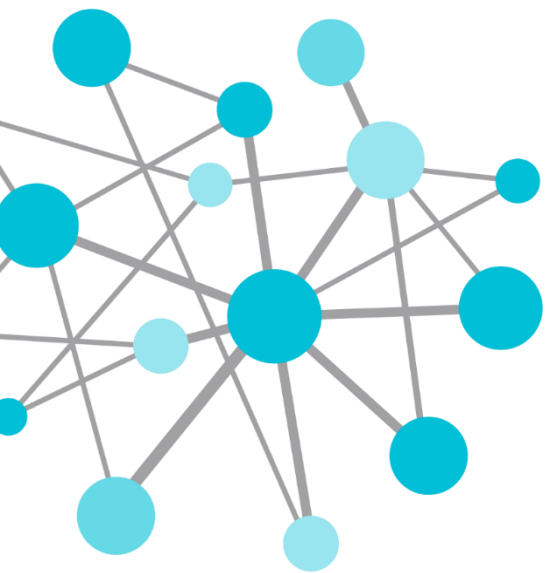




The PI System within Emera Energy's Generating Fleet

Presented by **Robert Peterson, Plant Manager**
Emera Energy – Bayside Power



Emera Company Summary

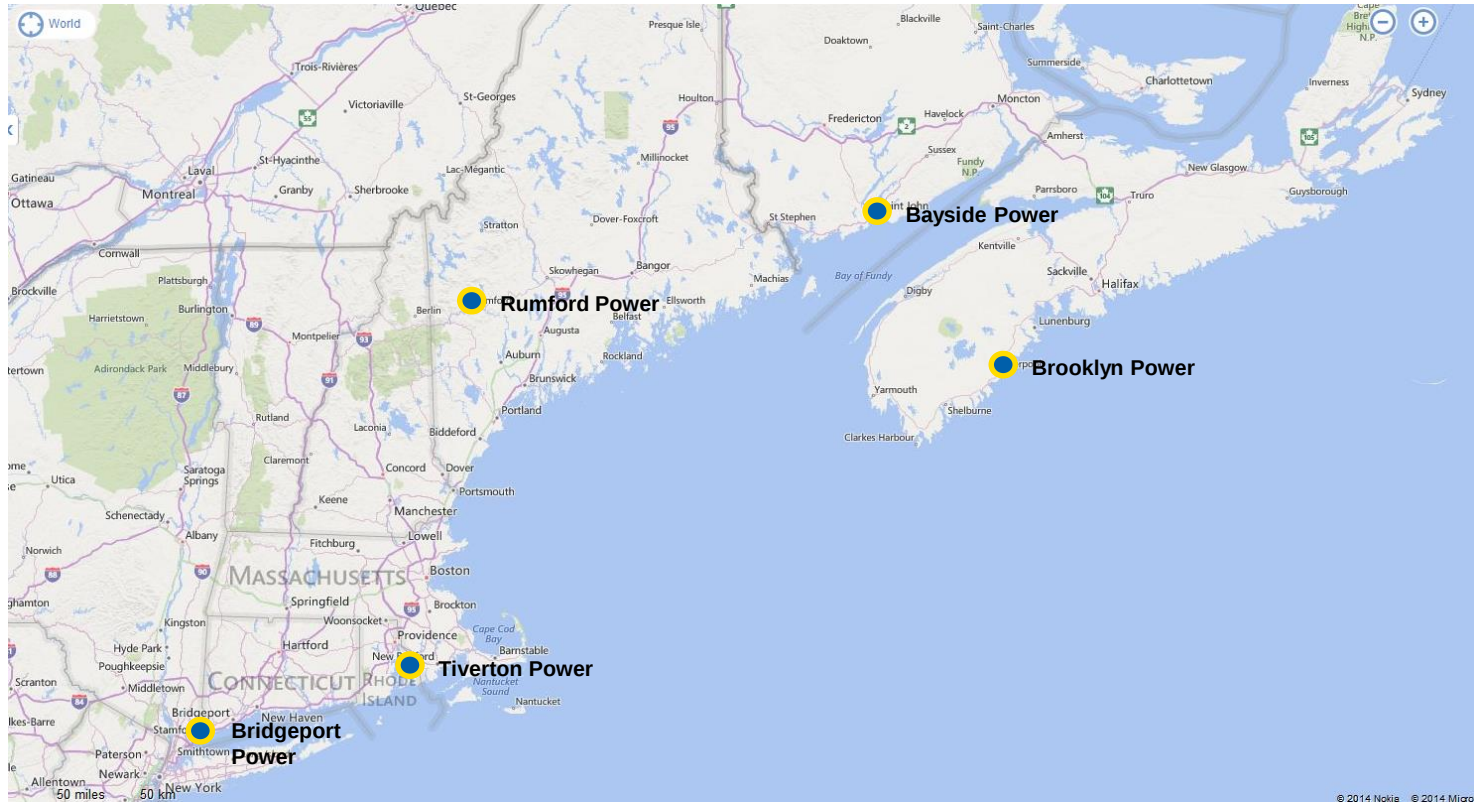


Emera operates electric utilities and have other investments in Canada, the Caribbean and the US. Total assets to date are valued at \$9.07B. Our headquarters are in Halifax, NS. Our President and Chief Executive Officer is Chris Huskison. The Emera group of companies relies on the dedication, expertise, and professionalism of our ~3,500 employees. Our people provide invaluable support to the leadership team along with excellent customer service and reliable energy to our over 900,000 customers.

Emera is exploring renewable generation in wind, biomass, hydro, solar, and the potential of tidal energy. We are also investing in transmission to collect new, often remote sources of renewable generation to deliver to market, including investments in the transmission and generation of natural gas.

