Conference Overview

This conference will provide critical insight into the effectiveness and value of strategic asset management to electrical utilities. Strategic asset management is a holistic approach to asset management that is applied across the entire utility organization/business. It starts with the utility corporate strategy and mission in a unified and coordinated approach across all technical and non-technical areas of the utility. Strategic asset management thus promotes an integrated and value-based approach to asset management. This conference is organized with the support of CEATI’s Strategic Asset Management Program (SAMP).

The conference responds to the increasing pressures utilities face to not only optimize their performance for customers and owners, but also to meet regulatory requirements along with environmental and social expectations.

The 1st Annual SAMP Conference is aimed at industry professionals and will bring together leading subject matter experts from around the world. The conference thus provides an exceptional opportunity to network with consultants, manufacturers, and other representatives from electric utilities.

Conference Themes

- Context of the Organization
- Leadership
- Planning
- Support
- Operation
- Performance Evaluation
- Improvement

Who Should Attend?

The 1st Annual SAMP Conference invites participation from:

- Current members of the SAMP Program
- Electric utility asset managers
- Utility chief operating officers or their support staff who would like to understand the value of approaching asset management from the corporate strategy and mission perspective.
- Utility Staff (e.g. in Finance, IT, and Human Resources) who would like to understand the value in a broader, more holistic approach in strategic asset management.
- Developers of asset management related products
- Universities & Government Agencies

For more information, visit www.ceati.com/SAMP2017
<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Topic</th>
<th>Presenter</th>
<th>Organization</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 - 8:15</td>
<td>Welcome &amp; Introduction</td>
<td>David Curtis, CEATI International</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8:15 - 8:45</td>
<td>Strategic Asset Management: Delivering Value across the Organization</td>
<td>Boudewijn Neijens, The Institute of Asset Management</td>
<td></td>
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</tr>
<tr>
<td>8:45 - 9:05</td>
<td>Lansing Board of Water &amp; Light's Organizational Model</td>
<td>Tom Myers, UMS Group</td>
<td>Lansing Board of Water &amp; Light</td>
<td></td>
</tr>
<tr>
<td>9:05 - 9:25</td>
<td>Crafting Aligned Asset Management Strategy in an Electricity Transmission Company</td>
<td>Saša Jamšek, ELES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:25 - 9:45</td>
<td>Status Update on Asset Management for T&amp;D Utilities</td>
<td>Yury Tsimberg, Kinetics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9:45 - 10:15</td>
<td>Morning Break</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:15 - 10:35</td>
<td>Real World Experience in Developing Asset Management Plans</td>
<td>Steven Morris, UMS Group</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:55 - 11:15</td>
<td>Implementing Strategic Asset Management: Case Study at Portland General Electric</td>
<td>Maty Sauter, Portland General Electric</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:15 - 12:00</td>
<td>Panel Session</td>
<td>All Presenters from Sessions 1 &amp; 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00 - 1:00</td>
<td>Lunch</td>
<td></td>
<td></td>
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<tr>
<td>1:00 - 1:20</td>
<td>Normalizing Risk and Investment Across Asset Classes</td>
<td>Paul Barnfather, EA Technology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1:20 - 1:40</td>
<td>Case Study: Use of Investment Prioritization Methodology at Tuscon Electric Power</td>
<td>Yury Tsimberg, Kinetics</td>
<td>Clark Bryner, Tuscon Electric Power</td>
<td></td>
</tr>
<tr>
<td>1:40 - 2:00</td>
<td>Decision-Making in Asset Management</td>
<td>Darin Johnson, BIS Consulting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2:00 - 2:20</td>
<td>Life Cycle Optimization Planning: Finding the Right Balance Between Network Reliability and Budgets</td>
<td>Mike Hutchinson, Remsoft</td>
<td></td>
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<tr>
<td>2:20 - 2:50</td>
<td>Afternoon Break</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2:50 - 3:10</td>
<td>MILES - Maintenance and Investigation of LinES</td>
<td>Troy Martin, CIMA+</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:10 - 3:30</td>
<td>Implementation of an Asset Management Program - Risk and Prioritization of Asset Investments</td>
<td>Adelana Gilpin-Jackson, BC Hydro</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3:30 - 3:50</td>
<td>Enhanced Predictive Based Maintenance Strategy</td>
<td>Steve Keller, Davey Resource Group</td>
<td></td>
<td></td>
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<tr>
<td>3:50 - 5:00</td>
<td>Panel Session</td>
<td>All Presenters from Sessions 3 &amp; 4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SESSION 1: CONTEXT OF THE ORGANIZATION**

**SESSION 2: LEADERSHIP**

**SESSION 3: PLANNING**

**SESSION 4: OPERATION**

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* Agenda is subject to change without notice
## DAY 2 • November 2, 2017

### SESSION 5: SUPPORT

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00 - 8:20</td>
<td>Challenges of Applying Probabilistic Methods for Asset Management</td>
<td>Ani Chopra, AltaLink</td>
</tr>
<tr>
<td>8:20 - 8:40</td>
<td>Charting a Consistent Course Across the Digital Utility’s Sea of Data</td>
<td>Kreg McCollum, Leidos, Matthew Coleman, Roames</td>
</tr>
<tr>
<td>8:40 - 9:00</td>
<td>Data Quality and Strategic Asset Management</td>
<td>Robert Otal, METSCO Energy Solutions</td>
</tr>
<tr>
<td>9:00 - 9:20</td>
<td>Enhancing Asset Management Value from Outsourced Inspection Programs</td>
<td>Mike MacMillan, Nova Scotia Power</td>
</tr>
<tr>
<td>9:20 - 10:00</td>
<td>Panel Session</td>
<td>All Presenters</td>
</tr>
</tbody>
</table>

### SESSION 6: PERFORMANCE EVALUATION

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10:30 - 10:50</td>
<td>Asset Status Review - Determination of Overall System Health</td>
<td>Richard Itiveh, ATCO Electric</td>
</tr>
<tr>
<td>11:30 - 12:00</td>
<td>Panel Session</td>
<td>All Presenters</td>
</tr>
</tbody>
</table>

### SESSION 7: IMPROVEMENT

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:00 - 1:20</td>
<td>Implementing an Asset Management Approach at a Small/Medium Power Utility</td>
<td>Robert Raynes, Turner &amp; Townsend AMCL, Shannon Rauch, Tacoma Power</td>
</tr>
<tr>
<td>1:40 - 2:00</td>
<td>Optimizing Wind Turbine Life-cycle Cost using Performance-Based Maintenance Contracts</td>
<td>Catherine Laplante, SNC Lavalin</td>
</tr>
<tr>
<td>2:00 - 2:20</td>
<td>Asset Management Decision Making - A Case Study</td>
<td>Boudewijn Neijens, Copperleaf, Tracy Martin, Alectra Utilities</td>
</tr>
<tr>
<td>2:20 - 2:50</td>
<td>Afternoon Break</td>
<td></td>
</tr>
<tr>
<td>3:10 - 3:30</td>
<td>Improving Stakeholder Value through Asset Management Strategy</td>
<td>Christopher Murphy, Hydro Ottawa Limited</td>
</tr>
<tr>
<td>3:30 - 4:50</td>
<td>Panel Session</td>
<td>All Presenters</td>
</tr>
<tr>
<td>4:50 - 5:00</td>
<td>Concluding Remarks</td>
<td>David Curtis, CEATI International</td>
</tr>
</tbody>
</table>

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Welcome & Introduction

Keynote Presentation
Strategic Asset Management: Delivering Value Across the Organization – The Institute of Asset Management

Abstract: Asset management is a strategic discipline that is increasingly well understood by board members, investors and regulators. Its profile has become a significant factor in utilities realizing value – and the concept of value itself has evolved to include the perspectives of all stakeholders. All of this requires managers at utilities to approach asset management on an increasingly strategic and holistic level. Over the last twenty years, the Institute of Asset Management has developed a large body of knowledge to support organizations along their asset management journey – but one question remained largely unanswered: how to demonstrate the value of asset management in tangible terms. Recent work sheds some light on this key aspect, showing that asset management is indeed a good investment.

