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ASSET INFORMATION STRATEGY | 23

Manitoba Hydro

MANITOBA HYDRO

ASSET INFORMATION STRATEGY

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1 Revision History

Revision	Date	Author	Approval	Change Description
1.0	March 2023	J. Schneider	J.Pawluk	Initial version.

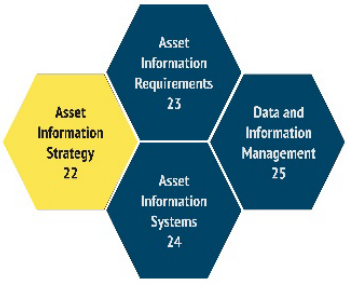
2 Purpose

The Asset Information Strategy is the primary vehicle for guiding and maturing the Asset Information Management System. The strategy describes how information will support the delivery of the asset management objectives and plans. It also covers what information systems, business processes, and governance are necessary to maintain asset information throughout its lifecycle[1].

This Asset Information Strategy will outline initiatives to

- explore the current state of asset information management system,
- develop the vision for the desired future state of asset information management system, and
- create a roadmap of key tactical actions and resources required to transform the current asset information landscape to future state.

The recent asset management maturity assessment evaluated Manitoba Hydro's Asset Information maturity at competency level 1.32. The assessor indicated that the current state of asset information is a hinderance to maturing the asset management system's tactical and strategic decision-making capabilities.



It is Manitoba Hydro's intent to reach a level 3 competency level in the asset information subject matter areas[2] of

22. Asset Information Strategy,
23. Asset Information Standards,
24. Asset Information Systems, and
25. Data & Information Management.

To achieve a competency level of 3 in the asset information subject areas, it is expected to take two major revisions of the Asset Information Strategy with ad-hoc course corrections.

The focus of this revision of the Asset Information Strategy will be addressing the priority recommendations of the Asset Management Maturity Assessment and understanding our current state and desired future state to create a transformation plan.

The tactical actions will be grouped by:

- Organizational Change Management and Communication
- Asset Information Standards and Information Requirements
- Asset Information Systems
- Data and Information Management

[1] The term data and information throughout this document refers to enterprise asset data and information.

[2] Definitions and summaries of the boundaries of the subject areas can be found in the IAM Subject Specific Guideline for Asset Information 22, 23, 25.

3 *Corporate Strategic Alignment*

The following section provides an outline for the strategic alignment of the Asset Information Strategy to Strategy 2040 and the Strategic Asset Management Plan (SAMP).

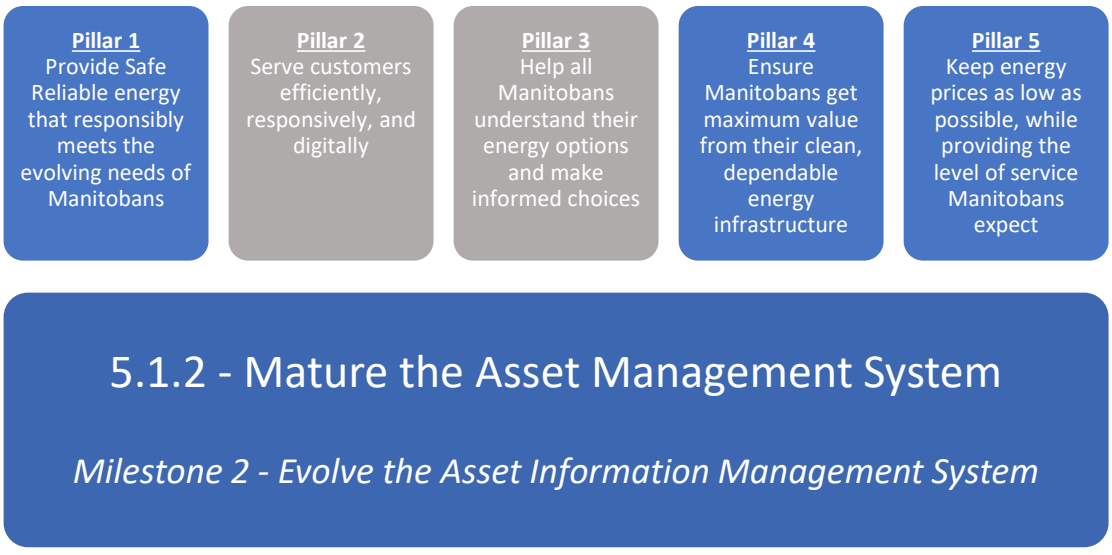
The Asset Management Division's mandate is to optimize Manitoba Hydro's energy system across the asset lifecycle to achieve target levels of performance and risk at the lowest cost.

3.1 *Asset Information Management System Alignment to Strategy 2040*

Strategy 2040[3] has identified a strategic initiative to mature the asset management system.

Asset management maturity is an ongoing process on multiple fronts. It must develop, integrate, and continuously improve the people, processes, and technology that make up the asset management system. The maturation of the asset management system will be delivered through initiatives detailed in the SAMP.

An optimized asset management system requires an effective asset information management system. Maturing the asset information management system to a maturity level 3 through the execution of the Asset Information Strategy satisfies Milestone 2 of the strategic initiative to mature the asset management system.



[3] Strategy 2040 Strategic Initiatives - Strategic objectives & initiatives (sharepoint.com)

3.2 *Asset Information Management System Alignment to Strategic Asset Management Plan*

As shown in Figure 1, information supports and enables the asset management system. Proper management of information, through an asset information management system provides tools, processes, skills, and competencies that support effective and mature decision-making.

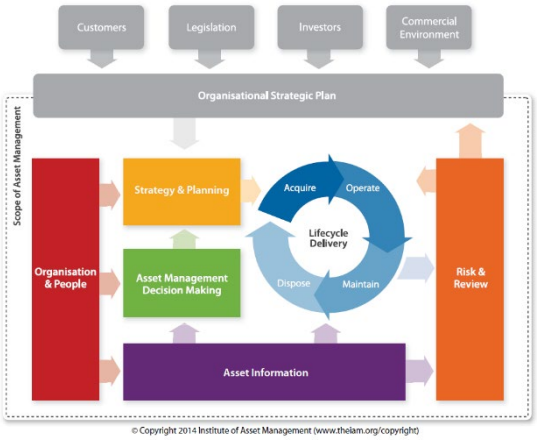


Figure 1 - The Asset Management System 6 box model - Conceptual

The asset information management system defines the scope of asset information in the context of the organization. Specifically, it defines what information is required, how and where asset information is stored, business rules for the lifecycle of information (i.e., collection, storage, usage, and disposal of asset information), roles, responsibilities, and access rights.

Manitoba Hydro's SAMP[4], Objective #3 is to develop an Asset Information Strategy to evolve the asset information management system.

SAMP Objectives #1 through #6 target the development of foundational Asset Management System requirements to mature the discipline at Manitoba Hydro. The progression of SAMP Objective #3 alongside the other foundational objectives is critical, as the maturity of Asset Information is required to realize the benefits of the other initiatives.

By enabling processes and practices that are effective as they are integrated, not only are the foundational efforts able to materialize in the improved management of assets, but a workplace culture which is supportive of the change becomes possible. The SAMP Objective Roadmap identifies the parallel initiatives contributing to Asset Management System foundational development, including those which require Asset Information maturity to demonstrate the effectiveness of initial or critical deliverables.

Future revisions of the Asset Information Strategy will include the organizational and asset information requirements to support operational, strategic, and tactical decision-making.

[4] Strategic Asset Management Plan, 2019, Manitoba Hydro - Asset Management Centre of Expertise - MANITOBA HYDRO SAMP 2019 Final.pdf - All Documents (sharepoint.com)

4 *Current State - Manitoba Hydro Asset Management Maturity Assessment*

In April/May 2022 Manitoba Hydro engaged AMCL as a consultant to assess the current maturity of Manitoba Hydro's asset management system[5]. The purpose of this assessment was to re-baseline Manitoba Hydro's asset management maturity following a major organizational restructuring. The assessment also provided an additional level of insight into where good practices exist between the energy streams to support the development of a more targeted improvement plan.

The maturity assessment includes:

1. Maturity against the thirty-nine subjects defined by Global Forum on Maintenance & Asset Management
2. Progress against the 2016 UMS Assessment Recommendations
3. The expected maturity score on completion of the existing asset management objectives
4. Recommendations for areas of improvement.

Asset management maturity is assessed in the thirty-nine subjects, using a range of assessment criteria and questions[6]. A total of 293 questions are used to assess the 39 Subjects, with the scoring weighted accordingly and corelated to the maturity scale shown in Figure 2.

A maturity score of 3 is described as "Competent. The organization can demonstrate that it systematically and consistently achieves relevant requirements set out in ISO 55001".

Improvement actions were identified based on the criticality of each subject to the organization, the current scores for the assessment criteria that make up each subject, and the targets an organization and its interested parties wish to set for each subject.

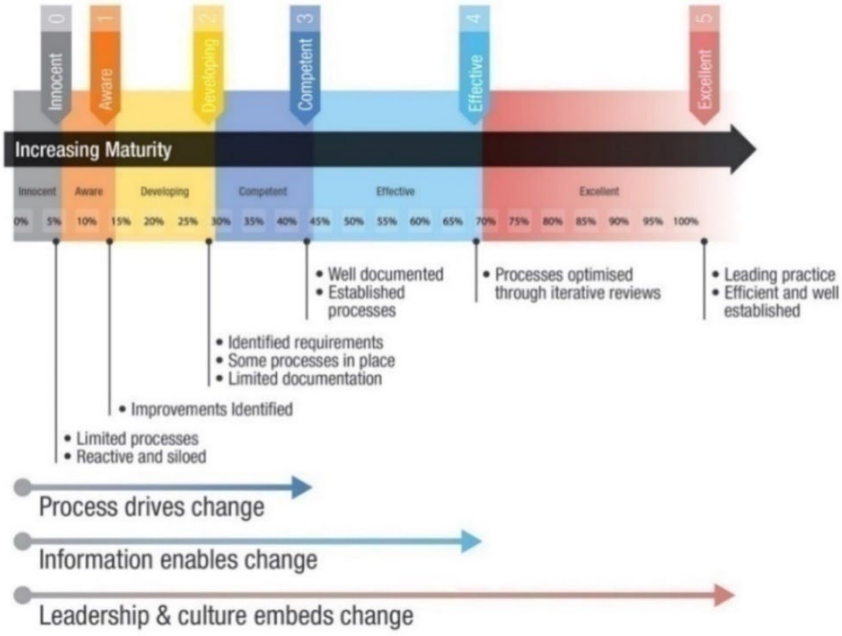


Figure 2 - The AMEM Asset Management Maturity Scale

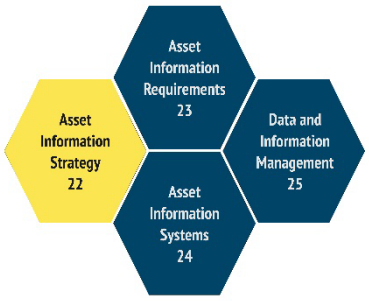
[5] Manitoba Hydro Asset Management Maturity Assessment, 2022, AMCL - MH AM Maturity Assessment Findings Summary Report Final.pdf

[6] (Asset Management Maturity Scale and Guidance, Institute of Asset Management, 2016, pp. 60-67)

4.1 *Asset Information – Maturity Assessment Scores and Findings*

Manitoba Hydro has reviewed the as-is state of asset information and is establishing a plan to define the future state of its information needs and types to support asset management decision making.

The scores for the Asset Information section of the 2022 Asset Management Maturity Assessment can be found in Table 1 - Summary of Manitoba Hydro's 2022 AM Maturity Assessment.



IAM Subject	Score
Group 4 - Asset Information	1.32
IAM SSG Subject	
22. Asset Information Strategy	1.20
23. Asset Information Standards	1.33
24. Asset Information Systems	1.43
25. Data and Information Management	1.30

Table 1 - Summary of Manitoba Hydro's 2022 AM Maturity Assessment

Summary

- In general, the purpose of a well-defined asset information program is understood.
- An Asset Information Strategy is currently under development and consists of a high-level roadmap to illustrate the asset information systems and technology strategy.
- There is an intention to improve data and analytics capabilities.
- Digital and Technology is working closely with the Asset Information & Risk Management Department to align the data management approach and define data governance, ownership, roles, and responsibilities.

4.2 *Asset Information - Key Takeaways*

The key takeaways from AMCL's Asset Management Maturity Assessment in the asset information subject areas are outlined below.

Asset Information Strategy

- An opportunity was found to integrate needs, teams, systems, processes across enterprise/energy streams, and align with Information Technology and Digital Divisions.

Asset Information Standards and Information Requirements

- Process for documenting asset information standards as part of the maintenance program review was completed.

Asset Information Systems

- Multiple work management systems are being utilized, without integration between the systems.
- Data access and sharing across the enterprise and energy streams is problematic and labor intensive due to duplication of systems.
- Previously executing Enterprise Asset Management Operational Readiness Initiatives[7] [EAMORA] had initiatives to rationalize existing systems and improve efficacy. These initiatives have been incorporated in the Asset Information Strategy.

Data and Information Management

- Adequate data governance exists for regulatory code and compliance requirements
- Data access and sharing across the enterprise and energy streams is problematic and labor intensive due to duplication of systems across the work management space.
- EAMORA has an initiative to rationalize existing systems and improve efficacy and outcomes
- Disconnect between strategic and operational decision making and the data requirements to support it.
- Task frequencies and hours identified on maintenance schedules currently does not support resource forecasting or processes related to resource planning and management.

4.3 *Asset Information Assessment - Priority Group Recommendations*

The following priority recommendations are for the asset information group.

Asset Information Strategy
Develop an Asset Information Strategy that sets out the approach to defining the future information needs, gaps and supports other improvement areas.

Asset Information Standards and Information Requirements
Review, improve, and implement data standards for asset and operational data aligned to business needs, by defining what information is needed, in what format, and at what frequency, etc.

Asset Information Systems
Review system capabilities, requirements, and develop an improvement plan.

[7] Enterprise Asset Management Operational Readiness Assessment was conducted by Deloitte and created a set of technology consolidation focused initiatives. Some of the initiatives have been absorbed in the Asset Information Strategy. For continuity for the initiatives that are currently executing, we've added reference to the initiatives with EAMORA#.

Data Quality Improvement

Review and improve asset data assurance processes and data quality requirements to support decision making - accounting for cost of the change/improvement vs the benefits/value gained for the cost incurred.

5 Future State

Realization of information management concepts and connecting the information to the business decisions will deliver value to our customers. This will enable consistent data driven business decisions by getting the right information to the right people at the right time and in the right format.

Through execution of the tactical actions, we will work to understand our information requirements, the current state of the asset information management system and develop an improvement plan for our data and information systems.

5.1 Vision

Asset Information that is accessible and fit for enterprise-wide strategic and operational decision-making.

5.2 Objectives

Objective 1

Understand Manitoba Hydro's asset information requirements for strategic, tactical, and operational decision-making.

> **What success looks like** | We understand the purpose of required information to appreciate the impact of data and information quality.

Success Measures		Status
1.1	Established process for classification of assets and information [including RACI]	In Progress
1.2	Established process for the digital creation of assets	Not Started
1.3	Identified and classified priority asset classes	In Progress
1.4	Information requirements completed for priority asset classes	In Progress
1.5	Failure catalogues implemented for priority asset classes	In Progress

Objective 2

Improve operational efficiency and user experience by strategically sequencing technology system upgrades and consolidations

> **What success looks like** | We understand where each type of information belongs and work to simplify collection, management, and access to information.

Success Measures		Status
2.1	Current and future state assessments of the AIMS technology landscape completed	In Progress
2.2	Improved User Experience - periodic survey	Not Started
2.3	Systems RACI and clear decision-making authority compiled + communicated	In Progress
2.4	Managed timeline/Gantt chart of all enterprise initiatives	In Progress
2.5	Prioritization of system improvements based on business requirements	Not Started

Objective 3

Through data governance, ensure adequate data quality for strategic, tactical and operational decision making.

> **What success looks like** | We have information that is verified and fit for enterprise decision-making purposes.

Success Measures		Status
3.1	Verified age data for priority asset classes by 2025[8]	In Progress
3.2	Understand current state of our data and data quality processes	Not Started
3.3	Data quality and completeness verified to information requirements	In Progress

Objective 4

Evolve the asset information management system to support Strategy 2040.

> **What success looks like** | Achieve level 2 maturity assessment in Asset Information subject areas 22, 23, 24 and 25.

Success Measures		Status
4.1	Achieve level 2 maturity assessment in Asset Information subject areas 22, 23, 24 and 25	Not Started

This iteration of the Asset Information Strategy is aimed at understanding the current state and needs of our future state asset information management system and addressing the priority action items in the 2022 Asset Management Maturity Assessment.

As the initiatives to determine our future state are executed, this section will contain future state targets for each of the asset information subject areas.

[8] Verified age or equivalent approximation of age subject to resourcing of outlined tactical actions.

6 *Business Alignment and Synchronization*

The tactical actions outlined in the roadmap are designed to create ongoing alignment and synchronization between the key interested parties of the asset information management system across Manitoba Hydro.

The interested parties are reflected by the Asset Information Strategy Steering Committee, the Core Team, and the Supporting Team and includes participants from the following divisions:

- Asset Planning & Delivery – Asset Management
- Asset Planning & Delivery – Engineering
- Asset Planning & Delivery – Project Management
- Operations – Operations & Business Solutions Services (Work Management)
- Digital & Technology – Information Technology
- Digital & Technology – Enterprise Architecture and Cyber Security
- Digital & Technology – Digital
- Finance

Transitioning to the future state of an integrated asset information management system, we will require all interested parties to be synchronized and aligned, as shown in Figure 3 - Interested Parties Alignment & Synchronization. Each interested party will have defined roles and responsibilities as part of the asset information management system.

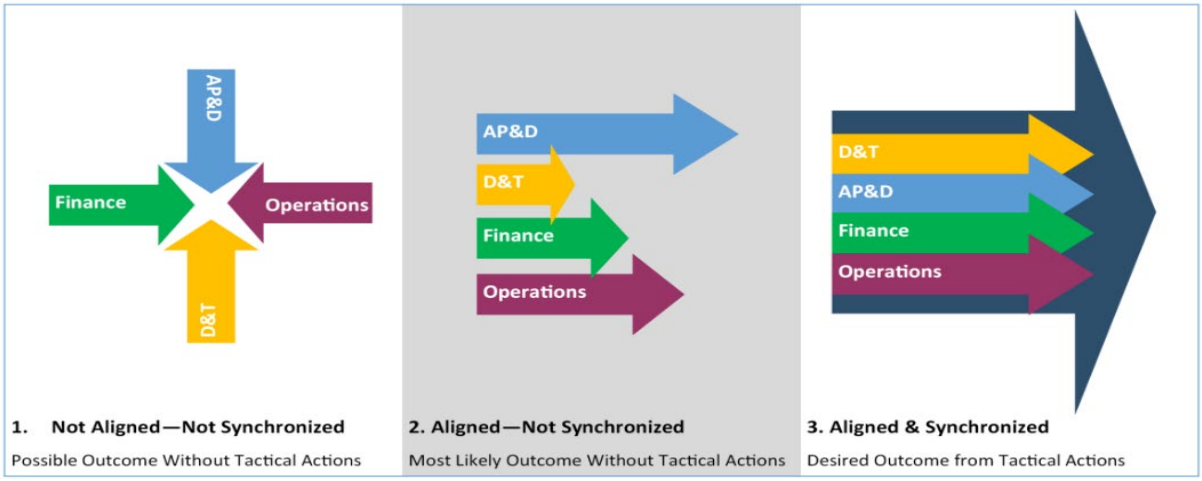


Figure 3 - Interested Parties Alignment & Synchronization

7 *Strategic Plan Roadmap*

The Asset Information Strategy is considered a living document that defines the vision of the asset information management system and manage the strategies and manages the tactical actions to achieve that vision.

The journey to achieve an asset information maturity level of three is expected to require the completion of tactical actions through two major revisions as described in Figure 4 - Asset Information Management System Maturity Roadmap[9].

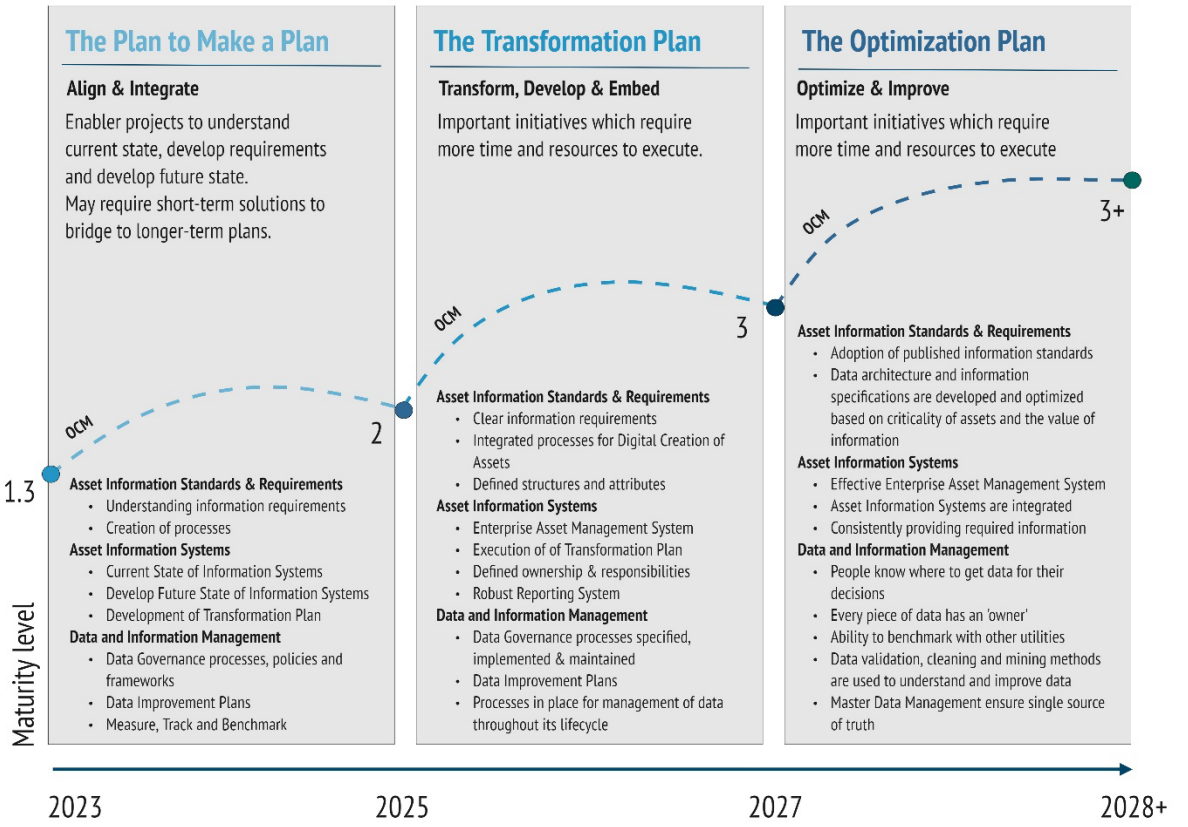


Figure 4 – Asset Information Management System Maturity Roadmap

REV01 – The Plan to Make a Plan
Execute planned actions to understand the current state of our systems, information requirements and establish defined processes, roles, and responsibilities for asset information.

Target Revision Date | 2023
Target Maturity Level 2 Date | 2025

REV02 – The Transformation Plan
Execute actions to embed the asset information management system in our business processes and technology. Will include the actions for the improvement of Information Systems.

Target Revision Date | 2025
Target Level 3 Maturity Date | 2027

REV03 – The Optimization Plan
Execute targeted strategies to improve outcomes, address outstanding information and process gaps and manage information related risks.

Target Revision Date | 2027

[9] Roadmap dates are subject to resourcing of outlined tactical actions.

7.1 Tactical Actions Summary

The tactical actions listed below were developed with working groups consisting of core and supporting team members from the areas with responsibility over asset information systems, governance, technology, and standards.

As a team we recognize the key coordination required between Digital and Technology and the Asset Information Strategy, especially in the asset information systems area. We are continuing to work with Digital and Technology to build out the asset information systems portions of the Asset Information Strategy, unifying people, processes, and technology under a common transformation strategy.

We have identified in black the following tactical actions that have been endorsed by the Asset Information Strategy Steering Committee and may progress today. The greyed out tactical actions require further discussion and coordination prior to their execution.

