

Risk-Centric Asset Management Infrastructure



Brantford Power Inc.

Urban & Environmental Management

Presentation Outline & Issues

- Important issues in regard to asset management facing the power industry in Ontario.
- Asset Management as an effective management concept.
- Important issues driving asset management for Brantford Power.
- Outline of framework for asset management for Brantford Power.
- Going forward actions.



ASSET MANAGEMENT PROGRAM DEVELOPMENT

Brantford Power Profile



Mid-sized GTA medium-high to High Undergrounding Cohort Group

Rate Class	Number of Customer Connections	% Distribution Revenue
Residential	34542	54.77%
GS<50 kW	2745	9.00%
GS>50 kW	424	31.47%
Embedded Distributor	3	3.24%
Unmetered Scattered Load	446	0.52%
Street Light	9963	0.83%
Sentinel Light	701	0.17%
Total	48,824	100.00%

Total Load (wholesale kWh)		950759112.7
Total Peak Load (kW)	winter max	149224
	summer max	186675
Kilometers of Lines		478



Rate Application Filing Requirements



- The applicant **must provide a formal asset management plan**; if the applicant has such a plan. If not, an explanation as to why the applicant does not have such a plan must be provided. The applicant must also state whether or not it is planning to have one in place in the future.
- In the absence of an asset management plan, the applicant must provide information outlining its approach to the planning and prioritization of capital projects.
- The applicant must also provide, at minimum, a three year forecast of capital expenditures (Test year plus two subsequent years).
- The applicant must also state whether or not it has undertaken any asset condition studies and, if so, copies of such studies must be filed.



Considerations for Rate Applications



- The test is “**just and reasonable**” rates.
- The distributor needs to demonstrate that it has been **prudent** with its costs
- Practical considerations from staff’s perspective, a distributor should:
 - Show evidence that they have assessed the **condition of assets** in making investment decisions
 - Provide evidence on how they **prioritized their projects**
 - Demonstrate that they have a **disciplined approach** to investment decisions
 - Have considered the **mid to long-term for their assets** (not just the year for which rates are being set)
 - Have considered the **total bill impact**
 - Have considered their **capability** to implement their plans
 - Have looked at **year over year variances** to determine if capital spending can be smoothed out
 - Have a reasonable approach to the materiality thresholds included in the filing requirements (typically 0.5% of revenue requirement)
 - Consider whether their estimates of planning have considered the load forecast used for rate setting



Developing a Renewed Regulatory Framework for Electricity: Context



- **Investment is needed:**
 - To support Ontario's long-term energy plan;
 - To connect renewable energy projects; and
 - For the development of the smart grid.

- **Investment is underway:**
 - For the renewal of assets to maintain appropriate service levels and system reliability;
 - For the continued deployment of smart meters and implementation of time-of-use pricing; and
 - For the achievement of CDM targets.

- **Leads to a sharper focus on the total cost to consumers.**



Project Overview

- Develop a high level framework which will include the completion of an AM Plan - incorporates all key components of a long term proactive list of prioritized projects that will be supported by service level objectives, risk mitigation criteria and life cycle/condition information about the assets. This AM Plan will be structured to achieve approval by the Ontario Energy Board.
- Develop continuous improvement projects so that the quality of the AM Plan will improve as data and knowledge of the assets improve.

Why Do We Need Better Asset Management?



Asset Failures

Aging Assets, Aging Population and Growth = Population

User Expectations

Management Reform

Private Sector Investment Potential

Technology

Sustainable Development

Objectives



The key objectives of asset management are to enable Brantford Power to meet its service delivery objectives effectively, and to provide a foundation for economic growth.

To provide the services required by Brantford Power

To optimize the service potential of assets

To maximize value for money

To contribute to economic growth

To assign responsibility and accountability

To promote balance between development and sustainability



Principles



Effective asset management is a continuous process covering the life cycle of the asset. The following principles apply:

Service delivery needs form the basis of all asset management practices and decisions