Our investments in electric utilities, a pumped storage hydro-electric facility, natural gas pipelines, gas-fired power plants, an energy services company, and a renewable tidal energy company continue to provide opportunities for our company.

Emera Energy's Generating Fleet

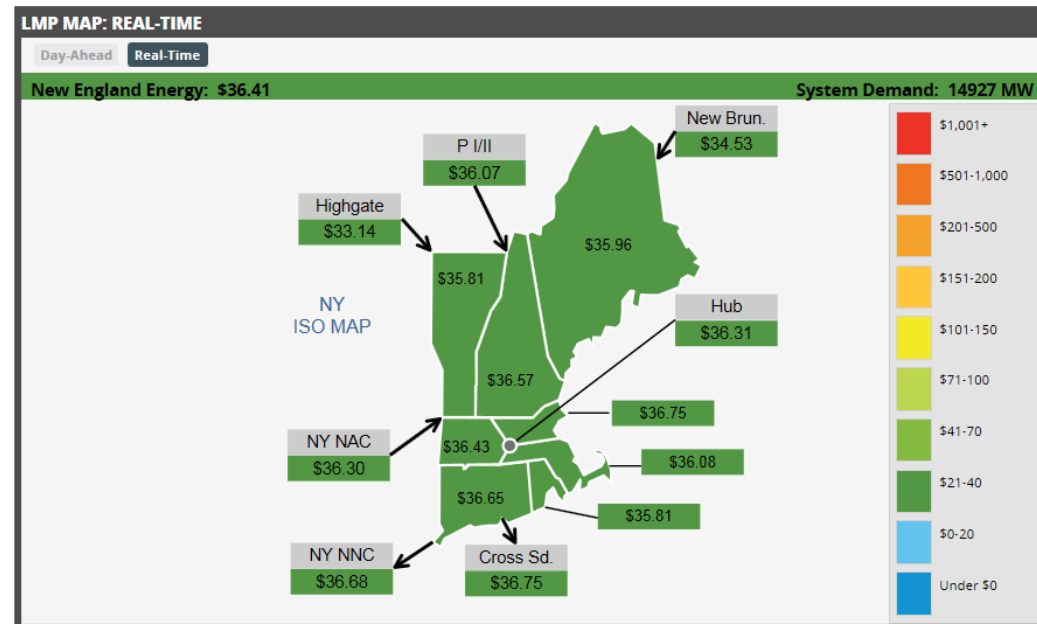


Overview of Assets – Plants & People

- Total of 5 generating assets in Canada and the US
- ~1.4 GWs of capacity
- 4 Natural Gas Combined Cycle Plants
- 1 Biomass Plant
- 184 employees (total), 129 employees (Operations)

Emera Energy's Generating Fleet – The Playground

- All 3 US Plants participate in ISO-NE through both energy and the capacity markets
- Brooklyn energy flows strictly into NS
- During the non-PPA season, Bayside flows energy into New England primarily through the Salisbury node in Maine. At this time, it does not participate in the capacity market



