OSIsoft®

REGIONAL SEMINARS 2012

The Power of Data

Find Opportunities, Gain Insights, Generate Value –

what you can do with access to PI System data

Presented by **OSIsoft**

“Data is your only weapon for improved performance.”

Dr. Don Paul, Vice President CTO, Chevron

Who Uses the PI System?

- Renewable Energy Dispatch Operator
- Control Room Operator
- Operations Supervisor
- Operations Lead
- Transmission Dispatcher
- System Dispatch
- Pipeline Controller
- Planning/Reliability Engineer
- SCADA Engineer
- Power Operations Engineer
- Automation Engineer
- Project Engineer
- Control Systems Engineer
- Process Engineer
- Process Control Engineer
- Commercial Engineer
- MES/PIMS Engineer
- Technical Service Engineer
- PI System Engineer
- Real Time Systems Engineer
- Instrument and Control Engineer
- Gas Engineer
- Performance Engineer
- Operations Engineer
- Systems Engineer
- Electrical Engineer
- Utility Engineer
- Power Systems Engineer
- Reconciliation Engineer
- Reservoir Engineer
- Reliability Engineer
- Generation Engineer
- Plant Engineer
- Bioprocess Equipment Engineer
- Mechanical Engineer
- Domain Expert Engineering
- EMS Engineer
- Automation MES Engineer
- Process Development Engineer

More PI System Users

- PI Application Engineer
- Sr. Manager, O&M IT Applications
- IT Manager - Mill Applications
- Refining I.T. Manager
- Data Systems Administrator
- Application Support Analyst
- Manufacturing IT Architect
- Data Systems Analyst
- Director of Application Development
- Tech Support for Operations
- IT Director, Consumer Packaging
- Global PI - Business Solutions Architect
- Process Systems Application Engineer
- IT Business Partner
- Applications Support Lead
- Director, Sustainable IT
- Information Security Engineer
- Product Line Manager
- Control System Supervisor
- System performance manager
- DCS Supervisor
- IT Applications Manager
- Plant Manager
- Maintenance Manager
- Global Production Volumes Manager
- PI System Manager
- Development Manager
- Maintenance Team Leader
- Product Engineering Mgr
- IT Operations Manager
- Managing Director
- Operations Manager
- Business Development Manager
- Central Heating & Cooling Plant Manager
- Global Production Services Manager
- Director, Midstream Operations North
- Director, Smart Network Operations
- IT - Director
- Hydro Generation Supervisor
- Manager, Data Analytics
- Infrastructure Manager
- Manufacturing Process Information Manager
- Program Manager

And the list goes on…

- Market sales Manager Utilities
- EMS Supervisor
- Asset Management Program
- Mine Superintendent
- Division Manager
- Business Development Manager
- Supply Operations Supt.
- Program Manager, Pipeline & Power Industrial Control & Operating Environment
- Supervisor, EMS SCADA Systems
- Mgr, Plant I.T.
- Manager, Process Control & EIT Program, XPS
- Plant Optimization & NERC CIP Compliance Manager
- Process Controls Software Manager
- Director of Platform Product Management
- Electrical & Control Systems Manager
- Business Relationship Manager
- Control Syst. Suprv.
- Technical Services Supervisor
- Scada & Process Control Supervisor
- Maintenance Supervisor Process control/IT
- Financial Systems Analyst
- Reliability Analyst
- Principal Operations Systems Analyst
- Business Systems Analyst
- Senior Sustainability Advisor
- Business Analyst
- Energy Systems Analyst
- Performance Analysis
- Real-Time Analyst
- Senior Sourcing Analyst
- Analyst Industrial IT
- IT Analyst
- Energy Analyst
- Engineering Analyst
- Wind Resource Data Analyst
- Hydro Analyst
- Quality Analyst
- EMS Analyst
- Process Systems Analyst
- Mill Application Analyst
- Process Computing Analyst
- Operations Analyst

Typical Users of the PI System

- Operators
- Supervisors
- Process Engineers
- Maintenance

How Does PI System Data Help?

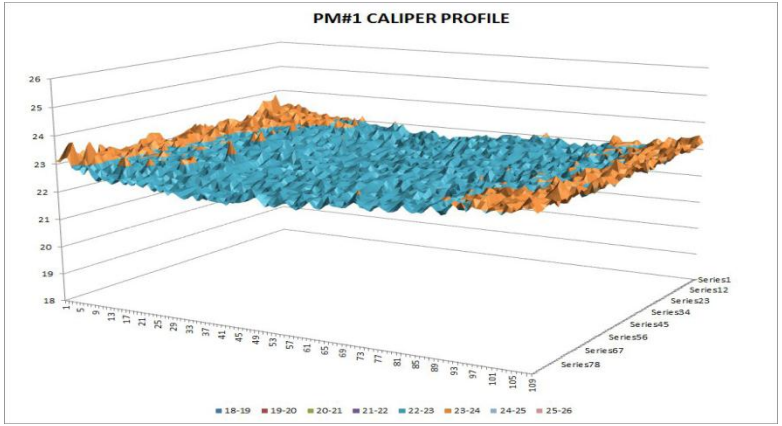
- Provide current status outside of control room
- Allow Situational Awareness for quick decision-making
- Support troubleshooting operations problems
- Measure effectiveness over time
- Compare performance
- Monitor equipment health
- Measure quality

RockTenn

- Needed to bring Users together
  - Interesting use cases emerging from mills
  - Corporate provided some ideas but Mills were interested in developing their own
- PI System Power User Group
  - Build cross Mill relationships
  - Promote idea sharing
  - Friendly competition promotes learning and initiative

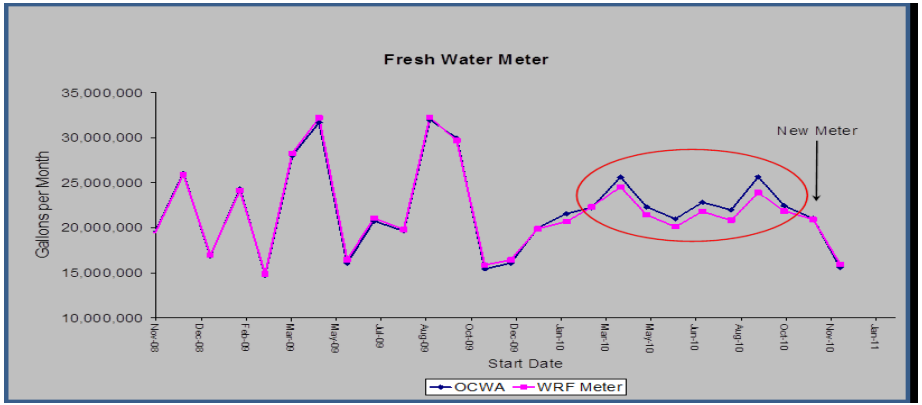
"*Operators are afraid of full blown PC Applications, PI Coresight will give them easy to use Ad hoc capabilities*" – Matt Corcoran

RockTenn Paper Profile in Excel



- Operator real time display to monitor quality
- 3-D chart shows caliper, basis weight and moisture

RockTenn Water Bill in Excel



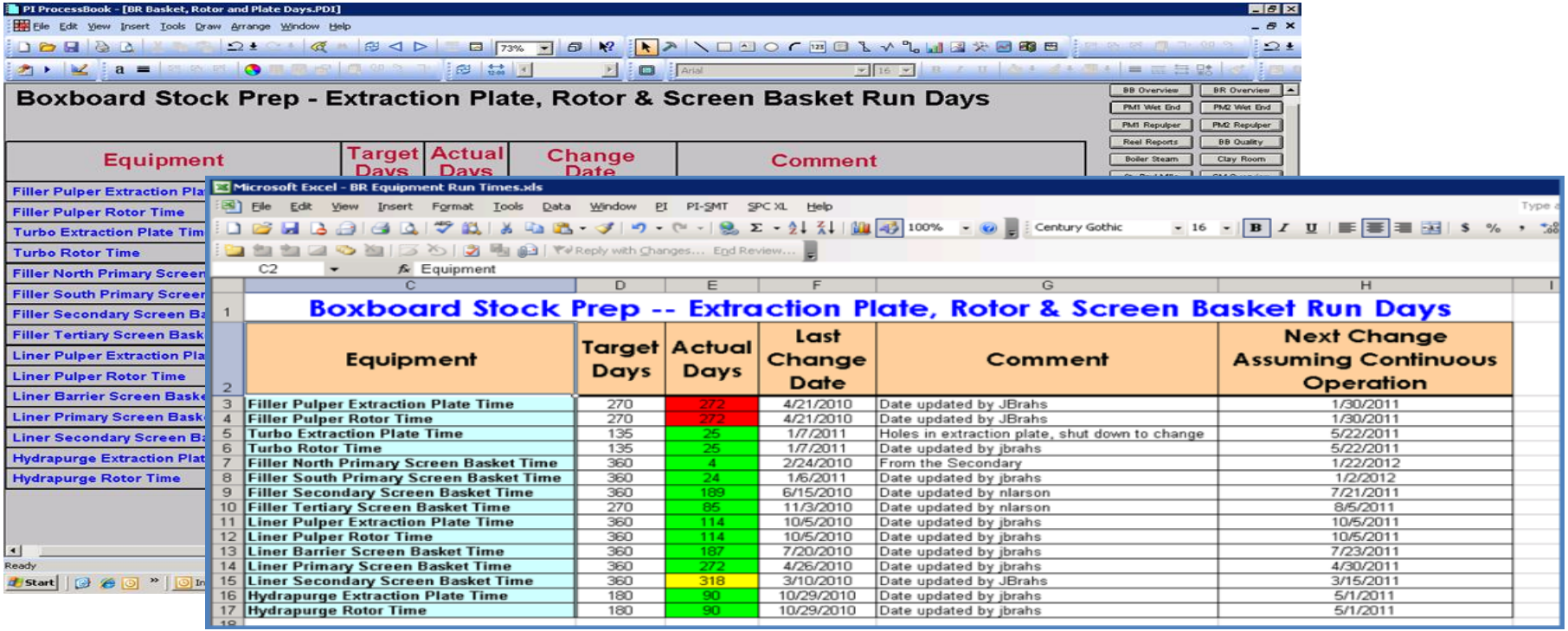
- Real time water usage stored in the PI System and analyzed in Excel using PI DataLink
- Found a faulty water meter installed by Utility company
- Overcharging for Effluent treatment due to a build up on the Effluent meter

RockTenn Waste Control

- Slab calculator helps operators calculate what they trim to reduce waste
- Operators assign reason codes and comments

	A	B	C	D	E	F	G
1	PIServer	NT327002	3270				Ready
2	PaperMachine	PM1					
3	StartTime	3/12/2012 7:00	Get Data				
4	EndTime	3/19/2012 7:00					
6		Loss (Feet)	161,099			4.45%	% Total Loss
7	Total	AS400 Lineal Feet	3,457,307			2.07%	% Unaccounted for Loss
8	Total	PI Reel Lineal Feet	3,618,406	193	86,194	74,905	Unaccounted for Loss
9							
10	ID	Start Time	Reel #	Min	Slab	Cause	Comments
11		13-Mar-12 16:35	RT512C1304	14.9	7,576	Grade Change	.020unc - .018 mill
12		13-Mar-12 21:07	RT512C1312	4.4	2,309	Other	cut 1.5" clayoff / cut 5" off e roll c.s.
13		13-Mar-12 21:44	RT512C1313	5.4	2,832	Coating AK	clayoff c.s.
14		14-Mar-12 00:14	RT512C1317	1.8	952	Hole	holes
15		14-Mar-12 02:02	RT512C1320	0.0	0	Coating AK	set 1 b.r. clayoff c.s.
16		14-Mar-12 02:52	RT512C1321	7.0	3,683	Coating AK	clayoff c.s.
17		14-Mar-12 03:45	RT512C1322	7.3	3,843	Other	cleaning backing roll and scraping oven roll
18		14-Mar-12 04:28	RT512C1323	7.5	3,931	Caliper Change	.018-.016
19		14-Mar-12 05:03	RT512C1324	0.0	0	Caliper Change	no set

RockTenn Equipment Run Time



Equipment	Target Days	Actual Days	Last Change Date	Comment	Next Change Assuming Continuous Operation
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AET Manufacturing Information Systems Project Leader