Organizational Change Management and Communication Plan

1.1 – Steering Committee Alignment and Vision Statement Creation
1.2 **–** Interested and Affected Parties Registry
1.3 **–** Interested and Affected Parties Communication Plan
1.4 **–** Interested and Affected Parties Change Management Plan

Asset Information Standards and Requirements

2.1 – Develop Information Requirements
2.2 – Regulatory and Reporting Requirements
2.3 – Process for the Digital Creation of Assets

Asset Information Systems

3.1 – Define Target Future State Architecture
3.2 – Define the Asset Information Management System Landscape [EAMORA2]
3.3 – Define the Asset Performance Management Software Requirements
3.4 – Application Rationalization – Quick Wins [EAMORA3]
3.5 – Asset Registry Rationalization [EAMORA4]
3.6 – Work Program Technology Rationalization Analysis [EAMORA6]
3.7 – Art of the Possible & Use Cases [EAMORA9]
3.8 – Create Information System Strategy

Data and Information Management

4.1 – Understand the Current State of Data and Information Management
4.2 – Data Improvement Program
4.3 – Asset Information Policies
4.4 – Asset Data Models
4.5 – Framework for the Lifecycle Management of Asset Information
4.6 – Data Governance
4.7 – Measure, Track and Benchmark

7.2 Detailed Tactical Action Objectives

For each tactical action, the first step will be to develop terms of reference for approval by the core team.

The terms of reference shall include:

- the scope of the tactical action
- the assigned lead and supporting team members required to execute the tasks
- detailed tactical action plan
- potential risks and levers
- expected deliverables, milestones, and timelines
- supporting change management initiatives
- measures to track successful completion of the tactical action

Any modifications to the sequencing or scope of tactical actions are required to go back to the Core Team for approval.

The detailed information for each tactical actions outlined below may be found in the supporting documentation - Asset Information Strategy – Detailed Tactical Actions.

Organizational Change Management and Communications

1.1 – Steering Committee Alignment and Vision Statement Creation

The initiative will attempt to answer the following questions:
What is the vision for the asset information management system? How will we measure success?

1.2 – Interested and Affected Parties Registry

The initiative will attempt to answer the following questions: *Who are the affected parties? How will they be impacted by the strategy?*

1.3 – Interested and Affected Parties Communication Plan

The initiative will attempt to answer the following questions: *How do we meet interested parties' communication requirements? How can we manage their expectations, concerns and ensure their support and alignment?*

1.4 – Interested and Affected Parties Change Management Plan

The initiative will attempt to answer the following questions: *How can we identify and target key groups according to their influence and interest related to change? How can we support the people side of change?*

Asset Information Standards and Requirements

2.1– Develop Information Requirements [includes portion of EAMORA7]

The initiative will attempt to answer the following questions: *What asset information does MH need to meet our organizational goals? What are their categories? How does MH refer to its assets? What are their boundaries? Who uses the information for their work? What decisions do they support? How*

does this impact others? How do we functionally organize our digital assets to consider rolling up costs, performance, and risk?

2.2 – Regulatory and Reporting Requirements *[includes portion of EAMORA7]*

The initiative will attempt to answer the following question: *How do we ensure we are meeting our reporting [internal and external] requirements?*

2.3 – Process for the Digital Creation of Assets

The initiative will attempt to answer the following questions: *Who creates what data, where and when to satisfy the business' decision-making needs throughout the lifetime of the asset? What are the roles and responsibilities around asset data?*

Asset Information Systems

3.1 – Define Target Future State Architecture

The initiative will attempt to answer the following questions: *What is our conceptual future state architecture? What objectives should this system meet? Is there a desire for a single system or multiple systems tied together through reporting? What is our optimal minimal set of applications to meet our business requirements?*

3.2 – Define the Asset Information Management System Landscape

The initiative will attempt to answer the following questions: *What systems do we currently have and support? What are their capabilities and what business function does it provide? Who uses the systems for their work? What information do they contain?*

3.3 – Define the Asset Performance Management Software Requirements

The initiative will attempt to answer the following question: *What functionality is required from an Asset Performance Management software suite?*

3.4 – Application Rationalization – Quick Wins [EAMORA3]
3.5 – Asset Registry Rationalization [EAMORA4]
3.6 – Work Program Technology Rationalization Analysis [EAMORA6]
3.7 – Art of the Possible & Use Cases [EAMORA9]
3.8 – Create Information System Strategy

Data and Information Management

4.1 – Understand the Current State of Data and Information Management

The initiative will attempt to answer the following questions: *What is the current state of our data and information systems [people, process & technology]? How do we mature our information and data quality management processes?*

4.2 – Data Improvement Program

The initiative will attempt to answer the following questions: *How do we improve our data? What information do we prioritize with improvement initiatives? Which improvements do we tackle first?*

4.3 – Asset Information Policies

The initiative will attempt to answer the following question: *What are the guiding principles for the management of asset information to support the asset management system?*

4.4 – Master Data Models [EAMORA8]

4.5 – Framework for the Lifecycle Management of Asset Information

The initiative will attempt to answer the following questions: *How does the people process, and technology fit together from an asset information management system perspective?*

4.6 – Data Governance

The initiative will attempt to answer the following questions: *How does the information in the asset information management system fit within enterprise data governance? Do data owners and stewards understand their roles? Do producers and consumers of data understand their roles, responsibilities, and impact to the quality of enterprise data?*

4.7 – Measure, Track and Benchmark

The initiative will attempt to answer the following questions: *How can we tell we are improving our data? How can we tell the data is fit for purpose? How can we tell that our processes are effective? How do we measure what matters?*

8 *Interdependent Initiatives*

Below is a listing of known interdependent initiatives that will require communication and coordination through the execution of the tactical actions of the Asset Information Strategy to avoid the duplication of efforts.

A list of the interdependent initiatives can be found in Appendix F.

		Application Modernization	Asset Class Maintenance Plans	Asset Class Strategies	Asset Management Advisory Team	Asset Management System OCM	Asset Risk Framework Initiatives	C55 Upgrade & CVF Recalibration	Data and Analytics Platform	Enterprise Architecture and Cyber Security	Enterprise Data Governance	IAM, SIEM + Cyber Security Framework	Maturing the Dam Safety Program	Project Management V2.0	SAP S/4 - Phase 0	SAMP & AMP	Work Management Process Alignment
Asset Information Standards and Requirements																	
2.1	Develop Information Requirements	x	x	x		x	x	x	x	x	x	x	x	x	x	x	x
2.2	Regulatory and Reporting Requirements	x	x	x					x	x	x	x			x	x	
2.3	Process for the Digital Creation of Assets	x			x	x			x		x			x	x	x	x
Asset Information Systems																	
3.1	Define Target State Architecture	x								x					x		
3.2	Define AIMS Landscape	x								x					x		
3.3	Define APM Software Requirements	x	x	x			x	x	x	x						x	
3.4	Quick Wins - Application Rationalization	x								x					x		
3.5	Asset Registry Rationalization	x								x					x		
3.6	Work Program Technology Rationalization	x								x					x		
3.7	Art of the Possible & Use Cases	x								x					x		
3.8	Create Information Systems Strategy	x								x					x		
Data and Information Management																	
4.1	Understand Current State of D&I Mgmt	x							x	x	x	x			x		x
4.2	Data Improvement initiatives	x	x	x			x	x	x	x	x	x	x	x	x	x	x
4.3	Asset Information Policies		x	x						x	x						
4.4	Master Data Models	x							x	x	x			x	x		x
4.5	Framework for the Lifecycle Mgmt of AI									x	x	x				x	x
4.6	Data Governance	x						x	x	x	x				x		x
4.7	Measure, Track and Benchmark								x	x	x						

References

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Appendix A- Definitions

Asset information management - Getting the Right information to the right person, in the right format and medium, at the right time.

Asset information management system - Defines the scope of asset information in the context of the organization. Specifically, it defines what information is required, how and where asset information is stored, business rules for the lifecycle of information (i.e., collection, storage, usage, and disposal of asset information), roles, responsibilities, and access rights.

Asset information standards and information requirements - The definition of what information is needed by whom, in what format, and the timeline needed.

Asset Information Strategy - Describes how asset information will support the delivery of the asset management objectives and plans. It also covers what asset information systems, business processes, and governance structure are necessary maintain asset information throughout its lifecycle.

Asset information systems - The people, processes, and technologies that are leveraged to deliver the right information to the right persons, in the right format and medium, at the right time.

Data and information governance -The policies and procedures that are implemented to ensure an organization's data is accurate to begin with – and then handled properly while being input, stored, manipulated, accessed, and deleted. Data governance responsibilities include establishing the infrastructure and technology, setting up and maintaining the processes and policies, and identifying the individuals (or positions) within an organization that have both the authority and responsibility for handling and safeguarding specific types of data.

For additional definitions see the Asset Management Glossary

Appendix B- Revision Structure

Major Strategy Revisions

Major revisions to the Asset Information Strategy alter or refine the vision. They require approval by the Asset Information Strategy Steering Committee to ensure the Asset Information Strategy and vision are relevant and achieve the corporate strategic goals.

The envisioned horizon for each major revision of the Asset Information Strategy is 2-5 years and will be indicated by the first digit in the revision number sequence, i.e., the “1” in “Revision 1.2”.

Minor Strategy Revisions

Minor revisions to the Asset Information Strategy affect the tactical actions and their resourcing requirements to ensure alignment to the corporate strategies. They require approval from the Asset Information Strategy Steering Committee.

Minor revisions will be ad-hoc and indicated by the second digit in the revision number sequence, i.e., the “2” in the “Revision 1.2”.

Tactical Actions Revisions

Revisions to the detailed information for the tactical actions affect the content of the detailed tactical actions and their implementation.

Revisions to the tactical actions require approval from the Asset Information Strategy Core Team and will be managed in the Asset Information Strategy – Detailed Tactical Actions document.

Appendix C- Asset Information Strategy Governance

Steering Committee

The Asset Information Strategy Steering Committee's will provide effective decision making, conflict resolution for the evolution of the asset information management system, and resource the transformation.

Conflicts or barriers escalated to the Steering Committee for resolution shall be resolved in a timely manner. The Chair of the Steering Committee [Director of Asset Management] will have the final decision-making authority.

Core Team

The Asset Information Strategy Core Team will be responsible for the execution of the initiatives, resolve conflicts that arise during the development and execution of the initiatives, and delegate the execution of the initiatives to supporting team members.

Conflicts or barriers that cannot be resolved at the core team level shall be escalated to the Steering Committee for resolution.

Decision-making Process

This section describes the process the Steering Committee will use to make decisions:

- Topics requiring a decision will be brought forward to the Chair, or delegate Chair by the Core Team Leader prior to the meeting.
- The Chair will determine if they own the decision or whether the topic requires a committee member to be the proxy decision owner.
- When topics are tabled at the committee meeting, the Chair will be the 'decision owner' or assign a 'decision owner' proxy.
- Committee members weigh in on the topic/decision.
- The 'decision owner' has the final decision/say and the committee supports 'decision owners' decision.
    - If further analysis is required, this request goes back to the Core Team Lead
- The Chair will determine when topics/decisions need to be escalated to the Vice President(s).

Appendix D- IAM Asset Information Concepts and Subject Area Boundaries

The information contained within this section is a summary compiled from the Institute of Asset Management's

- Subject Specific Guideline for Asset Information 22, 23, 25, and
- the Asset Management Maturity Scale Guidance.

This section is intended to provide context and help understand the definition of maturity level 3.

Asset Information Concepts

What is Asset Information?

> ***"Asset information is a combination of data about physical assets used to inform decisions about how they are managed both for short term operational purposes and for long term strategic planning"***
>
> *-IAM SSG 22|23|25*

There is not a rigid boundary around asset information. Asset information is commonly used for a multitude of business purposes and cannot be managed in isolation.

As a starting point, the following categories of Asset Information have been identified to be within scope of the asset information management system.

- *Physical asset information – asset inventory, what assets are owned and operated along with their technical characteristics*
- *Location & spatial link information – where the asset is located*
- *Relationship information – functional location, how an asset relates to other assets*
- *Work management information – work history and planned maintenance for the asset*
- *Performance information – how is the asset contributing to its serviceability targets*
- *Condition information – how healthy is the asset, what is the residual life of the asset*
- *Cost information – how much does it cost to buy and operate the asset*

For Manitoba Hydro's purposes, these categories will be defined and documented as part of the tactical actions in the 2.0 Asset Information Standards and Requirements' Asset Information Requirements.

Purpose of Asset Information

Asset information is foundational to the asset management system. It enables enhanced coordination between the asset management systems components and critical for effective asset management.

As asset information is embedded in many different business purposes it is imperative that asset information is managed as a system. This requires the several different parts of an organization to work collaboratively.

Similarly, the use and governance of asset information needs comprehensive business processes to support the asset information management system.

A structured approach to manging asset information will provide effective and efficient means to an organization to realize the benefits asset information provides to the asset management system and will be explored and documented in the tactical actions for Data and Information Management.

Asset Information Management System

The asset information management system is an organizations overall approach to managing its asset information. The asset information management system should align with and directly support the organizations asset management system.

The asset information management system defines the scope of asset information in the context of the organization, specifically; how and where asset information is stored, business rules for the life cycle of asset information (i.e., collection, storage, usage, and disposal of asset information), and roles, responsibilities, and access rights to asset information.

> ***"Asset Information Management System is established to define and manage the use of asset information by the organization as a key component, and in support of, the Asset Management System."***
>
> *-IAM SSG 22|23|25*

Industry has a wide range of asset information management system models, with varying degrees of functionality. Information requirements, asset information management system design, and software architecture is driven by the business needs. Linking the design of the asset information management system to the business decisions it is supporting is imperative to developing a successful asset information management system to enable the overall asset management system.

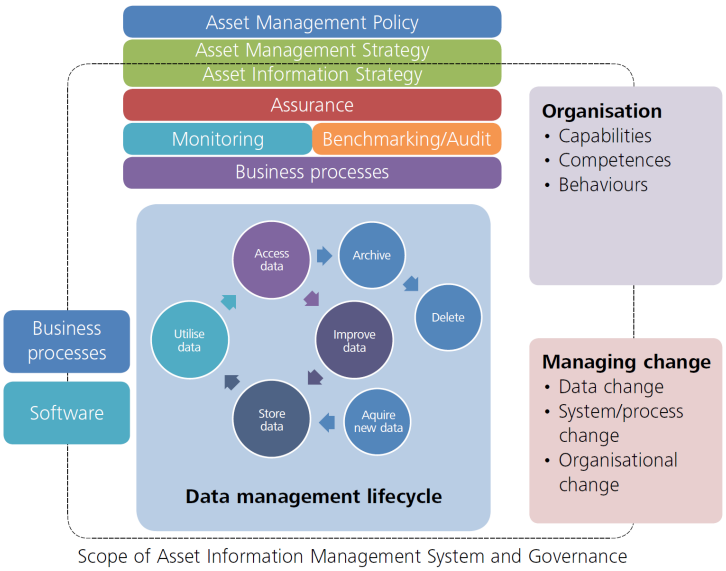


Figure 5 - The Scope of the Asset Information Management System and Governance - IAM Subject Specific Guideline for Asset Information 22, 23 & 25

The asset information management system is an ever-evolving system and should be designed with flexibility to accommodate long term organizational changes, including regular review and enhancement cycles to maintain a system that supports the asset management system.

The activities to define Manitoba Hydro's asset information management system reside within the data and information management tactical actions section.

Roles and Responsibilities of Asset Information

To enable asset management an organization needs to have a clear understanding of its asset inventory, providing clarity on what assets are owned and operated by the corporation. Allowing for the development of strategies/plans and polices to optimise the use of these assets to maximize the assets value to the organization.

Understanding what information is needed to support the asset management system such as how it should be collected, stored, and analysed, and how these processes should evolve over time is where the complexity of asset information management system occurs. Technology plays a vital role in the asset information management system, but the concepts of asset information management are a much broader field beyond than simply the technology tools themselves.

Institute of Asset Management's Subject Area Boundaries

IAM SSG 22 – Asset Information Strategy

An Asset Information Strategy is intended to define the current state and desired future state of the asset information management system in terms of business capabilities and document a transformation plan to achieve that future state in subject area. The Asset Information Strategy should unite the organizations approach to asset information management including:

- *Data quality management and information requirements,*
- *Technology and software,*
- *The vision for the organization's data architecture and integration with internal and external sources,*
- *Approach to unstructured content management,*
- *Analytics intent, and*
- *Requirements for data governance.*

An Asset Information Strategy is intended to be a living document, regularly updated in-line with the direction of the business and the organizations Strategic Asset Management Plan (SAMP) and Asset Management Plan (AMP).

Asset Information Strategy | What good looks like

- *The organization determines what asset management information is required to support its assets, management of assets, the asset management system and organizational objectives.*
- *The organization has a documented Asset Information Strategy that is consistent and aligned with the SAMP*
- *Development of the strategy considers:*
    - *The significance of identified risks on information requirements.*
    - *The Information required to support the key decisions within the asset management processes, the procedures and activities.*
    - *The exchange of information with stakeholders, including service providers.*
    - *How and when information is to be collected, analysed and evaluated.*
    - *The impact of quality, availability, and management of information on its organizational decision-making.*
    - *The quality required of asset information.*
    - *The appropriate traceability and consistency between financial and non-financial information relevant to asset management to the extent required to meet its legal, regulatory and stakeholder requirements and organizational objectives.*
- *The strategy contains objectives relating to the proposed improvement in asset information that are SMART including the identification of gaps between the currently available information (including its quality and accuracy) and that which is required.*

- *The strategy identifies the processes that are required to manage asset information and assure its quality, along with their governance, including responsibilities and accountabilities, and any programmes to improve these processes.*
- *The strategy contains information system business requirements necessary to support the organization's business processes and information needs.*
- *The strategy includes processes to ensure asset information retains alignment to needs as the organization's requirements evolve including migration of data and users from existing systems to new systems.*
- *The requirements are determined for aligning terminology (financial and non-financial) relevant to asset management across the organization.*

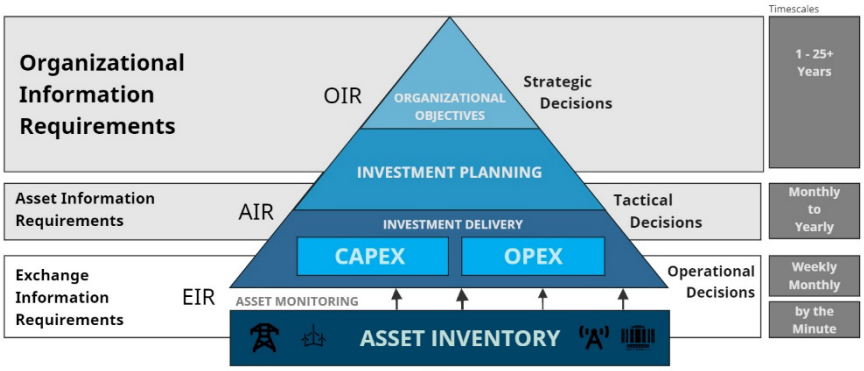
IAM SSG 23 – Asset Information Standards

Maintaining a clear and common view of what information is used for in the various business areas across the organization is key to successfully building an asset information management system that supports the corporation's asset management system (SAMP and AMP) and strategic plans.

Information within the asset information management system will be needed to support one or more of the following categories:

***Strategic** – at a level to support the corporations' strategic objectives.*

***Tactical** – to support technical decisions such as data and information to support analysis of maintenance plans or investment planning.*



***Operational** – to support work management by allowing for efficient scheduling of resources for work on specific assets.*

The same asset information may be used for multiple purposes within an organization, coordinating the level of granularity and detail required to support all the business needs is where asset information standards and a data dictionary becomes critical to the success of an asset information management system.

Having common taxonomy for an organizations asset provides the necessary common language to connect business areas and support the implementation of an enterprise level asset management system. The collection of asset information standards, specifications, and requirements for an organization make up its data dictionary. The data dictionary will provide a set of common characteristics for asset data and information.

Asset Information Requirements - What Success Looks Like:

- *The organization has developed standards and guidelines to ensure a consistent approach to the recording of asset information to meet the asset information needs defined in the Asset Information Strategy*
- *The information structure has a hierarchy for assets and enables the recording of their physical location*
- *There are definitions for the attributes required for asset information, including acceptable values and quality criteria.*
- *The information structure enables collection of data on asset utilization, condition and performance, incidents and non-conformities and describes how these should be recorded to support strategic Asset Management planning, improve service and reliability, support long and short-term planning activities and help determine overall asset lives and intervals between intervention activities.*
- *The organization has defined the quality and accuracy that is required for all asset information*
- *The organization has defined how the quality and accuracy of all asset information is to be assessed.*

What IAM SSG 24 – Asset Information Systems

The asset information systems include the provision, operation, and maintenance of all asset information systems necessary to satisfy the information requirements defined in the Asset Information Strategy.

Asset information systems includes considerations of the following:

- *Analysis of costs and benefits of implementing new or updated asset information systems.*
- *An evaluation of how systems can be used to automate business processes.*
- *An assessment of whether to acquire vanilla/generic solutions, to modify/update existing systems or to customize/develop bespoke solutions.*
- *How the information systems will be implemented, maintained, and updated, including governance arrangements.*
- *An obsolescence and technology migration plan to ensure business continuity and control costs and risks.*
- *Clearly defined 'ownership' responsibilities for information systems and the data contained in them.*

Asset Information Systems - What Success Looks Like:

- *The organization has identified the necessary asset information systems and architecture required to collect, store, process and analyze the asset information to manage its assets over their life cycle and deliver the Asset Information Strategy*
- *The organization has an Asset Information Systems implementation plan and migration plans [when required], which include governance arrangements*
- *The organization has implemented, in accordance with the organization's Technology strategy, the systems required to deliver the Asset Information Strategy*

- *There is consideration of the optimum mix of software applications, taking account the size and complexity of the organization and the regulatory environment, it operates in. This includes an analysis of the costs and benefits of implementing new or updated asset information systems; evaluation of how systems can be used to automate business processes; an assessment of compatibility between existing business processes and IT solutions.*
- *The organization has clearly defined system ownership responsibilities.*
- *The asset information system contains a robust reporting system.*

IAM SSG 25 – Data & Information Management

Managing data quality requires information governance from the top-down within the organization, to maintain a direct connection from the corporate strategy down through to the data inputs and information management.

Data quality can be assessed by examining data from the following lenses:

- *Accuracy*
- *Completeness*
- *Validity*
- *Consistency*
- *Uniqueness*
- *Timeliness*

Data & Information Management - What Success Looks Like:

- *There are governance processes to provide assurance that information is consistent with the quality and accuracy requirements defined in the Asset Information Strategy and asset information requirements and standards.*
- *There are data collection and maintenance plans to address any information gaps identified in the Asset Information Strategy.*
- *There are processes to ensure provision of asset information resulting from asset interventions.*
- *Suitable controls are incorporated into the business decision making process to ensure data of the required data quality is used to inform the decision.*
- *Processes and governance for managing information are specified, implemented, and maintained.*
- *There are processes and systems in place for the storage and preservation, distribution, access, retrieval and use of data and information to ensure that required information is available and suitable for use, where and when it is needed.*
- *Information is adequately protected, including from loss of confidentiality, improper use, or loss of integrity.*
- *There are processes in place for the control of changes to data and information.*
- *There are processes and systems in place for the retention and disposition of data and information.*
- *Documented Information originating from outside the organization and determined to be necessary for asset management activities is identified and controlled.*

Appendix E- Organizational Change Management Approach and Methodologies

Organizational Change Management (OCM) is about enabling a successful transition to a desired state, and empowering stakeholders to adopt new mindsets and behaviours as they get ready for the new ways of managing asset information.

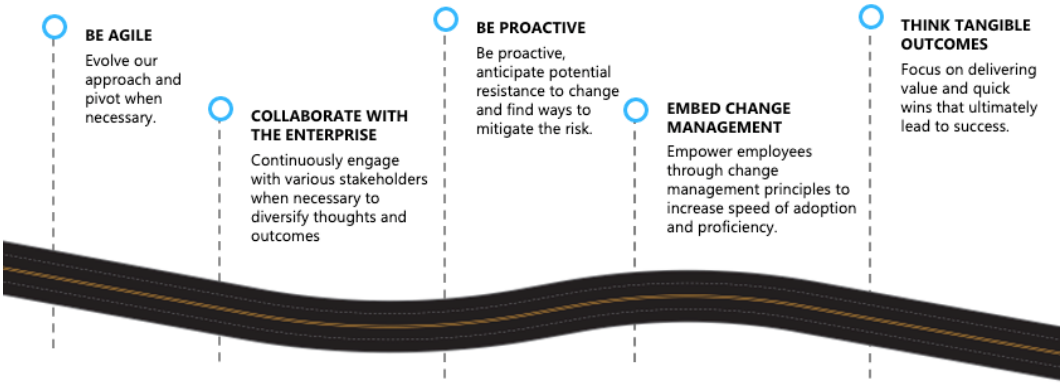
Effective OCM assist stakeholders in understanding:	**This leads stakeholders:**	**Resulting in an increased likelihood of:**
What the change is and why it's occurring	Feeling prepared for the change	Successful implementation
What the change means for them	Feeling confident rather than uncertain about the change	Long term adoption of the change
When the change will occur	Feeling supported throughout the change	Realization of project benefits
What they need to do to adapt	Feeling excited for the change	
Where they can go for more information and support	Focusing on fact, not rumors	

OCM will enable program success by supporting the individual transitions required by the various Asset Information Strategy Tactical Actions

OCM Guiding Principles

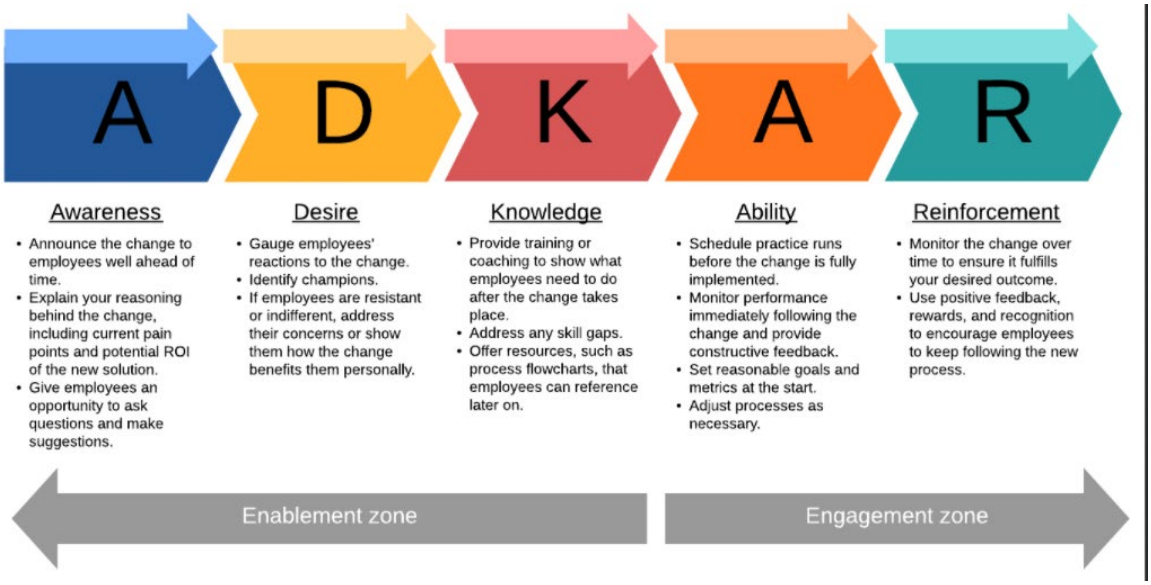
The OCM guiding principles serve as guideposts to influence the development and delivery of all OCM solutions for the Asset Information Strategy. These guiding principles will help the OCM team determine optimal approaches to managing change across Manitoba Hydro's diverse stakeholder community.