An integrated approach to planning

Sustainability

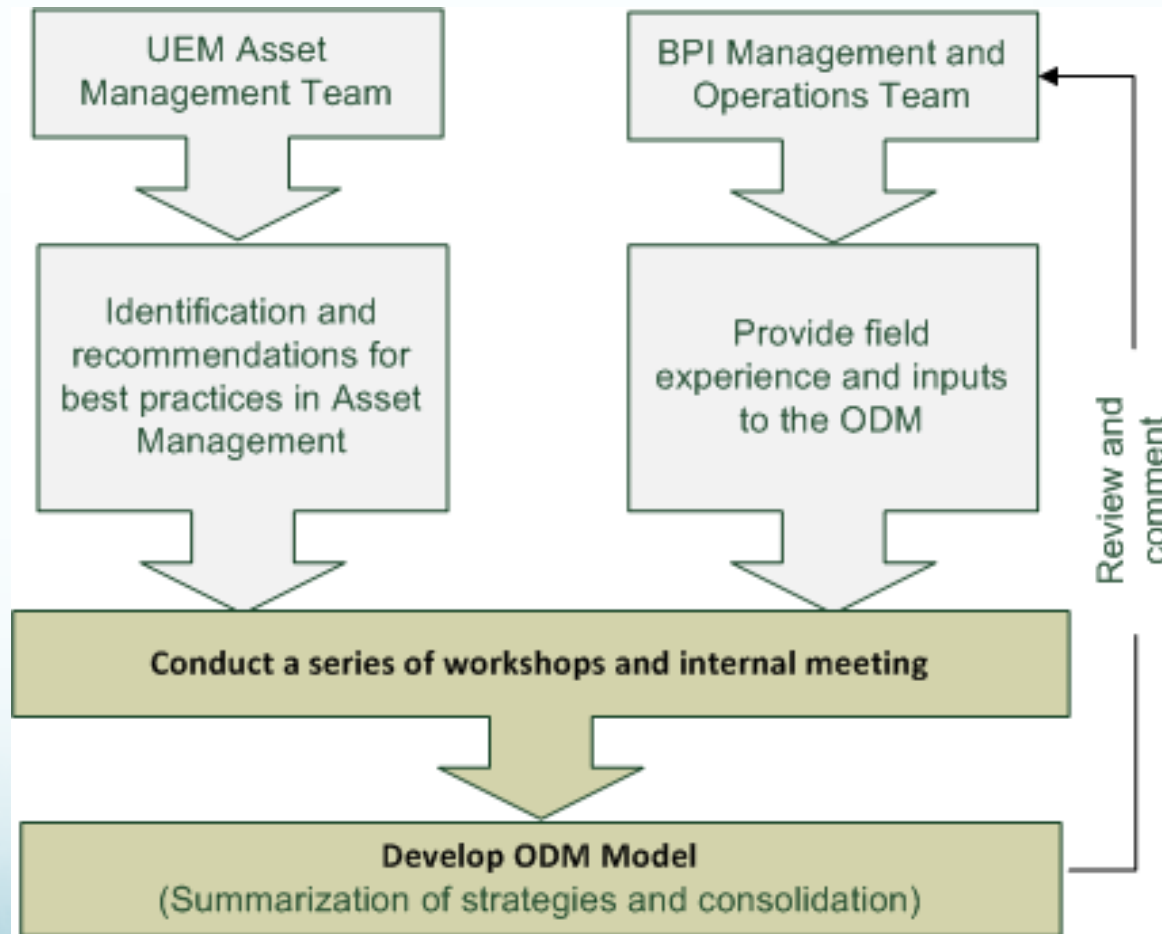
Informed decision making

Asset management within a whole of Brantford Power policy framework

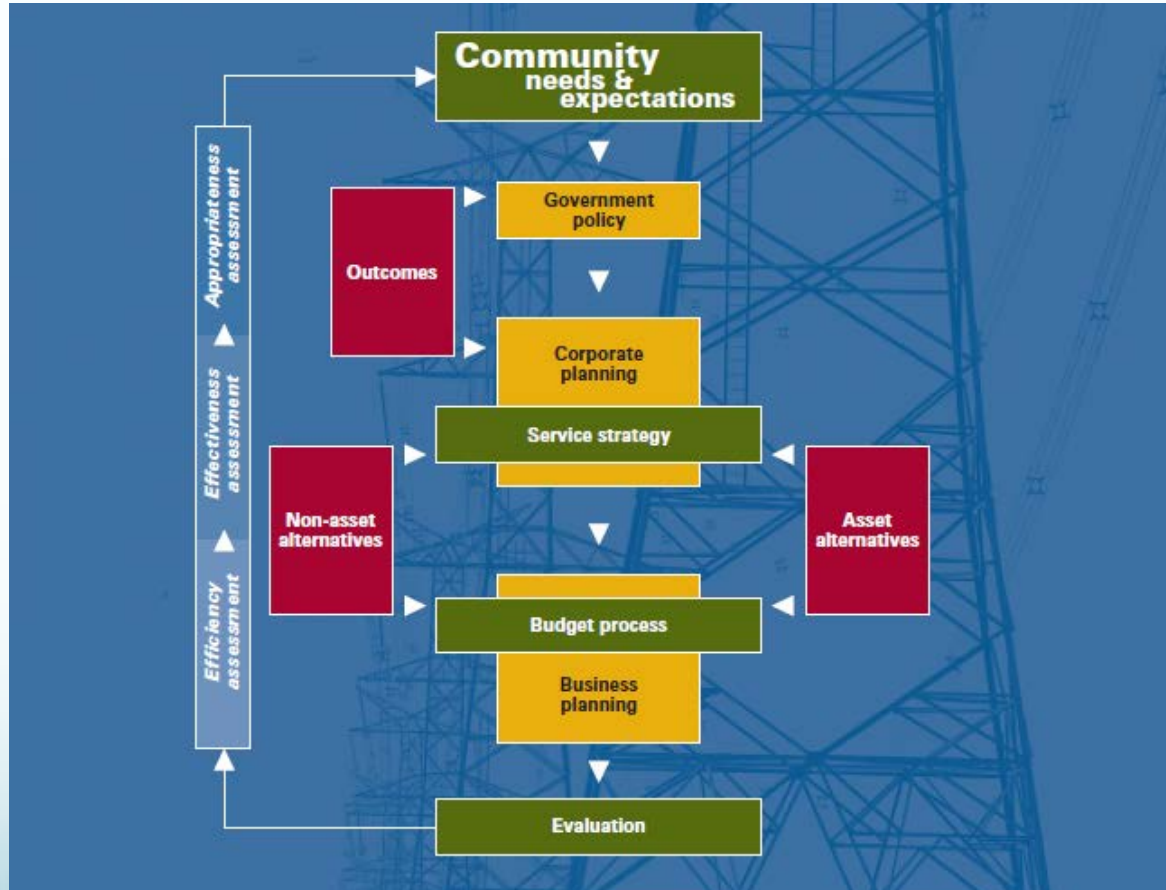
Accountability and responsibility



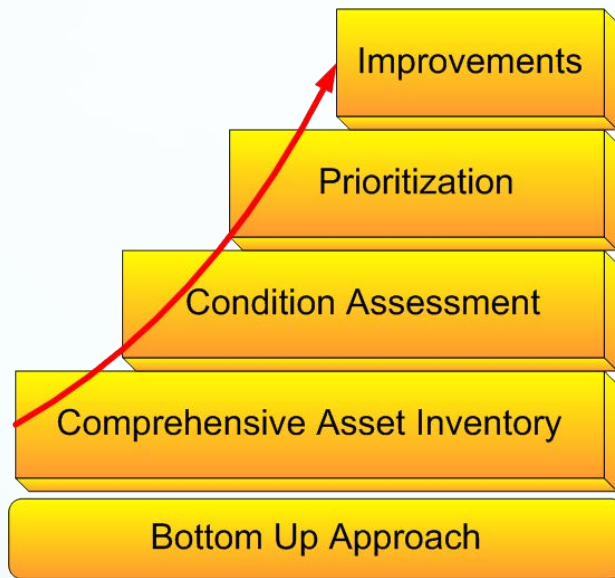