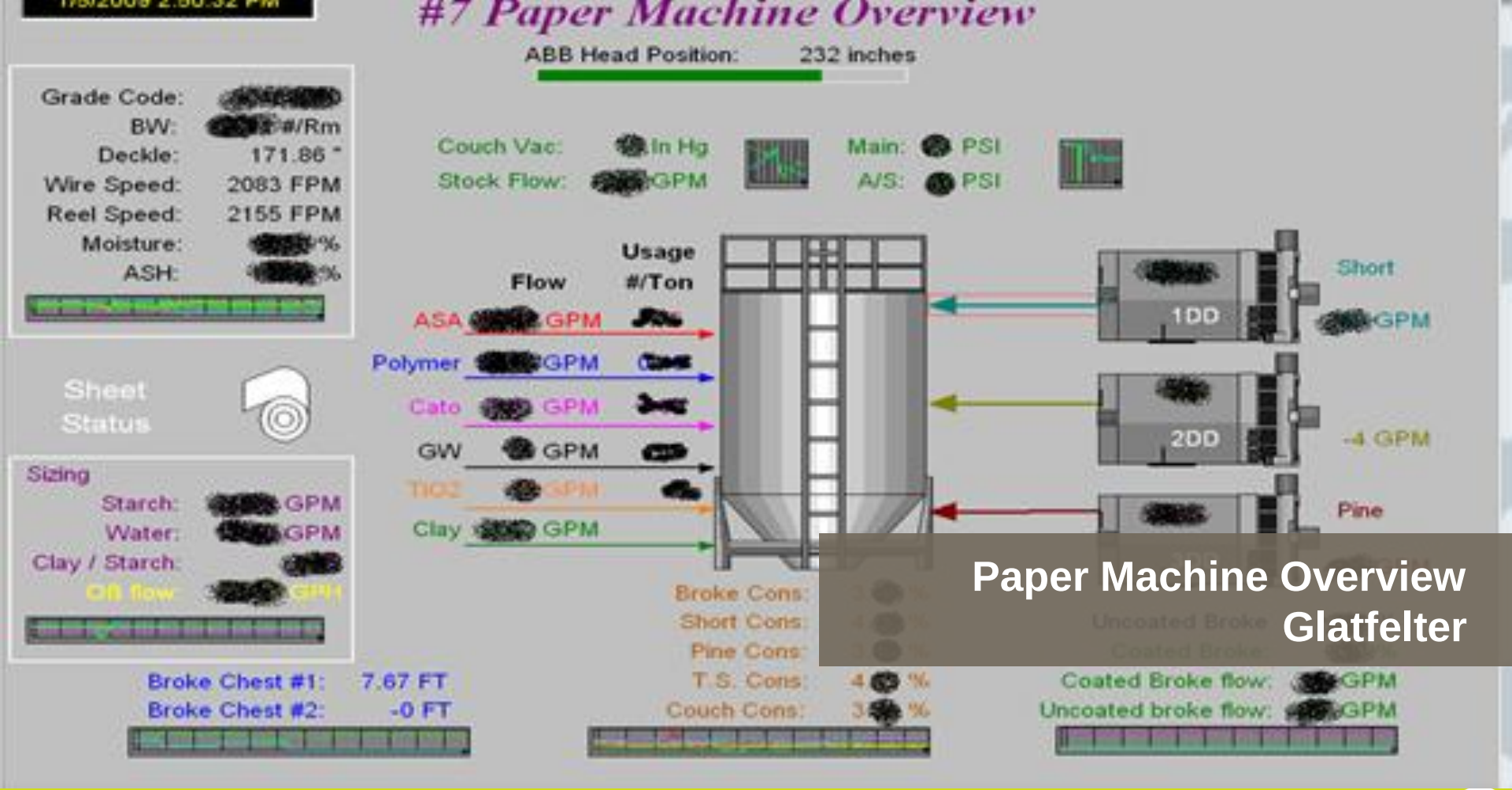
- Pareto Analysis of primary performance metrics identified Film Flatness as the greatest opportunity for manufacturing improvement and financial success
- Needed better control of quality against customer expectations
- Developed an algorithm to quantify customer film flatness fitness-for-use requirements

AET Plant Acceptance

- Operator participation key
- Field results began to verify the ability for the new algorithm to predict film performance at customers
- Manufacturing buy-in increased over time
- New spec limits were established based on field results

Glatfelter Paper Lab Technician

- Contest where multiple unique user-created projects were aimed at making the job easier, improving product quality, tracking costs and saving money
- Wants to see status of operations without leaving the lab
- Built his own display that checks additives and other key properties

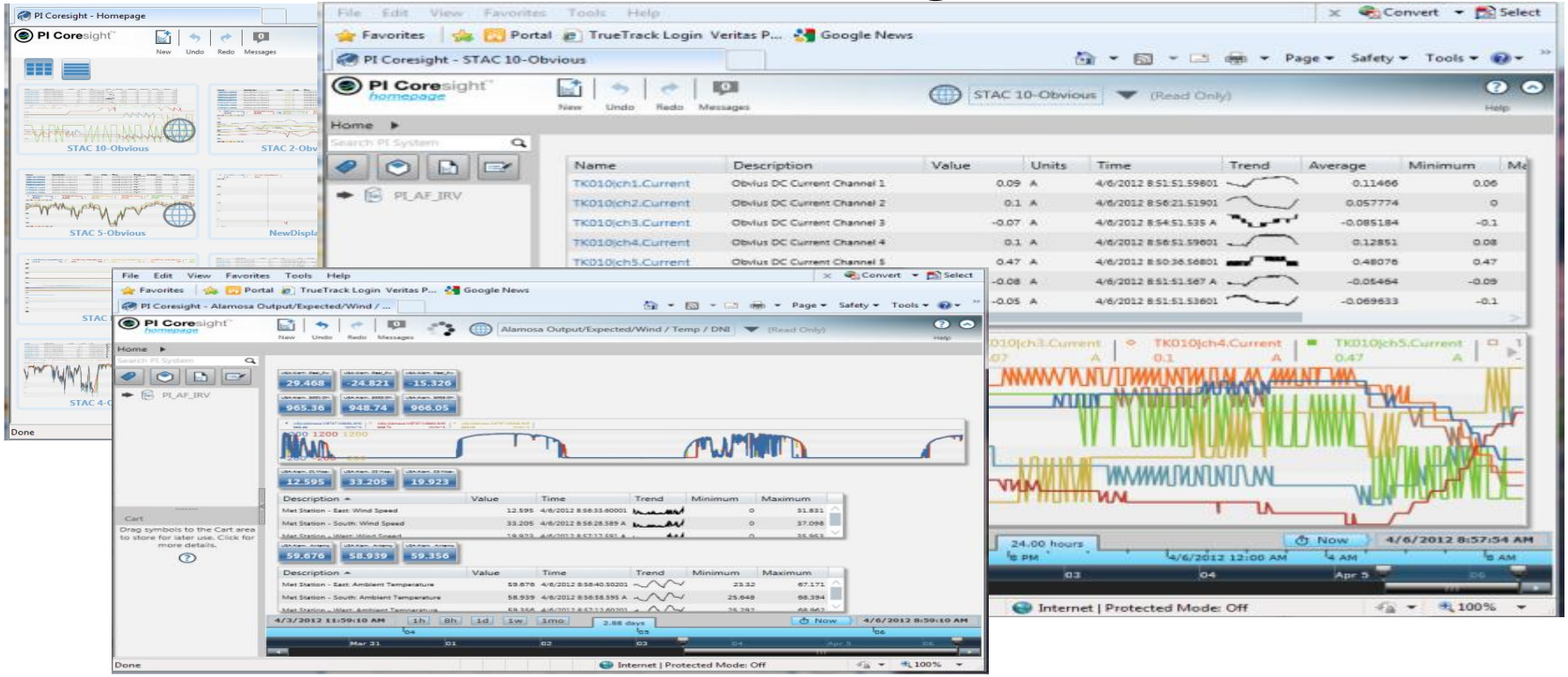


Paper Machine Overview Glatfelter

Amonix Remote Asset Monitoring

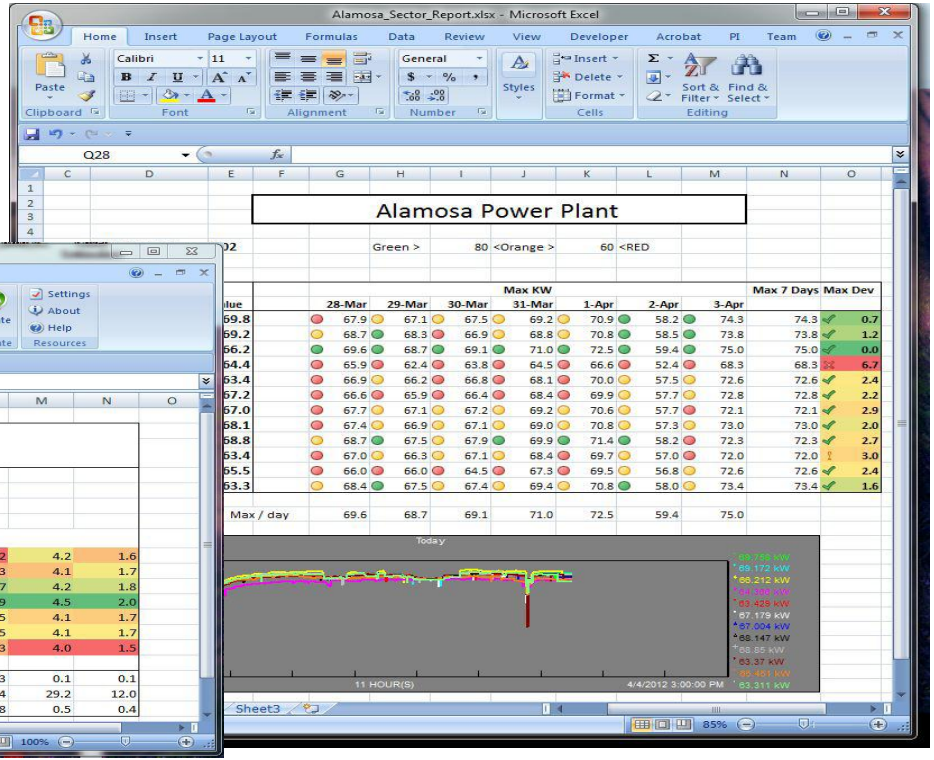
- Needed to monitor performance of remote equipment, starting with nothing
- Wanted an easy, low cost data system
  - Low Cost of maintenance
  - Easy to maintain from Remote (unmanned) locations
  - Full end-to-end system

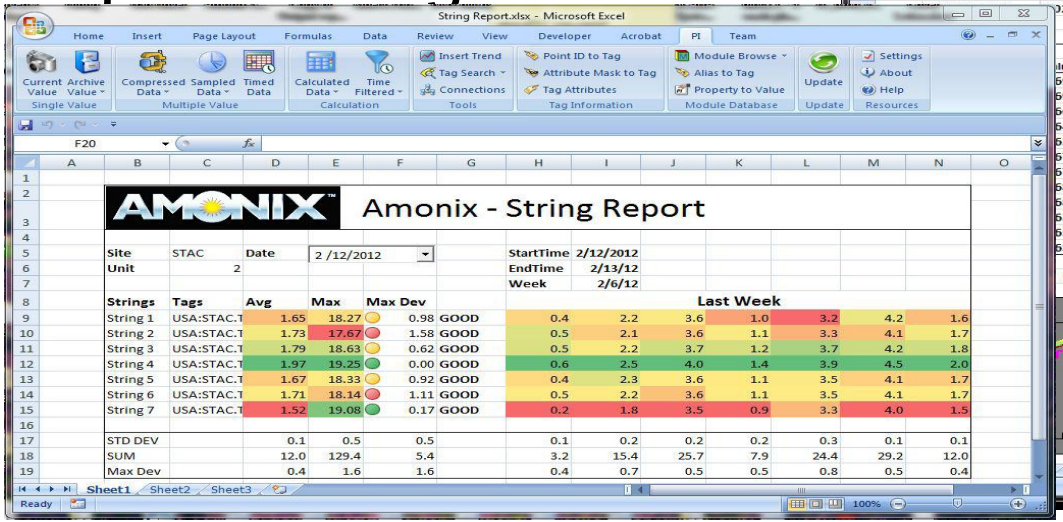
Amonix Field monitoring



Amonix Standard Reporting

- Engineers
- Project Managers





Amonix Expertise

- New to the PI System
- No formal training
- Made use of YouTube learning channel

Other Audiences for PI Data

- Executives
  - CFO
  - CEO
  - President
  - Chief Sustainability Officer
  - Vice President
  - Director
  - Chief Technical Officer
  - VP Field Operations
  - VP, Marketing
  - CIO Manufacturing
  - Vice President Product Development
  - Vice President of Sales
  - Chairman
  - VP of Operations and COO
  - Board Member
  - Vice President of Technical Services
  - Vice President Global Sales and Marketing
  - Vice President of Engineering
  - Vice President, Marketing
  - Vice President Condition Monitoring
  - Vice President Corporate Communications
  - Vice President of Marketing & Business Dev.
  - Vice President Predictive Equipment Health Management
  - Vice President Program Management
  - Vice President - Global Strategies and Solutions
  - Vice President, Operations and Business Development
  - Executive in Information Management for Production Operation
- Business Analysts
- Customers
- Public
- Contractors
- Vendors