Biography: Boudewijn Neijens holds a Master’s degree in Mechanical Engineering from the University of Brussels and an MBA from INSEAD in France. He is also a Certified Asset Management Assessor, and holder of a Certificate from the Institute of Asset Management. He has been involved with high-technology start-ups for the past 25 years, currently in the fields of asset management and environmental data processing. He is the Chief Marketing Officer at Copperleaf in Vancouver, BC. In this role, he works with large asset intensive corporations around the world to refine their asset management practices in the areas of asset investment planning and management, decision support systems, and risk-based planning models. He is the president of the Vancouver chapter of the Plant Engineering and Maintenance Association of Canada, and the Chair of the Canadian chapter of the Institute of Asset Management.

SESSION 1: CONTEXT OF THE ORGANIZATION

Lansing Board of Water & Light’s Organizational Model – UMS Group & Lansing Board of Water & Light

Abstract: The organizational models associated with Asset Management range from highly centralized organizations (often composed of more than one hundred people), to highly decentralized organizations (sometimes nearly entirely virtual). Both extremes offer advantages and disadvantages, and the optimal organization typically falls somewhere in the middle. This presentation will discuss the organizational model selected by the Lansing Board of Water and Light

Biography: Tom Myers is a Principal at UMS Group with over 30 years of experience providing management consulting services to the utilities industry. Tom has been working with the Lansing Board of Water & Light since 2015 on the implementation of their asset management program.

Biography: Roberto Hodge is the Director of the Power Supply business unit at the Lansing Board of Water & Light, and the leader of their asset management implementation program.
Crafting Aligned Asset Management Strategy in an Electricity Transmission Company – ELES

Abstract: ELES is a pure transmission system operator in a fully deregulated environment. Asset management has become the company’s strategic issue since the adoption of corporate strategy in 2011. ELES established an asset and project management division in 2013, and since then it has promoted an efficient asset management approach. This presentation is focused on an asset management strategy alignment case study. The following company-specific topics are explained: organizational transformation, asset management strategy themes and goals, linking strategic-level with real-life technical and economic challenges, and asset management model integration in existing corporate quality management systems. In the case of ELES, the asset management system is an integrated part of the organization’s management system, and as such a key success factor. A multi-level benchmarking concept is explained in the final part of the presentation; it is part of quality system review, and it shows the efficiency of both management systems.

Biography: Sasa Jamsek was born in Slovenia. He received his B.Sc. in Electrical Engineering and his M.Sc. in Business Administration from the University of Ljubljana. He is currently Deputy Division Director in the Asset and Project Management division at the Slovenian transmission system operator, ELES. His experience has included various positions in SENG hydro power plants, ELES transmission system operation, KORONA engineering, and the IREET research institute. He has been Director of Power Transmission at ELES from 2001 to 2005, responsible for the development, construction, and maintenance of Slovenian HV transmission grids.

His main areas of expertise are asset management, project management, and business strategy. He was a member of CIGRE C1.1 Working Group, participating in the preparation of Technical Brochure 309 “Asset Management of Transmission Systems and Associated CIGRE Activities”, published in 2006. He is a member of CIGRE, IEEE, and IAEE international organizations, as well as the Slovenian Chamber of Engineers. Currently, he is an observer on the CIGRE Study Committee C1, a member of WG C1.24, and chairman of the C1 Study Committee in national CIGRE organization. In ENTSO-E organization, he also took part in drafting teams for the 2016-2018 asset management roadmap, and reported on Strategic Asset Management Tools for TSOs. He has been working on the implementation of an asset management approach at ELES since 2013. Recent activities are focused on the preparation of asset management strategy, performing benchmarking studies, and the implementation of ISO 55000 compatible processes.

Notes:
Abstract: Asset Management for T&D assets has been available for approximately 15 years. Like other relatively new areas of the utility business, it is dynamic in nature and subject to continuous change based on experience gained, the introduction of new concepts, and the development of IT tools. This presentation will provide a brief overview of established asset management methodologies, though the focus will be upon its evolution and leading edge practices. Challenges facing utilities in establishing Asset Management business models, as well as benefits of using the Asset Management approach will also be discussed. This presentation will include:

1. Health indexing (approach).
2. Risk Assessment, including the development of Weibull failure curves.
3. Long-term planning strategy.
4. Strategic Asset Management tools.
5. New developments.
6. Challenges facing utilities.
7. Benefits, both operational and financial.
8. High-level Asset Management process conceptualization (when using Asset Analytics tools).

Biography: Mr. Yury Tsimberg is a Director of Asset Management with Kinectrics Inc., where he has been leading consulting services in the asset management field for several years. In this capacity, he successfully completed a number of asset management projects across North America, taught asset management courses all over the world, and presented at many industry conferences and forums. Prior to joining Kinectrics, Mr. Tsimberg spent 30 years with Ontario Hydro/Hydro One in various areas of the utility business, including leading the development of corporate Asset Management strategies and methodologies, system planning, operations, M&A, regulatory, transmission lines maintenance, and customer service. He acted as a member of the international advisory panel revising PAS 55 specification, as well as of the NERC Committees developing North American transmission planning standards. He is also currently the Canadian representative and the Asset Management Advisory Group Convener on the CIGRE Study Committee C1 “System Development and Economics.” Mr. Tsimberg holds a Bachelor of Applied Science and a Master of Engineering Degree in Electrical Engineering from the University of Toronto. He is a Registered Professional Engineer in the province of Ontario, Canada.

Notes:
Real World Experience in Developing Asset Management Plans – UMS Group

Abstract: This presentation will discuss how utilities are developing asset management plans to meet the requirement of ISO 55001 Section 6.2.2 “Planning to achieve asset management objective.” It focuses on best practices identified through working with electric utilities to develop asset management plans, and it aims to: 1) Provide attendees with an understanding of what an asset management plan is and its role in the AM System; 2) Explain how to determine the content of an asset management plan to ensure its alignment with its target audience; and 3) Discuss how to construct an asset management plan in terms of the roles, skills, analyses, and tools that are required. Real world examples from work performed in developing asset management plans for generation, transmission, and distribution assets will be provided. These examples will give context to the discussion, while grounding the content in actual, rather than theoretical, terms. Finally, these examples will offer insight into the typical difficulties that utilities face in developing asset management plans, including a lack of key data, unclear roles and responsibilities, insufficient resources, and fragmented accountabilities for life-cycle decision-making.