Establishing Decision Parameters



Integrated Asset Management Approach



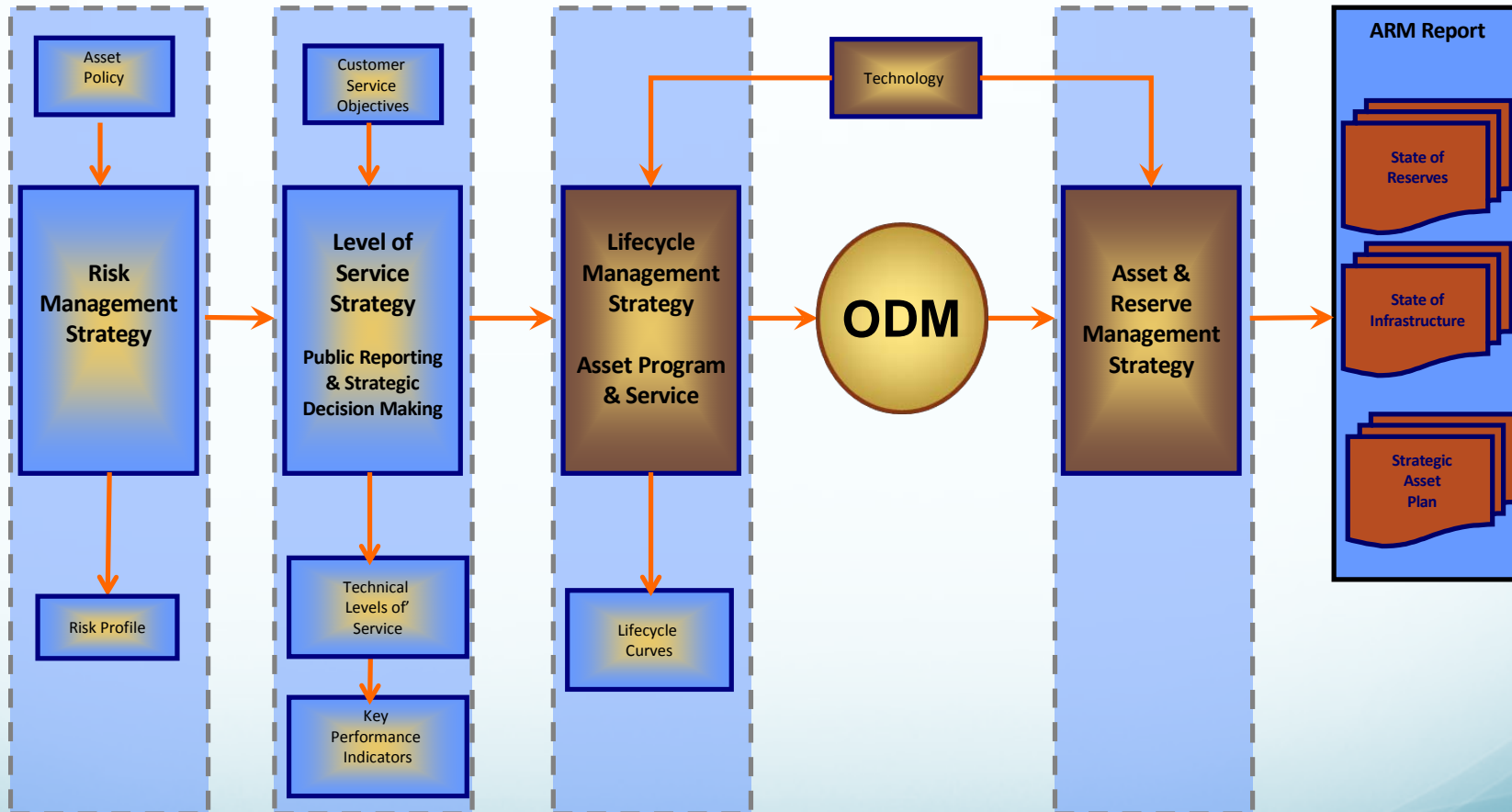
Bottom Up Approach Adopted for Brantford Power



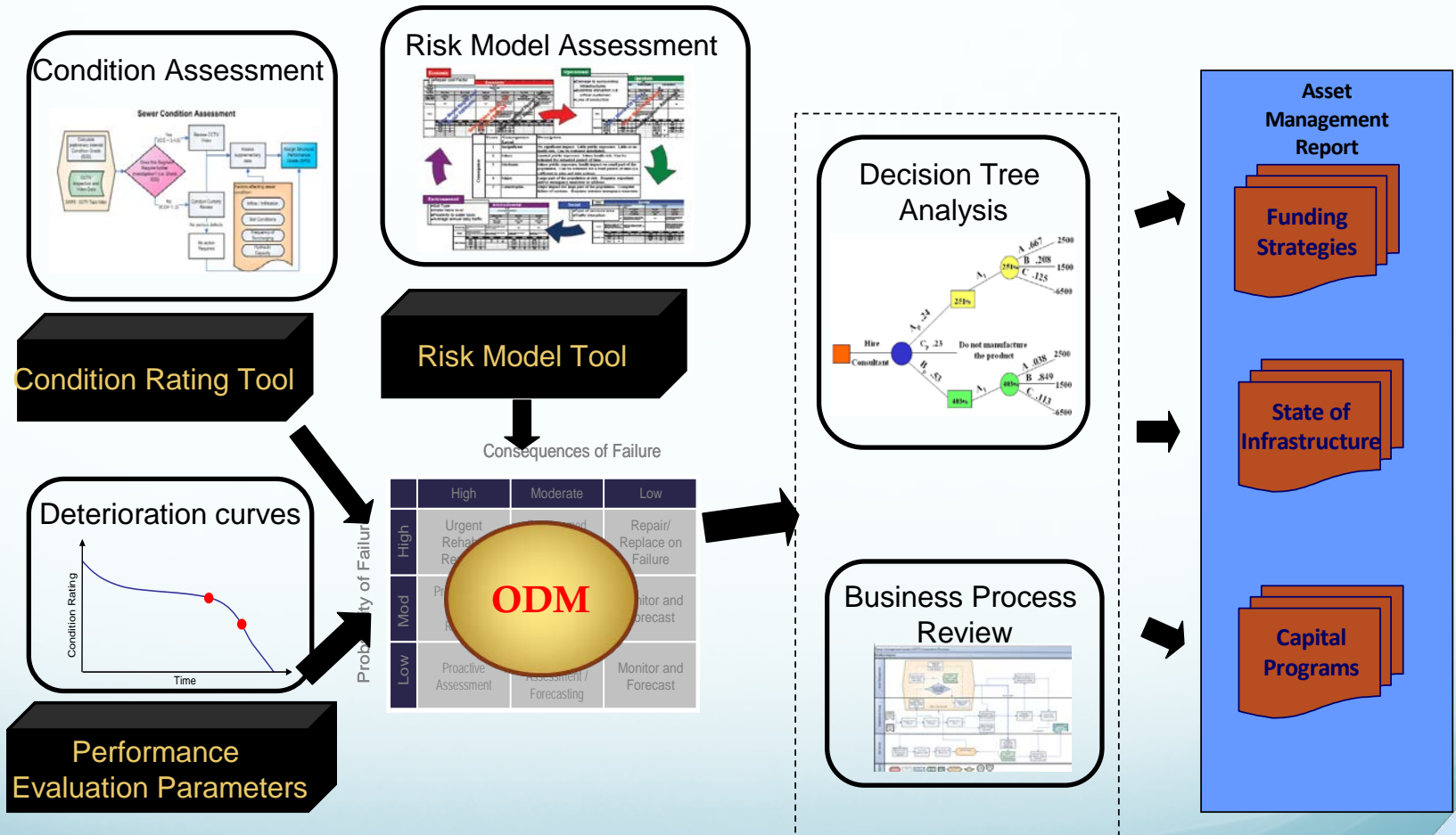
- Inventory your assets and evaluate their condition (takes time and effort)
- Proactively maintain assets
- Collect detailed information to measure the asset performance against your service level goals
- Understand Risks (a function of probability of failure and consequence of failure)
- Rank and prioritize your capital projects for renewing assets