Some Atypical Uses of the PI System

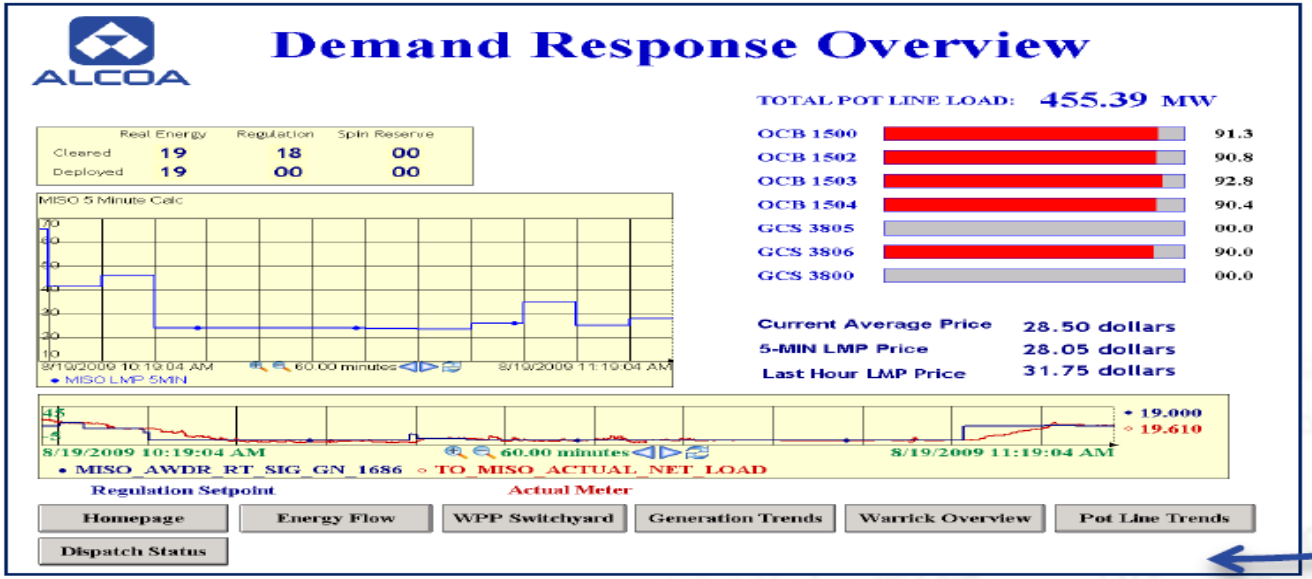
- Feeding into cost/profit - Alcoa Demand Response
- Sustainability initiatives – Seattle Mariners facility management
- Reducing energy use across businesses in Vermont – IBM
- Monitoring a computing infrastructure – Weill Cornell
- Managing Critical Facilities – Harvard Medical School
- Sharing Utility Data – Northeast Utilities

Alcoa Power Markets Coordinator

- Wanted to balance plant power needs against ability to generate revenue from local ISO
- Must coordinate both demand and capability
- Needs real time data to work

Alcoa Demand Response Data

Warrick Demand Response



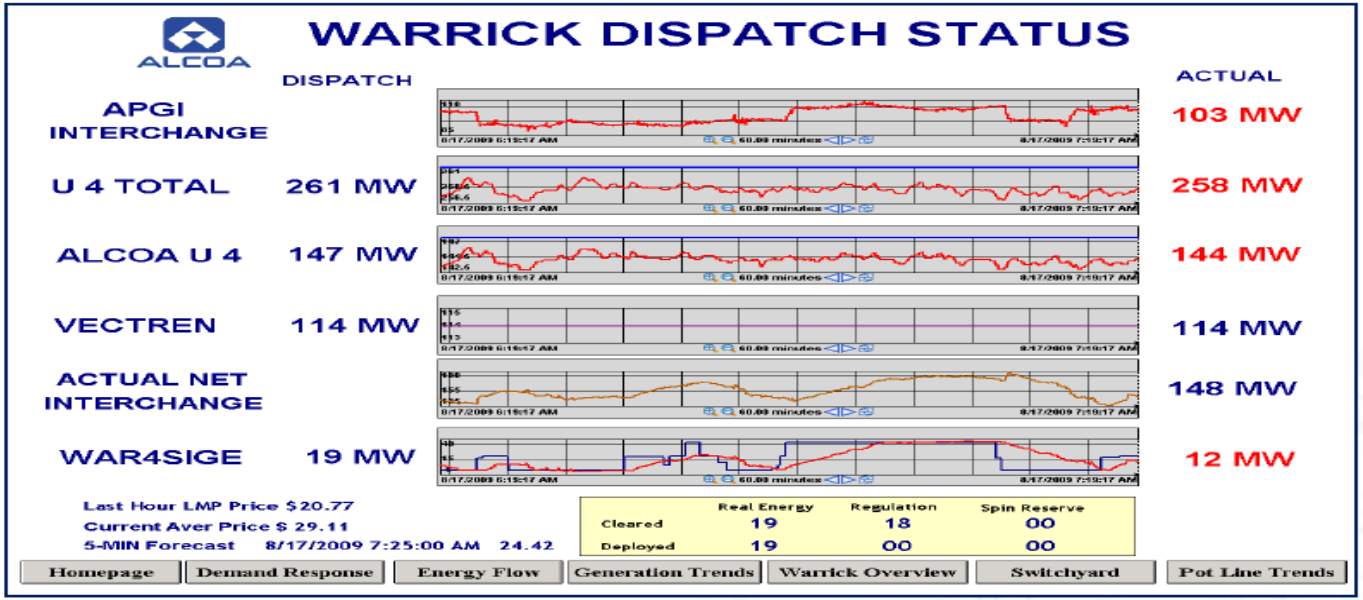
Real Time Data

Customer Driven

Hyperlinks

Communicating with Alcoa Operations

Power Plant Operating Tools



Functionality

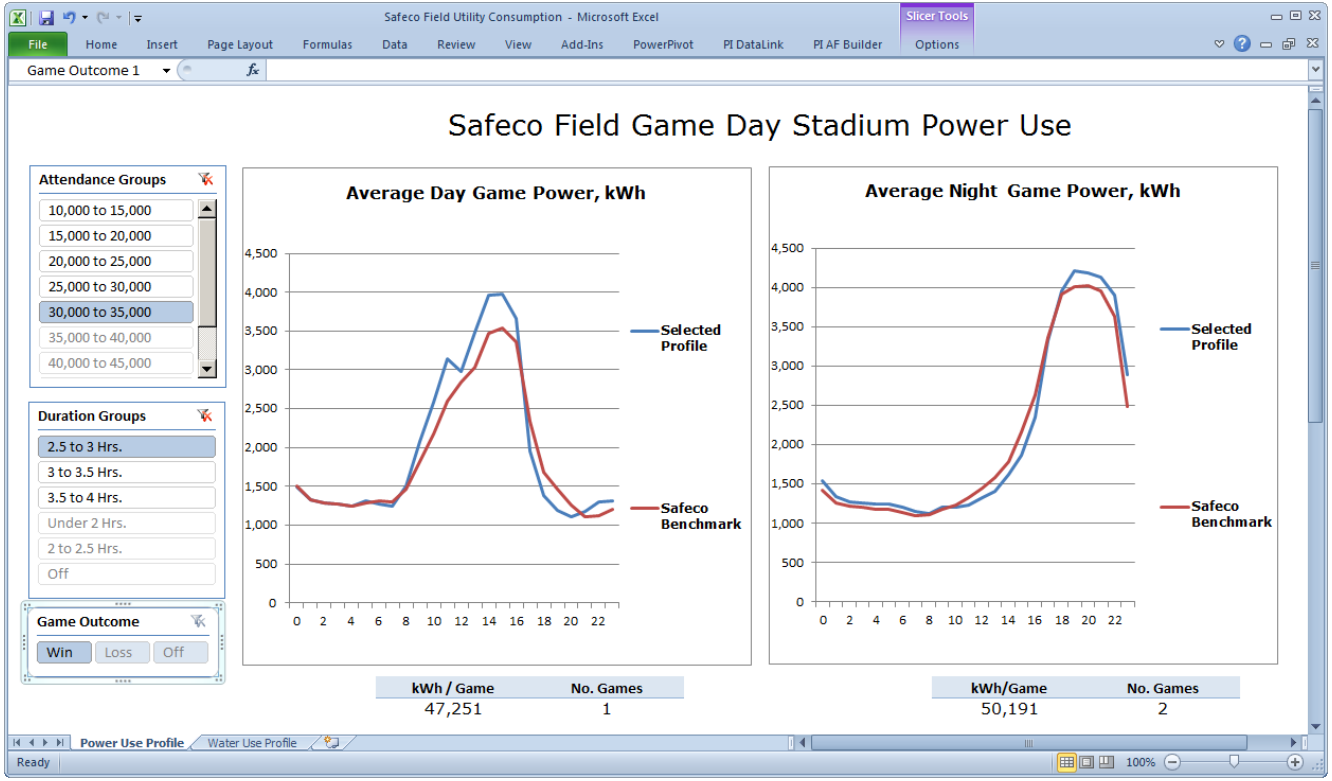
Operator Buy-in

Ownership

Facility Operations

- Vice President of Ballpark Operations
- Wanted to reduce the amount of waste (recycling) and utility use (power, water)
- Data and competition (with other similar facitlities) driving change
- PI System data shows him when the roof is opened, when there is a lot of kitchen exhaust, the difference made by changing parking garage lighting…

Stadium Sustainability



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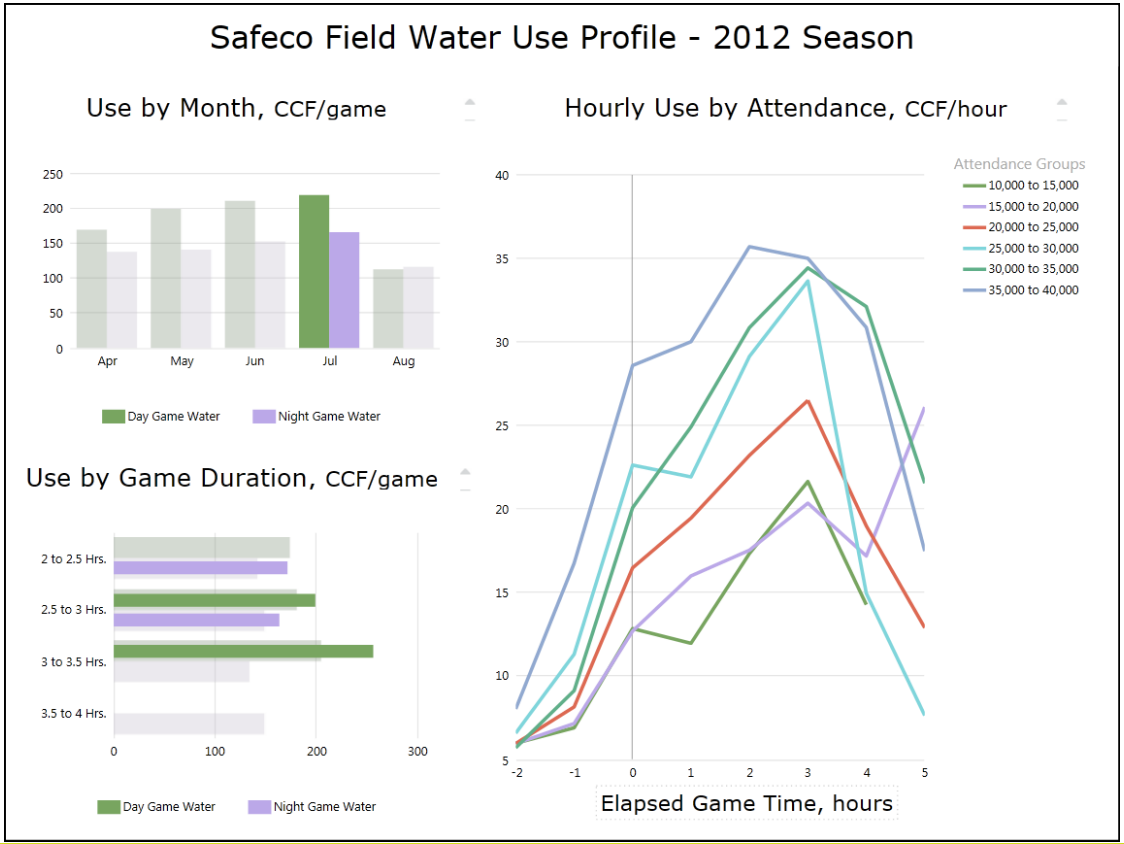


Ballpark Operations

- Making data available to Engineers, Security, and Control Room Operators allows them to gauge current performance
- Seeing results drives process improvement
- Must be easy to get to
- Seeing performance data allows them to adjust operations to improve over time

Facility Monitoring

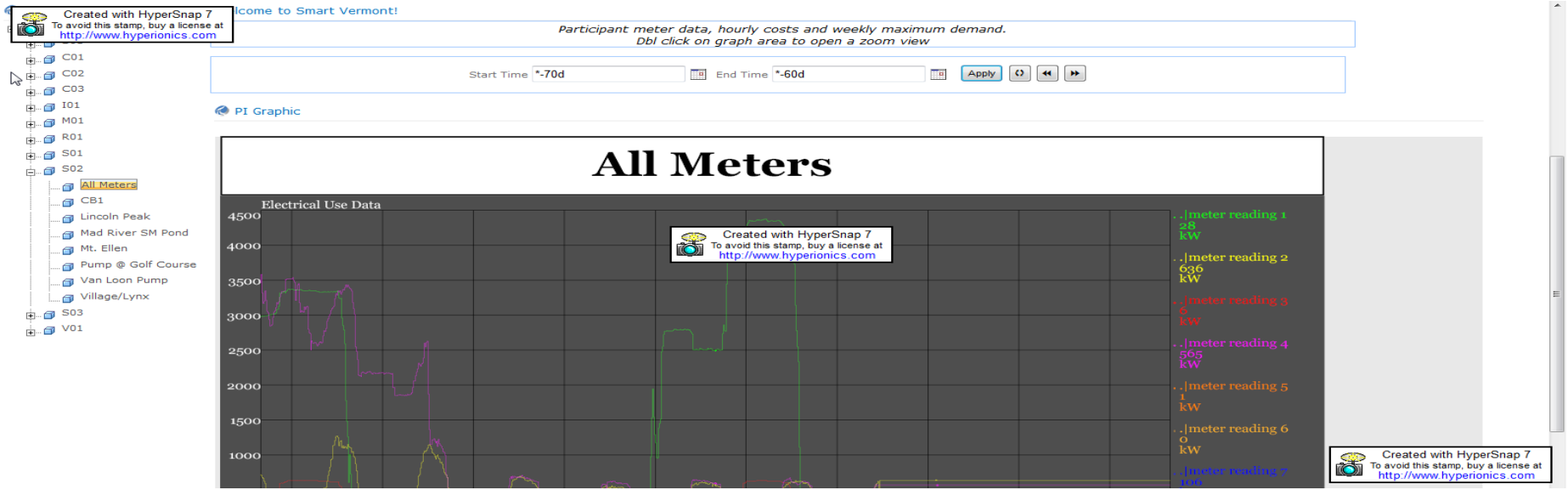
Utility Dashboard

- Real time information
- Automated event reports
- Share and compare with MLB

Vermont Businesses

- Collaboration among businesses in Vermont to reduce power use
- Part of smart grid initiative
- Sharing data across business entities
- Data viewed by business analysts, facility operators and administrators to affect usage patterns by reducing system demands, improving efficiency and providing a financial return