Biography: Steven J. Morris is a Principal of UMS Group. He has 28 years of consulting and management experience, with the last 21 years spent in the utility industry. He has led Asset Management projects for AES, Enbridge, Manitoba Hydro, PG&E, PSE&G, SCE, and TVA. These projects have included PAS 55/ISO 55000 gap assessments, strategic asset management training workshops, the development of asset management plans, the creation of asset replacement and maintenance decision-support tools, and organizational redesign to support asset management. Prior to joining UMS, Mr. Morris worked for both Andersen Consulting and Navigant Consulting. He holds a B.A. and an M.B.A. in Economics, both from Cornell University.

Notes:
Abstract: Strategic asset management interacts with and impacts all functions of an electric utility, from planning, design, and construction, to finance, regulatory, communications, information technology, and customer service groups. This presentation will highlight the necessary strategies employed by EPCOR’s asset management team to successfully implement key asset management principles across the organization. In particular, it will discuss the key challenges encountered and solutions generated by the team as part of their efforts to successfully achieve leadership commitment and stakeholder acceptance for their framework to realize its full potential, and to develop strong justification for their decisions, both internally and in front of external regulatory agencies. When first developing the asset management framework, it was necessary to create links between corporate strategy and asset management goals, while utilizing a corporate risk management model. The team engaged various stakeholders to collect and centralize asset information pertinent to system health and risk profiling. This required a great deal of interaction with various departments within the utility, and enhancements to existing data collection procedures. It was also necessary to engage with the recipients of the outputs, or decisions made, from an asset management framework, including the design & construction groups executing the AM decisions, as well as the financial and regulatory groups, who accordingly justify these decisions to external stakeholders. Executive support provided necessary expansion of the asset management principles and integration into existing processes and practices, while allowing for continuous improvements.

Biography: Alexander Bakulev is an experienced professional with over 14 years of experience in utilities asset management, investment, and budget planning, as well as in strategic management. Alex is a specialist on the business side of regulatory proceedings; he has been selected to balance the engineering specialists elsewhere in the project. Alex has extensive experience in long-term economic asset planning, business case development, financial modelling, and risk-based investment planning for generation, transmission, and distribution companies in North America and Europe.

Biography: Natalia Kazakova is the Senior Manager of Asset Management at EPCOR Distribution & Transmission Inc. (“EDTI”). Ms. Kazakova’s responsibilities include leading the asset life cycle management, asset performance management, and integrated planning teams. She oversees their management of EDTI’s distribution of physical assets and power infrastructure during the life cycle and planning of capital & operational expenditures towards asset maintenance and replacement, to ensure EDTI’s service sustainability. Ms. Kazakova holds two Master of Science degrees in Electrical and Computer Engineering from the University of Alberta and Lvov National Polytechnic University, and a Business Degree from Simon Fraser University. She is a Professional Engineer registered with the Association of Professional Engineers and the Geoscientists of Alberta (“APEGA”). She has authored and co-authored 7 technical papers published in IEEE journals and proceedings, and she is a patent holder in Microelectronics.

Notes:
Implementing Strategic Asset Management: Case Study at Portland General Electric – Portland General Electric

Abstract: T&D organizations are experiencing unprecedented levels of change in their operating environments - aging asset fleets and increasing reactive response requirements; strong public interest in “smart” and “integrated” grid infrastructure; workforce retirements; a growing reliance on “big data” to make decisions - the list of pressures is nearly endless. Accordingly, T&D organizations direly require increased strategy in their investments and operations.

This presentation will walk through how one utility, Portland General Electric, on-boarded a Strategic Asset Management function to address these pressures. PGE began its asset management journey in 2012 with a PAS-55 assessment. Five years later, the company has tripled its annual investment in the T&D asset base, and is in the process of hiring over 90 staff members to implement this increased volume of work. PGE also has a sizeable rate case pending with the Oregon Public Utility Commission, to fund the investments identified in PGE’s SAM program.

The practical execution of PGE’s transition will be highlighted in this presentation, with a focus on the organizational transitions and operational controls required to make SAM a fully functioning T&D entity. As such, this presentation will address:

1. The purpose (and benefits) of an external “maturity” assessment (e.g., PAS-55).
2. The development of a program vision, mission, goals, and methodological approach.
3. Outreach to educate and involve stakeholders in program development activities.
4. Consensus building around new analytical approaches in an engineering environment.
5. Organizational redesign and the development of new skills to support delivery.
6. The onboarding and management of new implementing entities, e.g., contracted labor.
7. Process design and redesign to meet new workflow requirements.
8. Measurement and reporting to articulate results.
9. General change management activities required to accept innovation in the utility environment.

Biography: Maty Sauter assumed responsibility for the development and implementation of Portland General Electric’s first T&D Strategic Asset Management Program (SAM). Maty’s background is in strategic and operations planning, and she has spent the past 10 years helping technical audiences to articulate and accomplish business objectives. Maty joined PGE in 2012 to manage PGE’s PAS-55 assessment, and to conduct stakeholder outreach. After five years developing T&D’s strategic asset management program, Maty transitioned to a corporate strategic planning role in September 2017. Maty earned an MBA from Portland State University, and a Bachelor’s degree from Reed College.

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Abstract: The management of utility assets boils down to optimizing the use of finite financial resources to deliver the lowest acceptable risk possible. The challenge in a large, diverse utility is weighing the impact of investment or non-investment in very different contexts. For example, how does an asset manager weigh a transformer replacement against a pole replacement program? Sometimes, the benefits can be compared in terms of SAIDI and SAIFI, but that leaves out the relative cost of these improvements. The only true normalized factor is money. The cost of interventions (replacement, refurbishment, & reconfiguration) is easily established. The opportunity lies in monetizing, and therefore normalizing, the impact of all potential interventions in terms of risk reduction. If the monetized consequence of failure can be determined, and the present and future probability of failure can be determined, the monetized risk becomes simple math. Once the monetized risk is determined for all asset classes and risk reduction through investments on interventions is known, comparisons can be made. The investment decision is simply dollars spent on interventions versus dollars saved in risk. This approach has been used for many years in the UK, and has been recently recognized by the government regulator. In February of 2016, the UK Office of Gas and Electricity Markets (OFGEM) approved the use of the Common Network Asset Index Methodology (CNAIM), and required its use by all network operators. This system normalizes all asset condition and risk in monetary form, allowing comparison not only between asset classes, but also between utilities. Clearly, the UK government has taken risk normalization to a new level. This presentation will discuss the concept of monetizing current and future risk, the preliminary work behind CNAIM, and provide a few case studies where the implementation of this concept has proven successful.

Biography: Paul Barnfather earned his B.Eng (Hons) in Mechanical Engineering and Electronic Systems, and he currently acts as the Head of Asset Investment Management at EA Technology. He has a strong background in the regulated electricity utility sector, and he is currently responsible for EA Technology’s investment decision support software and services. He specializes in strategic asset management techniques for electricity transmission and distribution. Paul sits as the Patron’s representative on the Institute of Asset Management Council, and he is a co-opted member of the ISO/TC 251 UK mirror committee on Asset Management.
Abstract: When it comes to strategic asset management, utilities often struggle with prioritizing major projects and establishing minimal level incremental expenditures across different annual programs. To maximize the cost effectiveness of investment portfolios, this should be done in a way that minimizes overall corporate risk, taking financial constraints into consideration. This presentation will describe a methodology for addressing each of these challenges, and present a case study by Tucson Electric Power. The case study will show a utility-specific set of parameters used in prioritization, and explain how it has changed an internal process for selecting projects within TEP's capital budgeting and planning process.