Asset Management Strategic Framework



Asset Management Tactical Framework



Risk Model Assessment

Asset ID	Asset Type	Condition Rating	Risk Level	Recommended Action
A-101	Transformer	High	Critical	Urgent Repair
B-205	Substation	Medium	High	Monitor and Forecast
C-125	Line	Low	Low	Proactive Assessment

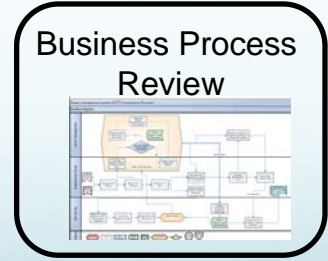
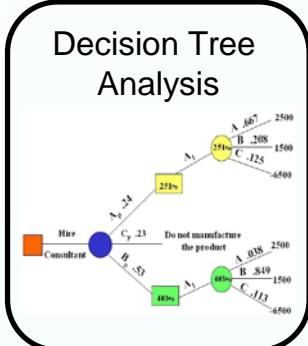
Risk Model Tool

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B-205	Substation	Medium	High	Monitor and Forecast
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Consequences of Failure

	High	Moderate	Low
High	Urgent Rehab/Repair	Monitor and Forecast	Repair/Replace on Failure
Mod	Monitor and Forecast	Monitor and Forecast	Monitor and Forecast
Low	Proactive Assessment	Assessment / Forecasting	Monitor and Forecast

ODM



Asset Management Report

- Funding Strategies
- State of Infrastructure
- Capital Programs

Optimized Decision Model (ODM)



- A UEM risk-centric model to aid strategic decision-making
- Optimizes funding across all asset groups
 - i.e. How do we best “stretch” the customers dollar?
- The “engine” that drives the Asset Management (AM) report