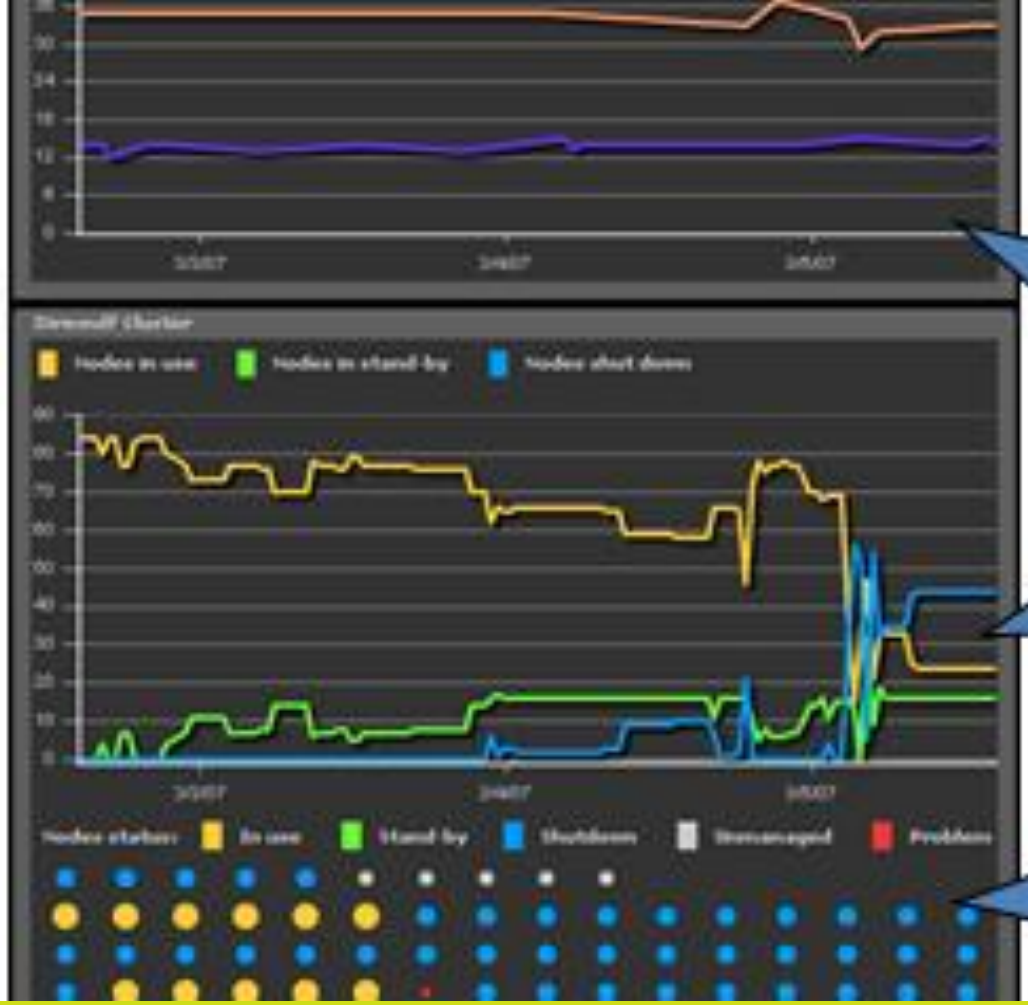
Business Collaboration



Weill Cornell Medical College

- High power computers used for research
- Needed to monitor and publish availability
- Wanted to conserve power used by compute clusters

Public kiosk showing computing status



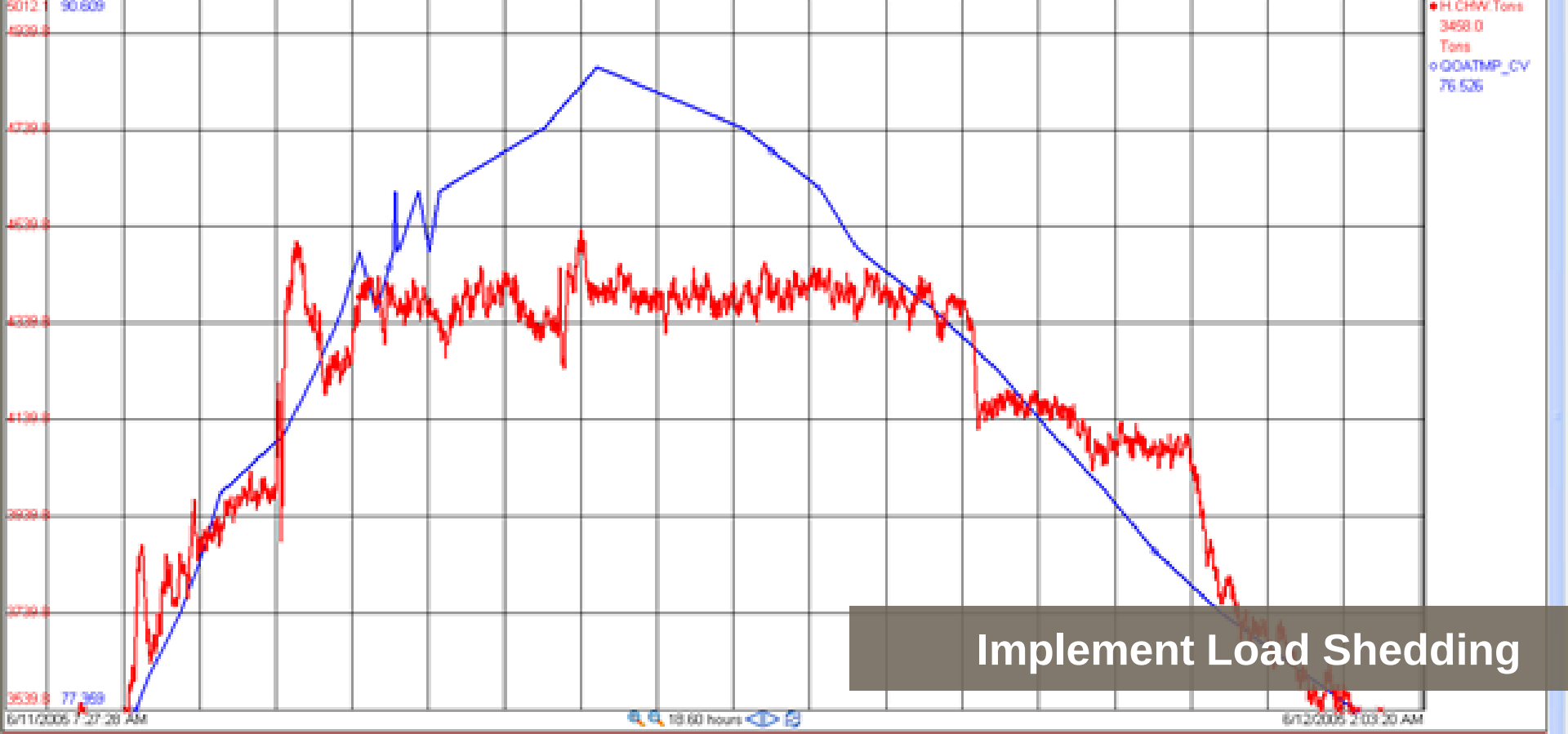
Note correlation between temperature and cluster usage

Cluster Power Mgmt

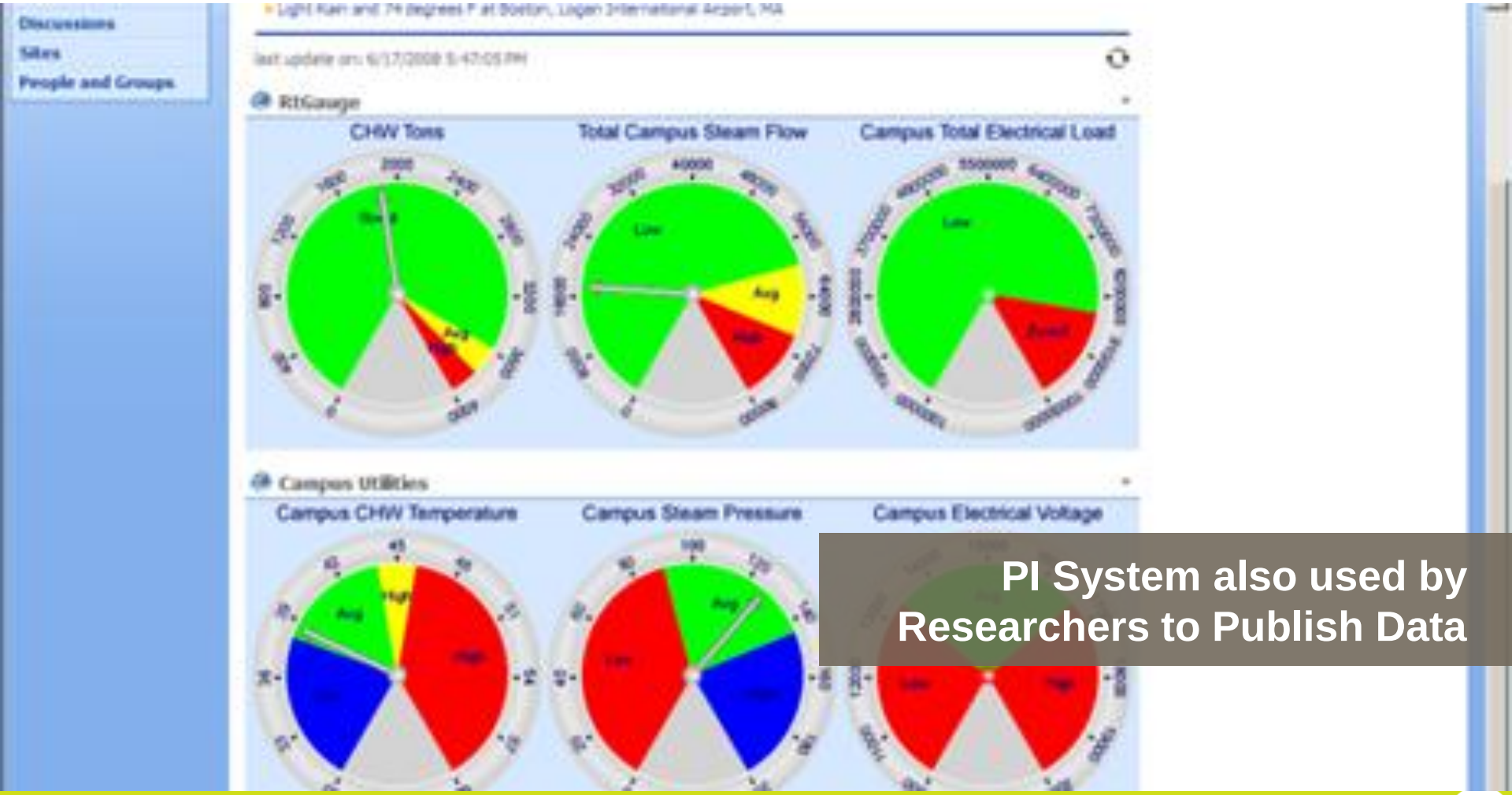
Powered down

Critical Facilities at Harvard Medical School

- Facilities Engineer needed to reduce greenhouse gas (GHG) production – required to save 30%
- Collected data on energy usage (about half his budget)
- Implemented load shedding to reduce consumption
- Published results to public web to increase awareness