Emera Energy's Generating Fleet – PI System Current Status

	Brooklyn	Tiverton	Bridgeport	Rumford	Bayside
Current version of PI being used	3.4.375.80	3.4.385.77 SP1	3.3.0.949	3.4.385.77	3.4.385.77
Number/type of interfaces installed	DCS ABB Infi90 (with redundant interface), KEPWARE, OPC	ABB Control IT Harmony OPC Server Version 4, Modbus Serial PLC Interface	Siemens TXP	ABB-semAPI, Modbus, PI Perfmon	ABB Advant, OPC, PI-HTML
Number of tags and estimated % of plant process monitored	1194 tags (90%+ monitored)	4389 tags (90%+ monitored)	6000 tags (80%+ monitored)	4504 tags (90%+ monitored)	1974 tags (90%+ monitored)
Current usage of the system	Moderate to heavy. ProcessBook and DataLink	Heavy. 5 Client Applications and multiple users	Light to moderate	Moderate to heavy. ProcessBook DataLink	Moderate to heavy. ProcessBook, DataLink, PI AF, Notifications, Performance Equations
Asset Framework in place	No	No	Yes	No	Yes

The Challenges

- Geography - 5 plants, 2 countries, 3 states and 2 provinces
- PI System version gaps
- PI Asset Framework not being fully utilized in all plants
- Training needs to be provided to those who can most benefit from using the PI System
- PI Client tools not being fully utilized
- Infrastructure and consistency for system backups needs refining
- Lean staffing model can present a strain on employee resources

Bridgeport Power

- Siemens V84.3A2 Natural Gas fired Combined Cycle Turbines
- 520 MW 2x1 Combined Cycle. Currently on outage for upgrades which will bring total output to 555 MWs
- Triple pressure HRSG
- Participate in the energy and capacity markets in ISO-NE
- 25 employees



Tiverton Power

- 265 MW 1x1 Natural Gas fired Combined Cycle
- 175 MW GE 7FA Hydrogen Cooled Gas Turbine Generator
- 90 MW GE A10 Air Cooled Steam Turbine Generator
- ~15-18 MW Power Augmentation through anhydrous ammonia used in a chiller cycle, which lowers GT compressor inlet temp during the summer
- 16 cell Air Cooled Condenser
- Nooter-Eriksen Triple Pressure HRSG
- 100% merchant plant with no PPA
- Participate in the energy and capacity markets in ISO-NE
- 17 employees



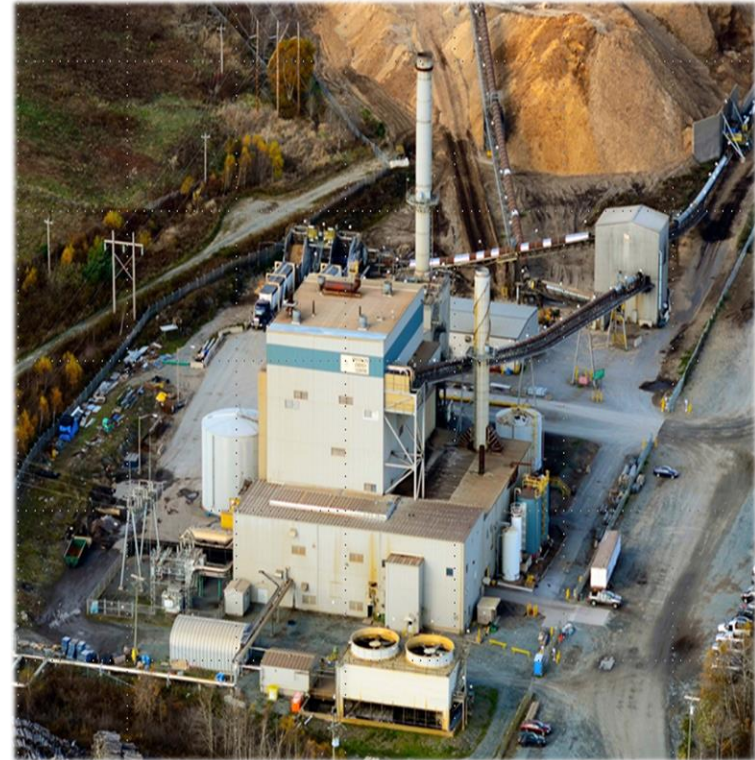
Rumford Power

- 265 MW 1x1 Natural Gas fired Combined Cycle
- 175 MW GE 7FA Hydrogen Cooled Gas Turbine Generator
- 90 MW GE A10 Air Cooled Steam Turbine Generator
- ~15-18 MW Power Augmentation through anhydrous ammonia used in a chiller cycle, which lowers GT compressor inlet temp during the summer
- 16 cell Air Cooled Condenser
- Nooter-Eriksen Triple Pressure HRSG
- 100% merchant plant with no PPA
- Participate in the energy and capacity markets in ISO-NE
- 17 employees