Case Study: Use of Investment Prioritization Methodology at Tuscon Electric Power – Kinectrics & Tuscon Electric Power

Abstract: The measure of success of any asset management program is how it changes decision-making in the utility. This presentation will demonstrate the elements of a convincing business case for justifying and prioritizing expenditures for financial and regulatory audiences. Specific topics will include the following, presented in the context of examples from T&D and generation:

1. The basic business case process.
3. Evaluation of complex projects involving many assets and sources of risk.
5. Uncertainty analysis.

Biography: Darin Johnson is the President and director of asset management practice at BIS Consulting. His expertise includes risk analysis, capital planning, and life-cycle cost analysis for utilities of all types, particularly decision-support methods, and justified & prioritized replacement of aging assets and other spending programs where he served as chairman from 2009 through 2013.
Abstract: The integrity of a network (T&D) is at the heart of providing reliable service at the lowest cost. An asset management business model (AMBM) can provide an optimized, transparent, defensible, and reliability-focused budget forecast (O&M and capital), for a utility’s activities. Outages due to component failures can be very costly and span several days, particularly due to pole breakage during extreme weather events. The challenge is identifying areas of the network that could be particularly vulnerable, due to the age/condition of components, and determining and defending the correct course of action that lowers these risks. To fully address these challenges, utilities must understand the risks of today, and how these risks will change over time. Applying an optimized, multi-year forecast planning approach allows for this new perspective. Given that a network is only as strong as its weakest component; the following are the building blocks necessary for measuring long-term network health:

1. The age and condition of individual components.
2. The inter-connectedness or spatial relation of each component.
3. Various options for life extension or the replacement of components (including associated costs).
4. Deterioration characteristics over time for each component.

By assigning consequences of failure to sections of the network and adding overall network performance targets, the AMBM can provide a detailed work schedule driven by powerful mixed integer programming (MIP) mathematics. This schedule will offer the most cost-effective treatments over time and a truly optimized result for any given budget. Given the many parallels, this solution has now been adapted for the utility sector.

Biography: Mike Hutchinson is a Technical Account Manager with Remsoft, a software solution which uses data analytics to develop plans, schedules, and long-term strategies that help businesses improve the performance and productivity of their assets. Based out of New Brunswick, Canada, Mike has an in-depth understanding of Remsoft’s optimization technology. He works in a project initiation capacity with utility and forestry companies on strategic, tactical, and operational planning and scheduling projects. Prior to joining Remsoft, Mike acquired over two decades of experience in the forestry industry in a variety of roles and operational & planning capacities.

Notes: 

1. The age and condition of individual components.
2. The inter-connectedness or spatial relation of each component.
3. Various options for life extension or the replacement of components (including associated costs).
4. Deterioration characteristics over time for each component.
MILES - Maintenance and Investigation of Lines – CIMA+

Abstract: MILES (Maintenance and Investigation of LinES) is a PQ based fault location system using the VDFL technique developed by Hydro-Québec. This advanced system offers a major advantage over widely used techniques - the ability to precisely detect and locate non-persistent faults (NPF), as well as outages. These essential functions help locate incipient equipment failure, improve vegetation control, circumvent outages, and enhance the overall quality of service. In a world where network reliability and performance are top priorities, MILES comes in handy to help utilities improve in these areas:

1. ASSESS the overall health of the network and assets.
2. FIND faults (NPF and outages). Faults that are difficult to find or unable to be found using traditional methodology will be detected, located, and identified by MILES.
   a. Leaking insulators.
   b. Conductor swing.
   c. Intermittent vegetation contacts.
3. KNOW why the fault occurred.
4. DETERMINE which specific piece of equipment failed. This will help utilities to identify trends in equipment failures and/or vegetation contacts.
5. PREVENT non-persistent faults from escalating to outages by determining the causes of temporary faults.
6. REDUCE the number of outages and the time required to locate them, due to instantaneous emails indicating the exact fault location (within 4-5 spans).
7. OPTIMIZE assets and rehabilitation budgets using the monthly reports indicating faults and NPF locations and causes. This will ultimately reduce the need for on-call resources.

After using MILES on one of their worst performing feeders for 2 years, Hydro-Québec noticed major improvements in performance. The annual average of 180 outages was greatly improved with a 51% reduction, while its SAIDI index was reduced by 61%. In addition, $1M of unnecessary investment costs were avoided on this feeder, as the problematic equipment was accurately identified by MILES.

Biography: Troy Martin has acquired over 25 years of experience in the power utility industry. Specializing in power systems, with a broad background in distribution, transmission, and substation projects in the provinces of British Columbia and Alberta, his career has advanced through technical roles (including field assignments), to positions in senior leadership. Over the years, Troy has attended numerous seminars and completed several courses to enhance his technical, leadership, customer service, and communication skills. Having worked for FortisBC and the City of Kelowna for the majority of his career, Troy is very familiar with power systems (overhead and underground), and associated assets.

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CEATI's 1st Annual SAMP Conference
Abstract: Aging infrastructure is an issue facing most utilities today. Coupled with financial austerity, and skilled workforce constraints, difficult investment decisions need to be made to ensure the safety and reliability of assets on our power delivery systems. As the assets age, the choice facing asset managers is whether to continue “sweating” the asset with maintenance or refurbishment, or replacing assets altogether. Regardless of the situation, a mature and prudent utility must develop strategies to assess the asset condition, evaluate decision risks, determine associated costs, and satisfy stakeholder expectations and regulatory compliance in order to define appropriate trade-offs. Within this complex financial and planning landscape, the overall business objective remains to keep the lights on safely, reliably, and at the lowest possible cost, while keeping a wide variety of risks as low as reasonably possible.

The development of an integrated capital and O&M plan across multiple competing portfolios is therefore a challenge of prioritization and risk validation. All investments are different, as they each target various risk elements - from reliability and reputational, to environmental and safety risks. Prioritization is a complex undertaking necessary to effectively assess the efficiency and effectiveness of proposed investments, and to determine if they involve the right scope, scale, and timing for the business. What will give the biggest bang for the buck? How are risks from unfunded projects mitigated? What are the appropriate processes, mechanisms, and tools for an investment prioritization exercise? What will be the end goal for an asset management program?

This discussion will present BC Hydro’s asset investment risk and prioritization practice, covering considerations for risk treatment and mitigation, while exploring the links to asset condition and health indices, as a basis for investment scoping and timing.

Biography: Adelana Gilpin-Jackson has over 20 years of experience in design, construction, consulting, management, innovation, and business development. He is a specialist civil engineer, currently with BC Hydro’s T&D asset investment management - transmission lines strategy & standards group. He manages all aspects of overhead transmission line assets with respect to structures, foundations, and related programs. He is responsible for developing standards, strategies, policies and investment programs for transmission assets, as well as a wider asset portfolio. He is a participating member of various committees at ASCE, ASTM, CEATI, IAM, IEEE, EPRI, NACE, and SSPC. He has published papers on technology, engineering, and asset management; and he has delivered lectures and seminars on a variety of topics.

