost-reliability-risk management. 6. Safe Operation of Assets, Environmental Stewardship. 7. On-going provision of service in a safe and environmental way 8. Supply of electricity, reduced safety incidents, dam safety, etc. 8. Lower cost. 9. Reliably electricity. 10. reliable system, organized approach with future proofing. 11. Improvements in our ability to communicate what we are doing with our assets given the important role we play in the economic fabric of the province. 12. They will see the company as having a strategy and methodology as opposed to what they believe happens. 13. Each group would see varied benefits. Things like reliable service, cost management, attractive work environment, benefits, legacy benefits for future generations, access to infrastructure (EV charging) for tourists... 14. availability of electricity to support lifestyle. ability to start businesses as infrastructure exists . 15. longevity of the asset base. 16. Lower cost better return on investment and reducing cost while maintaining best performance. 17. More reliable electricity and better rates. 18. Investments in AM in certain geographical locations contribute to economic prosperity, level of investment impacts rates. 19. Better control over the costs of our assets....being more responsible with the taxpayer dollars as well as providing a better outlook for future generations. 20. Most will not see the benefits.	1. Increased costs. 2. Perceived as "blah blah" and no clear benefit to them. 3. Cost impact. 4. Potential cost increase to implement. 5. Upfront costs. 6. More cost and more consulting to develop this system. 7. Rates charged. 8. Costs - managing properly. 9. Higher rates due to poor management/investment decisions. 10. Converse of the above, higher rates, less economic prosperity. 11. Increase in cost and their rates.	M	M
	First Nations Communities	Mushuwa First Nation, Inuit, Natuashish, Miawpukek (Conne River), Qualipo, NunatuKavut, Innu Nation, Naskapi, Matimekush - Lac -John, KAWA	1. Improved engagement and communications. 2. Impact on lands and agreements, service levels and costs. 3. Financial stability. Environmental stability. 4. Reduce environmental impacts. 5. Same as general public, potential for renewable partnerships. 6. Respect for their land and traditions. 7. Improved performance in all areas that impact them. 8. Return and lower costs. 9. Reliable delivery of power. 10. Reliable and future proofed service. Minimal risk. 11. Ability to partner with us more effectively due to clearer understanding of asset management activities that can influence either our services or our procurement functions. 12. Same as general public. 13. Service, cost, ability to attain benefit for community. 14. Provision of service, work in community from off-shoot activity i.e hotel restaurants. 15. Stewards of the resource. 16. Responsible planning. 17. More reliable electricity, better managed assets to benefit their industrial agreements. 18. Level of investment and impacts of new investments on their communities in which the live - positive being economic prosperity for these groups if they are employed in these projects. 19. Ensuring safety and environmental issues are being addressed. 20. Management of Asset's in their land claims area	1. Increased costs. 2. Perception of value to them. 3. Up front costs associated with a AM system. 4. Cost and impact to the environment. 5. Cost to implement. 6. Cost. 7. Upfront costs. 8. Size of info that they have to parse through to see what is of benefit to them. 9. Same as general public. 10. Restrictive? Inability to influence? 11. Rate impacts. 12. Perhaps not caring for the traditional access and use of the regions we operate in. 13. Higher electricity costs, loss of benefits to industrial agreements through poor decision making. 14. Cost and increase in rates.	H	H