Brooklyn Power

- Wood Biomass fired Dresser and Rand Axial Flow Steam Turbine
- Previously provided steam to the local paper mill
- 30 MWs of capacity
- Year round PPA with Nova Scotia Power
- The plant consumes ~ 50 GMT of biomass per hour (2 GMT is equivalent to 1 cord of wood or a pile 4' high by 8' long by 4' high)
- 27 employees



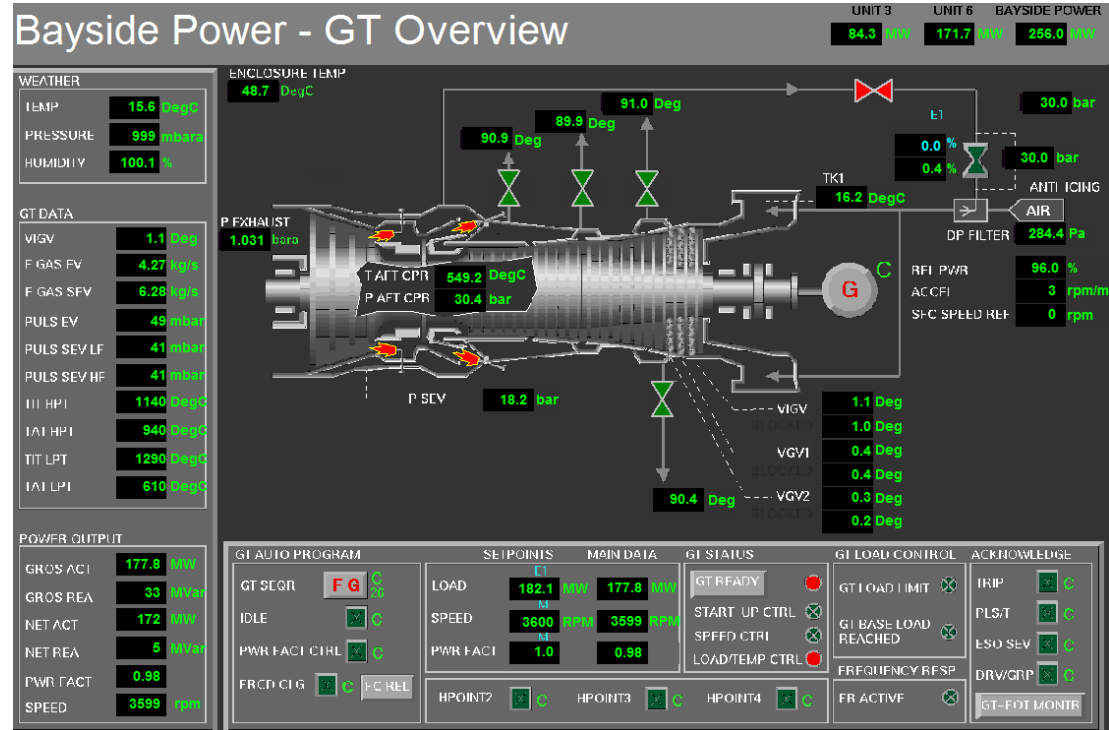
Bayside Power

- 190 MW Alstom GT24 Natural Gas fired Combined Cycle Turbine with a 100 MW repowered 1960's vintage Brown Boveri Condensing Steam Turbine
- 2-modes of operation available (XL / M-mode)
- Triple pressure HRSG
- 5 month PPA with New Brunswick Power (November 1st – April 30th)
- Merchant for the remainder of the time, selling into ISO-NE , NB and NS
- 22 employees