Notes:
Abstract: The most important aspect of making your overhead grid more reliable and resilient against outages is the ability to identify risks and potential problems through enhanced asset intelligence. Utilities today can employ a comprehensive predictive asset health assessment strategy using a single-sourced, multi-technology platform featuring RF asset health analytics, visual inspections, ultrasonic component identification, and IR camera patrols.

Integrating Multiple Technologies & Best Practices
These reliability practices and technologies have been integrated into a single program that provide unprecedented visibility into points of risk that allow the development of asset management strategies for planning, as well as precise targeted maintenance activities. The program also includes business case analysis and projections that quantify reduction targets for improved CMI, SAIDI, and SAIFI. Risk profiles are also built to help better target and prioritize planning and maintenance activities.

Overall Program to Develop the Best Mix of Reliability Improvement Resources
This program has been highly effective at a number of utilities across the country. In every case, it has opened up new possibilities for targeting specific conditions-based problems on the overhead system. By integrating technologies and best practices into a unified approach, utilities will have new options for attacking both the visible and invisible problems on the system.

Presentation Highlights:
1. System Overview with Patented RF Technology.
2. Use of Predictive Maintenance Methodologies to refine Business Case Strategies.
4. Recommendations for an Integrated Reliability Program.

Biography: Steve Keller is the Regional Territory Manager in the Western United States. He has over 15 years of experience providing new technologies and innovations to the utilities industry. Steve has managed projects in asset management strategies, smart grid, SCADA, SaaS, AMI/AMR, distribution and substation automation, demand response, DERMS and microgrids. A native of Colorado, Steve acquired degrees in Business Administration, Marketing, International Business, and Engineering from the University of Colorado at Boulder.

Notes:
Abstract: This presentation increases the audience's awareness of a few key challenges faced by AltaLink in the adoption of probabilistic or mathematical models for optimizing management of aging assets. Many of these challenges are circumvented through inputs from subject matter experts and workarounds for a particular instance. These quick-fixes, coupled with personnel turnover/movement within or outside of organizations and competing priorities, pave the way for bolstering the challenges associated with the successful adoption of these models. Probabilistic modeling/analysis methods like Weibull and Lognormal are industry-accepted tools that help asset managers predict and understand the life expectancy of various equipment. Naturally, there are numerous benefits that are associated with using these methods: they are relatively cost-effective to implement, relatively easy to analyze due to the outputs typically being graphical, and they create a simplistic way to benchmark against industry peers. This presentation will provide awareness of the issues above, and demonstrate how they can affect the results of accepted asset models. Proposed solutions will also be presented where applicable.

Biography: Ani Chopra is a 2015 graduate of the University of Calgary's Electrical Engineering program. He is currently working for AltaLink in the Lifecycle Maintenance Engineering (LME) group, having now completed three years in the utility space. His work experience includes lifecycle assessments of substation assets, power quality studies, and transmission line design. He also has a special interest in lifecycle philosophies and renewable generation advancements. Mr. Chopra is a registered Engineer-In-Training in the province of Alberta.
Abstract: Every utility faces the challenge of reducing operating expenditures and the task of making informed risk-based decisions on capital expenditures. The main cost commitments include vegetation management, asset inspections, defect repair, and emergency response. The delivery of these broad programs has not been significantly transformed in decades. Through the use of remote sensing, image processing, advanced machine learning technologies, and the creation of a virtual world model of a utility network, the Roames Asset Management System brings together an advanced technology set, which when combined with the asset information of a network business, is able to markedly reduce expenditures and risk in these key areas.

This presentation provides case study results for the application of Roames at two utilities. The use of Roames at Scottish Power is examined via two key initiatives: Vegetation Management, and Electricity Safety; Quality and Continuity Regulations (ESQCR). Scottish Power’s utilization of Roames has allowed them to realize specific benefits that include a decline in network faults, reductions in field inspections, accurate audits of vegetation management programs from the desktop, and the optimization of work programs.

Case study results are also presented for the utilization of Roames by Ergon Energy in Australia. Ergon has integrated Roames into all facets of its asset and risk management. Ergon’s entire network (covering an area of over one million square kilometers), is modeled in the Roames virtual world. Roames is used by Ergon to improve network performance, manage risk through the increased promotion of network safety, maintain and manage assets, improve vegetation management, ensure regulatory compliance, and to plan for and respond to natural disasters.

Biography: Kreg McCollum acts as Vice President at Leidos’ Commercial Energy Solutions Operation. Leidos is the exclusive North American provider of the Roames 3D asset management technology, where Mr. McCollum oversees the strategic direction, development, and delivery of Leidos’ Roames North America Program. Mr. McCollum has over 25 years of experience as a business leader, consultant, and trusted advisor of utilities, municipalities, governments, and others within the electric power industry. He received a Master’s degree with high honors in Resource Economics from the University of Wyoming, and a Bachelor’s degree in Resource Economics from Oregon State University.

Biography: Matthew Coleman is a Roames (EEI Edison Award 2015 Winner) Product Executive. Based in Brisbane, Australia, Mr. Coleman is an electrical engineer whose background developed at one of the world’s largest geographically dispersed energy distributors, Ergon Energy. He works globally with electrical utilities in the establishment of virtual world asset management practices, and he is a champion in the development of technologies improving asset performance and risk. Mr. Coleman has represented the industry while serving on governance committees charting the course of initiatives, including: smart energy management, autonomous flight systems for asset inspection, and ground based monitoring networks.

Notes:
Data Quality and Strategic Asset Management – METSCO Energy Solutions

Abstract: The quality and integrity of asset data plays a critical role in how a utility makes strategic decisions across their system, with good quality data resulting in optimal decision making. This presentation will discuss how the quality of asset data clearly influences decision-making, and the techniques that must be applied by the utility in order to achieve the optimal data set. It also considers which processes must be in place to continually improve and evolve this data over time, and how the data shall be collected across the organization by a variety of stakeholders. There is an optimal range of data that should be collected by the utility. Too little data will result in estimation and arbitrary decision-making, while too much data will result in cost-intensive data processing and the introduction of productivity issues, which can impact the entire organization. An ideal range of data would include attributes such as registry data, system conditions, and risk profiles, which can be used as part of engineering analyses to produce reliability forecasts, and to determine the optimal asset strategies that balance capital and risk cost, as well as asset performance. When utilities achieve this balance, they can minimize total long-term operating costs across their system. To perform this form of analysis, however, requires the integration of data across a multitude of data platforms.

Biography: Please see page 19 for Robert Otal’s professional profile.

Enhancing Asset Management Value from Outsourced Inspection Programs – Nova Scotia Power Inc.

Abstract: In order to maintain the safe and reliable operation of Nova Scotia Power Inc.’s (NSPI) transmission and distribution system, regular inspection of line assets is a key element of T&D asset management activities. Beginning in 2015, both transmission line and distribution feeder inspection programs were outsourced to non-utility personnel. Traditionally, both activities have been drivers for “proto” asset management through corrective maintenance and capital investment, when system deficiencies were identified. However, the outsourcing exercise undertaken in 2015 provided an opportunity to achieve a positive step towards change in inspections and asset management. This improvement was two-fold: firstly, skilled utility resources partially allocated to inspections could be migrated back into higher-value, customer-facing, PLT and planning work; and secondly, the ways in which collected data informs effective strategic asset management activities was enhanced. This presentation will explore approaches to gaining additional value from each inspection record, the management of execution, impacts on asset management workflow and prioritization, as well as potential next steps from the NSPI experience.