Post Results to Public on web



PI System also used by Researchers to Publish Data

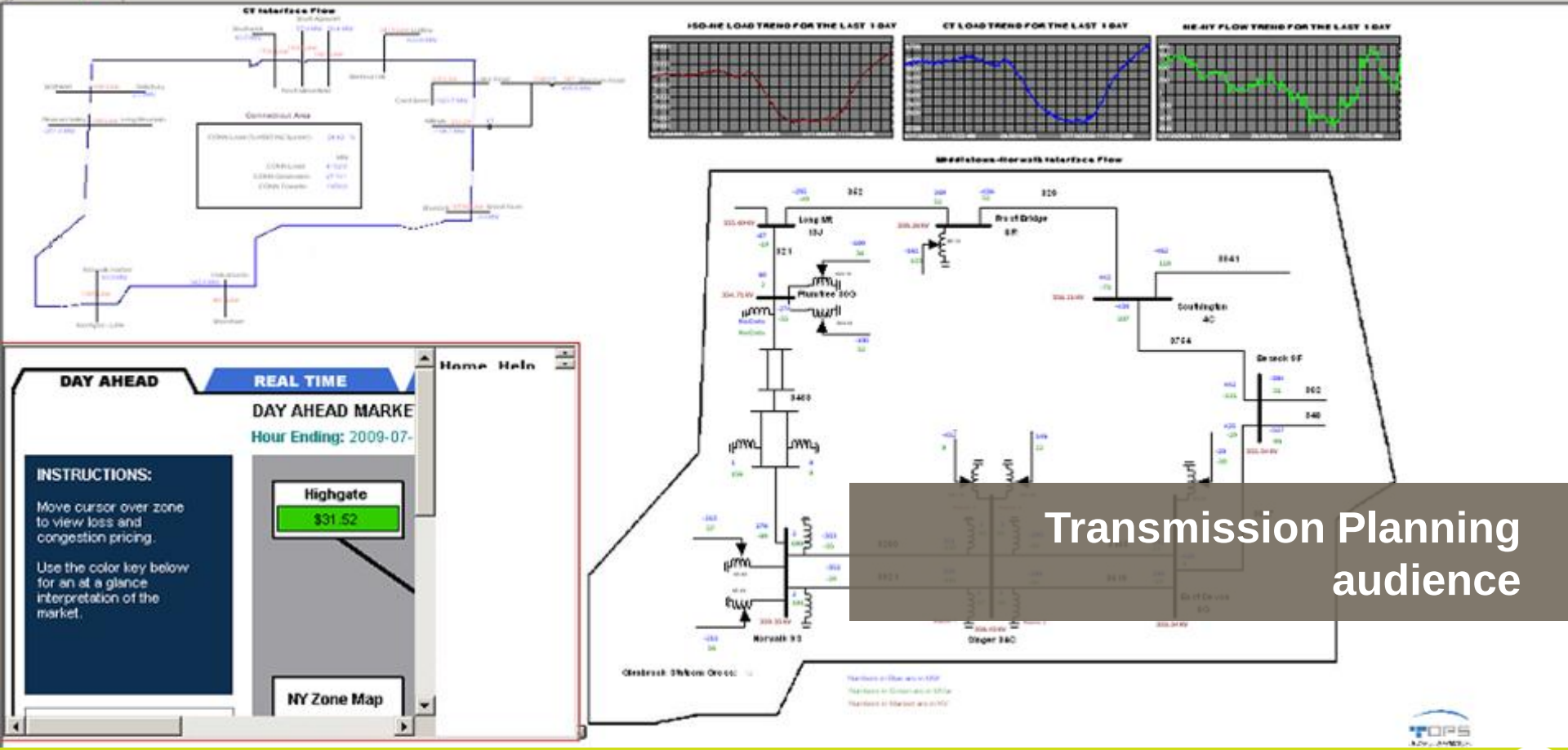
Share Data in a Compliant Environment

- A Business Application Systems Developer is tasked with providing critical secure data to non-operations support groups
- Providing a focused view of data using multiple portals
- Direct access to EMS system not a secure option

Reactive Reserve

	On-line (Mvar)	Reserve (Mvar)
Glenbrook STATCOM	15	. . .
SWCT Area Capacitors	534	626
SWCT Area Generators	73	544
Northwest CT Area Capacitors	0	93
Northwest CT Area Generators	1	17
Central CT Area Capacitors	506	396
Central CT Area Generators	13	14
Eastern CT Area Capacitors	131	26
Eastern CT Area Generators	16	48
Total Connecticut Area Capacitors	1171	1141
Total Connecticut Area Generators	212	1242
Pittsfield Area Capacitors	0	64
Pittsfield Area Generators	1	31
Springfield Area Capacitors	0	105
Springfield Area Generators	28	34
Total WMASS Area Capacitors	0	168
Total WMASS Area Generators	29	65

Operator display shows available reserve capacity



Address [redacted] Links TOA - SNC TOA - DEV TOA - TEST TOA - TRN TOA - PROD TOA - EXT

CONVEX Sequence of Events (Pi Server = [redacted])

Select an event date:

<	July 2009					>
Sun	Mon	Tue	Wed	Thu	Fri	Sat
28	29	30	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	1
2	3	4	5	6	7	8

Refresh

☐ Refresh automatically every 60 seconds (Only available on current day)

Date/Time Stamp	Substation Name	Substation ID	Device	Status
2009-07-05 23:45:44.588	[redacted]			Open
2009-07-05 23:43:06.131				Open
2009-07-05 23:41:19.513				Open
2009-07-05 23:08:41.534				Open
2009-07-05 22:47:16.101				Open
2009-07-05 22:46:26.061				Open
2009-07-05 22:45:06.474				Open
2009-07-05 22:43:46.565				Open
2009-07-05 22:22:04.388				Open
2009-07-05 22:21:25.652				Open
2009-07-05 22:20:45.26				Open
2009-07-05 19:55:47.519				Open
2009-07-05 19:35:34.86				Open

Asset Management display

VALLEY ELECTRIC EXCHANGE

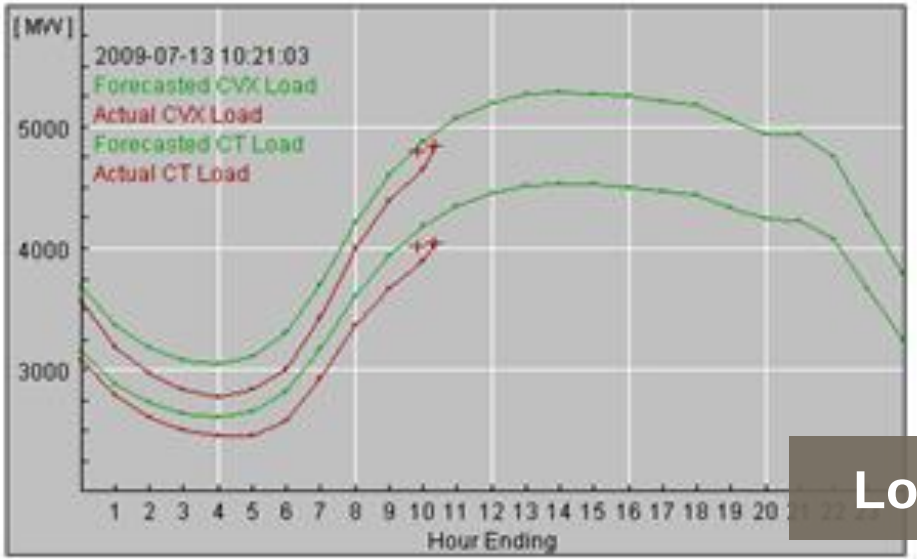
Home

Home | CONVEX Power Advisories | Maintaining Power Supply | Q&A's | Glossary Of Terms

Home Page > CONVEX Power Advisories > Today's CONVEX Loads

* Please note that all data is preliminary and is subject to change.

Today's CONVEX Loads



Load data published to Public

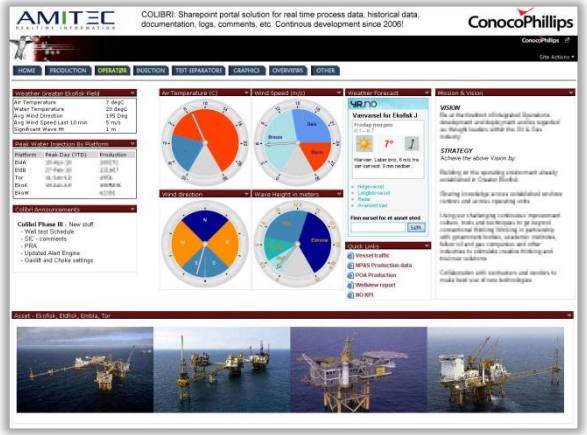
Your browser will automatically update the graph every 5 minutes.

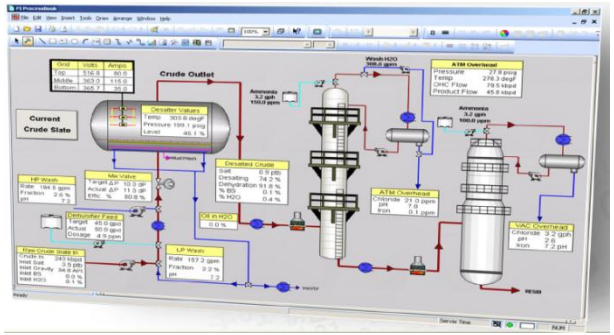
Each curve is a plot of the integrated load for the hour ending indicated on the horizontal axis. The right-hand cross-hair is the

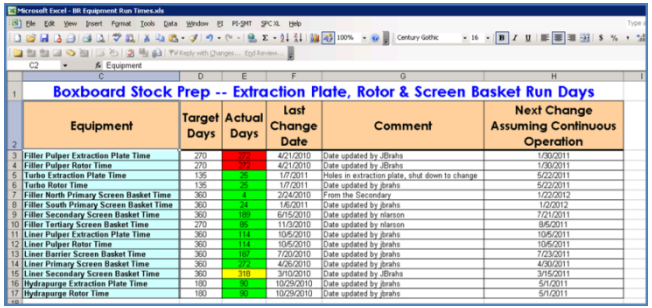
Providing Data for Your Users

- Some users need data they can work with to investigate
- Some users need to see previous data
- Some users just need to see current data

Pick the Tool that Best Suits







Boxboard Stock Prep -- Extraction Plate, Rotor & Screen Basket Run Days

Equipment	Target Days	Actual Days	Last Change Date	Comment	Next Change Assuming Continuous Operation
Filler Pulper Extraction Plate Time	270	272	4/21/2010	Date updated by JBrahs	1/30/2011
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PI WebParts

- You have a SharePoint environment
- Your users need to see a collection of information from different sources, including the PI System
- Your users don’t want to build new displays
- You want to provide navigation that guides different audiences to the content they need

Windtopia | Corporate | Operations | Engineering | Marketing

Report Type

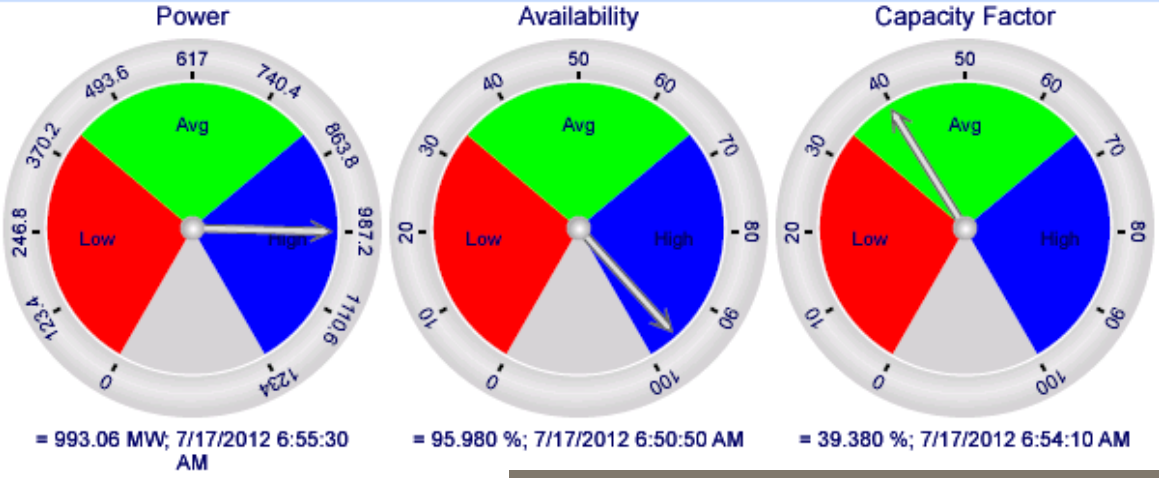
Region

- Country View
  - Brazil
  - China
  - Europe
  - USA

PI TimeRange

Start Time *-2h End Time * Apply

Real Time KPis



PI WebParts dashboard

Economical Data

Dataset	Time	Value	EngineeringUnits
Energy Price per MWh	7/17/2012 6:58:00 AM	769	USD
Daily Revenue	7/17/2012 6:50:10 AM	0.15746	MUSD
Running Turbines	7/17/2012 6:51:00 AM	789	Unit(s)
Yearly Revenue	7/17/2012 6:50:20 AM	396.16	MUSD

PI Coresight

- Your users need to explore data quickly or look at quick displays built by others
- Your users don’t want to install anything
- You have no SharePoint environment

PLEASE **PAUSE** FOR **DEMO**

PI DataLink

- Your users expect to work with numbers
- Your users want to build their own reports
- Your users are comfortable with Excel

File Home Insert Page Layout Formulas Data Review View PI DataLink PI AF Builder

A1 'Grand Ridge Wind Farm

Grand Ridge Wind Farm

Black Wolf Wind Farm
Deep Valley Wind Farm
Eldorado Wind Farm
Grand Ridge Wind Farm
White Bear Wind Farm
Wild River Wind Farm
Windy Valley Wind Farm
Yellow Creek Wind Farm