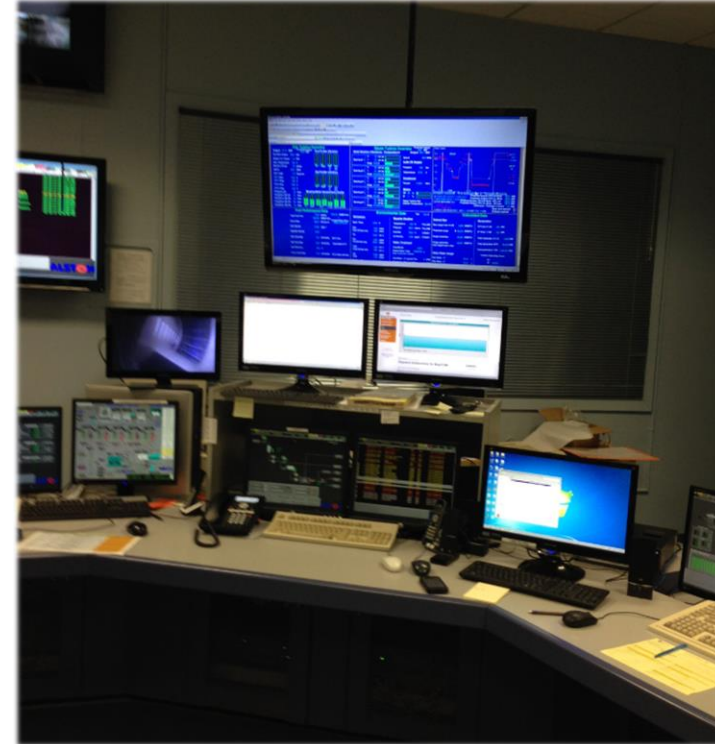
Emera Energy's Generating Fleet – PI System usage today

- Emulation of DCS graphics allows Management to observe the process in real-time away from the plant



Emera Energy's Generating Fleet – PI System usage today

- Control Room Operators are able to view data from the DCS, PLC control network and internet on a single monitor. This eliminates their having to navigate many different displays and control systems in order to make informed decisions during process upsets
- Dashboards will show Operators the financial impacts of how the unit is currently being run



Emera Energy's Generating Fleet – PI System usage today

- Bayside is making good use of PI Notifications in keeping Management both at the Plant and Corporate levels aware of current status

LP OTC Feedwater Delta exceedance

 Bayside_PI_Notification_Server@Emera.com

Sent: Fri 10/17/2014 12:03 AM

To:  PETERSON, ROBERT

The LP OTC Feedwater Demand and Actual Delta value has exceeded 0.3 kg/s. The current difference is 0.0901071280241013 kg/s.

Anti-Icing Valve Position

 Bayside_PI_Notification_Server@Emera.com

Sent: Fri 9/5/2014 8:42 AM

To:  PETERSON, ROBERT

Please note the following about the anti-icing valve:

The current valve opening is: 49.640625%

The current temperature is: 15.65625°C

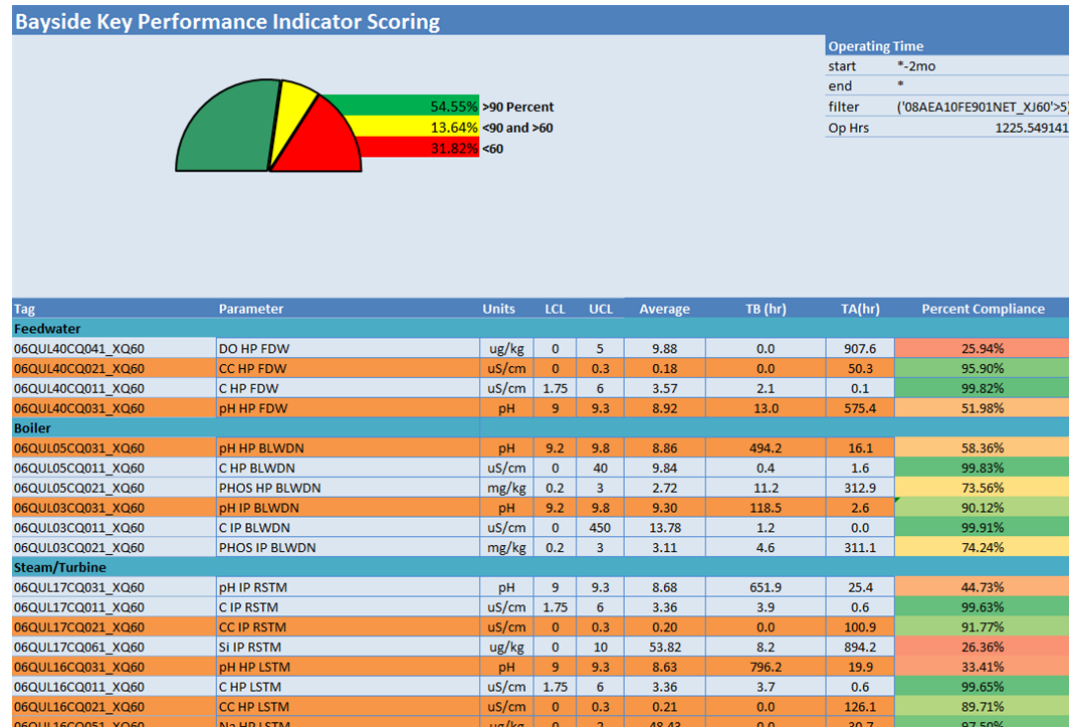
The current humidity is: 93.265625%

If this event is occurring on your shift, click the Acknowledge with comments button below and record the reason for valve opening (snow, fog, etc).

[Acknowledge With Comment](#)

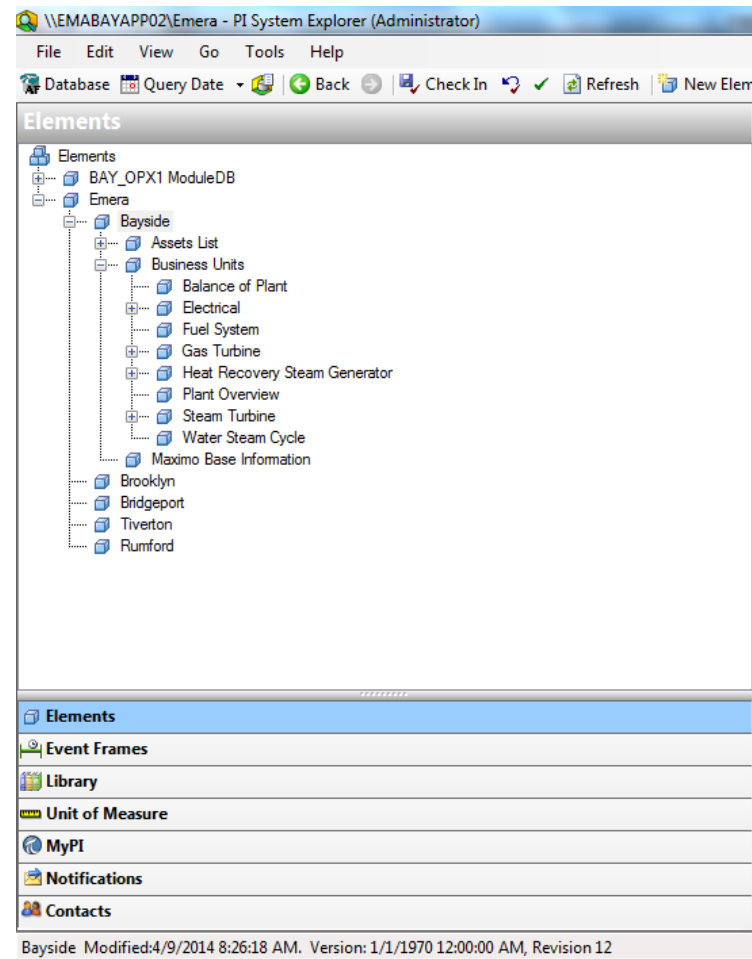
Emera Energy's Generating Fleet – PI System usage today

- Asset Management initiative will see the PI System being used to measure and report on KPI around things like water chemistry, work management compliance, work order creation (PI Notifications)
- Most of the 5 plants are currently using the PI DataLink tool to populate reports



PI Asset Framework

- PI AF allows for easy navigation to assets fleet wide
- Not necessary to know anything about how a PI Tag is named or configured
- Structure is easy to create
- Use of templates very much encouraged



The PI System and the bottom line

- The PI System has provided a means for the marketing desk to create and secure accurate power deals with a forecasting equation. The cost of procuring power to replace a shortfall or needing to purchase additional fuel to make dispatch can be huge
- The PI System is being used to monitor plant efficiency. Management and Operations respond to data being provided by the PI System in order to correct for processes not performing well. The cost of being inefficient is significant

Real Time Monitoring of an Electrical Generation Fleet

...5 plants, 2 countries, 3 states and 2 provinces...and 1 stop shopping for data.