Biography: Mike MacMillan is a T&D Asset Management Engineer at Nova Scotia Power Inc. (NSPI) in Halifax, Nova Scotia, where he has supported asset management activities on NSPI’s Transmission and Distribution system since 2014. As a member of the T&D capital management and performance team, his role includes responsibility for transmission reliability reporting, asset health and criticality, sustaining capital analysis, critical spares, as well as management of NSPI’s annual line inspection programs. Mike holds a BSc in Physics and a BEng in Chemical Engineering from Dalhousie University, as well as an MSc in Nuclear Engineering from the Swiss Federal Institutes of Technology. He is a member of the Institute of Asset Management, and a registered Professional Engineer with Engineers Nova Scotia.
Biography: Richard Itiveh is currently the Manager of the Asset Management Office in ATCO Electric. His team advances asset management best practices in the organization and ensures that the delivery of asset management plans is consistent with quality management principles. His team also initiates and leads continuous improvement across the organization, develops strategies to influence corporate culture, and develops asset management plans of over $200 million of capital investment annually for transmission and distribution asset renewals. Prior to joining ATCO Electric, Richard worked at Emera Nova Scotia Power and the Michelin North America Inc. Richard has a wealth of experience with maintenance planning and reliability management. He is also a registered professional engineer with the Association of Professional Engineers and Geoscientists of Alberta (APEGA), and the current Vice Chair of the IEEE Northern Canadian Section. He received a Strategic Leadership Certificate from the University of Western Ontario in 2014, a Master’s of Business Administration from Saint Mary’s University in 2012, and a Bachelor’s of Engineering from Dalhousie University in 2004.

Notes:
Abstract: As utilities continue to make decisions about their infrastructure based on asset management planning outputs, it is necessary to continually monitor and evaluate the effectiveness of these decisions from a performance and productivity standpoint. As state and provincial regulators continue to enhance their regulatory frameworks (used in evaluating utilities’ investment plans and decision-making), there is a need to develop new metrics that allow for the evaluation of the effectiveness of asset management plans and decisions in a consistent manner between utilities. These measures inform the regulator as to whether the utility is effective in their implementation of asset management processes and activities, and ultimately whether the right decisions are being made regarding the right assets at the right time. This presentation aims to discuss the asset management effectiveness measures that have been considered or implemented within various regulatory environments, including the processes and criteria that regulators are applying to develop such measures. This involves aligning measures with existing asset management standards (e.g. PAS 55, ISO 5500x), determining advantages and disadvantages for possible measures, and establishing the optimal criteria that these measures should adhere to. Specific and detailed criteria must be established in order to evaluate and prioritize each measure such that the best possible measure(s) can be selected. In cases where success measures have already been implemented, this presentation will also discuss the changes that utilities have had to make to their existing asset management frameworks to comply with these new requirements, and to ensure that their asset management plans and outputs are positively received and accepted by regulatory and intervening bodies.

Biography: **Alexander Bakulev** is an experienced professional with over 14 years of experience in utilities asset management, investment, and budget planning, as well as in strategic management. Alex is a specialist on the business side of regulatory proceedings; he has been selected to balance the engineering specialists elsewhere in the project. Alex has extensive experience in long-term economic asset planning, business case development, financial modelling, and risk-based investment planning for generation, transmission, and distribution companies in North America and Europe.

Biography: **Robert Otal** is the Director of Asset Management & Analytics at METSCO. In this role, Robert has worked with utilities to introduce solutions that better optimize their asset management processes and systems, such that the underlying plans and components can be better justified in a regulatory environment. Prior to joining METSCO, Robert worked with two utilities. While at Toronto Hydro-Electric System Limited, Robert worked hands-on towards the improvement and optimization of Toronto Hydro’s Distribution System Plan. While at Horizon Utilities, Robert assisted with the implementation of their asset management plan and condition assessment system to evaluate the distribution system assets. Mr. Otal obtained his B.Eng. in Electrical Engineering from Ryerson University, and he is a registered Professional Engineer in Ontario. His areas of interest include risk-based analysis and the optimization of distribution systems. Robert takes an active role in the Engineering profession; he is a member of IEEE.
Abstract: The application of digital asset management strategy to electricity transmission and distribution networks with the intent to drive asset performance has traditionally been encumbered or even precluded by poor asset information. Physical location, asset ID, age, rated capacity, connectivity & dependencies, performance (reliability, condition, & serviceability), work records, design drawings, and asset imagery information may be absent, or held in disparate systems. Asset context, such as topology, clearances for vegetation and hard features, and dynamic changes over time may also be deficient. An increasing number of utilities are working to solve these challenges through the adoption of new technologies that deliver a cost-effective means of correcting or renewing asset information, with significant and demonstrable net benefits. This paper first provides a technical review and digital asset management examples using 3D techniques. Case studies are then introduced to explain how three large electricity transmission and distribution utilities are deploying digital asset management to decrease asset maintenance costs, and driving efficiencies on more than 100,000 miles of network. A detailed examination of the key technical components required to implement a digital asset management approach is then provided. This paper concludes with a demonstration of the case study examples that obtain 3D asset position and condition information as part of a digital asset management strategy driving intelligent decision making. These key considerations should be taken into account by anyone applying asset management theory to electricity transmission and distribution networks.

Biography: Nick Ferguson is Senior Vice President & leader of business operations in the USA and Canada. Nick holds a Bachelor of Science Degree focusing on geospatial technology (BSc), and a Master’s Degree in Business Administration (MBA). He is also a Chartered Geographer (CGEOG, GIS), and a Fellow of the Royal Geographical Society (FRGS). Nick has acquired a decade of international experience working in a consultative capacity with electricity utilities in the USA, Canada, Australia and the EMEA region. He is a regular speaker at asset management, engineering, and vegetation management conferences, and an enjoyer of outdoor pursuits in British Columbia during his time off.

Biography: Ben Mallen acts as Business Area Director for the Trimble Energy Division. Trimble Energy develops industry leading enterprise-level solutions for electric and gas distribution utilities, including back-end network design and planning tools through to asset management and outage management. He holds a BSc in Surveying and Mapping Science from the University of Newcastle upon Tyne in the UK. Before joining Trimble, Ben worked as a surveyor both offshore and on land. He has been with Trimble for 17 years, throughout which he has held a number of roles. These have ranged from technical support through to product management for Trimble’s geospatial hardware and software products, as well as extensive sales and channel management in North and South America. Ben subsequently ran Trimble’s Oil and Gas business, helping launch new industry leading solutions into the exploration space. Based in Denver, Colorado, he enjoys the various outdoor activities that the state has to offer.

Notes:
Implementing an Asset Management Approach at a Small/Medium Power Utility – Tacoma Power & Turner & Townsend AMCL

Abstract: With the increasing awareness of strategic asset management, a number of electrical utility organizations are questioning: where to start, what to do first, how much will it cost, and what are the benefits? In 2016, Tacoma Power identified the desire to develop an asset management implementation program tailored to utility needs which can be implemented at a sustainable pace. This meant that their resources (people and finance) were not stretched, and prevented them from being left with something that would not be used. Tacoma Water previously developed and implemented an asset management approach, however, following certain lessons learned, Tacoma Power aimed to undertake a different methodology. Tacoma Power has adopted the following approach to launch their strategic asset management project. This involves:

1. Executive briefing on asset management to support and establish baseline understanding.
2. Lite assessment – 5 days maximum, solely including key people.
3. High-level roadmap development in collaboration with the project team, including targeted improvement areas and a sustainable/realistic implementation plan.
4. A business case to support the implementation of the roadmap, which has been approved by senior leadership.
5. A change management/communications plan.
6. Asset management template development and an action plan to complete.