56.7 %

2488.19 $
212696.12 $

Installed Capacity: 9000 kW
Instant Power: 858 kW

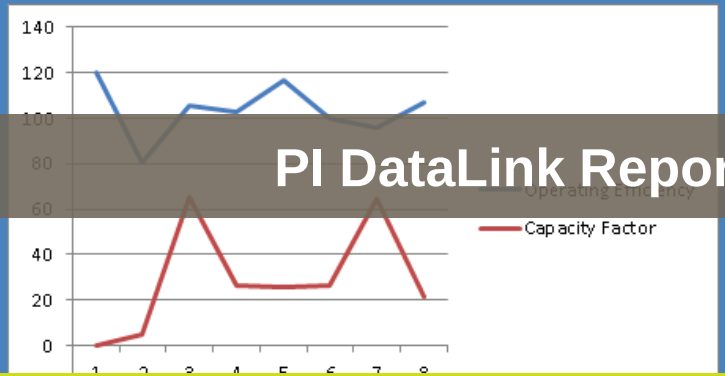
Exp.Capacity Factor: 38 kW
Actual Factor: 9.53 kW

MTD Generation: 399804.73 kWh
Daily Generation: 4677.04 kWh

Unit Summary

Turbines In Production	Faulted	Average
6	0	56.7

	Current	Previous Month	YTD	Plan
Average Capacity Factor (%)	9.1	34.0	240.0	38.0
Average Generation (MWh)	399804.7	2.2	9.2	29.4
Operating Efficiency (%)	114.2	102.8	105.1	98.0
Number of Employees	4	5	N/A	7
Regulation Non-Compliance	1	1	2	2



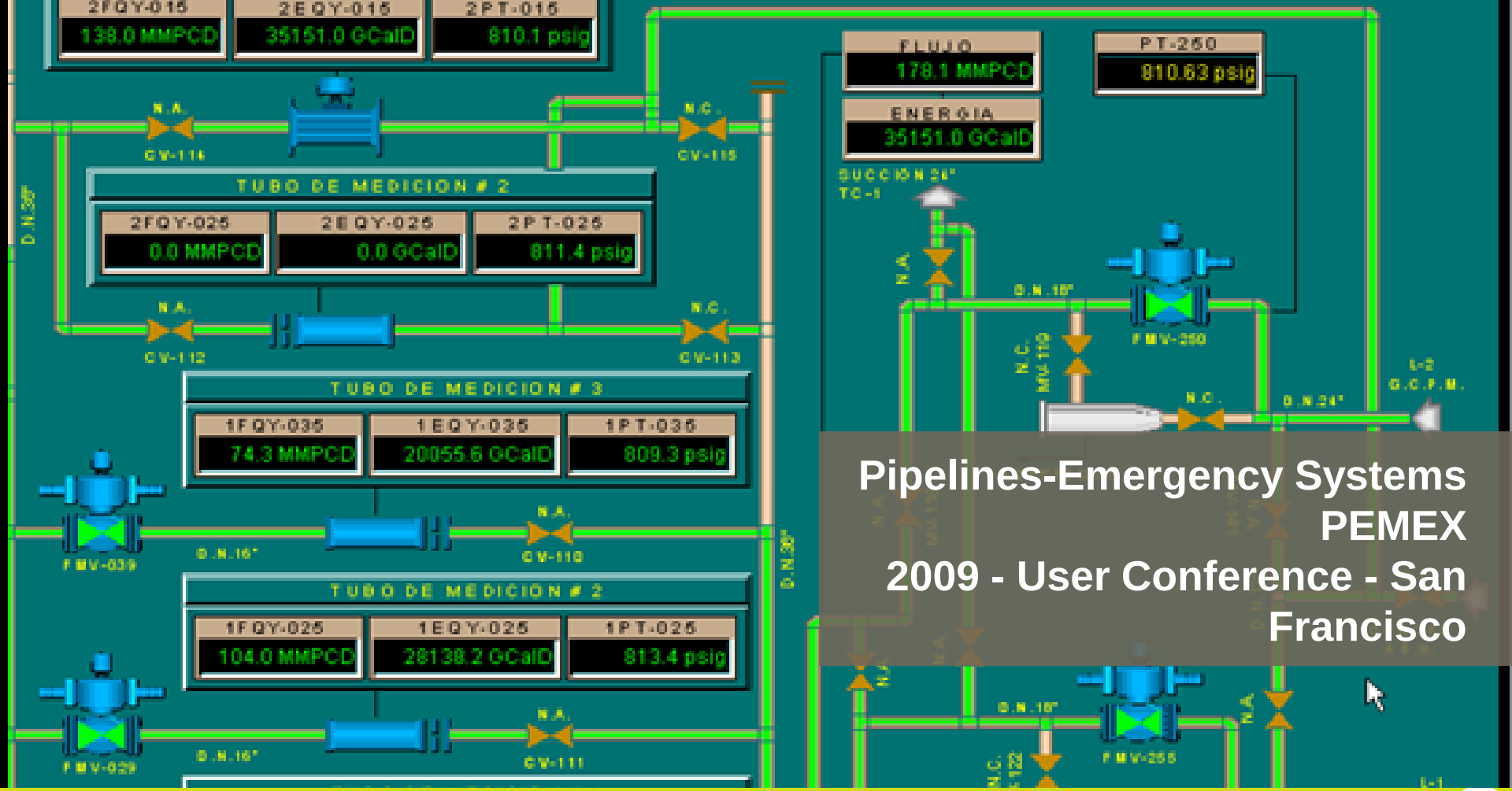
PI DataLink Report

PI ProcessBook

- Your users want to build their own graphical displays

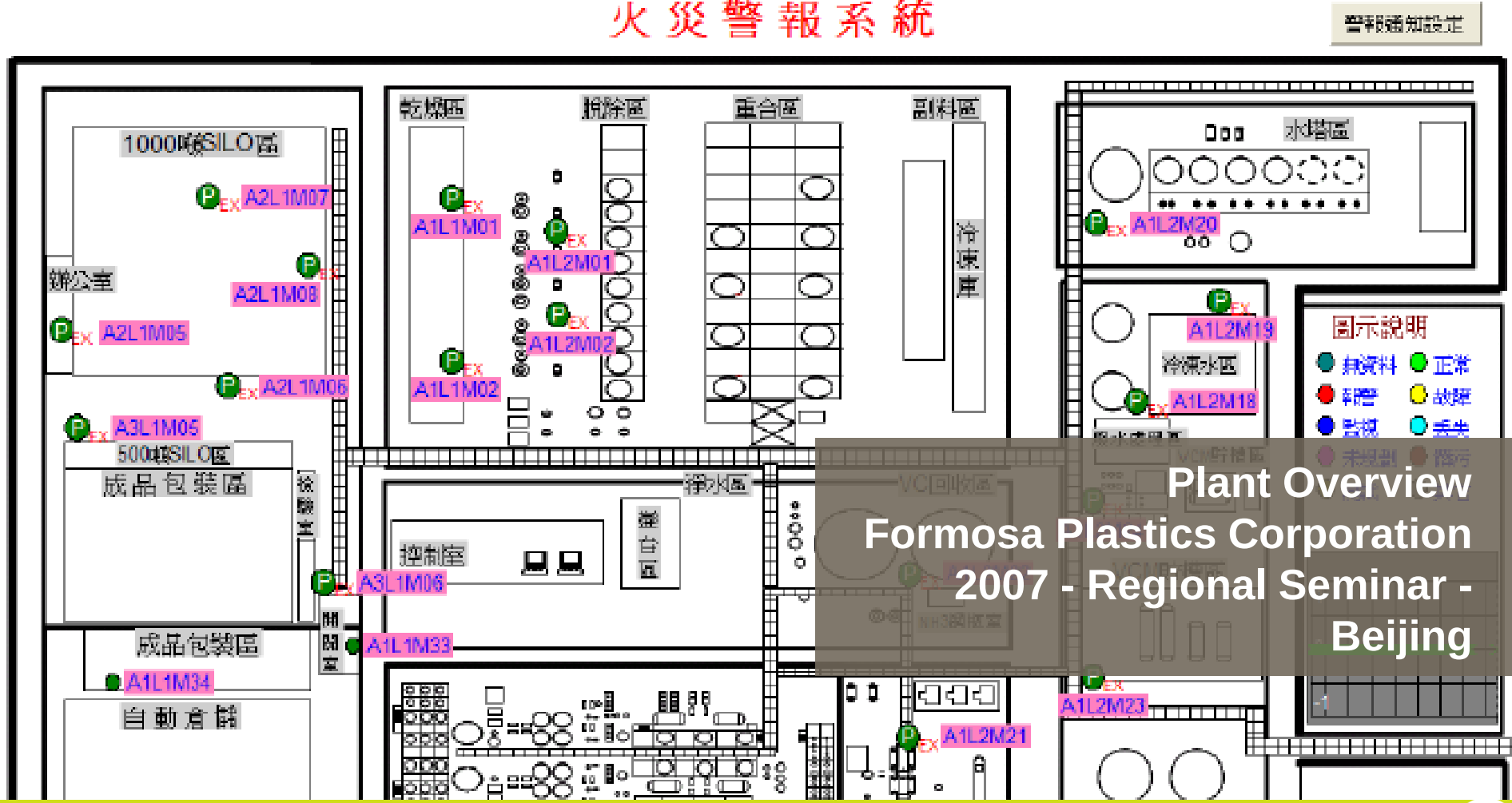
  Or

  – You have a group that builds displays for others
- Your users need to monitor how the process is progressing
- Your users need customized behavior or layout

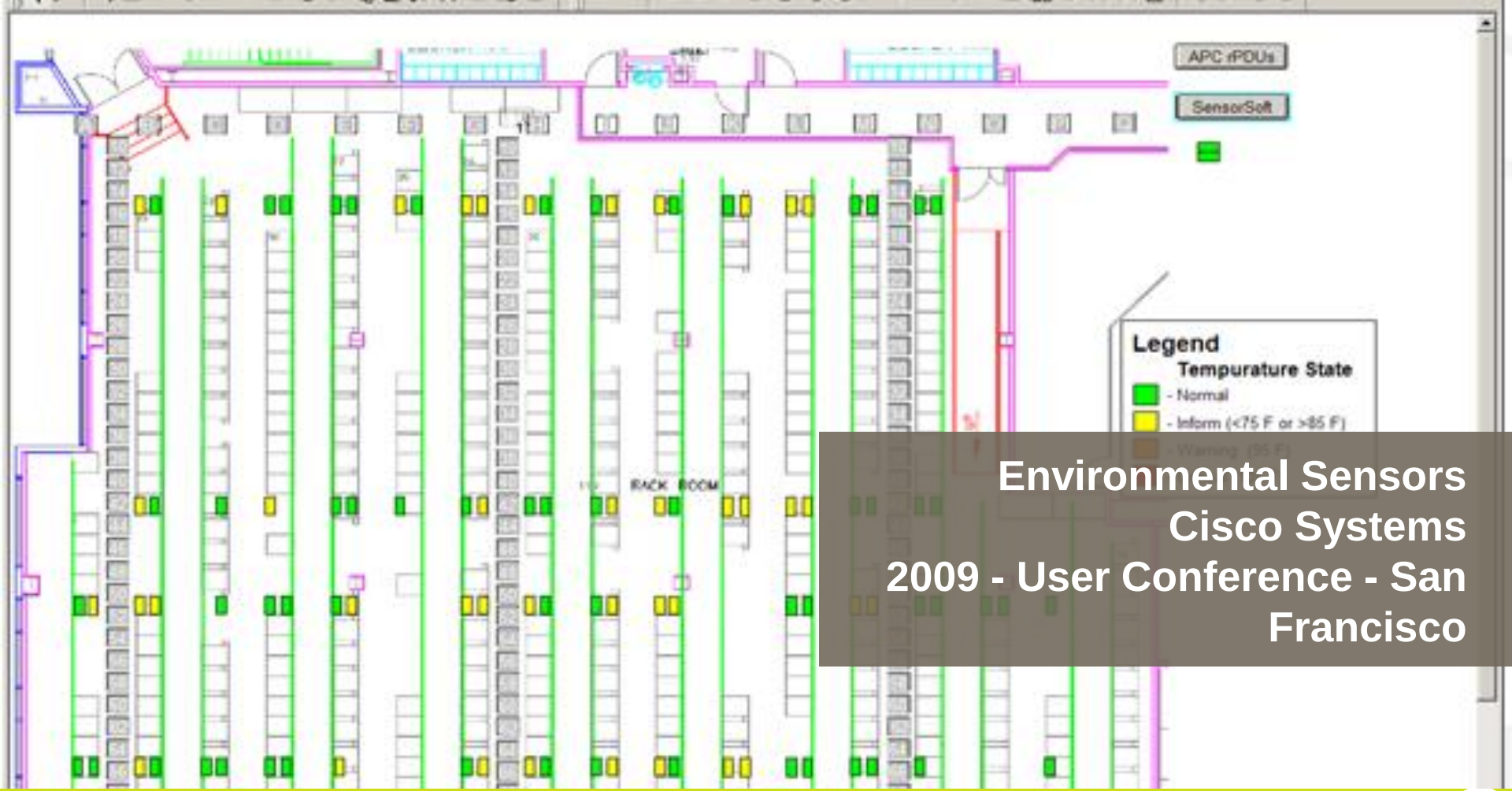


Pipelines-Emergency Systems PEMEX

2009 - User Conference - San Francisco



Plant Overview
Formosa Plastics Corporation
2007 - Regional Seminar - Beijing



Environmental Sensors Cisco Systems 2009 - User Conference - San Francisco

Who Should Be Using PI System Data?