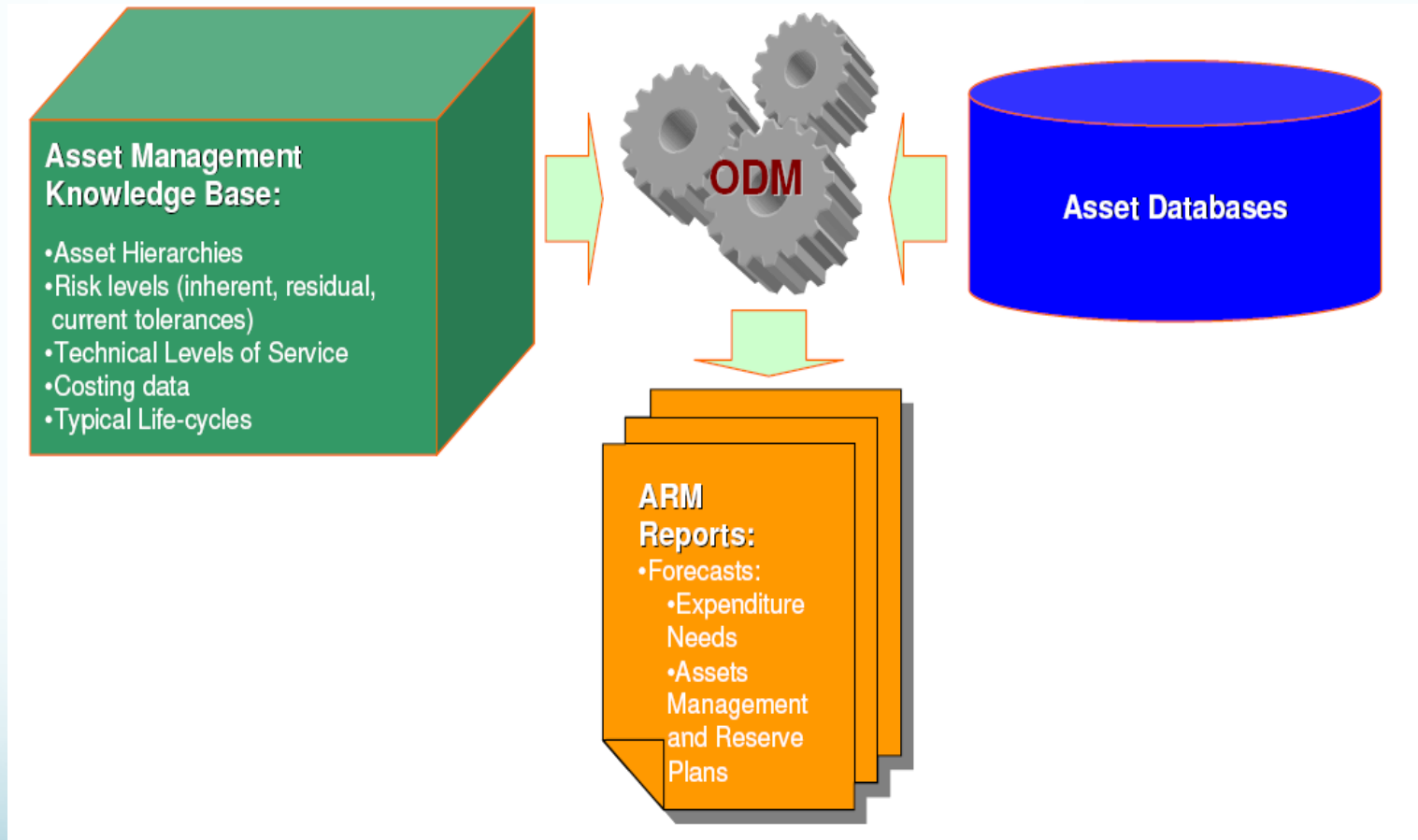


ODM Objectives

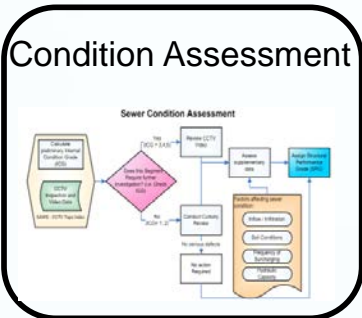


- Forecasting the level of service and risk parameters based on predictive lifecycle curve information
- Using cost information to produce capital plan recommendations by asset class based on meeting the required levels of service
- Using forecasted risk profiles to prioritize investment across asset classes, to meet budgetary constraints

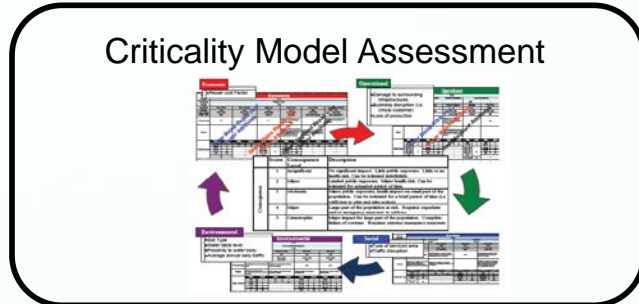
Operational Framework



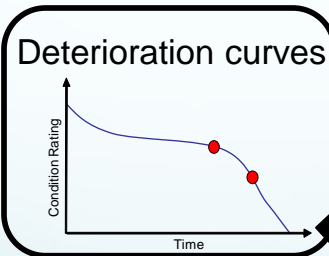
BPI's Risk Matrix



Condition Rating Tool



Consequence of failure Model



Life cycle curves

Action		Consequence of failure			
		0-20	20 - 40	40- 60	60 - 100
Probability of failure	4 Almost Certain	Mitigate	High Priority!	Fix Now !	Fix Now !
	3 Likely	Lower Priority	Mitigate	High Priority!	Fix Now !
	2 Moderate	Lower Priority	Lower Priority	Mitigate	High Priority!
	1 Unlikely	Lower Priority	Lower Priority	Mitigate	Mitigate