Adopting this approach, Tacoma Power has obtained support from their senior management team to implement a plan that is both affordable and sustainable.

Biography: Robert Raynes is a Chartered Surveyor with over 15 years of experience in management and consultancy, and currently a Director at AMCL North America. He has worked in capital delivery and asset management for infrastructure, property, and natural resources clients. He has provided guidance and management support at delivery team, management, and executive levels, and he has a deep understanding of the different communication styles and approaches required. Mr. Raynes’ experience has covered supporting the implementation of organizational strategies, change management, governance, and program delivery models, with a specific focus on helping organizations to establish an asset management implementation program. His qualifications and accomplishments include a BS.c. in Surveying, a Diploma in Construction Law, and Prince 2 training.

Biography: Shannon Rauch is the Manager of Strategic Asset Management at Tacoma Power. She has over 25 years of experience in the utility industry, and has been with Tacoma Power since 2014. Before joining Tacoma Power, Shannon led the asset management program at Tacoma Water. Prior to her affiliation with Tacoma Public Utilities, Shannon worked in consulting, providing Asset Management services to the public sector. Shannon earned her Bachelor of Science degree in Electrical Engineering, and she is a registered Professional Engineer.

Notes:
Progressing your “Asset Management” Approach with no Burning Platforms – NYPA Case Study
– New York Power Authority & Turner & Townsend AMCL

Abstract: In 2014, the New York Power Authority launched its strategic initiatives, with asset management as one of its leading programs. However, the question of motivation remained - NYPA had no ‘burning platform’ or crisis when they started this initiative. The assets were in a reasonably good condition after the completion of a series of life extension & modernization projects. NYPA wanted to demonstrate their provision of a value for money service in managing state assets to deliver future needs, and their ability to keep ahead of potential future federal & state requirements. After a maturity assessment against the GFMAM 39 subjects, the completion of the business case, and a roadmap, it was still unclear what would give the program a “sense of urgency” (Kotter 8 Steps of Change Management). After considering each of the improvement initiatives in the strategic asset management plan roadmap, the focus shifted to the production and independent implementation of our first AMPs. Initially, the newly appointed regional asset managers perceived their major role to be oversight of various improvement projects. However, delivering a longer-term asset management plan is the outcome of all of the work that we do, and the on-going responsibility of asset managers. We thus started with our existing knowledge-base, identifying the gaps and shortfalls over a 4-month period as we worked to form a complete plan spanning the next 10 years. The process also triggered a much wider collaboration, bridging multiple stakeholders from across the whole of NYPA.

Biographies: Gary Proulx is the Director of Asset & Maintenance Management for New York Power Authority (NYPA), where he has served throughout his tenure in a number of operations and maintenance roles that emphasize the principles of Asset Management. Additionally, over the course of his 34-year career, he has had the opportunity to serve in the manufacturing, mining, and automotive sectors, as well as within electrical utilities. Mr. Proulx has supported the strategic introduction of Asset Management at NYPA, and he is currently guiding the implementation of NYPA’s vision toward an ISO 55000 aligned asset management organization, with a vision toward the digital utility of the future.

Please see page 21 for Robert Raynes’ professional profile.

Notes:
Abstract: The maintenance cost represents a significant share of the Levelized Cost of Energy (LCOE) produced by Wind Turbines (WT). A recent survey has conveyed that said cost may represent up to 30% of the cost of production. Maintenance cost includes spare parts purchasing, repair labor, transportation, crane rentals, and energy production losses. WT asset management is a process that maximizes the return on investment in the equipment over its lifetime. A well-planned asset management strategy can help owners achieve considerable savings. Maintenance strategies have been classified in the literature as follows: Corrective Maintenance (CM), Preventive Maintenance (PM), Condition-Based Monitoring (CBM), and as Performance-Based Maintenance Contracts (PBMC). PBMC is a results-oriented contracting method that focuses on the outputs, quality, or outcomes that may bond at least a portion of a contractor’s payment.

In this paper, a PBMC approach is proposed to reduce the cost of WT maintenance while meeting availability requirements, mitigating risks, reducing noise, as well as other environmental issues. PBMC differs from CM and PM, as wind farmers compensate service providers for system performance, not for spare parts and repair labor. As a first step, PBMC models describing the relationship between system cost, reliability, and spare parts stocking will be developed. The aim of the analysis is to allow the WT manufacturers to optimize design, production, and after-sales services. PBMC is then used to reduce the operation and maintenance costs of wind power generation, thus permitting better returns by optimizing the condition of the assets and level of service. This strategic asset management approach illustrates the benefits of using PBMC.

We work to demonstrate such benefits via “InfraModex,” a sophisticated web-based Asset Management & Decision Support System. The WT current and future states are modeled over the life cycle with different maintenance regimes and user-defined degradation models. The goal is to simulate the entire life-cycle cost of each WT, and ultimately the entire wind farm. A yearly investment master plan is then generated, as well as a net present value (NPV), allowing life-cycle comparison between the scenarios. A combination of maintenance and renewal policies will be presented to compare total cost versus long-term levels of service, and to prioritize interventions based on their actual and predicted WT conditions, as well as their criticality. Finally, a comparative study based on commonly used maintenance strategies will be presented to demonstrate the advantage of the proposed PBMC approach for reducing the maintenance cost, mitigating risks, and maintaining required levels of service.

Biography: Mrs. Catherine Laplante is the current Director of Strategic Asset Management at SNC-Lavalin. She is passionate about the ways in which current maintenance and capital investment strategies align with long term sustainability, and with global corporate objectives. She has a solid understanding of the fundamentals behind the strategic decisions that lead to financial arbitrage between assets, and how these ought to be rolled out. As an economist, she has 25 years of experience in transport planning. She has become highly knowledgeable in large-scale project execution processes within multidisciplinary teams, and she has developed the ability to synthesize information generating financial/cost-benefit analysis, economic impact analysis, and risk assessments for numerous major infrastructure feasibility studies in Quebec and abroad. She has carried out multiple travel demand analyses for freight and passenger transportation alike, involving extensive characterizations of past, present, and future travel patterns with regards to changing travel conditions. She has worked in freight and passenger sectors, undertaken transport forecasts and market share analysis, as well as wider project analysis.
Asset Management Decision Making – a Case Study – Copperleaf & Alectra Utilities

Abstract: The Institute of Asset Management released its subject-specific guidelines for both capital investment and operations & maintenance decision-making in June 2016. As part of this effort, a number of case studies were considered; including the decision making process that was put in place by PowerStream, an electrical utility in Ontario, Canada. This case study explains PowerStream’s approach to defining its value and risk frameworks, and its rigorous capital planning and decision making cycle. The ultimate goal is the identification of the highest value capital plan across the entire organization (including fleet, facilities, IT), while complying with the Energy Board’s regulations, and the internal 6-year capital constraints. This presentation will explore the three-phase approach taken by PowerStream to achieve this goal.