Guiding Principles



Prosci ADKAR

The ultimate objective of Organizational Change Management is to move stakeholders along the change commitment curve as quickly as possible by delivering the right messages and actions to the right people at the right time in the change journey.



OCM Critical Success Factors

Outlined below are a set of factors that will guide the Asset Information Strategy OCM team and Asset Information Strategy leadership in understanding what needs to be in place to ensure successful adoption of the Asset Information Strategy tactical actions across the enterprise.

OCM Success Factor	Activities	Outcomes
Leadership Alignment	Develop a clear vision with objectives that are employee-centric and used throughout the initiative. Facilitate regular touchpoints to ensure leaders understand the change and impacts and are equipped to support the change (e.g., arrange for resource involvement, cascade messages, model new behaviors).	Leaders are aligned, engaged, and enabled to support the success of the program.
Organizational Alignment	Well defined and understood governance and task ownership, with clear roles and responsibilities across the Asset Information Strategy team. Deliberate and upfront planning for clarity on timelines, milestones, and interdependencies.	Change impacts and interdependencies across the enterprise are understood, and interventions are determined to support the degree and type of changes. What barriers (policies, governance etc.) must be removed to implement the change? What structures must be changed to implement the change?
Communication & Engagement	Identify and proactively engage impacted stakeholders to gain buy-in to initiative activities and objectives. Develop and manage timely, consistent, and effective communications and engagement activities to impacted stakeholders to build awareness, support buy-in for successful and sustained adoption of change.	Communications are aligned and consistent, with the right information shared with the right people at the right time. What expectations of staff must be made clear to implement the change?

	Seek insights from stakeholders on the issues and risks they face throughout the initiative.	

Training & Enablement	Define the knowledge, skills and new behaviors required to effectively support the changes (role changes, process changes, new expectations) Design, develop and implement training to prepare for launch/roll out, and to sustain the change over time (e.g., support new hires, or new Managers) Support knowledge transfer activities to ensure employees in sustainment roles are prepared (e.g., role training, processes, knowledge skills).	Stakeholders are prepared for the change and have the required knowledge, skills, and behaviors (or just-in-time support) to be successful.
People Readiness	Identify change champions to support change management activities Identify potential change risks/resistance, and develop mitigation strategies Support the identification and implementation of organizational readiness activities to prepare for launch (e.g., relocation requirements?)	The business is prepared and ready to change to the desired state.

Appendix F- Interdependent Initiatives

Note: This section is presented in alphabetical order.

Application Modernization

The Energy Information & Systems Department is leading the Application Modernization Program, which is envisioned as a multi-year, multi-faceted program. Currently, the Application Modernization Team is working on Phase 0, performing a current state assessment of the application inventory that Digital & Technology is responsible for. This initial phase of work includes an initial business capabilities model review and refinement, technical capabilities model review and refinement, current state application inventory, future state technical reference architecture, and fit gap assessment and recommendations. Future phases of work are intended to fulfil the recommendations from Phase 0. Phase 0 is planned to be completed by mid-late February 2023. Close alignment between the Application Modernization Program and the Asset Information Strategy is imperative as the Asset Information Strategy will define the required asset information business processes and asset information requirements that the future state asset information management system technologies will be needed to support. Aligning the recommendations for future state capabilities and priorities for application growth/investment in the upcoming Technical Reference Architectural development is key to both projects' success. Coordinating efforts between Application Modernization and the Asset Information Strategy is required to prevent and or minimize overlap and rework, minimize interviews with business interested parties to prevent fatigue, and to develop an overarching change management plan and governance considerations.

Asset Class Maintenance Plans

Asset Lifecycle Delivery (ALD) leads the creation and management of Asset Class - Based Maintenance Plans. These Maintenance Plans have two key roles in relation to the Asset Information Strategy. Firstly, the design of the future state asset information management system needs to identify and incorporate the information requirements needed to support the development, monitoring, and continuous improvement of these Maintenance Plans. Secondly, the Maintenance Plans will identify key information collection requirements, such as measuring points, and will identify the requirements for the frequency, standards, and methods for the collection of that information.

Asset Class Strategies

Lifecycle Value Optimization (LVO) is leading the creation and management of Asset Class Strategies (ACS). ACS's will be a collection of strategic decisions providing outputs related to management of individual asset classes based on defined inputs. Inputs to the ACS will include Asset Inventory Information (collected from the appropriate system of record), cost/risk/performance actuals correlated with condition indicators and Asset predictive value models. Outputs from the ACS's feed the Asset Management Plan (AMP), Portfolio investments (CAPEX and OPEX). ACS's are an interdependent initiative with the Asset Information Strategy as the asset information requirements identified in the ACS's and other

asset management system core components will feed into the Asset Information Strategy to influence the future state of the asset information management system.

Asset Management Advisory Team (AMAT)

The AMAT is a collection of representatives of the interested parties involved in the ground-up construction of Manitoba Hydro's asset management system. These representatives function as a resource for the Executive Leadership Team to draw from when they are presented with a deliverable or recommendation. AMAT members, who are interested parties in the asset information management system will be involved in the formulation and execution of tactical actions to align and reconcile the needs of asset management and the needs of their respective business areas

Asset Management System Organizational Change Management (OCM)

The Asset Management Strategy Section is leading the OCM activities for the implementation of an enterprise asset management system at Manitoba Hydro. Evolving the Asset information management system, the goal of the Asset Information Strategy, is a key milestone on this journey as it will enable the overall asset management system. OCM activities related to the Asset Information Strategy should waterfall from the activities on the larger Asset management system OCM.

Asset Risk Framework Initiatives

The Asset Risk Management & Monitoring Section is leading the initiative to implement a consistent asset risk management practice for the corporation. The implementation will leverage existing risk assessment processes, local centres of excellence and standards of practice for asset risk management. At present the team is implementing the Asset Risk Management Framework to develop Asset Health Indices (AHIs) and Risk Analysis Methods (RAMs) for the Asset Scope identified below. Additionally, the team will re-affirm, improve, and document existing AHIs as required. Asset Information Requirements developed though this initiative needs to be feed into the Asset Information Strategy to help develop the future asset information and information management system needs.

Currently Fleet, IT, Facility, and Property assets are not within the scope of the Asset Information Strategy. One exception associated with Property assets is utility right of ways (ROWs), which may be the focus of vegetation management in maintenance strategies.

C55 Upgrade & Corporate Value Framework Recalibration

The Asset Investment Planning Section is leading an upgrade of our Asset Investment Planning software, C55 along with a recalibration of the Corporate Value Framework. The future Enterprise Asset Management (EAM) System and Asset Performance Management (APM) System will be required to be integrated with the AIP. Making it imperative that the transformation and implementation plans for these systems, developed though the execution of the Asset Information Strategy, will need to consider the constraints of the AIP.

Additionally, asset information requirements developed though this initiative needs to be feed into the Asset Information Strategy to help develop the future asset information and information management system needs.

Data and Analytics Platform

Digital and Technology is leading the development of a Data & Analytics Platform (DAP) Strategy, leveraging the PCB DAS Use Case to define how information is managed and made available. Supplemental to the DAP Strategy is development of a metadata management model and data virtualization strategy. The metadata management model will provide structure on how data is governed and managed leading to the development of a Business Glossary and Data Catalogue. The data virtualization strategy will provide a layer of abstraction from source data sets enabling a simplified and consistent manner to access data deemed worthy of performing analytics. This interdependent activity relates to the Asset Information Strategy as much of the digital foundational building blocks that are developed will be leveraged to implement the future state of the asset information management system. Uniting digital technical capabilities to enterprise business needs.

Enterprise Architecture and Cyber Security

Enterprise Architecture

Enterprise Architecture is the practice of aligning IT investments (data, applications, and technology) to business needs and corporate strategies. Enterprise Architecture is a newly formalized practice at Manitoba Hydro and will be responsible for the creation of standards, guidelines, guardrails, and governance for data, application, and technology decisions which will support and guide the Asset Information Strategy and future Asset Information System.

Cyber Security

Cyber Security Operations is the practice of protecting technology assets, including data, from digital attacks, and the response and recovery from such attacks. Cyber Security Governance provides the policies, guidelines, standards, cyber architecture, cyber awareness, risk context, assessments, mitigation recommendations, and overall cyber governance for the protection of technology assets and to minimize the impact of cyber events.

Together, Enterprise Architecture and Cyber Security provide policies, rules, guidelines, risk awareness, and governance for the Asset Information Management Strategy and future Asset Information System.

Enterprise Data Governance

Digital and Technology is leading the development of an enterprise data governance model. The data governance model will be used to develop key areas of accountability related to specific types of data, establishing Data Owners and Data Stewards. This activity ties into the

Asset Information Strategy as it provides a foundational component that the future asset information management system will be built upon.

Identity Access Management [IAM], Security Information and Event Monitoring [SIEM] + Cyber Security Framework

IAM is the comprehensive framework of platforms, practices and policies Manitoba Hydro will use to protect and manage its electronic and digital users and identities. SIEM involves collecting and analysing information to detect suspicious behaviour or unauthorized system changes to Manitoba Hydro's network, defining which types of behaviour should trigger alerts, and acting on alerts when needed. Cyber Security is the practice of defending computers, servers, mobile devices, electronic systems, networks, and data form malicious attacks. IAM, SIEM, and Cyber Security frameworks will provide rules and governance the future state Asset information management system will need to adhere to.

Maturing the Dam Safety Program

The Dam Safety Section continues to lead initiatives to mature the Dam Safety Program. Asset Information Requirements developed though these initiatives will be fed into the Asset Information Strategy to help develop the future asset information and information management system needs.

Project Management Version 2.0 (PMv2.0)

The Project Management Division is leading the implementation of PMv2.0, which will create a harmonized project management delivery system enabling the Project Management Division to consistently deliver results and realize benefits, providing value to Manitoba Hydro and its customers. This is an interdependent initiative to the Asset Information Strategy as the collection of Asset Information during the asset acquisition phase of a project is a key input into the Asset information management system and project milestones need to be developed to support the timely, structured, and accurate capture of this critical asset information. The Asset Information Strategy will be a starting point for the development of a Project Management Divisional Standard that supports the work of Asset Management.

SAP for Utilities

Implementation of SAP S/4 HANA platform which will impact the corporations Enterprise Resource Planning system across the enterprise. SAP S/4 HANA Phase 0 is intended to be a foundational exercise, providing a value assessment and roadmap to align with enterprise-wide initiatives. This phase will educate Manitoba Hydro on SAP S/4 HANA's new look and feel, to demonstrate industry standards and best practices. Providing insight into the art of the possible and an understanding of our future needs regarding SAP S/4 HANA's functionality. The business needs for asset information management, specifically asset cost information and other asset information managed within SAP applications will need to align across the SAP S/4 HANA implementation and the Asset Information Strategy tactical actions.

Strategic Asset Management Plan (SAMP) & Asset Management Plan (AMP)

The Strategic Asset Management Plan (SAMP) communicates the strategic priorities of asset management at Manitoba Hydro. The SAMP considers the current state of Manitoba Hydro's internal environment, as well as impending opportunities and risks, and lays out the initiatives that best prepare Manitoba Hydro and its assets for the future. The current SAMP (2019) communicates the necessary foundations required to mature Asset Management at Manitoba Hydro and align it to leading industry practices. These foundations will contribute to the creation and evolution of an enterprise Asset Management Plan (AMP). The AMP specifies the activities and interventions, resources and timescales required to ensure the short-term operability and long-term sustainability of the energy delivery and support systems. Phased build out and continuous improvement of the AMP and Asset Management System will occur through an iterative assessment and planning cycle to reaffirm alignment with industry practice and corporate objectives. The SAMP and the AMP relate to the Asset Information Strategy as they set the high-level vision and direction for the Asset Management Objectives, such as SAMP Objective #3 Develop and Asset Information Strategy to develop and document an initial Asset information management system strategy. The Asset Information Strategy will be the driver of Organizational Information Requirements and document how the asset classes contribute to the other SAMP objectives.

Work Management Process Alignment

The Work Management Department is leading the initiative to standardize the corporation's approach to work management across our various maintenance management systems remnant of our former energy streams. Work management is an integral part of the overall asset information management system. A unified transformation strategy that will meet the needs of work management and the asset information requirements of the future state asset information management system will require a high degree of collaboration between work management activities and the Asset Information Strategy.

Appendix G - List of Participants

The following individuals participated in the meetings, working groups, discussions and/or in the review/approval of the original draft of this document:

Name	Division / Department or Section
J. Pawluk	Director Asset Planning and Delivery
J. Dumaine	Director Operations Business Solutions and Services
K. Zevena	Director Information Technology
M. Rheault	Director Digital
A. Driver	Director Engineering
R. Ward	Director Project Management
J. Schneider	Asset Information Team Lead
K. Mazur	Asset Information and Risk Management Department Manager
K. Fritz	Asset Information Section Head
P. Allan	Work Management Department Manager
K. Skulmoski	Work Management Systems Section Head
X. Perdomo	Work Management Standards & Process Section Head
J. Church	Data and Analytics Practice Department Manager
A. Dawodu	Enterprise Enablement Change Department
A. Poulin	Transmission Overhead and Civil Engineering Department Manager
A. Walters	Work Management Systems Consolidation Specialist
K. Ramlal	System Optimization Team Lead
R. Ketcheson	Work Management Data and Analytics Team Lead
K. Harber	Asset Information Systems Team Lead
Y. Li	Senior Asset Information Standards Engineer
G. Eason	Asset Information Officer
B. Jorowski	Asset Information Engineer
G. Rutherford	Asset Information Officer
D. Dudar	Asset Information Systems Officer
E. Brown	Asset Information Systems Officer
J. Olfert	Asset Information Systems Officer
D. Macdonald	Enterprise Data Governance Specialist
L. Wiebe	Geospatial Data Services Section Head
D. Acres	Geospatial Data Staff Officer
D. Pellegrino	Energy Information Systems Department Manager

Appendix H-
Enterprise Asset Management Operational Readiness Report
[EAMORA]

Deloitte.

Manitoba Hydro

Manitoba Hydro

Work & Asset Management
EAM Operational Readiness Assessment

December 2, 2021

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Table 3 - Overview of Initiatives 12

01. Executive Summary

Manitoba Hydro has recently shifted from an energy system operating model to a centralized integrated operating model. To ensure the successful transition to the centralized integrated operating model, in line with Strategy 2040, Manitoba Hydro is now working towards an integrated data and technology platform for the Work Management (WM) and Asset Management (AM) activities across the historic Energy Systems, meaning natural gas distribution and electrical generation, transmission and distribution assets.

Operations Readiness Assessment

As an initial step towards integrated operations and technologies, the Work Management and Asset Management teams, in alignment with the D&T team, performed an assessment to understand the current level of readiness towards integrated operations. The assessment discovered that between the historic energy systems, Manitoba Hydro has a significant application footprint consisting of duplications, obsolete applications, and homegrown applications. Yet, these applications are being used today, in clever ways to "keep the lights on". In order to begin moving towards integrated operations, it is vital to understand the many applications in use today, their purpose, and their functions. As a result, the assessment team identified a series of work initiatives to start on the alignment and synchronization journey.

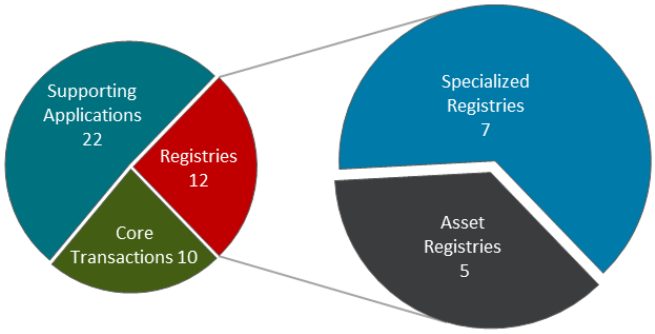


Figure 1 - Application Type Distribution

Identification of Work Initiatives

The assessment resulted in the creation of nine work initiatives, all in the purpose of getting ready for the eventual move to an integrated digital environment. The initiatives are intended to help work management and asset management address work that can be done in advance of the move to the new digital platform.

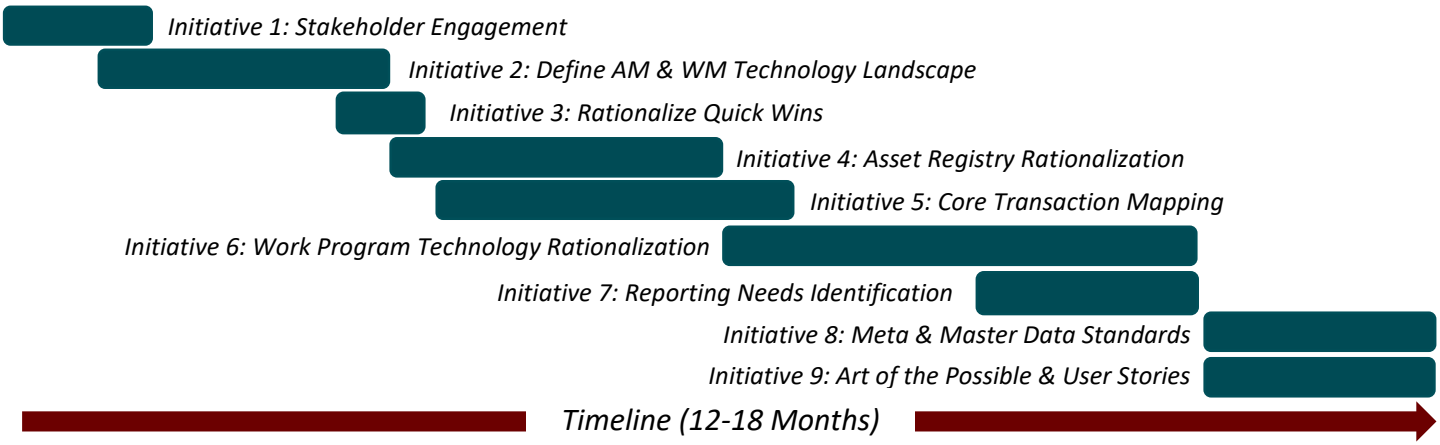


Figure 2 - High-Level Initiative Roadmap

Depending on resource availability, it is estimated that the completion of these initiatives can take anywhere from 12 to 18 months for completion. These initiatives must also constantly be adjusted in reaction to the priorities and sequence as defined by the D&T team.

The Value of Alignment & Synchronization

The initiatives that can be undertaken by Work Management and Asset Management are also intended to create ongoing alignment and synchronization between the three key stakeholders (WM, AM, D&T), each responsible for different portions of transitioning to an integrated process, technology data platform.

- WM is responsible for the transactional processes and data with respect to work management
- AM is responsible for meta and master data development with respect to asset management
- D&T is responsible for governance and data strategy, technology enablers, data curation, and data integration

Throughout the Assessment, participants were 100% in favor of moving towards an integrated technology platform, realizing that the current technologies have reached their limits. The participants were also very clear about the need to retain and even enhance business functionality that exists today. In addition, they also understood the importance of maintaining alignment and synchronization between all key stakeholders.

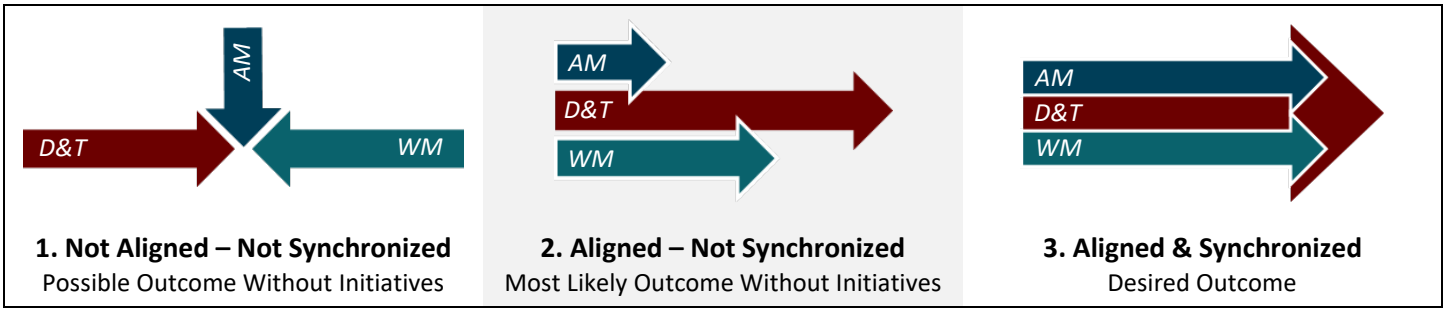


Figure 3 - Value of Alignment & Synchronization

Conclusion

It is recommended that the Work Management and Asset Management teams proceed with executing the initiatives defined in this report. It is also imperative that these teams maintain regular communication with the D&T team and share their progress as they move forward, as part of D&T responsibility's is the need to set up their data governance program. This data governance program has the opportunity to be the right vehicle to help steer the execution of the initiatives in this report.

02. Assessment Objective

Manitoba Hydro has recently shifted from an energy system operating model, where each energy system (Generation, Transmission, and Distribution) was operating as independent entities, to a centralized integrated operating model. To ensure the successful transition to the centralized integrated operating model, Manitoba Hydro is working towards an integrated data and technology platform for the Work and Asset Management activities across the three energy systems, which includes Gas in Distribution.

Due to the use of different applications across the different energy systems, Work and Asset Management activities at Manitoba Hydro are currently conducted through decentralized applications. The successful transition to a centralized integrated model, requires a comprehensive understanding of the current state of operational readiness around Work and Asset Management.

Through this assessment we will:

1. Address current migration needs
2. Align the corporation to a common Work and Asset Management approach, in alignment with the Digital & Technology's (D&T) future integrated landscape
3. Identify transaction differences between the BUs that must be incorporated into the integrated design
4. Identify data roadblocks to the future landscape

The objectives of this assessment are to:

1. Assess current state of operational readiness for enablement of Digital Transformation
2. Identify improvement opportunities to address:
    a. Manitoba Hydro's immediate operational needs
    b. Manitoba Hydro's future operational needs
3. Create a draft roadmap of initiatives that will help enhance Manitoba Hydro's ability to effectively manage its assets to deliver the safe, reliable, and economic delivery of power to its customers

Alignment to Strategy 2040

Note that objectives of this assessment are directly in-line with the BU Initiatives Roadmap, presented as a part of the Strategy 2040 vision in July 2021. In particular, the work initiatives tie in with: *Pillar 5: Keeping energy prices as low as possible, while providing the level of service Manitobans expect*. The initiatives also are intended to help support and accelerate a number of Strategy 2040 / BU Initiatives:

- *Assist AP&D and Operations to collaborate and optimize the capital / operating resource mix, as per Pillar 4 & 5*
- *Provide the foundation for AP&D to mature the AM system to optimize lifecycle costs, as per Pillar 1 & 5*
- *Align and synchronize with D&T efforts to support the effective implementation of the new business model, as per Pillar 1 &5*
- *Accelerate D&T efforts to leverage automation and digital technologies to drive enterprise value, as per Pillar 5*

03. Assessment Approach

The 3-phase assessment approach allows us to build on previous assessments, integrate with business unit plans, and provide tactical steps to enable operational readiness.