Business Challenge

- Geography
- PI System version gaps
- PI AF not being fully utilized in all plants
- PI Client tools not being fully utilized
- Infrastructure
- Employee resources

Solution

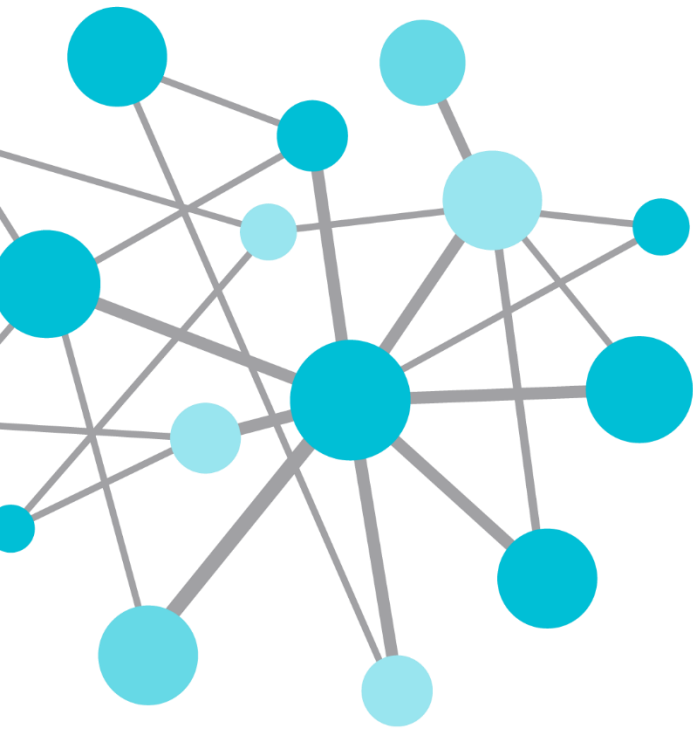
- Perform a Current State Analysis through Asset Management initiative
- Standardize data collection using the PI System
- Train employees

Results and Benefits

- Real time data for Plant Management, Corporate, Power Desk, Natural Gas traders and operations which provides the information required to make quick business decisions

Emera Energy's Generating Fleet – PI System usage for the future

- A large scale Asset Management program is currently being developed
- Several core teams have been created to address the building blocks of the AM model
- The PI System has been identified as playing a key role in bringing the vast amount of data available throughout the fleet to those who make the business decisions as well as those who maintain and operate each facility
- First steps are to bring all systems up to date (H/W and S/W)
- Some plants are not aware of the suite of tools available. The Asset Management core PI Team will analyze where each facility can gain the most value and with which software
- New Technical Lead will be responsible for the integration of a number of different technologies, including the PI System

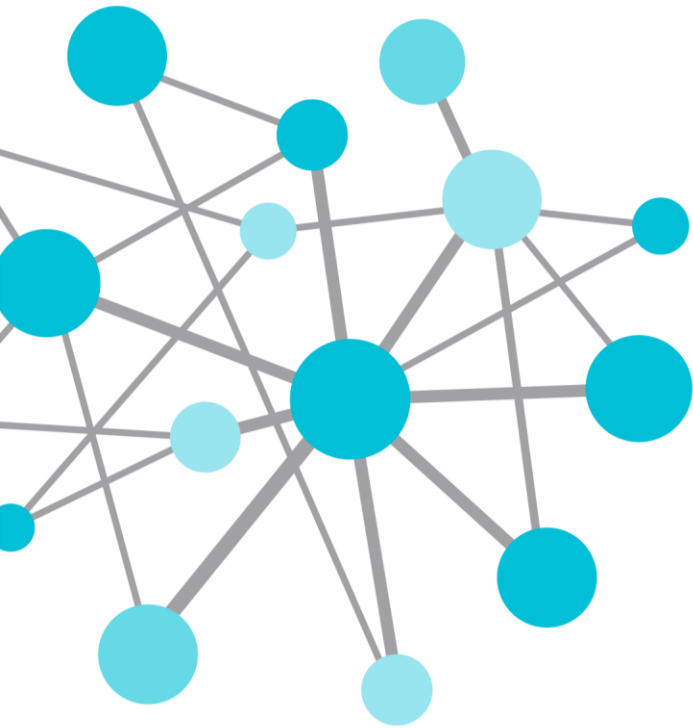


Questions

**Please wait for the
microphone** before
asking your question



**Please state your name
and your company**



THANK
YOU

Brought to you by  **OSI**soft.

Robert Peterson

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Plant Manager

Emera Energy – Bayside Power