- Renewable Energy Dispatch Operator
- Control Room Operator
- Operations Supervisor
- Operations Lead
- Transmission Dispatcher
- System Dispatch
- Pipeline Controller
- Planning/Reliability Engineer
- SCADA Engineer
- Power Operations Engineer
- Automation Engineer
- Project Engineer
- Control Systems Engineer
- Process Engineer
- Process Control Engineer
- Commercial Engineer
- MES/PIMS Engineer
- Technical Service Engineer
- PI System Engineer
- Real Time Systems Engineer
- Instrument and Control Engineer

- Gas Engineer
- Performance Engineer
- Operations Engineer
- Systems Engineer
- Electrical Engineer
- Utility Engineer
- Power Systems Engineer
- Reconciliation Engineer
- Reservoir Engineer
- Reliability Engineer
- Generation Engineer
- Plant Engineer
- Bioprocess Equipment Engineer
- Mechanical Engineer
- Domain Expert Engineering
- EMS Engineer
- Automation MES Engineer
- Process Development Engineer

- PI Application Engineer
- Sr. Manager, O&M IT Applications
- IT Manager - MIII Applications
- Refining I.T. Manager
- Data Systems Administrator
- Application Support Analyst
- Manufacturing IT Architect
- Data Systems Analyst
- Director of Application Development
- Tech Support for Operations
- IT Director, Consumer Packaging
- Global PI - Business Solutions Architect
- Process Systems Application Engineer
- IT Business Partner
- Applications Support Lead
- Director, Sustainable IT
- Information Security Engineer
- Product Line Manager
- Control System Supervisor
- System performance manager
- DCS Supervisor

- IT Applications Manager
- Plant Manager
- Maintenance Manager
- Global Production Volumes Manager
- PI System Manager
- Development Manager
- Maintenance Team Leader
- Product Engineering Mgr
- IT Operations Manager
- Managing Director
- Operations Manager
- Business Development Manager
- Central Heating & Cooling Plant Manager
- Global Production Services Manager
- Director, Midstream Operations North
- Director, Smart Network Operations
- IT - Director
- Hydro Generation Supervisor
- Manager, Data Analytics
- Infrastructure Manager
- Manufacturing Process Information Manager
- Program Manager

- Market sales Manager Utilities
- EMS Supervisor
- Asset Management Program
- Mine Superintendent
- Division Manager
- Business Development Manager
- Supply Operations Supt.
- Program Manager, Pipeline & Power Industrial Control & Operating Environment
- Supervisor, EMS SCADA Systems
- Mgr, Plant I.T.
- Manager, Process Control & EIT Program, XPS
- Plant Optimization & NERC CIP Compliance Manager
- Process Controls Software Manager
- Director of Platform Product Management
- Electrical & Control Systems Manager
- Business Relationship Manager
- Control Syst. Suprv.
- Technical Services Supervisor
- Scada & Process Control Supervisor
- Maintenance Supervisor Process control/IT

- Financial Systems Analyst
- Reliability Analyst
- Principal Operations Systems Analyst
- Business Systems Analyst
- Senior Sustainability Advisor
- Business Analyst
- Energy Systems Analyst
- Performance Analysis
- Real-Time Analyst
- Senior Sourcing Analyst
- Analyst Industrial IT
- IT Analyst
- Energy Analyst
- Engineering Analyst
- Wind Resource Data Analyst
- Hydro Analyst
- Quality Analyst
- EMS Analyst
- Process Systems Analyst
- MIII Application Analyst
- Process Computing Analyst
- Operations Analyst

- Executives
  - CFO
  - CEO
  - President
  - Chief Sustainability Officer
  - Vice President
  - Director
  - Chief Technical Officer
  - VP Field Operations
  - VP Marketing
  - CIO Manufacturing
  - Vice President Product Development
  - Vice President of Sales
  - Chairman
  - VP of Operations and COO
  - Board Member
  - Vice President of Technical Services
  - Vice President Global Sales and Marketing
  - Vice President of Engineering
  - Vice President, Marketing
  - Vice President Condition Monitoring
  - Vice President Corporate Communications
  - Vice President of Marketing & Business Dev.
  - Vice President Predictive Equipment Health Management
  - Vice President Program Management
  - Vice President -Global Strategies and Solutions
  - Vice President, Operations and Business Development
  - Executive in Information Management for Production Operation

- Business Analysts
- Customers
- Public
- Contractors
- Vendors

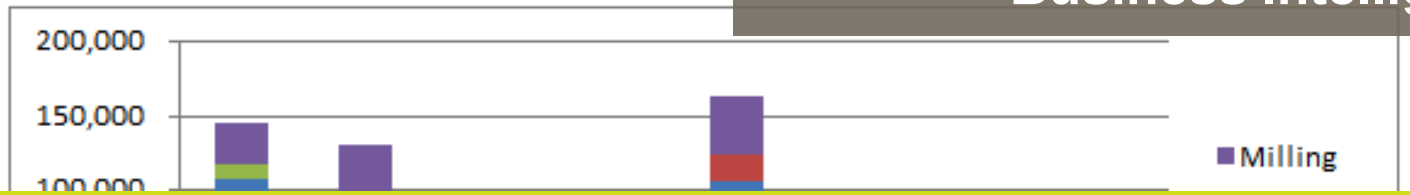
What's Next?

Corporate Fuel Gas Consumption

Shift

- Shift 1
- Shift 2
- Shift 3

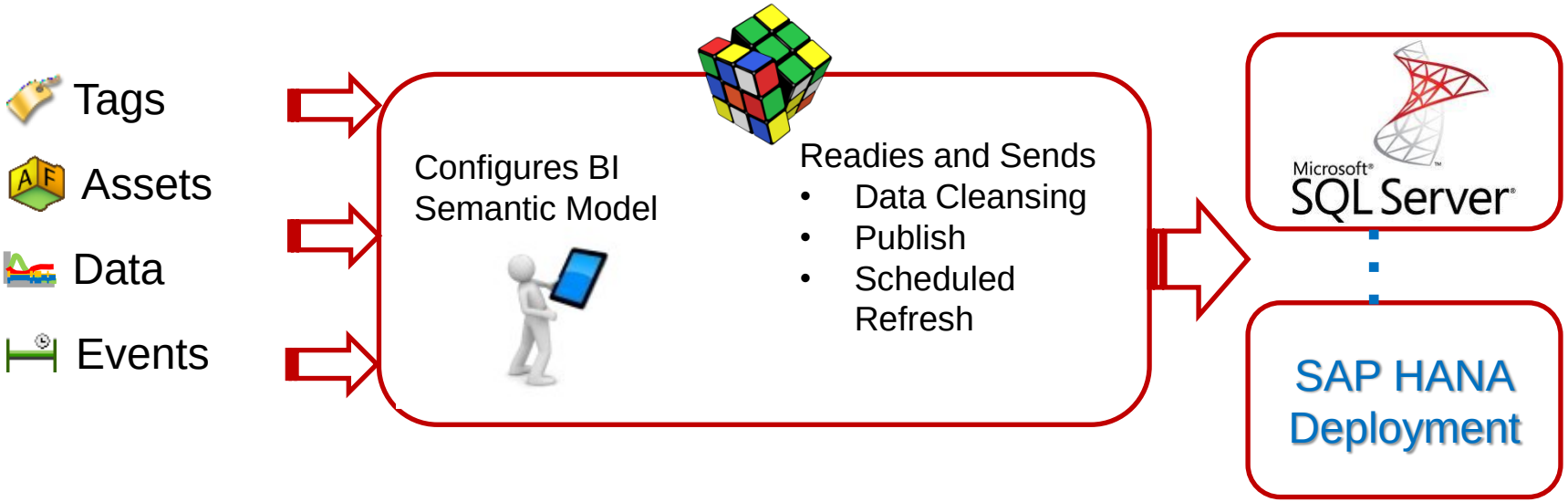
Sum of Fuel Gas Volume KFt3	Column Labels				
Row Labels	Cracking	Distilling	Extruding	Milling	Grand Total
Houston	**121,818**		**54,812**	**98,063**	**274,694**
Boiler	108,161		10,049	26,473	144,684
Heater	13,657		44,763	71,590	130,010
Little Rock		**44,952**	**63,409**		**108,361**
Boiler		9,464	18,646		28,110
Heater		35,488	44,763		80,251
Tucson	**125,455**	**36,175**		**92,188**	**253,819**
Boiler	107,410	17,321		38,036	162,767
Heater	18,045	18,854		54,152	91,052
Wichita	**91,865**	**45,170**	**44,546**		**181,581**
Boiler	57,075	18,199	8,468		83,741
Heater	34,790	26,971	36,078		97,840
Grand Total	**339,138**	126,297	162,7[illegible]	[illegible]	[illegible]



Business Intelligence

Project Rubik

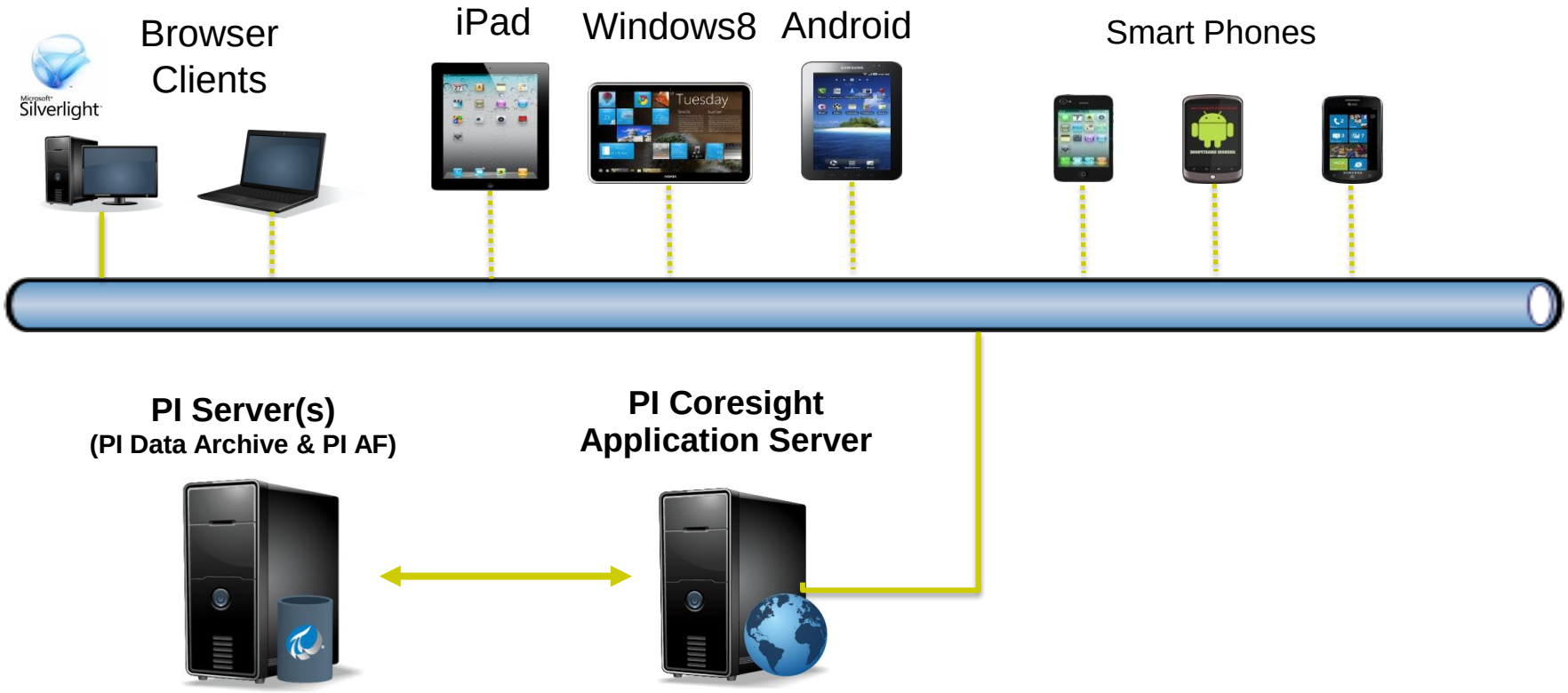
- Bridge the gap between PI System experts and BI Users
- Allow PI System expert to select the data
- Leverage BI Visualization Tools from Microsoft, SAP (and others)



PI System Data Everywhere

- Cloud options for sharing data
- Support for PI System displays on a variety of devices