Phases	***Phase 01*** ***Assess***	***Phase 02*** ***Identify***	***Phase 03*** ***Revise & Review***
Objective	Develop a deeper understanding of Manitoba Hydro's current state of work and asset management operational readiness across AP&D, Operations, and D&T	Identify improvement opportunities and create initiatives that will help achieve the desired operational readiness	Present & refine initiatives to help Manitoba Hydro address their EAM operational readiness needs
Approach	1.1. Leverage previous assessments to understand opportunities & risks related to application integration 1.2. Map out existing WM & AM technologies 1.3. Review existing business unit plans and initiatives 1.4. Perform targeted interviews to understand the current challenges and future integration concerns	2.1. Align improvement opportunities with existing BU plans to identify initiatives that can be proactively addressed before EAM integration 2.2. Create initiatives for selected improvement opportunities that are viable and worth doing 2.3. Sequence initiatives into a draft Operational Readiness Roadmap	3.1. Conduct a cross-functional working session where assessment finding, initiatives & roadmap draft will be presented 3.2. Identify resources to execute proposed roadmap and adjust resourcing / roadmap as needed 3.3. Development of work packages for initial improvements on the roadmap, including scope, resourcing, timing (i.e. the "how")
Deliverables	○ *Refined list of improvement opportunities in relation to operational and asset data*	○ *Prioritized improvement opportunities to achieve desired readiness, sequenced into an Operational Readiness Roadmap*	○ *Finalized Operational Readiness Roadmap* ○ *Initiative packages that guide the execution of operational readiness recommendations*

Table 1 - Assessment Approach

04. Project Team

The operational readiness team was comprised of members from Deloitte & Manitoba Hydro.

Assessment Role	*Responsibilities*	*Members*
	Deloitte's Team	
Engagement Partner	▪ Liaise with Executive Sponsor ▪ Advise on strategic direction of engagement, deliverables, and engagement scope	• Kim Roseborough
Engagement Lead	▪ Provide guidance and direction to the Assessment team ▪ Interface with stakeholders ▪ Participate as a technical advisor in client-led working sessions ▪ Oversight of deliverable creation and QA	• Frank Godin
Assessment Team	▪ Conduct research and analysis ▪ Produce all deliverables ▪ Support facilitation of working sessions	• Arya Russell • Behshid Behrouzi
	Manitoba Hydro's Team	
Executive Sponsor	• Liaise with Engagement Partners, Stream / Assessment Leads, and Assessment Team • Participate in key working sessions to provide executive vision and ensure alignment • Provide input / validation on key deliverables	• Jay Grewal
Assessment Sponsors	• Inform stakeholders of their assessment roles as required • Validate the feasibility of the initiatives being developed • Support final roadmap development	• Leanne Bray • Hal Turner • Michelle Rheault
Assessment Core Teams	• Support with scheduling of interviews and working sessions and fulfillment of data request • When appropriate, participate in 1:1 interview to provide perspectives and relevant insights • Participate in assessment working sessions to provide input & feedback • Keep assessment sponsors(s) informed of directions & key decisions	• Patrick Allan • Chris Mazur

Table 2 - Assessment Team, Roles & Responsibilities

As a part of understanding the current state and the existing technology landscape, the following Manitoba Hydro individuals were **interviewed**:

- Kevin Morgenstern
- Maria Neufeld
- Rob Gerry
- Brent Jorowski
- Sheldon Kosowich
- Alan Chaychuk
- Mike Smith
- Shaun Vinthers
- Bridget Robinson
- Derek Acres
- Andrew Walters
- Coralee Crowe
- Adele Poulin
- Owen Preston
- Kaitlin Fritz
- Rejan Sayak
- Jules Gareau
- Ken Penner
- Karla Skulmoski

04.1. Philosophy of shared responsibilities

Too often, during large scale business and digital transformations, there is a level of competition regarding which team is responsible and accountable for the overall effort. Just as often, that level of responsibility and accountability on one single team can be overwhelming to manage. To overcome this risk, we have proposed that responsibilities and accountabilities be aligned with the current and future roles of each team. In other words, teams become accountable and responsible for the development of what they own.

- We recommend that D&T, AP&D and OPS lead their respected responsibilities
- While all teams must work in concert with their counterparts, appropriate leadership will result in long term buy-in and ownership
    - D&T oversees Governance and data strategy, technology enablers, data curation, and data integration
    - AP&D oversees meta and master data development with respect to asset management
    - Operations oversees the transactional processes and data with respect to work management
    - AP&D and Operations develop their respective reporting and analytics requirements on a platform that is managed by D&T

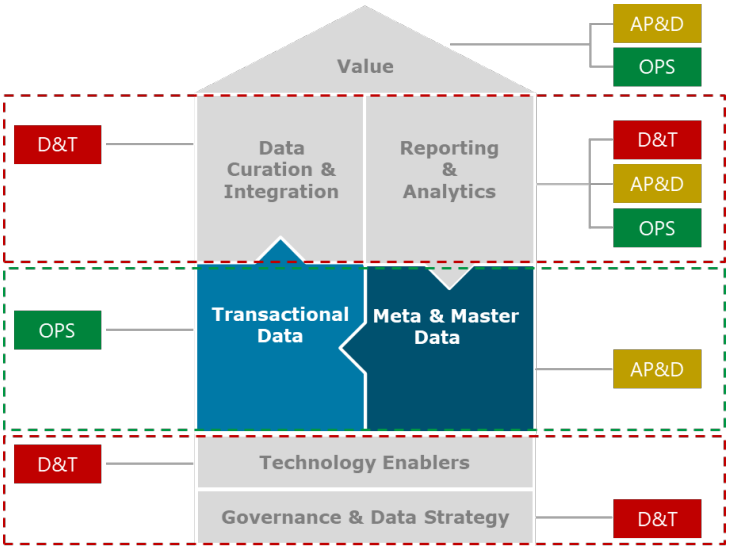


Figure 4 - Shared Responsibilities

Beyond a philosophy of shared responsibility, teams also need to continue to work together through the life of the process and technology harmonization efforts. One of the suggested vehicles for the continued collaboration is to launch the data governance team already being initiated by D&T. The data governance team will help provide a structure to generate alignment and synchronization

05. What We Heard

1. Passionate Sense of Ownership

- *Passion for doing a good job*
- *Sense of ownership on some of the applications*
- *Strong attachment to RMS or SAP-PM results in "camps"*

2. Silos Within Silos

- *MH data is often in silos, within silos*
- *Silos work within themselves but results in loss of cohesion at corporate level*
- *Lack of consistency in documentation for core processes*

3. Duplications & Inconsistencies

- *Duplication of applications, functions, as well as wide discrepancies in competencies with different applications*
- *Multiple processes for the same/similar task across different personnel*
- *Mobile Workforce Management varies significantly by teams*

4. Data Savvy Culture

- *MH staff are clever at using data to help manage the business*
- *RMS has been evolving over the years, providing functionalities that are not in SAP EAM*
- *Extensive use of PowerBI shows a clear understanding of how the data is leveraged*

5. Less Resistance Than Expected [1]

- *Staff are less resistant to change when expected, in fact they are excited at the prospect. However, they fear losing functionality*
- *Participation was amazing and approval of direction was agreed upon 100% (19/19)*
- *Common realization that current operating model is unsustainable*

6. Lack of Transparency

- *Stakeholders unclear of the digital visions of the future, but like the idea of the integrated direction*
- *Some stakeholders not aware of responsibility & accountability by AM & WM with D&T*
- *There is a need for data*

[1] The interviewees selected by the Manitoba Hydro team showed a positive and welcome reaction to the direction of the future integrated data and technology platform. However, it has been brought to our attention that although these individuals are considered as key influencers in their groups, their engagement is not representative of that of the larger population at Manitoba Hydro, which we have been told could be less receptive to change.

06. Recommended Initiatives

As a part of this assessment, a series of tactical actions and initiatives have been identified. Captured from the interviews with key stakeholders, the initiatives are aimed at tackling targeted problems. The problems identified as a part of this assessment will likely lead to integration challenges as Manitoba Hydro starts to transition to a centralized integrated data and technology platform. The initiatives highlighted in this section are to be carried out by Asset Management and Work Management groups with the objective of converging into the upcoming D&T initiatives, once D&T is ready to start the transition. *It is important to note that the teams will adjust these initiatives as needed as they progress in their execution.*

INITIATIVE TITLE	*CURRENT SITUATION / CHALLENGE*	*RECOMMENDED INITIATIVE*
1. Stakeholder Engagement	• Manitoba Hydro is going through an extensive organization change that is being followed by process and technology changes • Many individuals do not understand the roles of the WM & AM team	• Define roles, responsibilities, and accountability of AM & WM teams, and clarify that they are their advocates for change • Introduce current technology possibilities and define what is to be expected in the next 12-18 months of the digital operations journey
2. Define WM & AM Technology Landscape	• Business units & sections are still having to perform similar tasks on different technologies, in alignment with the previous energy system structure • There are 12 registries (7 specialized registries, 5 asset registries), 22 supporting applications, and 10 Core Transactions applications	• Identify applications related to AM and WM to create a Technology Landscape • Classify applications according to the future initiatives they align with - populate into a tracker which will be used to continuously understand the analysis and rationalization effort towards each application
3. Application Rationalization Quick Wins	• There is an activity to rationalize a large number of applications across the whole organization • Identifying quick wins opportunities allows D&T to be in a better position for the long-term application integration effort	• Identify the applications used by Manitoba Hydro, classify them, measure their duplication/overlap, and identify clear target applications • Reduce application footprint by having Asset Management and Work Management identify quick win opportunities
4. Asset Registry Rationalization	• Manitoba Hydro has a number of Asset Registry applications, two of which are Geospatial Asset Registries and three of which are Functionally Located Asset Registries • There are misalignments in Asset Registry meta data and master data	• Further analyze the current asset registries for geospatial and functionally located assets • Identify deviances in meta and master data structure and determine if it is possible move to one single core registry built on one interfaced EAM and GIS
5. Core Transaction Mapping	• Different applications are used to execute the IPSEDA (Identification, Planning, Scheduling, Executing, Document, Analyzing) process • It is vital to distinguish core transactions from program management transactions	• Capture the IPSEDA process that will meet all work management core transaction needs • Determine the feasibility in capturing all elements of the IPSEDA process in a single core application

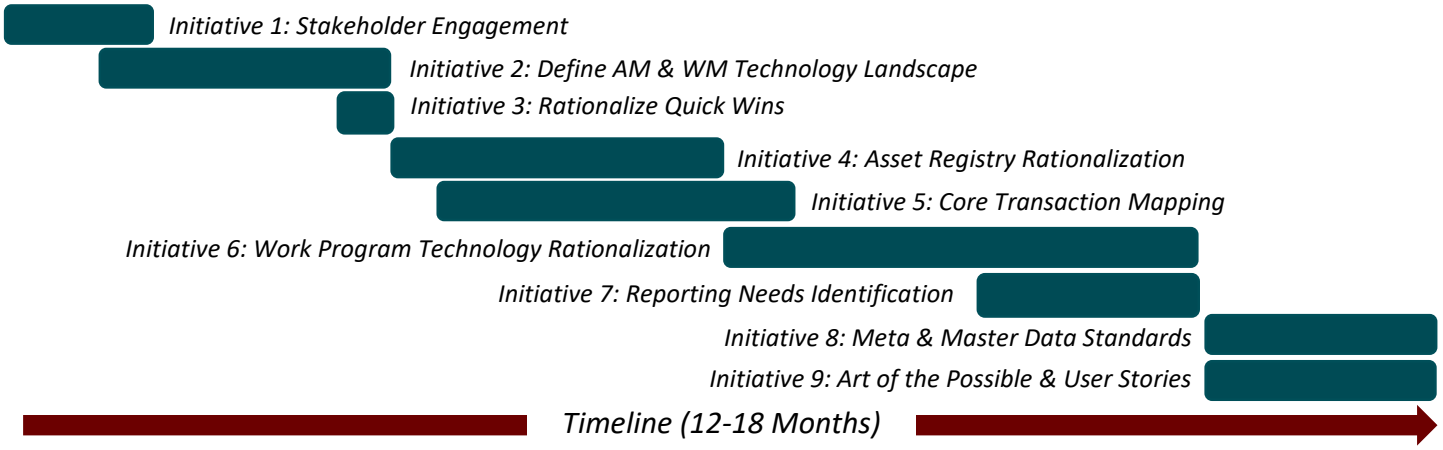
INITIATIVE TITLE	CURRENT SITUATION / CHALLENGE	RECOMMENDED INITIATIVE
6. Work Program Technology Rationalization Analysis	• Manitoba Hydro is using at least 22 different work program support technologies which include homegrown and duplicated applications • There is an opportunity to rationalize and bundle specialized work program technologies with similar functions into a single application for a given type (APM, CBM, MWM)	• Perform a Work Program Functional Needs Analysis spanning all existing applications supporting program analysis • Identify the extent, classification, functions, outputs, and the master / meta data for each application classified as supporting applications • Map out possible program classifications that the applications will migrate to
7. Reporting Needs Identification	• There is no formal documentation of existing reports and dashboards across Manitoba Hydro, resulting in a lack of knowledge surrounding existing reports and their sources • Vital reports and dashboards, as well as their sources, need to be identified so that the existing dashboards/reports are not lost after migration	• Identify the reports that are vital to Manitoba Hydro business in terms of meeting regulatory requirements and delivering core services • For applicable reports, create a repository of data fields and calculated fields along with their raw data sources • Create a master relationship diagram for applicable reports and dashboards
8. Meta & Master Data Standards	• A common meta and master data standard across different applications does not exist, even common asset class attributes don't align • Aligning meta and master data is a critical prerequisite to the successful creation of an integrated Work Management & Asset Management requirement	• Compare and reconcile the meta and master data structure in the existing registries and transaction applications and define one comprehensive standard • For every applicable field in all current applications that need to be migrated, create a migration script to support future load sheets
9. Art of Possible & Use Case Identification	• Work Management and Asset Management teams have been clever in using data but lack the exposure as to where the digital operation world is going • Replicating what they have now without looking at improving what they have now may result in not leveraging investment as much as possible	• Educate team on the digital working world via use cases and demos, showing what is possible in P&U and other industries • Identify use cases that consider the program outcomes they need and the power of the new digital environments

Table 3 - Overview of Initiatives

A detailed description of the initiatives, including the initiative benefits, roadblocks, and levers have been appended in Appendix I. Initiative Details.

06.1. Initiative Roadmap

The assessment resulted in the creation of eight work initiatives, all in the purpose of getting ready for the eventual move to an integrated digital environment. The initiatives are intended to help work management and asset management address work that can be done in advance of the move to the new digital platform.

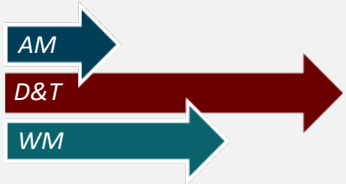


Dependent on resource availability, it is estimated that the completion of these initiatives can take anywhere from 12 to 18 months for completion. These initiatives must also constantly be adjusted in reaction to the priorities and sequence as identified by any of the stakeholders.

06.2. Desired Outcomes

The initiatives that can be undertaken by Work Management and Asset Management are also intended to create ongoing alignment and synchronization between the three key stakeholders (WM, AM, D&T), responsible for different portions of transitioning to an integrated process, technology and data platform.

1. Not Aligned – Not Synchronized
Possible Outcome Without Initiatives



2. Aligned – Not Synchronized
Most Likely Outcome Without Initiatives

3. Aligned & Synchronized
Desired Outcome

Throughout the Assessment, participants were 100% in favour of moving towards an integrated technology platform, realizing that the current technologies have reached their limits. The participants were also very clear about the need to retain and even enhance business functionality that exists today. In addition, they also understood the importance of maintaining alignment and synchronization between all key stakeholders.

APPENDICES

Appendix I. Initiatives Details

For each of the work initiatives, the following fields have been captured to help the team in understanding and carrying out the initiatives:

- ***Current Situation / Integration Challenge***:
  Description of the current situation and how it poses a challenge to integration
- ***Recommended Initiative***:
  A high-level description of what needs to be done and the desired outcomes
- ***Initiative Benefits***:
  Immediate and long-term benefits from the initiative
- ***Potential Risk / Roadblocks***:
  List of risks that may increase the complexity of the initiative, or reduce the likelihood of success
- ***Potential Levers***:
  List of levers that exists today which may expedite the execution of the initiative
- ***Duration***:
  Estimated time to execute the initiative
- ***Timing***:
  Timing when the initiative will be executed
- ***Key Stakeholders***:
  Primary stakeholders involved in the project
- ***Resource Requirements***:
  Resources such as software and personnel needed in executing the initiative
- ***Detailed Initiative Approach***:
  A detailed list of steps and sub-steps required to achieve the desired change from this initiative
- ***Dependencies***:
  Requirements that must be in place before this initiative can be executed, i.e. other projects, other initiatives, technology deployed, teams fully staffed, etc.
- ***Initiative Success Criteria***:
  Definition of an initiative's success
- ***Sustainment Considerations***:
  Proposed plan for sustaining the results of the initiative

1. Stakeholder Engagement

CURRENT SITUATION / INTEGRATION CHALLENGE

Manitoba Hydro is going through an extensive organization change that will be followed by process and technology changes. However, how those changes will occur and who will be leading them is still unclear to many Manitoba Hydro stakeholders. Most crucially, there is a lack of clarity on who has the authority and responsibility for leading the direction and execution of change. With respect to work and asset management, many individuals do not understand the roles of the Work Management team and Asset Management team.

As a result, before proceeding with the series of recommended initiatives that require close collaboration with different stakeholders, there is a need to engage the affected stakeholder and help them understand:

- *The vision for integrated management technologies*
- *The responsibility and accountability of Work Management, Asset Management, and D&T in developing the vision*

By deploying a campaign to help stakeholders understand Manitoba Hydro's digital vision and the roles of WM, AM and D&T in facilitating the vision, the chances of engagement and success increase significantly.

RECOMMENDED INITIATIVE

In order to begin informing stakeholders on the digital vision of the future and identifying the individuals who will lead the identification of needs, a targeted stakeholder engagement is required. It is vital that stakeholder recognize the WM and AM team as advocates that will help them get what they need, as opposed to having to accept what is given to them.

The Stakeholder engagement must accomplish the following:

1) *Provide a clear view of the future of digitally supported operations and current technology capabilities*
2) *Make clear the non-negotiables in the journey to the digital operations*
3) *Define the role, responsibility, and accountability of WM and AM*
4) *Make clear that AM and WM are their advocates, looking out to meet their needs*
5) *Define what is to be expected in the next 12- 18 months*

INITIATIVE BENEFITS

Once the stakeholders are engaged and made aware of the change that is to come, Manitoba Hydro can expect improved cooperation from all of the stakeholders that need to be engaged in all subsequent initiatives.

POTENTIAL RISKS/ ROADBLOCKS	**POTENTIAL LEVERS**
• *Misalignment on whether an integrated model is necessary across varying stakeholders* • *Engaging stakeholders that are attached to their current processes and are not willing to accommodate a change*	• *D&T and their current work on implementing a unified data governance model* • *EAM Operational Readiness assessment by Deloitte and previous assessments* • *Connection to Strategy 2040*
DURATION: *6-8 Weeks*	**TIMING:** *Q1 (CY 22)*
KEY STAKEHOLDERS: • *AP&D, Asset Management Team* • *Operations, Work Management Team* • *D&T Team representative*	**RESOURCE REQUIREMENTS:** • *1 AM Data team members @ ¼ time* • *1 WM data team members @ ¼ time* • *1 D&T member @ part time* • *Consult Organizational Change Management (Tania Nietrzeba)*
DETAILED INITIATIVE APPROACH:	

1) *Provide a clear view of the future digitally supported operations and current technology capabilities*
    a. *Highlight examples on why the current operating model is unsustainable*
    b. *Highlight benefit of moving to fully digitally supported operations, such as analytical capabilities*
    c. *Show examples of how current integrated technologies helps work and asset management thrive*
    d. *Reiterate that the transition to the integrated model will "turn data into information"*
    e. *Tie to Strategy 2040 and the appropriate pillars*
2) *Make clear the non-negotiables in the journey to the digital operations*
    a. *Outline that a unified data governance structure is the end-goal*
    b. *Reinforce that the data standards that are being created during this journey are mandatory to follow*
3) *Define the role, responsibility, and accountability of AM and WM*
    a. *Identify the personnel within AM and WM that will be key players in this journey and connect their activities to the department and section mandates and responsibilities*
    b. *Ensure that every employee is aware of the personnel in their department that has been identified in 3(a)*
4) *Make clear that AM and WM are their advocates, looking out to meet their needs*
5) *Define what is to be expected in the next 12- 18 months and who has different responsibilities*
    a. *Create a roadmap of general changes that will be seen company-wide for a high-level view of the journey*
    b. *Create a separate roadmap for each business unit that includes major changes and associated timelines for maximal transparency at a business unit level*
    c. *Create a separate roadmap for each department within the business units that includes major changes and associated timelines for maximal transparency at a department level*

DEPENDENCIES:

- *Engagement of senior leadership to carry the message forward that change is coming and that it is necessary*
- *Manitoba Hydro employees complying with the mission and actively engaging with the AM and WM key players*

INITIATIVE SUCCESS CRITERIA:

- *Understanding at a company-wide level as to what the journey will look like, the part they will play in it, and awareness of relevant contacts/key players in the journey*

SUSTAINMENT CONSIDERATIONS:

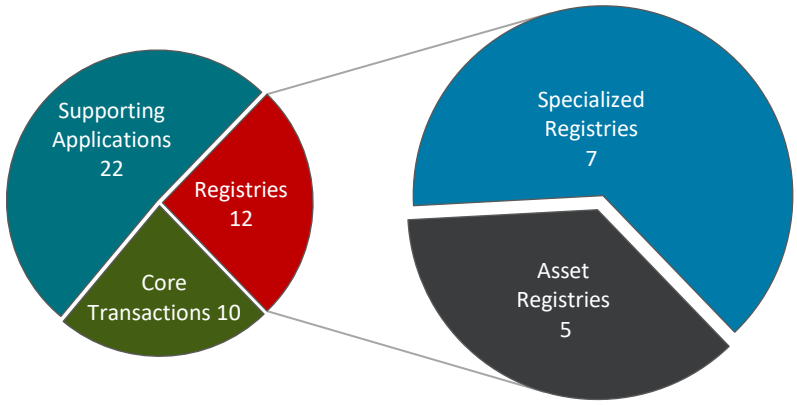
- *Regular "pulse-checks" with key players to ensure that at a company-wide level, stakeholders are aware of and engaged with the journey that is being undertaken*

MANAGEMENT APPROVAL:	**APPROVAL DATE:**
Name & Signature	

2. Define WM & AM Technology Landscape

CURRENT SITUATION / INTEGRATION CHALLENGE

Despite the recent organization change, business units & sections are still having to perform similar tasks on different technologies, in alignment with the energy system structure. This is to be expected to continue until D&T can provide integrated work and asset management tools that meets the many needs of the business. As of the Fall of 2021, Manitoba Hydro has identified:



The first step towards integrated and rationalized technology is to develop a very clear understanding of all the applications in use today. The understanding of the applications must include the following:

- *The core functions of the application*
- *The master data needs of the application*
- *The transactions performed by the application*
- *The user base for the application*
- *The business needs supported by the application*

The WM and AM Landscape will inform Work Management, Asset Management and D&T of the minimum viable digital products that needs to be delivered to operations and AP&D in order to run MH successfully. The technology landscape is the first step towards rationalizing towards a single asset registry and a single core transaction application. It also informs D&T of the vital supporting technologies needed to maintain safe operations and regulatory compliance

RECOMMENDED INITIATIVE

In order to understand all existing applications relating to work management and asset management, it is recommended that MH builds a Technology Landscape that acts as the foundation for all follow-on WM and AM operational and digital readiness initiatives. The Technology landscape must provide the following initiatives with:

1) *A definitive list of all applications used to manage and execute work and asset management at Manitoba Hydro*
2) *A set of descriptors for each application that will allow subsequent initiatives to move forward with confidence that they are scoping efforts adequately and not neglecting any important business function*
3) *An importance ranking of all applications to help guide D&T to understand AM and WM priorities*
4) *A classification of applications to determine which future initiatives will need to address them*
5) *Create a Technology Landscape tracker to continuously understand the analysis and rationalization effort towards each individual application*
6) *Validate the technology list with D&T and share their findings*

INITIATIVE BENEFITS

Once the Technology Landscape is complete, Manitoba Hydro Work Management and Asset Management can confidently proceed subsequent initiatives towards integrated work and asset management, certain that no application will slip through the cracks