Asset Classes Completed



Asset Class	Number of Assets
Transformers	3331
Poles	10115
Switches	1014
Structures	1722
Primary Cables/Conductors	514582 Meters
Secondary Cables/Conductors	534342 Meters

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Transformers



Count			Consequence of Failure (CoF)			
			0-20	20 - 40	40- 60	60 - 100
			Minor	Moderate	Major	Catastrophic
Probability of Failure (PoF)	4	Almost Certain	40	24	100	22
	3	Likely	792	333	96	20
	2	Somewhat Likely	1114	398	10	3
	1	Unlikely	170	70	0	3

Table 10: Risk Level Distribution of Transformers

Percentage			Consequence of failure (CoF)			
			0-20	20 - 40	40- 60	60 - 100
			Minor	Moderate	Major	Catastrophic
Probability of Failure (PoF)	4	Almost Certain	1.20%	0.72%	3.00%	0.66%
	3	Likely	23.78%	10.00%	2.88%	0.60%
	2	Somewhat Likely	33.44%	11.95%	0.30%	0.09%
	1	Unlikely	5.10%	2.10%	0.00%	0.09%

Table 11: Risk Level Distribution of Transformers by Percent

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Poles



Count			Consequence of Failure (CoF)			
			0-20	20 - 40	40- 60	60 - 100
			Minor	Moderate	Major	Catastrophic
Probability of Failure (PoF)	4	Almost Certain	0	377	8	9
	3	Likely	1	734	0	42
	2	Somewhat Likely	26	1499	1	213
	1	Unlikely	124	4138	7	698

Table 12: Risk Level Distribution of Poles

Percentage			Consequence of failure (CoF)			
			0-20	20 - 40	40- 60	60 - 100
			Minor	Moderate	Major	Catastrophic
Probability of Failure (PoF)	4	Almost Certain	0.00%	4.78%	0.10%	0.11%
	3	Likely	0.01%	9.31%	0.00%	0.53%
	2	Somewhat Likely	0.33%	19.02%	0.01%	2.70%
	1	Unlikely	1.57%	52.51%	0.09%	8.86%

Table 13: Risk Level Distribution of Poles by Percent

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Selected & Prioritized Projects