PI Coresight with Mobile Clients



PI Coresight Tablet Edition – Target Audience

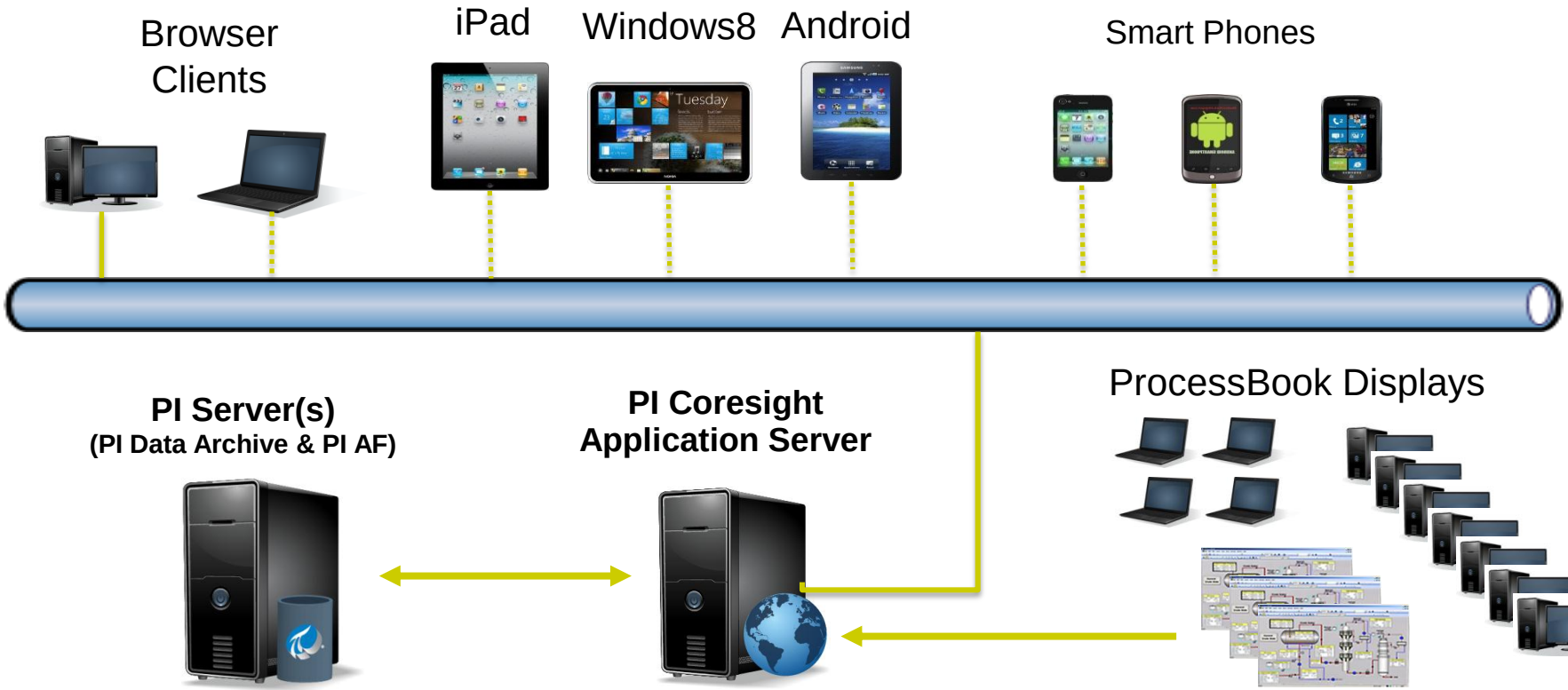
- Plant / Operations Management
  - Most likely to have iPad or similar device
  - Overview of how the plant/utility is running
  - Failures, Efficiency, KPIs, Actual vs Forecast
- Process Engineers / Corporate Planners
  - Identifying problems
  - Optimize processes – plant to plant
  - Create Content / Displays for management
- Maintenance
  - Manual Data Entry / Problem Recording
  - Troubleshooting – documents and real-time
  - Calibration

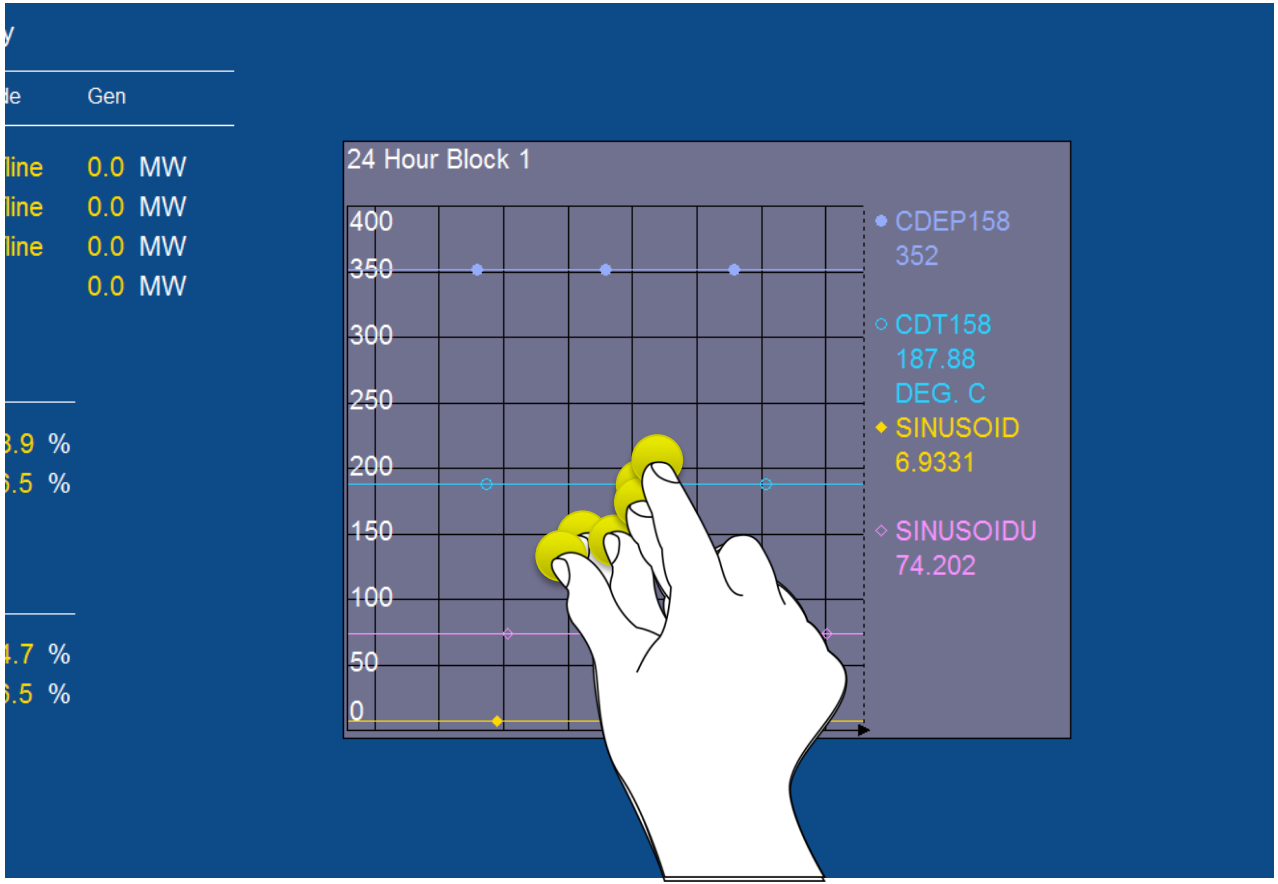



PI Coresight Phone Edition – Target Audience

- Check in with Plant from Home / Road
- Tell me if something is wrong!
- Focus on Notifications, Acknowledge, Dispatch, and Escalation
- Give me some basic data related to notification
- Outside of plant - 3G, 4G, or public WiFi
- Personalization

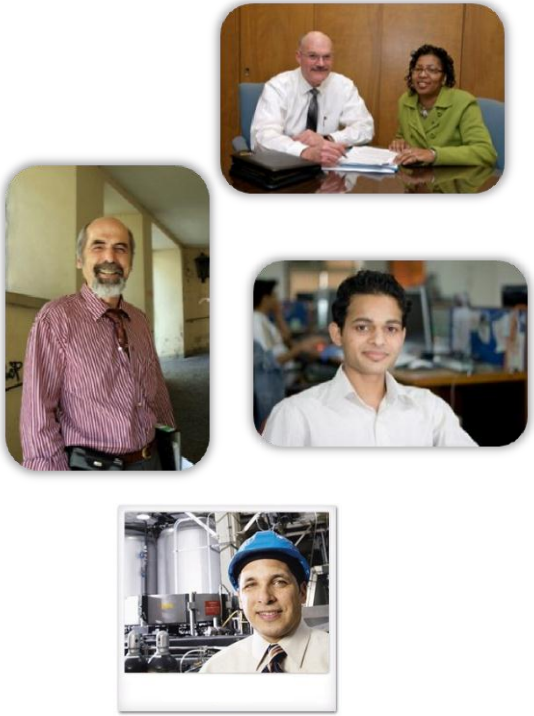
PI Coresight – ProcessBook Display Viewer





ProcessBook Display Viewer– Target Audience

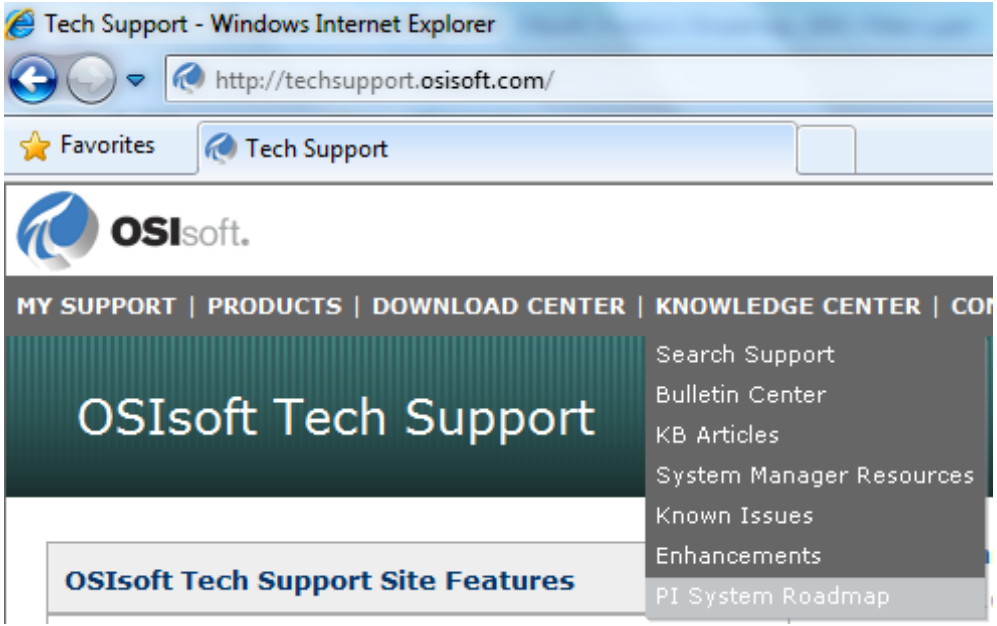
- Plant / Operations Management
  - See overview of how plant/utility is running
  - Failures, Efficiency, KPIs, Actual vs Forecast
- Process Engineers / Corporate Planners
  - View operator screens away from plant
  - Use troubleshooting displays you already have
- Maintenance
  - Troubleshooting
  - Calibration
- Anyone who needs to see existing displays!



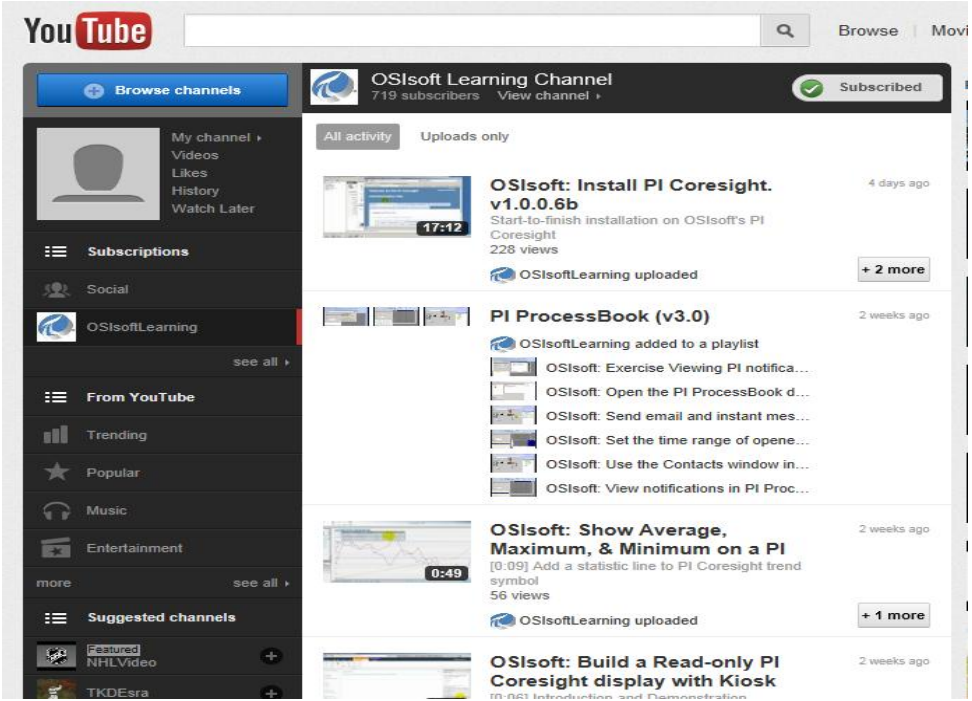
Stay Up-To-Date on the Web

- PI System Roadmap on OSIsoft Technical Support Site

http://techsupport.osisoft.com/techsupport/NonTemplates/roadmap.aspx



OSIsoft Learning Channel on YouTube



THANK YOU

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