	Local Communities	Service Districts, Provincial municipalities, NL Power service districts, Community organizations, Nonprofit organizations, Other communities	1. Improved communication and engagement. 2. Reliable electricity and least cost. 3. As per previous. 4. Improved performance in all areas that impact them. 5. Reliable service. 6. Spin off business, reliable service for life and business operations. Provide value to the communities with safe reliable power. 7. Don't know enough to comment. 8. Safe reliable power. 9. Improved reliability (minimize both frequency and duration of outages), minimize rates	1. Rate impacts. 2. Increase in cost to maintain and increase in rates.	N	N
	Press/Media	Local, national, and international press/media, Social media, Bloggers	1. Improved communications. 2. Reputation, good news stories etc. 3. Better ability to explain risk and performance to the media, and in turn, the public. 4. Ability to get strong accurate information. 5. Reliable service. 6. Not sure there is a benefit but perhaps less to discuss regarding our company. We may be able to build a better relationship. 7. Content creation, stories to tell, audience to grow, viewership, listeners etc. 8. News coverage on customer impacts, ability to operate business. 9. Decisions and expenditures are defend-able, and easily explained to media outlets. 10. Impacts their news stories, community and regional news. 11. Good news stories. 12. Maintain reliability, minimize rates.	1. More new stories. The media feeds from negative news coverage. 2. Less bad stories. 3. More interest in stories for lack of managment. 4. More drama to sell news if we fail. 5. Costs and resources. 6. Less to report in the media. 7. Same as above, stories to tell. 8. Rate impacts. 9. Lack of a real story if we are making the right decisions - no "juicy" news. "No story here!" 10. Higher electricity rates due to mis-management of asset base. 11. Bad news often generates more interest from a news story perspective than good news. 12. Increased cost and increase in rates.	M	L
	Special Interest Groups	Non-Governmental organizations (NGOs), Conservation Corps of Newfoundland and Labrador, Nature Conservancy of Canada, Glenburnie-Birchy Head-Shoal Brook, Wildlife Boards, Grand River Keepers, Pippy Park Commission, The Wilderness and Ecological Reserve Advisory Council, Trail associations; Local nature Conservation groups, Nunacor, Other Special Interest groups,	1. Cost and reliability, land claims and environment. 2. Better governance, increased awareness on programs. 3. Reduced negative impact on the environment and our natural resources. 4. Better compliance with regulations. 5. Environmental Stewardship, Public Safety. 6. Care of environment, accuracy of info; good practises. 7. Employment, business, improved performance. 8. Lower impact to operating env. 9. Reliability. 10. More/better info available for them to better understand our organization and how they can better advantage their organizations' objectives. 11. Hydro doing well, money for community groups. 12. Service for clients. 13. Good relationship when we are seen to be doing the right things. 14. Better planning and deliberate coordination maybe bring environmental benefits. 15. Less disruption of habitats by less frequent intervention. 16. Significant environmental impact. 17. Environmental concerns are being addressed. 18. Minimize impact to environment.	1. Increased negative impact to the environment and our natural resources. 2. Cost to implement. 3. Some will utilize lack of or less organized information to advance their objectives, which AMS would reduce. 4. Rates for service. 5. Longer periods of disruption to habitats. 6. I do not think there would be any. 7. May not go far enough to minimize impact to environment.	L	M


Intolerable Region
Risk Tolerance
Risk Tolerance Range
Tolerable Region
Communities' Involvement with Assets – Opp & Threat
Rates & Tariffs – Opp & Threat
Changing Regulations & Regulatory Tone
Reputation & Brand
Supply Chain Disruptions
Changing Federal, Provincial, Municipal Govts. & Policies
Skilled Labor Availability & Costs
Climate Change & Adverse Weather – Opp & Threat
Employee Shelter & Protection
Emerging Technology, Digitalization, Cyber Security – Opp & Threat
Geo-Political Issues – Opp & Threat
Economy & Economic Opportunities – Opp & Threat
Legal Shelter & Protection
Exchange Rates Stability
Recyl. & Renew Tech – Opp & Threat
Green Energy Trend – Opp & Threat
IP Protection