POTENTIAL RISKS/ ROADBLOCKS	**POTENTIAL LEVERS**

• *Different individuals have different understandings of the various applications, bringing a risk of clouding the understanding of different applications* • *It is vital to continuously update the landscape document after the initial report is completed* • *Hiring timeline for Asset Information Standards, Asset Information Team may result in a risk in starting this initiative*	• *Current D&T Application Rationalisation effort being led by Deloitte* • *Deloitte application landscape assessment findings* • *CGI Report highlighting applications used for each of the business units* • *Asset Information Strategy report capturing the current state and level of standardization across application types.* • *Asset Information System highlighting key stakeholders & functionalities of applications*
DURATION: • *22 Applications @ 2 Applications / Week = 11 Weeks* • *Pre & Post planning & Analysis = 6 Weeks* • *Total 15-20 Weeks*	**TIMING:** *Q2 (CY 22)*
KEY STAKEHOLDERS: • *AP&D, Asset Management team* • *Operations, Work Management team*	**RESOURCE REQUIREMENTS:** • *1 WM data team members @ full time* • *D&T, consulted at 5%* • *Asset Information Standards, Asset Information Team*

DETAILED INITIATIVE APPROACH:

1) *Compile a definitive list of all applications used across the three energy systems to manage and execute Work and Asset Management activities at Manitoba Hydro*
2) *Capture a set of descriptors for each application that will allow subsequent initiatives to move forward with confidence that they are scoping efforts adequately and not neglecting any important business function. For each application:*
    a. *Capture the business needs supported by the application*
    b. *Identify which of the three energy systems are using the application*
    c. *Identify and record the core purpose(s) of the application*
        i. *Asset Registry: Primary applications used to store asset master data (Name, Class, Criticality, FLOC). The one source of the truth, where additions, retirements & edits are done in these applications*
        ii. *Core Transactions: Applications used to manage Asset and Work Management transactions including: Work Identification, Planning, Scheduling, Executing, Documenting, Analyzing (IPSEDA)*
        iii. *Supporting Application: Applications used to perform program specific activities such as: Inspections, Condition Monitoring, Health Monitoring, Reporting, Regulatory Compliance, etc.*
    d. *List the functions and capabilities required in performing Work and Asset Management activities*
    e. *Identify the core users, which will include all function interacting with the application*
    f. *Identify the key functional and technical key contact(s), where:*
        i. *Key functional contact: individual(s) within the organization who ensure the correct use of the application and are well familiar with the functionalities and capabilities of the application*
        ii. *Key technical contact: individual(s) within the organization who provide technical support to the application, i.e. application updates*
    g. *Identify and list interfacing applications, where interfaces can be classified as:*
        i. *Data pull: where data is being pulled from another application*
        ii. *Data push: where data is being pushed to be used in another application*
    h. *Categorize and document developer details as either:*
        i. *In-House: for all In-House applications*
        ii. *Commercial Off the Shelf (COTS): document Developer name, Application Name, and Version for all outsourced applications*

3) *Rank each of the applications based on an importance ranking system to help guide D&T understand Asset and Work Management priorities*
    a. *Establish an importance ranking system based on the number of users, applications' functions and capabilities, level of interaction with other applications, and criticality in maintaining an active registry, conducting core transactions, or supporting the program.*
    b. *Rank each of the applications based on the importance ranking system*
    c. *Identify stand-alone applications that will =likely not be integrated into a centralized data and technology platform, i.e. AutoCAD*
4) *Classify applications to determine which future initiatives will need to address them*
    a. *Referencing the information captured in step 2, capture the core purpose of each application, where:*
        i. *Applications identified as **"Asset Registries"** will be rationalized through Initiative 4*
        ii. *Applications identified as **"Core Transactions"** will be mapped out through Initiative 5*
        iii. *Applications identified as **"Supporting Applications**" will be analyzed through Initiative 6*
5) *Create a Technology Landscape tracker to continuously understand the analysis and rationalization effort towards each individual application*
6) *Validate the technology list with D&T and share their findings*
7) *Identify key resources to include in subsequent workshops for Initiatives 03,04, and 05.*

INITIATIVE DEPENDENCIES:

No dependencies, this initiative is the first that will need to be completed

INITIATIVE SUCCESS CRITERIA:

- *The Technology landscape must provide an accurate listing of the applications and databases in use today*
- *The Technology Landscape must be considered accurate and fairly describe their key stakeholders*
- *The Technology Landscape must meet the needs of the subsequent initiatives*

SUSTAINMENT CONSIDERATIONS:

Maintaining and updating the Technology Landscape for Asset and Work Management is important for future integration opportunities and continuous improvement initiatives by D&T, as well as the functional teams.

MANAGEMENT APPROVAL:	**APPROVAL DATE:**
Name & Signature	

3. Application Rationalization - Quick Wins

CURRENT SITUATION / INTEGRATION CHALLENGE

As part of the application integration effort, the Manitoba Hydro D&T team will begin by rationalizing as many applications as possible across the whole organization. By applying an initial application rationalization effort that focuses on quick win opportunities, D&T will put itself in a better position for the overall long-term application integration effort.

RECOMMENDED INITIATIVE

In order to accelerate D&T's effort towards application rationalization, any early identification of possible quick wins with regard to reducing the existing application footprint is of value. By having work management and asset management identify quick win opportunities, it provides these teams with some level of control over what will be executed first within their teams. It also helps the impacted teams prepare for the eventual rationalization. Finally, it helps D&T accelerate their efforts towards a quicker selection process. By proactively identifying application rationalization quick wins, everybody wins.

In order to identify the application rationalization quick win opportunities, the following outcomes are required:

1) *A listing of applications within a given classification and their current level of duplication and overlap.*
2) *Identification of clear target application that exists today in your current application portfolio mix for overall and duplicated applications*
3) *The identification of ideal candidates for early quick win rationalization*

INITIATIVE BENEFITS

The application rationalization quick win effort will provide an opportunity for D&T and the WM & AM teams to work collaboratively towards application integration in a relatively low risk situation.

POTENTIAL RISKS/ ROADBLOCKS

- *The very first teams* that face the loss of their applications may offer resistance due to a lack of confidence in the target application

POTENTIAL LEVERS

- *This initiative can be a role model of collaboration between the current D&T Application Rationalization effort and the WM /AM technology needs identification*

DURATION:

1-2 Weeks

TIMING:

Q3 (CY 22) - (Consult with D&T on when they want to see the first round of candidates)

KEY STAKEHOLDERS:

- *AP&D, Asset Management team*
- *Operations, Work Management team*
- *D&T*

RESOURCE REQUIREMENTS:

- *1 AM Data team members @ part time (20%)*
- *1 WM data team members @ part time (20%)*
- *D&T @ part time (20%)*

DETAILED INITIATIVE APPROACH:

1) *Review all applications within a given classification and determine the current level of duplication and overlap*
2) *For all applications with significant duplication and overlap, determine if a clear target application exists today in your current application portfolio mix*
    a. *Gauge the readiness and willingness of the teams using the applications to engage in the rationalization effort. Focus on applications that teams do not like today*
3) *With the support of D&T, identify which applications are ideal candidates for early quick win rationalization*
4) *Present the recommendations to leadership and communicate the mutual agreement between all stakeholders towards the recommended application rationalization*

INITIATIVE DEPENDENCIES*:*

• *This initiative is a successor to Initiative 02: Define WM & AM Technology Landscape*	
INITIATIVE SUCCESS CRITERIA: • *Selecting appropriate applications for quick win rationalization in alignment with D&T's objectives*	
SUSTAINMENT CONSIDERATIONS: *Not Required*	
MANAGEMENT APPROVAL: *Name & Signature*	**APPROVAL DATE:**

4. Asset Registry Rationalization

CURRENT SITUATION / INTEGRATION CHALLENGE

For the sake of this initiative, we define asset registries as the system(s) of record for the physical assets, used to store master data such as equipment ID, name, asset class, criticality, FLOC and hierarchy, attributes, etc. The asset registry is considered the one source of truth where asset master data is recorded.

Currently, Manitoba Hydro is having to use different Asset Registry applications across the three energy systems for their geospatial and functionally located assets. Those applications are:

- *geospatial Assets:*
  - *TGIS (ESRI Based)*
  - *eGIS (SmallWorld Based)*
- *functionally located Assets:*
  - *EAM (SAP-PM)*
  - *DMPS (SAP-PM)*
  - *RMS*

The continued use of different applications in maintaining active asset registries does not align with the objective of transitioning to an integrated work and asset management platform.

The most notable roadblock to integration is caused by the misalignment in asset registry meta and master data. In transitioning towards a centralized data and technology platform, Manitoba Hydro must first identify applications used as active asset registries for both geospatial and functionally located assets. Once identified, Manitoba Hydro must understand all fields in the existing registries in order to rationalize to one single registry.

Proving the ability to move to a single asset registry is a precursor to defining a single core transaction application and helps scope the effort needed for the eventual asset data reconciliation and migration to a single registry.

RECOMMENDED INITIATIVE

In order to eventually migrate Manitoba Hydro's assets to a single asset registry, an Asset Registry Rationalization is needed. This consists of a detailed comparison between the multiple applications that supports work management and asset management across Generation, Transmission, and Distribution. The intent is to identify the commonalities that will facilitate data migration to a single registry versus the gaps that might hinder the registry reconciliation. The asset registry rationalization must deliver the following information:

1) *Share the leading practices and latest technologies related to Asset Registry Management with team*
2) *A definitive list of all applications used as an asset registry for both geospatial and functionally located assets*
3) *A detailed mapping of the meta and master data structure for each of the applications*
4) *An identification of existing deviances in meta and master data structure*
5) *Identification of the meta and master data structures that must be absorbed in a future single registry*
6) *Validation that the proposed asset registry can meet all asset and work management migration needs*
7) *A recommendation on the possibility of meeting all asset registry migration needs in one single core application*
8) *Regular validation with D&T to ensure alignment with their overall data governance plan*

INITIATIVE BENEFITS

Once the asset registry needs analysis is complete, Manitoba Hydro can inform the D&T team of their asset registry needs and validate the minimum requirements for a single integrated asset registry

POTENTIAL RISKS/ ROADBLOCKS	**POTENTIAL LEVERS**
• *Different types of registries are used throughout Manitoba Hydro. Not clearly distinguishing between Asset Registries and Specialized Registries may result in*	• *Current D&T Application Rationalisation effort being led by Deloitte* • *Findings from Initiative 02: Define WM & AM Technology Landscape*

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increased complexity and confusion throughout the rationalization process.
- *Complexity imposed due to NERC requirements*

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- *D&T's current technology landscape*

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DURATION:

To be Determined

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TIMING:

To be Determined

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KEY STAKEHOLDERS:

- *AP&D, Asset Management Team*
- *Operations, Work Management Team*
- *D&T Team*
- *RMS Support Team*
- *SAP-PM Support Team*

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RESOURCE REQUIREMENTS:

- *1 AM Data team members @ full time*
- *1 WM data team members @ full time*
- *1 RMS support member for the duration of RMS rationalization*
- *2 SAP-PM support members (EAM & DMPS) for the duration of SAP-PM rationalization*
- *D&T, consulted at 10%*

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KEY STAKEHOLDERS:

- *AP&D, Asset Management team*
- *Operations, Work Management team*

D&T

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RESOURCE REQUIREMENTS:

- *1 AM Data team members @ part time (20%)*
- *1 WM data team members @ part time (20%)*

D&T @ part time (20%)

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DETAILED INITIATIVE APPROACH:

1) *Share the leading practices and latest technologies related to Asset Registry Management with team*
2) *Build a definitive list of all applications used as an asset registry for both geospatial and functionally located assets, using Appendix II: Technology Landscape, as a launch point*
    a. *From all applications identified as registries, classify them based on the following criteria:*
        i. *Asset Registries vs. Specialized Registries*
        ii. *Application used for fixed location asset and/or geospatial assets*
        iii. *Applications used in Generation and/or Transmission and/or Distribution*
3) *Build a detailed mapping of the meta and master data structure for each of the applications*
    a. *List all data fields of the existing registries*
    b. *List all calculated fields of the existing registries (if applicable)*
    c. *Identify existing deviances in master and meta data structure between registry applications*
    d. *Understand commonalities and deviances in data fields between identified asset registries*
    e. *Understand the meta data rules applied to each of the data fields the identified asset registries*
    f. *Understand the calculations for the calculated fields*
4) *Identify the meta and master data structures that must be absorbed in a future single registry*
    a. *Develop a preliminary meta and master data structure that satisfies existing functional requirements*
    b. *Understand the feasibility in applying the same meta and master data structure to a future single registry, focusing on identifying any significant roadblocks*
5) *Validate that the proposed asset registry can meet all asset and work management migration needs*
    a. *Understand the feasibility in applying the same meta and master data structure for a future single registry that satisfies functional migration needs*
6) *Provide a recommendation to D&T on the possibility of meeting all asset registry migration needs in one single registry*
7) *Collaborate with D&T to create an estimate of the time and effort needed to migrate all registry data to a single registry*
8) *Regular validation with D&T to ensure alignment with their overall data governance plan*

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DEPENDENCIES:

- *This initiative is a successor to Initiative 02: Define WM & AM Technology Landscape*

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• *Having high degree of certainty of which application(s) Manitoba Hydro is looking to migrate to for a single registry*
  ○ *One GIS database*
  ○ *One EAM database*

INITIATIVE SUCCESS CRITERIA: • *Validation that Manitoba Hydro can either shift to a single asset registry or not and the definition of the minimum requirements needed to be in one single registry*
SUSTAINMENT CONSIDERATIONS: • *Regular validation with D&T to ensure alignment with their overall data governance plan* • *Periodic review to capture new or changed capabilities added to existing applications* • *Consider going to a Registry modification black out period – except for extreme cases*

MANAGEMENT APPROVAL: *Name & Signature*	**APPROVAL DATE:**

5. Core Transaction Mapping

CURRENT SITUATION / INTEGRATION CHALLENGE

For the sake of this initiative, we are defining Core work management transactions as those that manage work order transactions and captures accurate work history, including costs and failure history in time. They are essentially used to execute Manitoba Hydro's IPSEDA process, a process that is accepted globally by maintenance management professionals.*

Currently, Manitoba Hydro is having to use different applications across the three energy systems to perform core work management transaction processes. Those applications are:

1. *SAP-MM*
2. *MWM – Mobile Work Management*
3. *Banner*
4. *FRS*
5. *JobTrac*
6. *LIMS*
7. *RMS*
8. *EAM*
9. *DMPS*
10. *TGIS*

The continued use of different applications to execute the IPSEDA process does not align with the goal of transitioning to an integrated work and asset management environment. In order to achieve proper integration, Manitoba Hydro needs to shift to a single core transaction process that is executed on a single asset registry, applying a single set of meta and master data. This configuration allows full integration to all other core applications and results in consistent asset and work history data.

In transitioning towards a centralized integrated data and technology platform, Manitoba Hydro must first identify all current applications used to perform core transaction processes and test those existing processes against the accepted IPSEDA process. Any deviations need to be understood and determined if any exception to the IPSEDA process is needed. During this effort, it is VITAL to distinguish core transactions from program management transactions.

Once the core process needs are validated, this paves the path to understanding the program management identification

**IPSEDA = Identify, Plan, Schedule, Execute, Document, Analyze (full work order life cycle process)*

RECOMMENDED INITIATIVE

In order to validate the ability to move to a single core transaction application that supports the IPSEDA process, it is recommended that MH perform a core transaction needs analysis spanning all existing applications supporting core transactions. The core transaction analysis must deliver the following information:

1) *Share the leading practices and latest technologies related to Core AM & WM Transactions with team*
2) *A definitive list of all applications used to manage the IPSEDA process at Manitoba Hydro*
3) *A detailed mapping of how each application performs the IPSEDA process*
4) *An identification of existing deviances from the IPSEDA process and validation on the need for the deviance*
5) *Preliminary design of the IPSEDA process and all its variables*
6) *Validation that the IPSEDA process can meet all work management core transaction needs*
7) *Validation that the IPSEDA process can generate all asset management data needs*
8) *A recommendation on the possibility of meeting all IPSEDA process variables in one single core application*
9) *Validate with D&T the technology list and share their findings*

Once the core transaction needs analysis is complete, Manitoba Hydro Work Management and Asset Management can begin the subsequent initiatives towards identifying all program transactions that are needed and the applications managing those programs. Work Management and Asset Management should then map the applications against the core transaction process.

INITIATIVE BENEFITS

Once the core transaction needs analysis is complete, Manitoba Hydro can inform the D&T team of their core transaction needs and validate the minimum requirements for a single application to perform the IPSEDA process. This initiative also helps identify those transactions and data captures that fall instead onto a program work program management application such as APM, CBM or MWM.

POTENTIAL RISKS/ ROADBLOCKS	POTENTIAL LEVERS
• *Confusing core transaction versus work program transactions, seeking too much from the core*	• *Findings from Initiative 02: Define WM & AM Technology Landscape* • *Asset Registry Rationalization findings* • *D&T's current technology landscape*
DURATION: *To be Determined*	**TIMING:** *To be Determined*
KEY STAKEHOLDERS: • *AP&D, Asset Management Team* • *Operations, Work Management Team* • *D&T Team*	**RESOURCE REQUIREMENTS:** • *1 AM Data team members @ full time* • *1 WM data team members @ full time* • *D&T, consulted at 5%*

DETAILED INITIATIVE APPROACH:

1) *Share the leading practices and latest technologies related to Core AM & WM Transactions with team*
2) *Build a comprehensive list of all applications used by the WM & AM to manage the IPSEDA process at Manitoba Hydro*
    a. *Create a list of technologies used for each of the energy systems used for managing the IPSEDA process*
    b. *Determine whether an application is unique to an energy system or is used across multiple energy systems*
3) *Develop a detailed mapping of how each application is used in performing the IPSEDA process*
    a. *Map out the functionalities of all applications used to perform core transaction processes, i.e. compare functions between RMS vs. TGIS*
    b. *Understand the unique functionalities of core transaction applications that must be met in managing the work and asset management processes for different business units (Generation, Transmission, Distribution)*
4) *Identify all existing deviances from the IPSEDA process and validate the need for the deviance with key stakeholders*
    a. *Highlight commonalities between the identified applications in managing the IPSEDA process*
    b. *Highlight deviances between the identified applications in performing similar or identical tasks*
    c. *Validate with the team, the need for deviant capabilities in managing the core transaction processes*
5) *Develop a preliminary design of the IPSEDA process and all its variables*
    a. *For each of the business units, develop a list of capabilities that must be met in managing the IPSEDA process*
    b. *Cross-reference the capabilities and identify commonalities and deviances from Step-3*
    c. *Create a preliminary design of a common IPSEDA process that meets the functional requirements of all Work and Asset Management activities across the three energy systems*
6) *Validate that the IPSEDA process from the target application can meet all work management core transaction needs*
    a. *Review the proposed IPSEDA process with team representatives and identify disconnects*
    b. *Review and compare the proposed IPSEDA process against compliance requirements, i.e. NERC*
    c. *Revise as required to ensure that a common core transaction process can be used in managing the Work and Asset Management activities across the three energy systems*
7) *Validate that the IPSEDA process can generate all their asset management transactional data needs*
    a. *Review the proposed IPSEDA process with the AM team to ensure that the right asset management data is captured*
8) *Develop recommendations on the possibility of meeting all IPSEDA process variables in one single core application*
9) *Validate with D&T the technology list and share their findings*

DEPENDENCIES:

- *This initiative is a successor to Initiative 02: Define WM & AM Technology Landscape*
- *This initiative is a successor to Initiative 04: Asset Registry Rationalization*
- *A high degree of confidence in what the target core IPSEDA transaction application will be*

INITIATIVE SUCCESS CRITERIA: • *A recommended IPSEDA model, compatible with Work and Asset Management activities across the three energy systems* • *A validation that the target application can or cannot meet the IPSEDA needs of Manitoba Hydro*	
SUSTAINMENT CONSIDERATIONS: • *Regular validation with D&T to ensure alignment with their overall data governance plan* • *Periodic review to capture new or changed capabilities added to existing applications* • *Consider going to a Core Transaction changes black out period – except for extreme cases*	
MANAGEMENT APPROVAL: *Name & Signature*	**APPROVAL DATE:**

6. Work Program Technology Rationalization Analysis

CURRENT SITUATION / INTEGRATION CHALLENGE

For the sake of this initiative, we are defining Work Program technologies as those applications that are used to guide the execution work programs and capture specific data from those same work programs. Work Program Technologies consists of tools used to support inspections, asset changes, condition monitoring, health trending, and program reporting, among other functions. These tools are often specialized based on unique work program that needs to be managed. The data these applications capture is intended to enhance work and asset management decision making and meet regulatory reporting needs

Currently, Manitoba Hydro is using over 22 different work program related technologies, ranging from shared enterprise COTS applications used by 100+ employees, to very specialized homegrown applications used by only a handful of people. There are also definite application duplications in the mix. And many applications have interfaces to other applications. As a result, the program management technology landscape has been described as a "spaghetti mess of applications" and resulting data as a "data swamp", as opposed to a data lake.

While Manitoba Hydro can never get away from having specialized program management technologies, there is an opportunity to rationalize and bundle certain similar functions into a single application. For example, many existing inspection programs can potentially be bundled to be managed and executed in one single Mobile Work Management (MWM) application while still maintaining the very unique inspection requirements. In the same vein, many asset health monitoring applications can be managed in one single Asset Performance Management (APM) application. One common denominator is that all future program management technologies must be able to leverage the single asset registry and single core management process.

In transitioning towards a limited set of Program Management Technologies that interact with the core, Manitoba hydro must first identify all the current applications used to support work programs and understand the specialized functionality of each application. Every application must also be classified in terms of their program classification such as:

- *Mobile workforce management*
- *Management of change*
- *Specialized compliance reporting, i.e. NERC*
- *Asset Health Monitoring*
- *Asset Performance Management*
- *Asset Investment Planning*

By understanding the specialized functionality required to execute your work programs and by classifying for those functionalities into program classifications, work management and asset management can provide D&T with a clear understanding of the integrated technology landscape they will need moving forward.

RECOMMENDED INITIATIVE

In order to rationalize the existing program management technologies, it is recommended that MH perform a Work Program Management Needs Analysis spanning all existing applications supporting program analysis. The Work Program Management Needs Analysis must deliver the following information:

1) *Share the leading practices and latest technologies used by Work & Asset Management Programs with team*
2) *A definitive list of all applications used to manage specialized work programs at Manitoba Hydro*
3) *A definitive program classification, in agreement with the program execution teams*
4) *A detailed list of functions and outputs from each application*
5) *A validation of which applications are still relevant and of value, are require further exploration*
6) *A clear mapping of interfaces to any existing applications and the reason for the interfaces*
7) *Detailed of the data from the core registry and transaction applications needed, in order function (asset ID, X,Y coordinates, PMs etc.)*
8) *A preliminary mapping to a possible program classification that the existing application can migrate to*
9) *Validate with D&T the technology list and share all findings*

Once the Work Program Management Needs Analysis is complete, Manitoba Hydro Work Management and Asset Management can begin working closely with D&T to identify the functions needed from their future program management applications

INITIATIVE BENEFITS

The Work Program Management Needs Analysis helps separate the EAM application needs from the work program management needs. It helps set boundaries between what needs to be managed within the core EAM and what needs to be managed via additional application and extensions that work with the EAM core.

POTENTIAL RISKS/ ROADBLOCKS	**POTENTIAL LEVERS**
• *Large number of applications to review* • *Inability to identify duplicate functionalities and capabilities between applications* • *Inability to map applications back to different application classifications*	• *Findings from Initiative 02: Define WM & AM Technology Landscape* • *D&T's current technology landscape*
DURATION: *To be Determined*	**TIMING:** *To be Determined*
KEY STAKEHOLDERS: • *AP&D, Asset Management Team* • *Operations, Work Management Team* • *D&T Team*	**RESOURCE REQUIREMENTS:** • *1 AM Data team members @ full time* • *1 WM data team members @ full time* • *D&T, consulted at 10%* • *Participation by Application Technical and Functional owners*

DETAILED INITIATIVE APPROACH:

1) *Share the leading practices and latest technologies used by Work & Asset Management Programs with team*
2) *Create a definitive list of all applications used to manage specialized work programs at Manitoba Hydro*
    a. *Leveraging the findings from Initiative 2: Define WM & AM Technology Landscape, compile a list of applications classified as "Supporting Applications"*
3) *Develop a definitive program classification, in agreement with the program execution teams*
    a. *Leveraging the key stakeholders from Asset and Work Management teams, compile a list of program classifications for supporting applications.*
    b. *Classifications must be in accordance with key functions, including but not limited to:*
        i. *Mobile workforce management*
        ii. *Asset performance management*
        iii. *Management of change*
        iv. *Specialized compliance reporting, i.e. NERC*
        v. *Asset Health Monitoring*
        vi. *Asset Investment Planning*
4) *For every application being reviewed for rationalization, perform a current state validation with regards to the value and relevance of the application in question.*
5) *Compile a detailed list of functions and outputs from each application*
    a. *For each application identified as a "supporting application", create a detailed list of functions and capabilities, i.e. data captures, asset health monitoring, etc.*
    b. *For each identified application, create a detailed list of outputs, i.e. visual work schedules, Compliance (NERC) reports*
6) *Locate the interface maps to any existing applications and validate the core reason(s) for the interfaces*
    a. *For each application, identify active interface(s) to existing applications*
    b. *Determine whether the interface is established to pull or push data*
        i. *Data pull: where data is being pulled from another application*
        ii. *Data push: where data is being pushed to be used in another application*
7) *Identify all data from the core registry and transaction application, needed by the supporting application in order to function as required*
8) *Create a preliminary mapping to a possible program classification that the application can migrate to*

a. *For each application, identify potential application classifications (i.e. AIP, APM) that the application can effectively migrate to, without loss of functionality* 9) *Validate with D&T the technology list and share all findings*
DEPENDENCIES: • *This initiative is a successor to Initiative 02: Define WM & AM Technology Landscape* • *This initiative is a successor to Initiative 04: Asset Registry Rationalization* • *This initiative is a successor to Initiative 05: Core Transaction Mapping* • *Engagement of Manitoba Hydro's functional and technical owners of the applications*
INITIATIVE SUCCESS CRITERIA: • *Detailed mapping of all applications used to support Asset and Work Management processes to one of the support application classifications* • *Information needed to define the Functional requirements of any support application required beyond EAM*
SUSTAINMENT CONSIDERATIONS: • *Regular validation with D&T to ensure alignment with their overall data governance plan* • *Period review to capture new applications or new capabilities added to existing applications*

MANAGEMENT APPROVAL: *Name & Signature*	**APPROVAL DATE:**

7. Reporting Needs Identification

CURRENT SITUATION / INTEGRATION CHALLENGE

While Manitoba Hydro work and asset management teams use reports and data queries, there is no formal documentation of existing reports and dashboards across Manitoba Hydro. This results in a lack of knowledge surrounding existing reports and their sources which can lead to duplication of efforts and mistrust in the reports. While teams show clever usage of the data to help them with their work, they are aware of gaps and limitations in what is available today.