Biography: Please see page 3 for Boudewijn Neijens’ professional profile.

Biography: After graduating from Wilfrid Laurier University in Ontario and completing a CMA designation, Tracy Martin worked in the financial planning and analysis field. Though she gained experience in a variety of industries, Tracy’s work primarily focused on construction before she found her way to the utility business in 2008. In 2014, Tracy transitioned to asset management. Responsible for the capital budget and reporting, she was immediately immersed in the ongoing implementation of PowerStream’s asset investment planning and management system. Following the merger resulting in Alectra, Tracy continues to work in the asset investment planning and management system, rolling it out across the additional three utilities.

Notes:
**The Launch of an Asset Management Plan at Yukon Energy Corporation – Yukon Energy Corporation & Hatch**

**Abstract:** Yukon Energy (YEC) is situated in the northern climate of Canada. Its mandate calls for the generation and delivery of electrical energy to cities and homes within its service territory. Over the past 20 years, its focus has been on connecting communities and decreasing dependency on diesel generation, while increasing green energy content – which is now of the highest in North America, thanks to the use of hydro generation. YEC is expecting to continue its aggressive capital investment towards solving various environmental, social, and technical challenges, particularly those related to the generation and delivery of electricity in the North, due to its isolation from the rest of the transmission system in North America. YEC has consequently identified a need to review and improve its business operations and asset management practices. YEC’s business improvement initiative, with the help of Hatch, is examining the life cycle of its infrastructure through the lens of ISO 55000. Hatch is facilitating YEC’s evaluation of current state, future state, and gap analysis. This will lay the foundation for developing a roadmap that spans the next 5 years.

**Biography:** Albert Schwarz is YEC’s Asset Manager. This is a new position, created to lead YEC’s transition into asset management. Albert will advance the use of evidence based asset management principals to manage risk and to support the YEC capital plan across all asset classes (Generation, T&D, and Stations). In his 14 years at YEC, he has worked in various roles & functions, including Capital Project Manager, Transmission Engineer, Customer Connections, Implementation of Corporate Software, and Manager of Operations. Albert completed his B.Sc. in Electrical Engineering at the University of Alberta in 1994, and he is a registered Professional Engineer with APEY in the Yukon Territory.

**Biography:** Harjit Bajwa is the Director of Engineering & Capital Projects at Yukon Energy Corporation. Harjit leads the engineering department supporting YEC’s existing generation, transmission, and distribution assets. He is responsible for the capital budget plan, prioritization of capital expenditures vs. O&M costs, advancing asset management plans, and executing major capital projects. Harjit has over 20 years of experience in power generation, including 10+ years as Project Manager, Major Projects at SaskPower, where he completed major hydro plant refurbishment projects. Harjit earned his B.Sc. in Mechanical Engineering from Sardar Patel University in 1994, and he is a registered Professional Engineer with APEY in the Yukon Territory.

**Biography:** Hans Ziemann is a Project Manager and Practice Lead at Hatch, with over 27 years of experience in power generation, transmission and distribution. Hans developed his skillset in the utility space, particularly in the processing & manufacturing industry, as well as in the mining sector. His background provided him with broad based knowledge & expertise, including design, tendering, construction, operations, maintenance, automation, analytics, process improvement, and management consulting (including transaction advisory). Hans completed his B.A.Sc. in Electrical Engineering at the University of Waterloo in 1990 and his Dipl-Ing (Masters) at TU Braunschweig in Germany (1992). He is a registered Professional Engineer with PEO in Ontario.

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CEATI's 1st Annual SAMP Conference
Abstract: The electrical utility sector is increasingly under pressure to keep electricity rates from rising while meeting the service expectations of customers. This is occurring simultaneous to a growing amount of aging distribution and station infrastructure. Strategic asset management is required for the effective determination, maintenance, operation, and replacement needs of these assets, while achieving their maximum value, which, in turn, provides the most value to customers and shareholders. Hydro Ottawa Limited uses Copperleaf’s C55 Asset Investment Planning and Management tool to identify asset replacements and prioritize projects based on cost, benefits, and mitigated risks. The optimization of projects allows Hydro Ottawa to provide maximum value for our approved spending. Looking to the future, Hydro Ottawa has undertaken the continued improvement of its asset management practices through an initiative to align the management of distribution and station assets with the ISO 55001 standard. The ISO 55001 standard defines asset management best practices by setting out the development of processes and procedures to be adopted across many departments. The continual improvement of asset management practices will allow Hydro Ottawa to offer better value to its customers and shareholders. This presentation will describe how Hydro Ottawa has progressed in its asset management strategy, beginning with its implementation of C55 to evaluate and prioritize projects, through to the takeaways to-date on aligning this strategy with the ISO 55001 standard.

Biography: Christopher Murphy is a distribution system planner in Hydro Ottawa’s asset management group. He develops both short-term and long-term plans regarding the assets required to support the electrical system within Hydro Ottawa’s service territory. Christopher is responsible for developing yearly load forecasts, planning asset renewal and system service projects, evaluating generation connections, and contributing to various reports, such as Hydro Ottawa’s Distribution System Plan. He has also led the application of Hydro Ottawa’s asset investing planning and management software (Copperleaf’s C55), used for valuing and optimizing projects, as well as for budget tracking. Most recently, Christopher has been tasked with managing the implementation of certifying the management of Hydro Ottawa’s distribution and station assets to the ISO 55001 standard.
# Registration Form

## 1st Annual SAMP Conference

Strategic Asset Management Enhancement of Effectiveness & Value

November 1-2, 2017 • Vancouver, BC, Canada

You may also register online at www.ceati.com/SAMP2017

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### Registration Fees & Discounts

- [ ] $1000 USD Tabletop Display *Does not include a pass
- [ ] $945 USD Standard Registration
- [ ] $675 USD CEATI Participant Registration
- [ ] $475 USD Academia/ Speaker Registration
- [ ] N/A SAMP Participants*

* SAMP participating organizations receive 2 complimentary registrations.

Contact events@ceati.com for Sponsorship Opportunities!

### Important Information

Registration fees include proceedings package, breakfast, breaks, lunches and reception where indicated on the schedule.

- Please check if you wish to be contacted about allergies or other dietary requirements.

Prices are in USD. Charges will appear as ‘CEATI International Inc’ and are subject to applicable taxes and fees.

All cancellations received at least 30 days prior to event will be subject to a $200 processing fee. There will be no refunds granted after this date. Delegate substitution is permitted at no extra cost.

Please note that all names completing this form will be added to CEATI’s mailing list. If you do not wish to be included in this electronic outreach, please click the “unsubscribe” button in the email to remove yourself. By attending, you acknowledge that there may be photographs or videos taken of you during this event, and you consent to the use of these photographs or videos in future CEATI communications.

Completed registration forms can also be sent by email to events@ceati.com or by fax to (514) 904-5038

### Location Information

Element Vancouver Metrotown
5988 Willingdon Ave,
Vancouver, BC, V5H 2A7
Canada
+1-604-568-3696

All conference guests are eligible for a discounted group rate of $149 CAD subject to availability. Simply mention “CEATI International” when reserving.

Tel: +1.514.866.5377  Fax: +1.514.904.5038  events@ceati.com  www.ceati.com