Waste & Effluent Mgmt – Opp & Threat
Endangered Species
Immediate
Treat risk element within 1-3 year range
Short Term
Treat risk element within 3-5 year range
Medium Term
Treat risk element within 5-10 year range
Long Term
Treat risk element within 10-15 year range
Far Term
Treat risk element >15 year range


ASSET MANAGEMENT SYSTEM (AMS)
Asset Management Strategy & Planning
AMS Planning
Asset Management Policy
Asset Management Strategy (SAMP)
Asset Management Decision-making
Decision-making Criteria
Decision-making Processes
Long Term Asset Investment Planning
Organization & People Capability
Asset Management Leadership
Organizational Culture & Structure
Competence Management
Supply Chain Management
Asset Information Management
Asset Information Strategy & Planning
Digitization & Digitalization
Asset Information Standards
Asset Information Systems
Data & Information Management
Life Cycle Delivery
Legal & Regulatory Requirements
Systems Engineering & Configuration Management
Reliability Strategy
Operations & Maintenance Strategy
Aging Asset & Retirement Strategy
Fault & Incidence Response (Emergency Response)
Risk & Review
Enterprise Risk Management System
Emerging Risks in Organizational context
Asset Health Monitoring
AMS Monitoring & Continuous Improvement
Management Review, Audit and Assurance
Life Cycle Costs & Asset Valuation
Stakeholder Management

Risk Description				Recommended AM Improvement					
Internal Forces	**Elements/Components**	**Risk Level**	**Risk Horizon**	**AM Strategy & Planning**	**Asset Information Management**	**AM Decision-Making**	**Organization & People Capability**	**Life Cycle Value Delivery**	**Risk and Review**
Asset Portfolio	Size/Scale/Complexity		1-3 Years	x		x	x	x	
	Importance of Asset Portfolio to Regional and North American Economy		3-5 Years			x		x	
	Overall Asset Condition		1-3 Years	x	x	x	x	x	x
	Special Technologies		5-10 Years	x	x	x	x	x	
Internal Stakeholders	Management Controls & Governance		1-3 Years	x	x		x		x
	Organizational Design & Structure		3-5 Years	x			x		
	Leadership Approach		1-3 Years	x			x		x
	Asset-centeredness		3-5 Years	x	x	x	x	x	x
	Composition of Human Resources		1-3 Years				x		
	Competence Management		3-5 Years			x	x		
	Organizational Culture		3-5 Years	x			x		
	Accountability		1-3 Years	x			x		x
	Risk Attitude		3-5 Years	x			x		x
	Financial Attitude		3-5 Years	x			x		x
Management Systems & Business Processes	Organizational Policies		3-5 Years	x	x		x		x
	Management Systems & Frameworks		3-5 Years	x	x		x		x
	Performance & Compliance Management		3-5 Years	x	x		x		x
	Multi-functional Teams		3-5 Years				x		x
	Information Management		1-3 Years		x	x			
	Asset Care Delivery		3-5 Years	x	x	x	x	x	x
	Management of Change		3-5 Years	x					x
	Continuous Monitoring & Review		5-10 Years	x	x		x		x
	Process (Non-Financial) Audits		5-10 Years	x	x		x		x
	Management Review		5-10 Years	x			x		x
	Risk Functions Assessment		1-3 Years	x			x		x

Risk Description				Recommended AM Improvement					
External Forces	Elements/Components	Risk Level	Risk Horizon	AM Strategy & Planning	Asset Information Management	AM Decision-Making	Organization & People Capability	Life Cycle Value Delivery	Risk and Review
Political	Federal, Provincial or Municipal Governments		1-3 Years	x			x	x	
	Geo-political Issues		3-5 Years	x			x		
	Legal Shelter and Protection		5-10 Years	x			x		
Economic	Economy and Economic Opportunities		5-10 Years	x			x	x	
	Key Exchange Rates Stability		5-10 Years	x					
	Supply Chain Stability		1-3 Years	x			x	x	
	Rates & Tariffs Risks		1-3 Years	x	x				
	Labour Pool		1-3 Years	x	x		x	x	
Social	Community Involvement		1-3 Years	x					x
	Reputation & Brand		1-3 Years						x
Technological	Emerging Technologies / Digitization / Cyber Security		3-5 Years	x	x	x	x		
Environmental	Climate Change & Adverse Weather		3-5 Years	x					x
	Recycling and Renewable Energy Technologies		5-10 Years	x		x			
	Society's Green and Clean Posturing		5-10 Years	x					x
	Waste & Effluent Management		10-15 Years	x				x	
	Endangered Species Protection		10-15 Years	x					x
Legal	Regulations		1-3 Years	x	x	x	x	x	x
	Employee Protection & Shelter		3-5 Years				x		x
	Intellectual Property Protection		5-10 Years	x			x		x