Through stakeholder interviews and surveys, we have found a total of 558 unique reports and dashboards from the work management and asset management groups. While this is not an exhaustive list of all existing reports and dashboards, a detailed description of the captured reports, along with their sources are appended in Appendix III - Existing Reports & Dashboards.

Before moving towards an integrated technology platform, Manitoba Hydro must identify and understand the existing reports and dashboards, along with their sources and core users. This will minimize the chance of losing existing dashboards and reports after migrating to the new platform.

RECOMMENDED INITIATIVE

In order to understand all existing reports and dashboards, it is recommended that Manitoba Hydro inventory and dissect the current reports and queries used by work management and asset management teams. Understanding the current reporting needs will help to ensure that the right infrastructure and data standards are in place when transitioning to an integrated asset registry, a single core transaction application and the appropriate program support applications.

The Reporting Needs Identification initiative must provide the following outcomes:

1) *Build a comprehensive list of all reports and dashboards used to manage, monitor, and analyze functional and cross-functional activities for work management and asset management groups*
2) *Identify the author(s), common users, and the purpose of each existing report and dashboard*
3) *Identify the reports and dashboards that are vital to the business, used to guide decision making or required for regulatory reporting. For these specific reports:*
    a. *Identify the data fields and calculated fields of each existing report and dashboard, and capture existing data field maps*
    b. *Understand the raw data source(s) for each data field and each calculated field in the existing reports and dashboards*
    c. *Compile a master repository of raw data fields and the calculated fields between all existing reports, highlighting their sources*
4) *Create a master relationship diagram demonstrating interfaces between all of the data fields, calculated columns, and their raw data sources across every report and dashboard*

Once the current reporting needs have been identified, Manitoba Hydro is in a better position to ensure business-as-usual with reduced chance of losing important reports and dashboards post-migration to an integrated solution.

IMPORTANT: This initiative does not seek to identify new reports but rather focus on the existing reports. Any new reporting needs and data requirements will be generated by the Performance Management project currently in progress

INITIATIVE BENEFITS

This initiative will help ensure that the appropriate reports that exist today and are needed to run Manitoba hydro will be available and the new technology. This initiative will also help reverse engineer any specific data requirements needed for specific reports, most notably for any regulatory reporting needs.

POTENTIAL RISKS/ ROADBLOCKS	**POTENTIAL LEVERS**
• *Not all reports being identified during the exercise due to not asking the right personnel* • *True data sources being misidentified due to different data processing standards across varying personnel (Example: An Excel spreadsheet being identified as the*	• *Compilation of reports found during the EAM Operational Readiness Assessment found in Appendix III: Existing Reports and Dashboards*

data source, when the data source is actually SAP-PM data that is being loaded into the spreadsheet)	
DURATION: *To be Determined*	**TIMING:** *To be Determined*
KEY STAKEHOLDERS: • *AP&D, Asset Management Team* • *Operations, Work Management Team*	**RESOURCE REQUIREMENTS:** • *1 AM Data team members @ full time* • *1 WM data team members @ full time* • *Interviews and data gathering with report owners*

DETAILED INITIATIVE APPROACH:

1) *Compile a comprehensive list of all reports and dashboards used to manage, monitor, and analyze functional and cross-functional activities for work management and asset management groups*
    a. *This list includes emails, Excel spreadsheets, CSV files, and Power BI reports that are used for reporting*
    b. *Highlight all of the reports and dashboards that require review*
    c. *Sort the reports and dashboards that are similar to each other in terms of function/purpose into the same category (be clear that we filter down to critical reports those that impact on master data)*
2) *Identify the author(s), common users, and the purpose of each existing report and dashboard*
    a. *This exercise will ensure that the reports are still relevant to the organization post integration*
    b. *This data and the Technology Landscape will help validate Step 4, as the raw data sources should align with the applications that are relevant to each department*
3) *Identify the reports and dashboards that are vital to the business, used to guide decision making or required for regulatory reporting. For these specific reports:*
    a. *Identify the data fields and calculated fields of each existing report and dashboard, and capture existing data field maps*
    b. *Identifying data fields and calculated fields for Power BI reports can be done using Power BI's Fields windowpane NOTE: Capturing data field maps can be done in Power BI's data relationships view*
    c. *For all other formats of reports (example: an Excel spreadsheet), the data collection methods in 3(a) and 3(b) will need to be completed by interviewing the creator(s) of the report*
    d. *Understand the raw data source(s) for each data field and each calculated field in the existing reports and dashboards*
    e. *The raw data sources should ideally be applications and not a spreadsheet/separate document that is used to transform the data from an application*
    f. *Compile a master repository of raw data fields and the calculated fields between all existing reports, highlighting their sources*
    g. *Any gaps in information should be filled before the next step, as this master repository is crucial for maintaining information when moving to the integrated model*
    h. *Create a master relationship diagram demonstrating interfaces between all of the data fields, calculated columns, and their raw data sources across every report and dashboard*
    i. *Any duplicates of raw data sources should be removed before creating this diagram in order to keep the relationship diagram as concise as possible*

DEPENDENCIES:

- This initiative is a successor to Initiatives 01: Stakeholder Engagement
- This initiative is a successor to Initiatives 02: Define Technology Landscape

INITIATIVE SUCCESS CRITERIA:

- *Able to provide D&T with a master repository of raw data fields and the calculated fields between all existing reports alongside their raw data sources*
- *Able to provide D&T with a master relationship diagram demonstrating interfaces between all of the data fields, calculated columns, and their raw data sources across every report and dashboard*

• *There is no loss of reports or dashboards during and after the transition to the new integrated model*	
SUSTAINMENT CONSIDERATIONS: • *The master data field/source repository and master relationship diagram are updated as new reports are created*	
MANAGEMENT APPROVAL: *Name & Signature*	**APPROVAL DATE:**

8. Meta & Master Data Standards

CURRENT SITUATION / INTEGRATION CHALLENGE

Today, Manitoba Hydro is using multiple applications as their asset registries and to manage their core transaction. It was confirmed through the assessment that a common meta and master data standard across different applications does not exist. Each application was configured to meet specific business needs at a given point in time, resulting in a lack of standards and ongoing governance.

A key step towards an integrated work and asset platform requires Manitoba Hydro to align on a set of corporate standards for meta and master data structures. Meta and master data structures applies to all fields supporting the asset registry and the core transactions related to work. And while there is a need to reconcile existing master and meta data standards, it is of significant importance that the standards do not compromise the core applications, nor require any customization.

Aligning and standardizing the meta and master data is a vital prerequisite to successfully creating an integrated work and asset management environment. It ensures that all the required fields are made available and that the appropriate rules and restrictions are applied to the fields. Standardization of meta and master data helps ensure data integrity and completeness irrespective of the energy system they are being used for.

RECOMMENDED INITIATIVE

In order to eventually migrate Manitoba Hydro's assets to a single asset registry and single core transaction application, a standardization of the meta and master data is required. The intent of this initiative is to compare and reconcile the meta and master data structure in the existing registries and transaction applications and define one comprehensive standard. The initiative must also consider the mandatory requirements and the level of flexibility within the target applications that will be providing the asset registry and core transaction management.

To standardize the meta and master data structure for the existing applications, Manitoba Hydro must:

1) *From Initiative 2 – Asset Registry Rationalization, compile a list of asset registries and reconcile the meta and master data for those applications*
2) *For every applicable fields in all current applications and in the target application, compare the existing field names and rationalize them (i.e. Serial No. Vs. Serial Number Vs. Serial #)*
3) *For every applicable fields in all current applications and in the target application, compare the meta data rules governing the data fields including but not limited to data types (binary, text, date, time, etc.), format, validation rules (mandatory vs. optional fields), and create data standards from this comparison*
4) *For every applicable fields in all current applications that need to be migrated, create a migration script to support future load sheets*

Once the existing meta and master data have been identified, analyzed, and reconciled, a meta and master data standard can be established. Establishing a standard is a required to ensure the successful migration from decentralized asset registries into a single integrated registry. This phase also opens the door to begin addressing targeted work and asset management enhancement.

INITIATIVE BENEFITS

Once the meta & master data standards are defined, D&T can apply the standards are followed in the new integrated registry so as to ensure that the data quality allows for WM and AM analytics and informed decision making.

POTENTIAL RISKS/ ROADBLOCKS	**POTENTIAL LEVERS**
• *Possible misalignment on what should be categorized as meta or master data between varying personnel* • *D&T timing needs to be understood and followed to ensure proper synchronization*	• *This may be an effort being led by D&T, look to coordinate with D&T to define procedure and roles* • *D&T's implementation of Microsoft Azure Purview will help maintain any meta/master data standards created in this initiative*
DURATION:	**TIMING:**

To be Determined	*To be Determined*
KEY STAKEHOLDERS: • *AP&D, Asset Management Team* • *Operations, Work Management Team* • *D&T Team*	**RESOURCE REQUIREMENTS:** • *1 AM Data team members @ full time* • *1 WM data team members @ full time* • *1 D&T data team members @ full time* • *Workshop participation by process and program stakeholders*

DETAILED INITIATIVE APPROACH:

1. *From Initiative 2 – Asset Registry Rationalization, compile a list of asset registries and reconcile the meta and master data for those applications*
   a. *The reconciliation of meta and master data should align across every business unit to ensure a holistic repository is created*
2. *For every applicable fields in all current applications and in the target application, compare the existing field names and rationalize them (i.e. Serial No. Vs. Serial Number Vs. Serial #)*
   a. *Nomenclature standards should be defined in order to rationalize the existing field names and to ensure that any future fields adhere to the data standards (Example: Field names should have no spaces and start with a lowercase letter, and any words following the first word should have the first letter capitalized - "MasterData")*
3. *For every applicable fields in all current applications and in the target application, compare the meta data rules governing the data fields including but not limited to data types (binary, text, date, time, etc.), format, validation rules (mandatory vs. optional fields), and create data standards from this comparison*
4. *For every applicable fields in all current applications that need to be migrated, create a migration script to support future load sheets*

DEPENDENCIES:

- *This initiative is a successor to Initiative 02: Define WM and AM Technology Landscape*
- *This initiative is a successor to initiative 04: Asset Registry Rationalization*
- *This initiative is a successor to initiative 05: Core Transaction Mapping*

INITIATIVE SUCCESS CRITERIA:

- *The initiative will validate that an integrated set of master & meta data standards can be applied for work and asset management in the EM and GIS application.*

SUSTAINMENT CONSIDERATIONS:

- *Leverage the Microsoft Azure Purview tool set to govern and sustain master and meta data decisions*

MANAGEMENT APPROVAL: *Name & Signature*	**APPROVAL DATE:**

9. Art of the Possible & Use Cases Identification

CURRENT SITUATION / INTEGRATION CHALLENGE

During the assessment, it was determined that Manitoba Hydro employees are very clever in determining how to execute their work using the limited digital solutions at their disposal. As such, it can be very difficult to imagine the possibilities in a new digital landscape that have never been seen before. As a result, one of the likely limitations with leveraging the new digital environment may be one of imagination and understanding the possibilities.

RECOMMENDED INITIATIVE

To better take advantage of the expanded digital capabilities and improve the ask to D&T, , it is recommended that selected Manitoba Hydro WM and AM team members learn more about what is possible in a cloud environment supported by 5G and the use of a data lake. The team should explore digital WM and AM use cases from the power utility sector and beyond.

In order to better understand the art of possible and to identify appropriate use cases, it is recommended that Manitoba Hydro:

1. *Provide stakeholders with an understanding of the new digital environment capabilities*
2. *Provide demonstrations of the tools and technologies that will be used for Work and Asset management*
3. *View use cases related to the power / utility industry and other large asset owning corporations*
4. *Identify use cases most relevant to Manitoba Hydro's many work and asset management needs*

By better understanding what is possible with the digital tools that Manitoba Hydro will be acquiring. it becomes much easier to identify relevant use cases of that technology solving real world problems.

INITIATIVE BENEFITS

By identifying appropriate use cases early in the digital tool development cycle, it becomes much easier for D&T to help provide those types of functionality.

POTENTIAL RISKS/ ROADBLOCKS	**POTENTIAL LEVERS**
• *Unclear commitment to providing advanced functionality to different work teams* • *Unclear timeline as to when the technologies will be rolled out in the various OPS and AM teams*	• *There is buy-in by influential leaders that the current technology has hit its limitations and that a new environment is needed* • *The list of use cases is growing at a rapid pace*
DURATION: *~ 8 -12 weeks to prepare and perform a proper art of the possible review and to present appropriate use cases to appropriate for the many different teams and programs across the whole utility – To be Reviewed*	**TIMING:** *To be Determined*
KEY STAKEHOLDERS: • *AP&D, Asset Management team* • *Operations, Work Management team*	**RESOURCE REQUIREMENTS:** • *1 AM Data team members @ full time* • *1 WM data team members @ full time* • *D&T, consulted at 20%*

DETAILED INITIATIVE APPROACH:

1. *Provide stakeholders with an understanding of the new digital environment capabilities*
    a. *Research on new digital capabilities pertaining to Work and Asset Management activities*
    b. *Prepare and deliver targeted workshops and communications with key stakeholders to raise awareness on new digital capabilities available in the market*
2. *Provide demonstrations of the tools and technologies that will be used for Work and Asset Management*
    a. *Perform targeted workshops with key stakeholders to demonstrate the capabilities of alternative tools in the market for conducting different specialized work activities*

3. *Share use cases related to the power / utility industry and other asset intensive corporations*
    a. *Research on state-of-the-art technologies and adaptations of innovative solutions for performing Work and Asset Management activities in the utilities and other asset intensive industries, i.e. oil and gas, mining, transportation, etc.*
    b. *Create use-cases to showcase the benefits in adapting new digital solutions pertaining to Work and Asset Management activities. Use cases should be comprised of at least these following three sections:*
        i. *Challenge: Describing the challenges faced by the organization prior to implementing new solutions. In this section, the "previous ways of working" should be described*
        ii. *Solution / Approach: Describing the solution adapted by the organization in tackling the challenges identified*
        iii. *Results / Impact: Quantitative and qualitative impacts of the change*
4. *Identify use cases most relevant to Manitoba Hydro's many work and asset management needs*

DEPENDENCIES:

- *This initiative is a successor to Initiative 06:* Work Program Technology Rationalization Analysis

INITIATIVE SUCCESS CRITERIA:

- *Creating a level of understanding and excitement by the various Manitoba Hydro program delivery teams at the prospect of new technology solutions they can request moving forward*

SUSTAINMENT CONSIDERATIONS:

- *Not applicable*

MANAGEMENT APPROVAL:	**APPROVAL DATE:**
Name & Signature	

Appendix II. Technology Landscape

The applications captured in this Technology Landscape is a snapshot of the applications that were captured amongst the 19 interviewees that were engaged for this assessment. A few important notes:

- The list of applications below is non-exhaustive and requires growth and expansion of content
- The landscape acts as a support and starting point to Initiative 2 outlined in the main body of this document
- It should be noted that no demonstrations were done during the assessment and that the interviews were conducted verbally and on a one-to-one basis
  - Therefore, there is a data bias in the information below which is skewed by the use-case i.e. limited capacity to which each employee uses the application
- In addition, there is a list of applications included below that should be considered for future investigation that was not included in the scope of this assessment

As a result, the captured in the following pages should be considered as start point for the more comprehensive development of the Technology Landscape.

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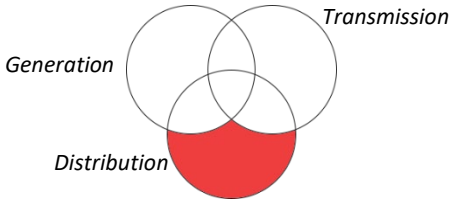
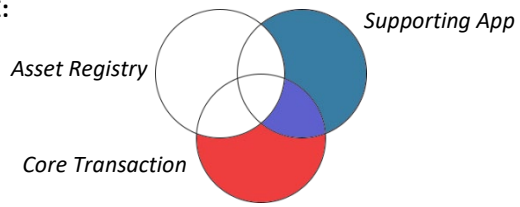
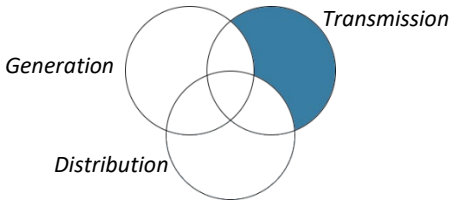
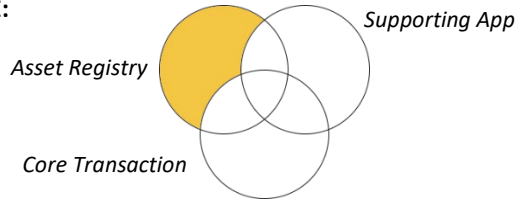
01. Banner

APPLICATION NAME: *BANNER CIS*	**CODE NAME:** *Banner*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 
APPLICATION DESCRIPTION: • *Banner is used as a customer account management system*	
FUNCTIONS & CAPABILITIES: • *Premise, account management, billing, meter information, work management for meters, Service Order creation that goes to MWM for planning/scheduling/assigning/executing, service completion data returns* • *Some metering is done in Banner that is not strictly Distribution* • *Energized Customer, asset registry for the premise* • *Requests, turn on-offs, meter swaps, billing, no planning/scheduling/assigning/capturing* • *Inventory and Inspection Data Capture and Reporting* • *Inventory for customer appliances, inspection data for permit*	
CORE USERS: *Customer contact center, Distribution O&M staff, City of Winnipeg, Click Before You Dig external vendors (anyone customer facing)*	**FUNCTIONAL KEY CONTACT:** *Coralee Crowe*
INTERFACING APPLICATIONS: *SFM; eGIS; MWM; OMS; CSI*	**DEVELOPER DETAILS:** *ESRI ArcGIS*
REMARKS & WHAT WE HEARD: • *MH has a highly customized MWM due to Banner, they are now undoing the customization* • *Banner is clunky and has a non-friendly user interface* • *Banner is time intensive for data management*	
INTERVIEWEES: *Kevin Morgenstern, Coralee Crowe*	

02. BrassCap

APPLICATION NAME: *Brass Cap – Survey Control Management System*	**CODE NAME:** *Brass Cap*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *The Survey Control Management System, Brass Cap, is a centralized repository that enables Manitoba Hydro to readily access, manage and disseminate Survey Control information*
- *Brass Cap is a specialized survey monument Asset Registry and is only used in Transmission*
- *Manitoba Hydro uses ground-based survey control points (physical monuments) to provide horizontal and vertical control for surveying, mapping, and construction projects*
- *These points span the entire Province and are provided by a wide variety of agencies internal and external to Manitoba Hydro including Federal and Provincial Departments*
- *The application will store GIS features to help users to better plan survey projects and will store Survey Features that will provide the detailed information such as values, its established purpose, status and links to related reports and images*

FUNCTIONS & CAPABILITIES:

- *Used to check-off monument conditions and when they were used last*
- *Everything is built and referenced to a coordinate system, which is captured in ESRI GIS*
- *Business rules are associated with each item to define the data models*

CORE USERS: *Survey Control Teams*	**FUNCTIONAL KEY CONTACT:** *Jack Carter*	**TECHNICAL KEY CONTACT:** *N/A*
INTERFACING APPLICATIONS: *WISKI*	**DEVELOPER DETAILS:** *In-House Application*	

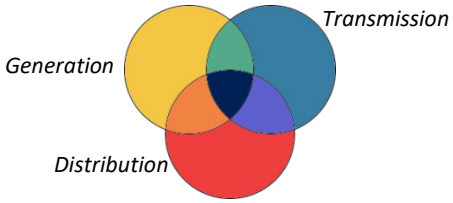
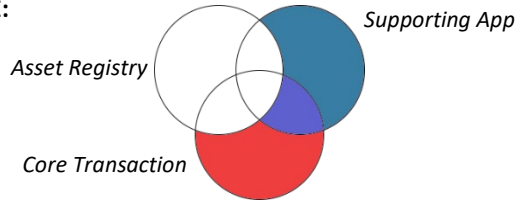
REMARKS & WHAT WE HEARD:

BrassCap does not trigger work based on the data captured. For additional details to what is captured in BrassCap, technicians must speak to surveyors.