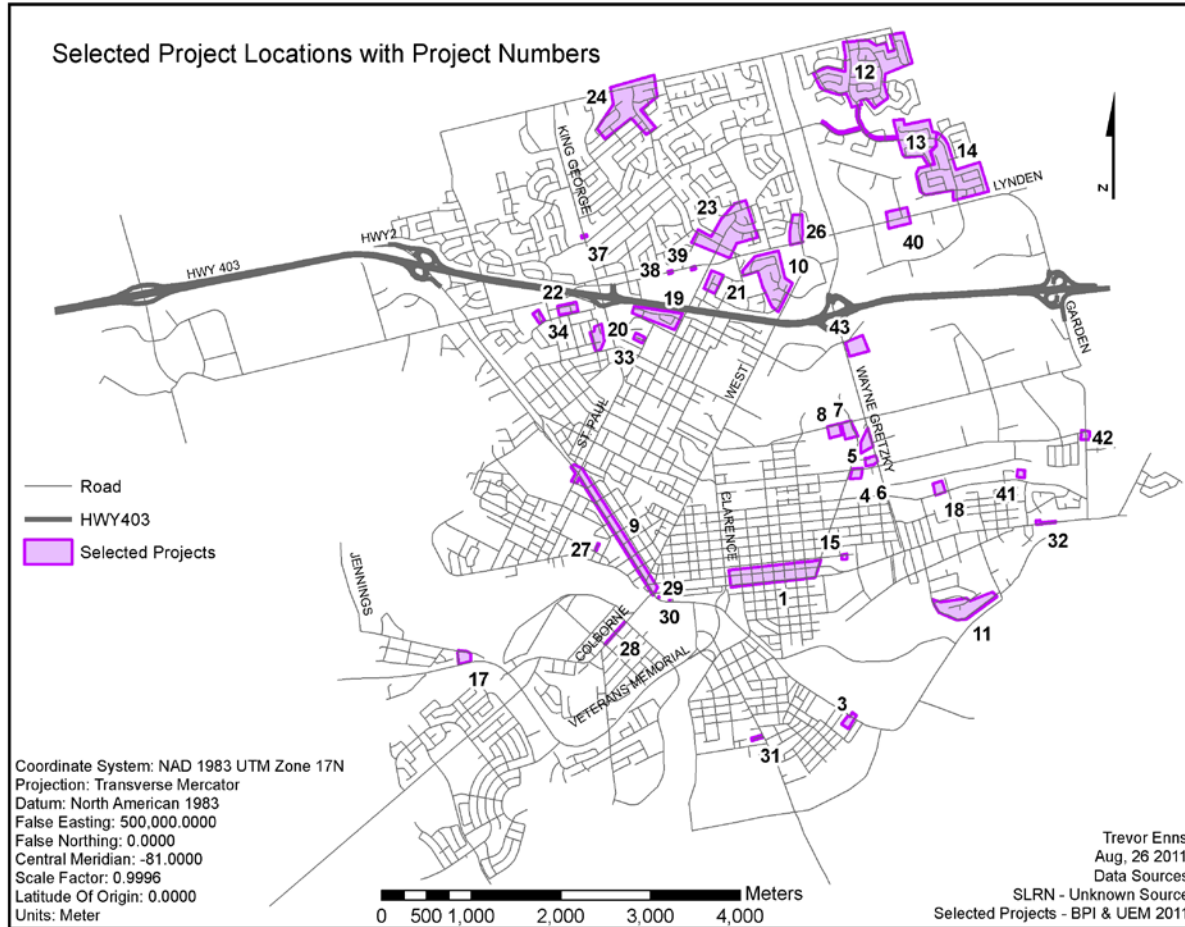
Order of Priority	Project Number	Project Location	Total Fix Now and High Priority Assets	Total Risk Index From Fix Now and High Risk Assets
1	12	Brantwood Park	398	61270
2	14	Lynden Hills	321	51008
3	1	Dalhousie Street	234	24127
4	13	Dunsdon Street & Brantwood Park Road	169	23074
5	24	Memorial Dr / Powerline Rd	128	15970
6	9	Brant Avenue	140	15577
7	23	North Park St.	114	12312
8	10	Farringford Drive & Pusey Boulevard	82	11095
9	19	Metcalf Cres	49	8165
10	11	Forest Road / Keeler Place / Marvin Avenue	33	5872
11	18	James Ave / Grey St	24	3876
12	26	West St	34	3298
13	28	Colborne St West	17	2810
14	21	Joysey St / Ariel St	14	2422
15	22	Omega Dr / Belaire Dr	11	1971
16	5	Stanley Street Townhouses / Stanley Manor	8	1736
17	15	Darling Street	10	1554
18	40	Dalkeith Dr / Lynden Rd	15	1530
19	43	Holiday Dr	14	1350
20	20	Holborn St / Orchard Ave	7	1272
21	27	Forbes Cres	6	1236
22	6	Campbell Street Townhouses	7	1161
23	31	Canada Crt	6	1159
24	37	King George Rd / Oxford St	11	1009
25	33	Alpha Cres	5	966
26	8	Henry Street Townhouses 154-164	3	939
27	32	Colborne St	8	870
28	17	Oak Hill Drive Townhouses	4	805
29	34	Tuscarora Cres	4	773
30	3	Mohawk Street Townhouses	3	743
32	42	Garden Ave / Elgin St	7	599
33	41	Steed Cres	6	590
34	4	Elgen Street Townhouses / Varga & Frank	4	562
35	7	Henry Street / Town & Country Townhouses	3	402
36	39	Fairview Dr / Hayhurst Rd	3	347
37	38	Fairview Dr / Sandra St	3	318
38	29	Icomm Dr	2	311
39	30	Hill St	2	311
		TOTAL		

Poles

Year	Criteria	Number	Total Risk
1	(Very High Priority, PoF = 4) & (Very High Priority, CoF > 75)	30	7482
2	(Remaining Very High Priority) & (High Priority, PoF = 4, CoF > 35)	32	7079
3	Remaining High Priority, PoF = 4, CoF > 34, ESL% > 80% or NULL	30	4145
4	Remaining High Priority, PoF = 4, CoF > 34	32	4421
5	Remaining High Priority, PoF = 4, CoF > 30, ESL% > 124%, CHI = Poor	43	5262
Total		167	28388



Map of Project Locations



Observations



- BPI is well on it's way to effectively implementing Asset Management within the Distribution Company.
- Together with the LDC industry a significant effort is required to gather more historical data regarding Asset Failure trends, so we can improve Life Cycle curves.
- Pass-55, a QC/QA standard, will be the next initiative for LDC's, BPI is in a good position to be prepared for the implementation of Pass-55.
- As Rate filing is scheduled for 2013, it is essential that the plan is continually updated and improved as quality of data is being improved.

Going Forward



- Integrated Asset Database and Business Process and Strategy must be completed
- Improve and Incorporate Outage Data
- Develop Asset Deterioration Curves
- Continually Improve Data Collection and Entry Processes
- Enhance Multi Year Horizon Reporting capability



In Conclusion....



Brantford Power operates in a dynamic environment. Events within the environment in which Brantford Power operates provide strong motivation and incentives for the continuous improvement in asset planning, operating and maintenance procedures, and in risk management.



Thank You