INTERVIEWEES:

Rob Gerry

03. C55

APPLICATION NAME: *CopperLeaf C55 - Asset Investment Planning*	**CODE NAME:** *C55*
APPLICABLE ENERGY SYSTEMS: 	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *C55 is a modular AIP application which enables Power Supply to prepare short-term and long-term (20-year) capital spending plans for aging asset replacement (or refurbishment) based on balancing equipment condition and performance with available resources while managing risk*

FUNCTIONS & CAPABILITIES:

- *Value optimization of projects and investments, ranked by added value to MH*
- *C55-CVF specifically is used to prioritize investments for capital projects, capital portfolio management, and asset planning*
- *C55 has a predictive analytics piece (asset condition, lifecycle impacts, modelling asset life) and aids in cost benefit analysis and risk reduction*
- *C55 manages the capital request process as a whole*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Asset Planning & Delivery, Finance, Program managers, AM capital support, management, accounting, Project managers	*Krista Halyko/* *Kathy Allard (Generation)*	*Lisa Legge*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
RMS; SAP-PM; SAP-PS	*Copperleaf, Application: C55, Version 23*

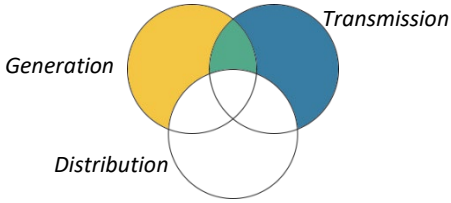
REMARKS & WHAT WE HEARD:

- *C55 does not track asset health index, remaining life, or risk threshold being exceeded- that is being done in RMS*
- *Generation is most advanced in its use of C55, it's limited in the other business units and is just used for value prioritization.*
- *There is nothing in C55 that isn't in EAM or DMPS*
- *C55 does not pull data from source systems, the user needs to replicate asset information within the application*
- *C55 was rolled out a few years back, management may look into leveraging the application further in the long-term*
- *C55 is seen at the same level as SAP in terms of poor user experience- the interface is not easy or intuitive, the data loading is not automated, and its associated software documentation is out of date*
- *C55 has a narrow use-case*

INTERVIEWEES:

Kevin Morgenstern, Maria Neufeld, Mike Smith, Owen Preston, Kevin Morgenstern, Bridget Robinson

04. COLA

<table>
<tr><td>APPLICATION NAME:
COLA</td><td colspan="2">CODE NAME:
COLA</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
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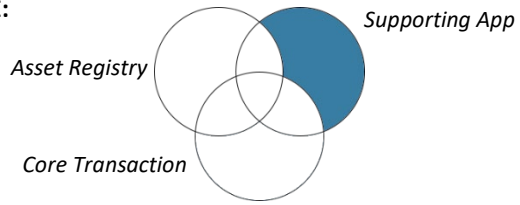
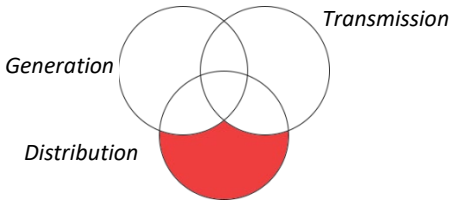
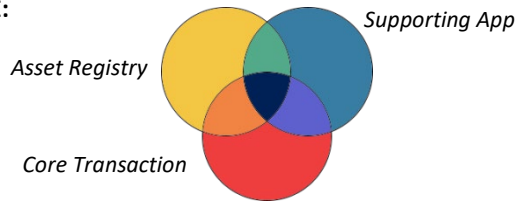
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
• Outage reporting and planning tool</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
• COLA may or may not be used for Work Management
• COLA provides asset condition and health monitoring
• COLA is used to review previous outage records
• Used for Outage scheduling</td></tr>
<tr><td>CORE USERS:
System Control Department</td><td>FUNCTIONAL KEY CONTACT:
Ask System Operations</td><td>TECHNICAL KEY CONTACT:
Tom Tonner</td></tr>
<tr><td>INTERFACING APPLICATIONS:
SAP-PM, Meridium</td><td colspan="2">DEVELOPER DETAILS:
Sunnet</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
• There is value in integrating COLA as a part of a centralized integrated data and technology platform
• COLA is a decision support tool
• COLA is due for a replacement</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Adele Poulin</td></tr>
</table>

05. DMPS

APPLICATION NAME: *SAP-PM*	**CODE NAME:** *DMPS*
APPLICABLE ENERGY SYSTEMS: 	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *SAP Plant Maintenance - Distribution Maintenance Planning System (DMPS) Reporting through SAP BW and SAP BusinessObjects*
- *SAP-PM is an Asset Registry, Core Transaction application, and Supporting Application that is used in Distribution*

FUNCTIONS & CAPABILITIES:

- *DMPS provides work management analytics*
- *DMPS is an asset registry for equipment*
- *DMPS's functionality is based on IPSEDA: the application provides notifications, preventative maintenance, routine maintenance and work management for maintenance of assets*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Field technicians, supervisors, planners/schedulers? *Planners, schedulers, operators, supervisors*	*Corey Bobinski*	*Lisa Legge*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
RMS, C55, SAP-MM, SAP-HR, MWM, eGIS, Power BI, Azure Synapse and Purview and ML (2022)	*SAP, Application: ECC, Version: Suite ON HANA 2.0*

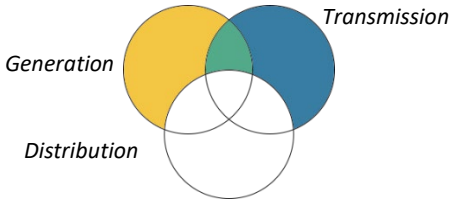
REMARKS & WHAT WE HEARD:

- *Distribution is using two systems for asset registry, one of which is eGIS (linear assets) and one of which is DMPS (stationary assets)*
- *Interface is a large challenge, collecting electrical test data (power factor) for example- now collecting data in RMS instead (note this is a dated example). Need to make data easy to load into the system*

INTERVIEWEES:

Coralee Crowe, Brent Jorowski, Bridget Robinson

06. EAM

<table>
<tr><td>APPLICATION NAME:
SAP-PM</td><td colspan="2">CODE NAME:
EAM</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
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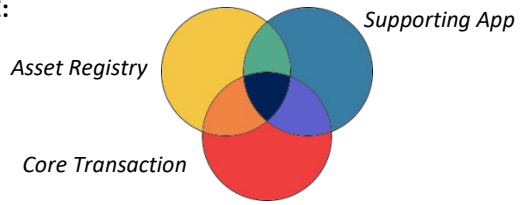
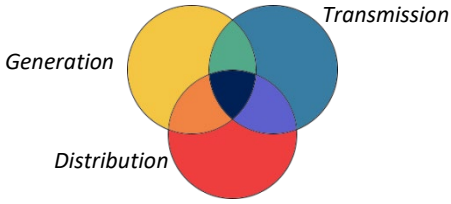
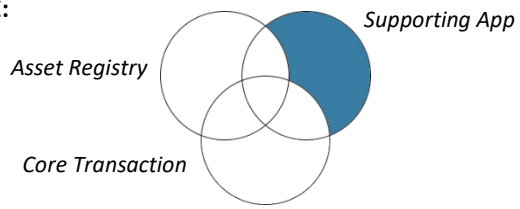
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
• SAP Plant Maintenance - Enterprise Asset Management (EAM) Reporting through SAP BW and SAP BusinessObjects
• EAM is an Asset Registry, Core Transaction application, and Supporting Application that is used in Generation and Transmission</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
• EAM provides data management, maintenance planning, measurement points, documentation
• EAM contains inspection data, preventative maintenance i.e. test templates, labour against work order
• System of record for assets and asset attributes and the work that’s done on the assets
• EAM manages non-asset related work: allows to schedule people to a capacity for non-asset work (training, admin, shop-duties)
• Generation, HVDC, Telecom, and Systems Support mainly use EAM and less so, Indigenous Relations
• EAM contains failure codes: only one asset class has failure catalogs, this is being done by engineering and is taking long, the rest are based on text-based notes
• EAM contains NERC Inspection and measuring points, compliance reporting</td></tr>
<tr><td>CORE USERS:
Field technicians, Supervisors, Planners, Engineering Sections, Engineering Technicians, Admin, Operations, Asset Management, Operators</td><td>FUNCTIONAL KEY CONTACT:
Karla Skulomski</td><td>TECHNICAL KEY CONTACT:
Lisa Legge</td></tr>
<tr><td>INTERFACING APPLICATIONS:
Power BI; RMS; C55; LIMS; MWM; Azure Synapse and Purview and ML (2022); Promethius; SAP Suite</td><td colspan="2">DEVELOPER DETAILS:
SAP, Application: ECC, Version: Suite ON HANA 2.0</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
• Check with System Support (Carl Penno) to see where DCSI's are captured
• Pain point: need to go back and fix maintenance measurement points, all meta/master is consistent within the EAM, Maintenance Plan Review Phase 3 will help clean up Equipment and FLOC data: mostly OK, data on the work side is messy
• Pain point: No quality control when inputting data, no feedback loop for analysis
• Very few fields within EAM in transactional data that are structure consistently to allow for PM and AM analysis
• Mobile Work Management: Non-existent, Potential future project
• Data quality not granular, for example, material cost is assigned to a general line as opposed to a specific item</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Brent Jorowski, Alan Chaychuk , Andrew Walters, Owen Preston, Bridget Robinson, Karla Skulmoski</td></tr>
</table>

07. EDMS

APPLICATION NAME: *Engineering Drawing Management System*	**CODE NAME:** *EDMS*
APPLICABLE ENERGY SYSTEMS: 	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *Engineering Drawing Management System - repository to store the corporations 2D engineering drawings.*
- *EDMS is a Supporting Application and is used across Generation, Transmission, and Distribution*

FUNCTIONS & CAPABILITIES:

- *Registry for documents in general, but mostly engineering drawings.*

CORE USERS: *N/A*	**FUNCTIONAL KEY CONTACT:** *N/A*	**TECHNICAL KEY CONTACT:** *N/A*
INTERFACING APPLICATIONS: *Documentum / WorkSmart*	**DEVELOPER DETAILS:** *Not Captured*	

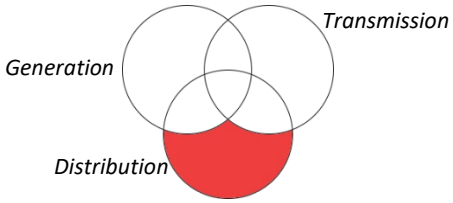
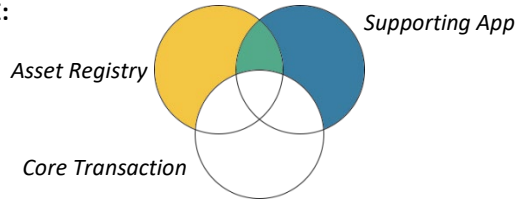
REMARKS & WHAT WE HEARD:

- *EAM does not hold engineering drawings- EDMS does, and it's not connected to EAM*
- *Documentum can create or import content into Documentum folders while also gaining access to the complete range of Documentum content management capabilities such as check-in/checkout editing, security, version control, content lifecycles, and search.*

INTERVIEWEES:

Kaitlin Fritz

08. eGIS

APPLICATION NAME: *eGIS (Enterprise Geospatial Information System)*	**CODE NAME:** *eGIS*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *3rd party GIS system used to design and store gas and electric distribution facilities and corresponding network connectivity*

FUNCTIONS & CAPABILITIES:

- *Geospatial analysis*
- *The one source of truth for capturing events (date, type of failure)*
- *Supports reporting*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Department manager position and down	*Joe Waatainen*	*Jamie Andreychuk*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
Smallworld Geospatial Analysis; SFM	*GE Smallworld*

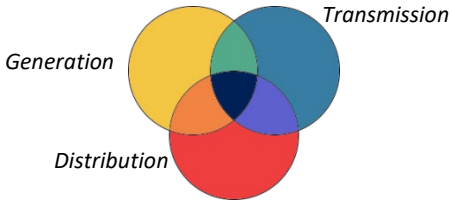
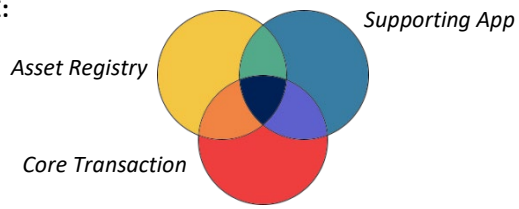
REMARKS & WHAT WE HEARD:

- *eGIS is used daily*
- *There is a rigorous process to keep it up to date on natural gas processes, however electric distribution data may be of lower quality*

INTERVIEWEES:

Kevin Morgenstern

09. FRS

APPLICATION NAME: *Facility Ratings System*	**CODE NAME:** *FRS*
APPLICABLE ENERGY SYSTEMS: 	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *Facility Ratings was designed to effectively support Transmission System Operations, and all other operating business units, in meeting NERC Reliability Standards and audit processes*
- *FRS manages equipment data and provides traceability to changes made to equipment ratings*
- *The primary applications are a desktop-based administration application that provides read/write access to equipment and line ratings and a read-only web-based application for consumption of ratings data and reports*

FUNCTIONS & CAPABILITIES:

- *FRS contains linear and stationary assets for all three energy systems*
- *FRS shows connection points between energy streams, equipment, and capabilities in a linear set, so that all three business units are aligned- any changes made-bottlenecks and downstream changes are identified between BUs*
- *FRS allows understanding of system integration of electrical assets- it can be used to look up the voltage and rating of an asset to confirm connection points and therefore, aids in updating diagrams.*
- *FRS aids in work identification, compliance reporting i.e. NERC, and Summer/Winter Ratings*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Stations Design, Generation Design, Grid Infrastructure Planning	*Roger Chan*	*Michael Liu*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
N/A	*In-House Application*

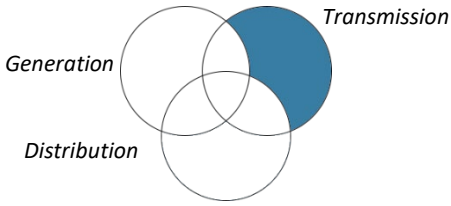
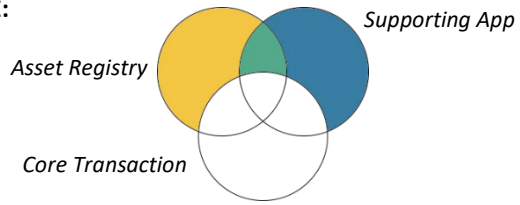
REMARKS & WHAT WE HEARD:

- *This application is necessary for NERC- FRC standard requirements*
- *On limited assets, the information on FRS is limited to the scope of study that will be conducted on the assets*

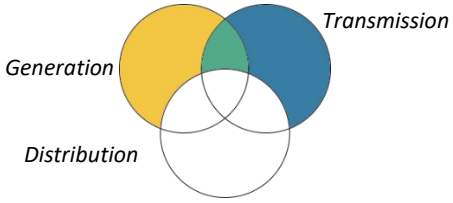
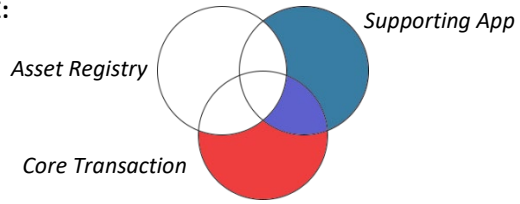
INTERVIEWEES:

Jules Gareau, Maria Neufeld, Adele Poulin

10. ICCMS

<table>
<tr><td>APPLICATION NAME:
Industrial Control Configuration Management System</td><td colspan="2">CODE NAME:
ICCMS</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
</td><td colspan="2">CORE PURPOSE:
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
• ICCMS provides staff with the ability to manage configuration firmware, software, setting files, PC based system BIOS firmware, OS versions, patch history, workstation drive images, and software applications for industrial control devices</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
• Critical Infrastructure Protection (CIP) metadata management
• CIP information is split between Relay Tracker (moving -> RMS), Remedy, and ICCMS
• Compliance Reporting i.e. NERC Support, Repository</td></tr>
<tr><td>CORE USERS:
Converter station, Systems Support, Field Technicians, Managers</td><td>FUNCTIONAL KEY CONTACT:
IT: Ask David Birch, Rajitha Pereira</td><td>TECHNICAL KEY CONTACT:
David Birch</td></tr>
<tr><td>INTERFACING APPLICATIONS:
N/A</td><td colspan="2">DEVELOPER DETAILS:
Unknown (it is a COTS application)</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
• Working for what it is needed, there are duplicate applications and is worth exploring
• The user experience is fair, the user interface is similar to Windows Explorer</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Mike Smith</td></tr>
</table>

11. JobTrac

APPLICATION NAME: *JobTrac*	**CODE NAME:** *JobTrac*
APPLICABLE ENERGY SYSTEMS: 	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *The purpose of this application is to record information and act as an Engineering Work Management system*
- *JobTrac is a project management tool- Information is organized by project with links to station, section within the GME department, project staff, project comments and project documents.*
- *In 2017 Technical Services Job services data and functionality was merged into GME JobTrac*
- *JobTrac is a Core Transaction application and Supporting Application that is used in Generation and Transmission (HVDC only)*

FUNCTIONS & CAPABILITIES:

- *In Work Management, JobTrac is used as a database that identifies work coming in from generating stations which need engineering resources*
- *Occasionally used in Asset Management for identifying resources (including capital resources and programs) and for forecasting*
- *All asset assessments within Generation are initiated in this application*
- *JobTrac facilitates identification and prioritization of work that require significant volume of resources: O&M and capital budget, captures, scores, and is then funneled to Asset Management and design*
- *JobTrac captures reports, test results (manual entry) and is used as a KPI raw data pull into Power BI for resource loading, schedule of work, task completion, and task completion as a percentage total of workflow*
- *JobTrac is used to build work packages and tracks information as it is collected: who is assigned, when the work starts, what kind of asset is being dealt with, etc.*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Maintenance Engineering Groups (Generation), Site Operation Staff, Asset Management	*Rob Jensen/Kris Harber/Krista Haleynko*	*Rob Jenson/Krista Haleynko*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
N/A	*In-House Application*

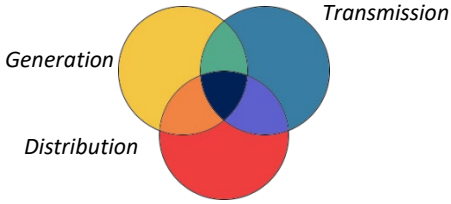
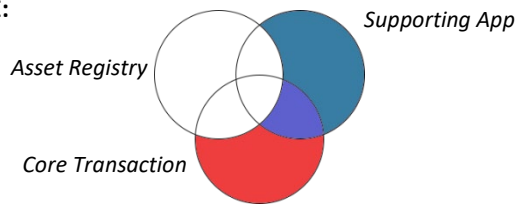
REMARKS & WHAT WE HEARD:

- *CITRIX is used to open JobTrac and the application runs on Paradox*
- *The software Jobtrac is based on is now obsolete and MH is in process of replacing it- it is time to move to something more functional due to issues in the past*
- *MH is looking into adding on JobTrac to Transmission & Distribution*
- *New JobTrac replacement is an SAP structure- not sure if it integrates into SAP-PM*

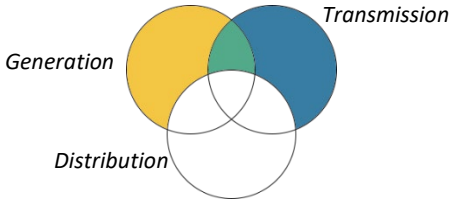
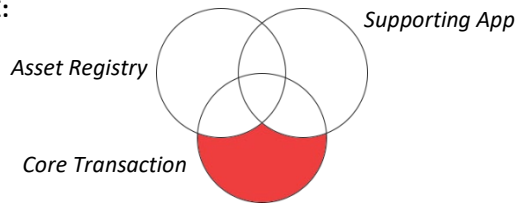
INTERVIEWEES:

Rejan Sayak, Jules Gareau

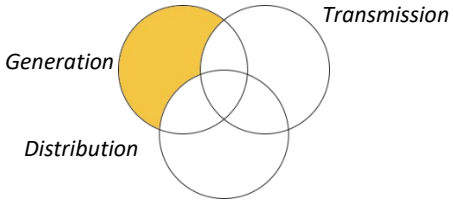
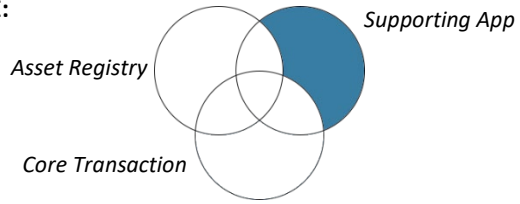
12. LIMS

<table>
<tr><td>APPLICATION NAME:
Lab Information management System</td><td colspan="2">CODE NAME:
LIMS</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
</td><td colspan="2">CORE PURPOSE:
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
• This application provides users the searching and reporting ability on test results stored in the Corporate LIMS system
• Parts of the application are available corporate wide.
• The majority of the accessible to the Chemical Laboratory Services used to search LIMS v10 and LIMS v9 data</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
• LIMS acts as a system of record for any asset's test results, oil samples from electrical equipment and captures the results against assets
• LIMS may be used for insulating oil testing, lubricating oil testing, and water testing
• LIMS is used by oil processing labs to record transactions on oil samples, stores results, schedules analysis, and generates a barcode
• LIMS also acts as a reporting and flagging tool and makes maintenance frequency adjustments</td></tr>
<tr><td>CORE USERS:
Field technicians, Lab staff</td><td>FUNCTIONAL KEY CONTACT:
Namal Fernando, Mark Dalmaijer</td><td>TECHNICAL KEY CONTACT:
Namal Fernando, Charles DuCharme</td></tr>
<tr><td>INTERFACING APPLICATIONS:
RMS, SAP-PM, Excel</td><td colspan="2">DEVELOPER DETAILS:
Star LIMS, Application: LIMS, Version 10</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
• LIMS works great and direct logging enablement is time efficient
• An upgrade is happening soon with direct logging from RMS</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Bridget Robinson, Maria Neufeld, Shaun Vinthers, Rejan Sayak</td></tr>
</table>

13. Materials Database

<table>
<tr><td>APPLICATION NAME:
SAP-MM</td><td colspan="2">CODE NAME:
Materials Database - ZParts</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
</td><td colspan="2">CORE PURPOSE:
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
This SAP-Based application functions as an order-entry system and as a project planning system
It tracks the material ordered for projects in Electrical Engineering. It is also used to facilitate estimates and to copy/edit previously ordered material for inclusion in new projects
Materials Database is a Core Transaction software and is used across Generation and Transmission (HVDC only)</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
Used in System Support and Telecom
In the EAM, Z Parts is a custom SAP transaction for requesting material from vendors or internal stock
For spares, some entries are built as material, equipment, or both through serialized equipment functionality
Used to perform all material transactions (reservations, orders, issuing, assignment, all MRO transactions)</td></tr>
<tr><td>CORE USERS:
Technicians, Admins, Supervisors, anyone who needs to request a part
Maintaining data: corporate material ID group, data management team, local storekeepers, corporate supply chain personnel</td><td>FUNCTIONAL KEY CONTACT:
Andrew Walters</td><td>TECHNICAL KEY CONTACT:
Corporate: SCM Business Enablement</td></tr>
<tr><td>INTERFACING APPLICATIONS:
SAP Suit</td><td colspan="2">DEVELOPER DETAILS:
SAP, Application: SAP-MM, Version ECC</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
Critically important and any integration needs to include material and inventory management
Materials Database works well within in its sphere, but in different spheres it does not work due to data inconsistencies. Lack of visibility due to having 3 plants
Other corporate wide Materials Databases exist: ZM Cat Plant 3000 which is linked to SAP/Corporate landing page Empower, Waverly Service Centre for Plant 3200, and another database for 3400 (3200 and 3400 databases aren't used often)
Valuation for Work Orders is set as zero, therefore inventory is inaccurate
Inventory count data quality has been better over the past few years</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Andrew Walters</td></tr>
</table>

14. Meridium

APPLICATION NAME: *Meridium APM Framework*	**CODE NAME:** *Meridium*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *Meridium software consisting of the base Meridium APM Framework and the following modules : Generation Management (event reporting), Hourly Generation (generation station operating data), Policy Manager, OSI-OPC Connector, RCM (Reliability Centered Maintenance) and FMEA (Failure Modes & Effects Analysis), RCA (Root Cause Analysis)*
- *The system is used to gather the NERC data required to meet MISO and GADS reporting standards. The system is used to collect and verify generating station event and operating data. Station operating is input to HYDAMS WISKI system for use in generation planning*

FUNCTIONS & CAPABILITIES:

- *Meridium provides performance monitoring and output data to the corporate site*
- *Meridium has a RCM module- RCM facilitation includes a form for RCM analysis during maintenance. Asset Management captures information related to forced outages (Generation only) and workflows into engineering support*
- *Work flow, possibly root cause analysis: forced outages only, doing more storage of failure code, proposed resolution (fix/send to capital against the asset) at this point, not being used for data mining as it should be, generation start/stop/runtime functionalities*
- *Meridium assists in outage workflows*
- *Meridium provides Root Cause Analysis and Performance Reporting*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Maintenance Operations Engineering Group, Asset Management, physical operators, operations supervisor, Engineering Maintenance for RCA, asset risk management and monitoring	*Earl Brown, Chris Mazur*	*Unknown*

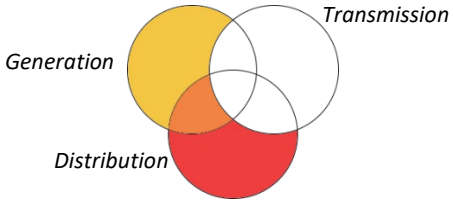
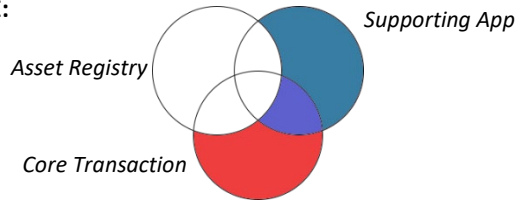
INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
COLA; Power BI; SAP(?)	*GE, Application: Meridium, Version 3.6 050*

REMARKS & WHAT WE HEARD:

- *Want analytic capabilities to help plan work, investigation into maintenance standards, KPIs*
- *Root cause information is not captured against an asset record, which is a gap in the system*
- *MH is not using Meridium's APM functionality and Meridium does not use SAP-PM registry as master record*

INTERVIEWEES: *Rejan Sayak, Jules Gareau*

15. MWM

APPLICATION NAME: *PragmaCAD*	**CODE NAME:** *MWM*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *MWM enables all aspects of dispatching and field operations.*
- *MWM can be used in four different modes: monitoring, call-taking, dispatching, and supervising*

FUNCTIONS & CAPABILITIES:

- *Work Management tool: Schedule and dispatch work for CAD-only jobs to create jobs and allocate time and material*
- *For a replacement/repair, MWM will update information in DMPS and close the task and then update in eGIS*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Field technicians, Schedulers, Dispatchers	*Coralee Crowe*	*Jason Bergthorson*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
DMPS; Banner; SAP-CS; OMS (Outage Management System); SFM; eGIS (standalone)	*CGI, Application: PragmaCAD*

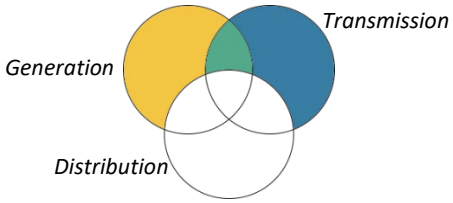
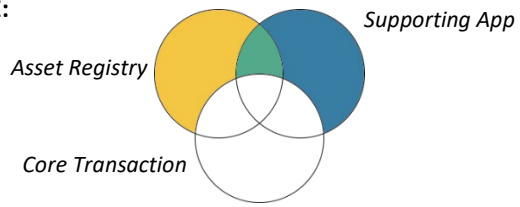
REMARKS & WHAT WE HEARD:

- *Needs to be field friendly*
- *Works well for what you're "supposed to be doing", however difficult to train to use as the user experience is poor- the transition to OpenGrid should improve this aspect*

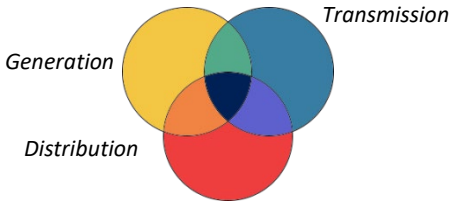
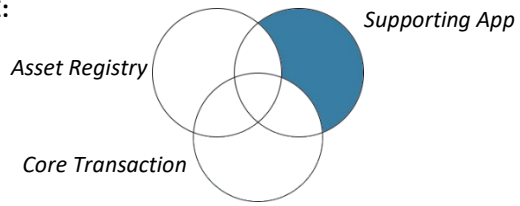
INTERVIEWEES:

Coralee Crowe

16. Relay Tracker

<table>
<tr><td>APPLICATION NAME:
Relay Tracker</td><td colspan="2">CODE NAME:
Relay Tracker</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
</td><td colspan="2">CORE PURPOSE:
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
• Relay Tracker is supported by the Business (Transmission - Protective Maintenance Engineering)
• It is a database tracking relay events and is protected under NERC-CIP5</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
• Relay Tracker Lite: RMS reads from this application to update relay data, automates email reporting on discrepancies. Data integrity functionality
• All relay master data including NERC/non-NERC resides in Relay Tracker</td></tr>
<tr><td>CORE USERS:
Operations Business Unit and Solutions, Protection Maintenance Engineering</td><td>FUNCTIONAL KEY CONTACT:
N/A</td><td>TECHNICAL KEY CONTACT:
Gary Lussier</td></tr>
<tr><td>INTERFACING APPLICATIONS:
RMS</td><td colspan="2">DEVELOPER DETAILS:
In-House Application</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
• Relay Tracker was supposed to be discontinued in 2018 according to a supporting document given to the assessment team by Work Management</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Shaun Vinthers</td></tr>
</table>

17. Remedy

APPLICATION NAME: *Remedy*	**CODE NAME:** *Remedy*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *Change management application, used as an IT help desk*
- *Remedy is a Supporting Application and is used in Generation, Transmission, Distribution and System Support*

FUNCTIONS & CAPABILITIES:

- *Ticketing system for IT, change requests for EAM, eForms for WM to request work and for multi-approval workflows (Remedy is back-end maybe)*
- *Contains NERC evidence records, specifically for HVDC equipment (Ask Derek Acres)*

1. *There are multiple sub-systems of Remedy: 1) Service Hub, 2) Management of Change (MoC), 3) Workflow Management (eForms), 4) NERC Data Capture*

- *Any assets tracked through Remedy are tracked through EAM, RMS, LIMS*
- *Remedy is a Maintenance Evidence/Cybersecurity standards Repository and provides NERC Data Capture*
- *IT uses Remedy as a work management tool, provides time stamp/digital trail for NERC requirements*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Anyone who needs change implemented	*Bridget Robinson*	*Unknown*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
N/A	*COTS, Unknown*

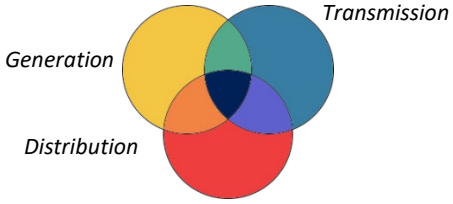
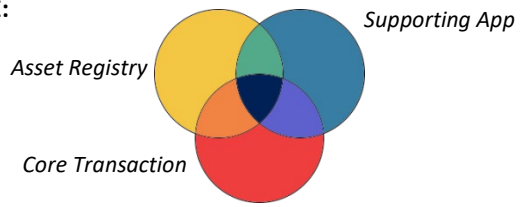
REMARKS & WHAT WE HEARD:

- *Remedy is sometimes referred to as ServiceHub*

INTERVIEWEES:

Sheldon Kosowich, Andrew Walters, Adele Poulin

18. RMS

APPLICATION NAME: *Regional Maintenance System*	**CODE NAME:** *RMS, Visual RMS*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *Visual RMS (Regional Maintenance System) is a client server CMMS Computerized Maintenance Management System that supports the Apparatus Maintenance RCM Reliability Centered Maintenance philosophy*
- *Its primary goal is to track historical maintenance records and to project future maintenance requirements on 95,000 pieces of electrical and gas apparatus inside the stations that are managed by the Transmission and Distribution business unit*

FUNCTIONS & CAPABILITIES:

- *RMS contains reading tests and oil samples due to interface with LIMS (RMS creates the barcodes)*
- *RMS contains maintenance hours, work hours, and Electrical/mechanical AC assets*
- *RMS creates asset condition data and updates it, feeds into C55, schedules follow up tasks automatically based on rules*
- *RMS has Protection Maintenance functionality and is used as an APM- used as a data repository*
- *RMS is used for work order management*
- *RMS is used for Compliance i.e. NERC reporting via a built-in report*
- *NERC Work Orders, standards and task templates build the jobs and frequencies, which are dictated by SMEs and are shown as equipment families which gets transferred to manufacturers (feedback loop based on RCM)*
- *RMS provides preventative maintenance plans based on RCM maintenance strategies, bad actor identification, maintenance overview dashboard*
- *RMS has a safety management system (transmission only), which maintenance work centers access- this shows targets and readings based on work order completion/manual entry*
- *RMS is used for APM, regulatory reporting, AIP feed-in, and MWM for transmission*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Maintenance groups in Transmission System Operations, AM for electrical AC assets, Field technicians, supervisors, planners, asset SMEs, engineering technicians, local work centre manager (Jason), Contractors, Waverly Service Centre (WSC), service workers/storage, technical support group	*Andy Seddon, Shawn Vinthers, Patrick Allan, Sheldon Kosowich, Ken Penner*	*Ivan Gibson, Dan Hawksworth, Ken Penner, Shaun Vinthers, Sheldon Kosowich, Roy Harrower*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
C55; LIMS; SAP Finance; SAP-PM; COLA; SAP-HR; Banner; Sharepoint; DCS	*In-House Application*

REMARKS & WHAT WE HEARD:

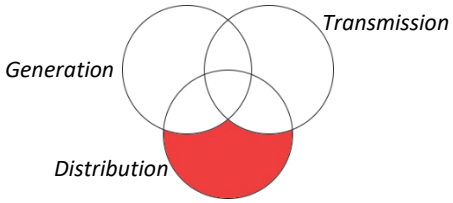
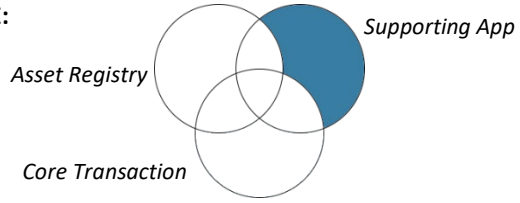
- *Civil assets don't reside in RMS: no repository for civil assets in Transmission/distribution*
- *Built-in report: Mandatory that WO request can't be closed without a mandatory test evidence file attachment, AND/OR rules for capturing files*
- *RMS does not track materials planning*
- *Safety assets, Protection assets, Generation assets, Transmission assets, HVDC*
- *eForms can be tedious to use, which are requests for work to be done*

- *RMS is a key application, however with the data quality, there needs to be clean data inputted*
- *RMS can accommodate contractors. Costs are not captured (SAP tied to open ended RMS number), read-only*
- *Real time connection to PowerBI, RMS offline is a skeleton that field techs use to get a snapshot of the work*
- *Quality of data is vital, should include materials management and travel*
- *RMS is ahead of its time, case for past 5-7 years to defend RMS despite talks of it being pushed for past 25 years*
- *Front-end and user friendly, many workarounds to using SAP-PM*

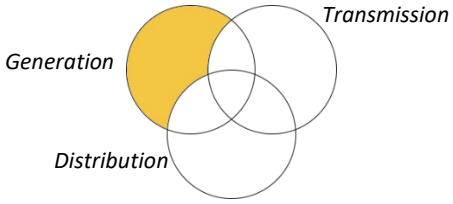
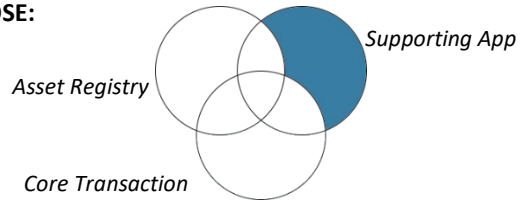
INTERVIEWEES:

Kaitlin Fritz, Adele Poulin, Maria Neufeld, Brent Jorowski, Sheldon Kosowich, Ken Penner, Shaun Vinthers

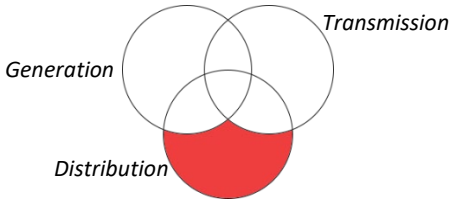
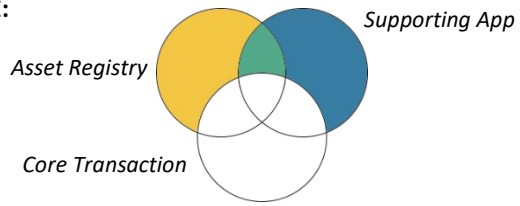
19. RUCES

<table>
<tr><td>APPLICATION NAME:
Regional Utility Costing Estimating System</td><td colspan="2">CODE NAME:
RUCES</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
</td><td colspan="2">CORE PURPOSE:
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
• Designs and estimate distribution and construction projects</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
• RUCES is a master repository of costing information for project cost estimation, access the application is the initial step for costing capital investment</td></tr>
<tr><td>CORE USERS:
Distribution Design Technologists</td><td>FUNCTIONAL KEY CONTACT:
Barry Paddock</td><td>TECHNICAL KEY CONTACT:
N/A</td></tr>
<tr><td>INTERFACING APPLICATIONS:
SAP</td><td colspan="2">DEVELOPER DETAILS:
In-House Application</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
• The user experience for RUCES is poor- the application is highly customized for specific projects and is non-dynamic.</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Kevin Morgenstern</td></tr>
</table>

20. Setting Letter Search

<table>
<tr><td>APPLICATION NAME:
Setting Letter Search</td><td colspan="2">CODE NAME:
Setting Letter Search</td></tr>
<tr><td>APPLICABLE ENERGY SYSTEMS:
 
</td><td colspan="2">CORE PURPOSE:
 
</td></tr>
<tr><td colspan="3">APPLICATION DESCRIPTION:
• Setting Letter Search is an application transferred from "System Support Department"</td></tr>
<tr><td colspan="3">FUNCTIONS & CAPABILITIES:
• Setting Letter Search is used to securely capture information and document settings for generation assets
• Setting Letter Search contains protection devices and maintains CIP data</td></tr>
<tr><td>CORE USERS:
System Performance Department</td><td>FUNCTIONAL KEY CONTACT:
Chris Mazur</td><td>TECHNICAL KEY CONTACT:
N/A</td></tr>
<tr><td>INTERFACING APPLICATIONS:
N/A</td><td colspan="2">DEVELOPER DETAILS:
In-House Application</td></tr>
<tr><td colspan="3">REMARKS & WHAT WE HEARD:
• There may be a duplication of functionality with CIP applications which needs to be investigated</td></tr>
<tr><td colspan="3">INTERVIEWEES:
Rejan Sayak</td></tr>
</table>

21. SFM

APPLICATION NAME: *Service Facility Maintenance*	**CODE NAME:** *SFM*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *SFM is a database that manages gas service line facilities*

FUNCTIONS & CAPABILITIES:

- *SFM stores asset information for service meter sets, where each meter is assigned a unique premise code*
- *SFM is a database of associated events to each meter set (not the specific meter)*
- *SFM used to store survey information on asset condition*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Front-line customer service staff	*Jason Bergthorson*	*N/A*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
Banner; eGIS	*In-House Application*

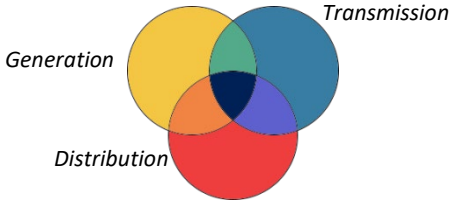
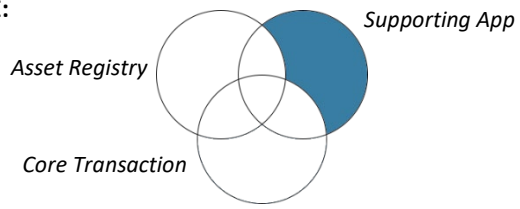
REMARKS & WHAT WE HEARD:

- *SFM contains customer ID and premise code, but it's not a customer database; it is more on the asset side and therefore, SFM needs work*
- *Events associated with each meter is in Banner due to the data tie-in with account, transaction, and billing information*
- *Present survey information on asset condition is available through Survey 123- SFM cannot receive this data*

INTERVIEWEES:

Kevin Morgenstern

22. Survey 123

APPLICATION NAME: *ArcGIS Survey 123*	**CODE NAME:** *Survey 123*
APPLICABLE ENERGY SYSTEMS:  	**CORE PURPOSE:** 

APPLICATION DESCRIPTION:

- *Survey 123 contains forms for civil assets*

FUNCTIONS & CAPABILITIES:

- *Survey 123 provides georeferencing, ortho-imagery capturing, inspection data and deficiencies resulting, and reporting creation capabilities*
- *Used to build and execute surveys (for example, corrosion levels) and captures results in a master-shared spreadsheet*

CORE USERS:	**FUNCTIONAL KEY CONTACT:**	**TECHNICAL KEY CONTACT:**
Inspectors, Field staff	*Larry Wiebe/Rob Gerry*	*Rob Gerry*

INTERFACING APPLICATIONS:	**DEVELOPER DETAILS:**
ESRI database, Microsoft Excel	*ESRI ArcGIS*

REMARKS & WHAT WE HEARD:

- *Survey 123 contains linear and non-linear assets as civil assets aren't only linear. Examples of civil assets include fencing, drainage pipes, oil containment, utility vaults*

INTERVIEWEES:

Adele Poulin, Kevin Morgenstern

Appendix III: Existing Dashboards

The following reports and dashboards have been captured as a result of surveying the 19 Manitoba Hydro interviewees that were involved in the EAM Operational Readiness Assessment. The owner, title, purpose, and data source(s) for each report are listed below. The documents have been sorted into two categories: Dashboards and Queries. Dashboards include documents that are used for reporting purposes and contain KPIs, whereas Queries are auto-generated data reports.

All existing dashboards and queries can be found in the Appendix Attachments folder associated with this document, which also include additional information including the Data Source and the Owner associated with each dashboard below.

Dashboard Title	***Purpose***
Actual vs. Estimated Hours for Completed Order Operations - KPI	Used to refine estimated (or planned) hours, this KPI displays the overall percentage of actual time charged against the estimated times as established during the planning process for non-routine work or the maintenance program for routine work. The target is >90% <110%. Can be viewed by Order Type, Work Category or Work Center.
Ad-hoc Outage Data	Without this dashboard, there would be a duplication of work/uncoordinated responses
AHI & WLC Model Report	*Not Provided*
AP&D AM Quarterly Event and Performance Reporting	Without this dashboard, there would be a loss of important information (such as forced outage root causes, trends of reliability KPIs and human error, etc.) used for asset management decisions and maintenance priorities.
AP&D Quarterly Dashboard Reporting	Without this dashboard, there would be a loss of KPI information and tracks
CEA SCC	Without this dashboard, there would be no access to compare to other utilities
Completed Operations with no time charge - KPI	This KPI tells us how well we are capturing labour costs. Displays the percentage of orders that were technically completed (TECO) with no time charge. Can be viewed by Work Center, Work Category and Order Type.
Completed Operations within 0-2 days - KPI	This KPI tells how timely Technicians are completing their work and is intended to drive a daily documentation process. Displays the ratio of operations completed within 2 days of the schedule start date. Can be viewed by Work Center, Work Category and Order Type.
Corporate Monthly Dashboard Reporting	Without this dashboard, there would be a loss of KPI information and tracks
Corrective Action Report	*Not Provided*
Data Validation - Generator Event Data - CEA (ERIS Reporting?)	*Not Provided*
Data Validation - Generator Event Data - MISO	*Not Provided*
Distribution data for surveys	Without this dashboard, there would be no participation in surveys and therefore cannot review results
Distribution PCB Dashboard	eGIS data used and owned by the AC Assets Team
DMPS Dashboard Page	DMPS data used and owned by the AC Assets Team
EAM Dashboards	*Not Provided*
EAM Documentation	Report associated with Operations - Power BI Report Server, which include reports used for reliability engineering activities
EAM Equipment	Report associated with Operations - Power BI Report Server, which include reports used for reliability engineering activities
EAM Identification	Report associated with Operations - Power BI Report Server, which include reports used for reliability engineering activities
EAM Planning	Report associated with Operations - Power BI Report Server, which include reports used for reliability engineering activities

Dashboard Title	*Purpose*
EAM Analysis	Report associated with Operations - Power BI Report Server, which include reports used for reliability engineering activities
Engineer FOR Workflow Status Report	*Not Provided*
Generation Asset Advisor Analytics Report	*Not Provided*
Generator Hourly Data - MISO	Without this dashboard, there would be lost sales capacity
Generation Investment Report	*Not Provided*
Generation Reliability Monthly Dashboard Reporting	Without this dashboard, there would be a loss of KPI information and tracks
Generator Event Data - CEA (ERIS Reporting)	Without this dashboard, there would be lost benchmarking
Generator Event Data - CEA (ERIS Reporting)	Without this dashboard, the team would be unable to access NERC data for benchmarking, customer unsatisfaction, negative reputation for Manitoba Hydro
Generator Event Data - CEA (ERIS Reporting?)	*Not Provided*
Generator Event Data - MISO	Without this dashboard, there would be a significant financial loss to Manitoba Hydro, breach of contract lawsuit, customer unsatisfaction, negative reputation for Manitoba Hydro
Generator Event Data - MISO	Without this dashboard, there would be a lost sales capacity
Generator Event Data - MISO	*Not Provided*
Generator Event Data - NERC GADS Reporting	Without this dashboard, there would be no compliance, the team would be unable to access NERC data for benchmarking, customer unsatisfaction, negative reputation for Manitoba Hydro
Generator Event Data - NERC GADS Reporting	Without this dashboard, there would be lost benchmarking/access
Generator Hourly Data - MB License Requirement	Without this dashboard, there would be a violation of license
Generator Hourly Data - MB Regulations MW (Water tax) reporting	Without this dashboard, there would be a violation of regulation
Generator Hourly Data - NERC	Without this dashboard, there would be lost benchmarking/access
GVTC results to MISO	Without this dashboard, there would be lost sales capacity
Hourly Log Incorrect Time Report	Saves hours per month
Hourly Log Null Values Report	Saves hours per month
Hourly Unit Validation comparing with the Existing Event data	Saves >15 minutes a day
IEEE Reliability Benchmark group	Without this dashboard, there would be no access to compare to other utilities
Incident Rollup	Saves 10 minutes per day
JobTrac Report	*Not Provided*
Labour Forecast	Displays the routine maintenance labour requirements by plant/work center for the next 10 years. This report can be used in concert with the Maintenance Forecast to assist in overall resource planning & allocation. Labour Forecast can be viewed by year, plant, work center, MTCE item, Floc, equipment, program or sub-program.
Load Estimation	Without this dashboard, identifying O/L transformers would be much more difficult
Manager FOR Workflow Status Report	*Not Provided*
Monthly Dashboard Reporting - SAIDI/SAIFI & analytics	Without this dashboard, there would be a wrong interpretation of reliability data and inaccurate reliability metrics

Dashboard Title	*Purpose*
NAG and GAG report	Saves 10 minutes per day
Notification Approval Time - KPI	This KPI displays the average time to approve notifications, as well as the percentage of notifications approved within the standard (<2 days).
Notifications with Notes - KPI	This KPI tells us how well Technicians are doing at entering notes to detail their work and is intended to drive a daily documentation process. Displays the percentage of technically completed (TECO'd) orders that have notification notes.
Open Overdue Orders in 1P (Planning) - KPI	Provides a more detailed view of the backlog. Displays a count of orders that are overdue and in the status of 1P (Planning) with a target of <12.
Open Overdue Orders in 2S (Scheduling) - KPI	Provides a more detailed view of the backlog. Displays a count of orders that are overdue and in the status of 2S (Scheduling) with a target of <2.
Open Overdue Orders in 3A (Assigned) - KPI	Provides a more detailed view of the backlog. Displays a count of orders that are overdue and in the status of 3A (Assigned) with a target of <96.
Outage Costing (GRO Value type)	*Not Provided*
Outage Costing (Power Price Type)	Without this dashboard, there would be no sense of value to Generation losses. Let alone seasonal and market conditions.
Overall Percentage of Actual Hours (Reactive) - KPI	Displays the percentage of total time charged for reactive work for the selected time period with a target of <15%.
Permit Software Reports	*Not Provided*
Post event analysis	Without this dashboard, there would be a duplication of work/uncoordinated responses
Reactive Work Orders Overview	Provides an overview of reactive work for monitoring effectiveness of the maintenance program. Includes the count of reactive orders vs the % of Total Orders, count of Immediate Orders vs % of Total Orders, and count of Urgent Orders vs % of Total Orders. Also displays Reactive, Immediate and Urgent Orders vs. Total Orders, Actual Hours and Actual Costs.
Reliability Requests	Without this dashboard, there would be a wrong interpretation of reliability data and inaccurate reliability metrics
RTU Invalid Candidate report	Saves hours per month
Slave Falls Spillway Operation Report	*Not Provided*
Slave Falls Spillway Operation Report?	*Not Provided*
Slave Falls Spillway Operation Report?	*Not Provided*
Supervisor FOR Workflow Report for Plan XX	*Not Provided*
Technically Completed Orders within 0-4 days - KPI	Displays the percentage of orders completed within the target time period (0-4 days). This KPI is intended to drive timely review & completion of work orders by Supervisors.
Water Elevation Stuck or large change report	Alert of Issues possibly.
Work Management System Measures Report	This report (which is a series of KPIs) is sent out to Department managers directors and VP's and represents the overall performance of the work management system for all EAM plants within MB Hydro.

Appendix IV. Overview of Supplementary Files & Documents

Throughout the duration of the assessment, 24 supporting documents were accumulated and have been listed below. In order to help support future initiatives, the files listed have been compiled into a single folder that is associated with this document. The files were received from Manitoba Hydro stakeholders or were compiled from previous assessments held by Deloitte for Manitoba Hydro. In addition, a few documents were created to compile information gained from this assessment and have also been included in the supporting folder.

File Name	*Received From*	*Overview*
AM ITS RSD Glossary	Chris Mazur	Glossary of MH Capabilities and their mapping to Global Forum on Maintenance & Asset Management (GFMAM) Landscape terms
Applications Diagram Details Listing	Patrick Allan	This report provides a listing and description of production and planned Applications used by Manitoba Hydro as of 2020/09/15
Applications List	Arya Russell	A list of non-familiar applications
Asset Information Strategy	Brent Jorowski	AIS provides strategic actions and recommendations that improve alignment of Manitoba Hydro's asset information systems to their corporate Asset Management Policy and Strategic Asset Management Plan
Asset Information Systems presentation	Chris Mazur	Presentation tying in 2040 Strategy to D&T Initiatives, Asset Management Policies, and Asset Information Systems
Capability Mapping	Chris Mazur	Mapping of applications to their capabilities in Manitoba Hydro
CGI Document Review	Shawn Aucoin	A summary of the CGI Manitoba Hydro Report
CGI Manitoba Hydro Report	Michelle Rheault	A report conducted by CGI for Manitoba Hydro that describes their Current State, Future Vision, and Gap Analysis
Civil and Linear Infrastructure	Adele Poulin	A list of Civil and linear infrastructure assets
Civil Infrastructure Stations TAM Asset List	Adele Poulin	A list of electrical stations Civil assets
CYMDIST Gateway Presentation	Chris Mazur	A presentation describing how a power engineering software by Cooper Systems can interface with GIS
GEMS Presentation	Chris Mazur	A presentation detailing replacement options for GEMS software
IPSEDA Final	Shaun Vinthers	A diagram of Manitoba Hydro's IPSEDA process
MH EWM Assessment	Chris Mazur	Manitoba Hydro Enterprise Work Management Assessment prepared by Vesta Partners in 2019
Ongoing Projects	Arya Russell	A compilation of current initiatives within Work Management compiled from emails with Patrick Allan
Remedy-CIP Information Access Controls	Patrick Allan	NERC/CIP Information Access Restrictions in Remedy
Reports and Queries	Behshid Behrouzi	A file containing a list of all the reports and queries that are used/owned by the 19 Manitoba Hydro interviewees
RMS Deeper Dive	Shaun Vinthers	This document outlines the RMS CMMS application from a roles and responsibilities level to a deeper look at the tools used
RMS Interface Diagram	Shaun Vinthers	A diagram showing the applications that RMS interfaces with
RMS Interfaces	Shaun Vinthers	A report containing information on the architecture and interfaces with RMS
RMS IPSEDA Write Up	Shaun Vinthers	Information on RMS as an Enterprise Asset Management Application
RMS.NET Architecture	Shaun Vinthers	A diagram of RMS's .NET software architecture
Technology Landscape	Behshid Behrouzi	A supporting table for the Technology Landscape in Appendix II along with all the interviewee notes associated with each application
Transmission Lines TAM Asset List	Adele Poulin	A list of assets that are associated with Transmission Lines