# The Power of Data to Drive Sustainability

Presented by **Andrew Fanara – OSIsoft**

**afanara@osisoft.com**

# The Multifaceted Spheres & Priorities of Sustainability


(Gartner Research)

# Why Sustainability is an Emerging Megatrend*

- Launched by **dramatic shifts in the marketplace** which result in a general shift in thinking affecting entire countries, industries and organizations.

- Creates an **inescapable strategic imperative** that forces fundamental and persistent shifts in how companies think and compete.

* *The Sustainability Imperative*, Harvard Business Review, May 2010, David Lubin, Dan Esty

# Sustainability Nears Tipping Point*

- Even as the economy struggles to regain momentum, 70% of companies surveyed put Sustainability on their management agendas, 68% of those companies have increased their commitment to sustainability over the past year.
- This trend towards greater commitment is very strong in key "Heavy Asset" industries such as Energy, Utilities, Chemicals, etc.

* Sustainability Nears a Tipping Point, MIT Sloan Management Review, Winter 2012, Vol.53 No. 2

# Helping Customers Build Strong Foundations for Sustainability


**2011 PARTNER OF THE YEAR**

Sustainability

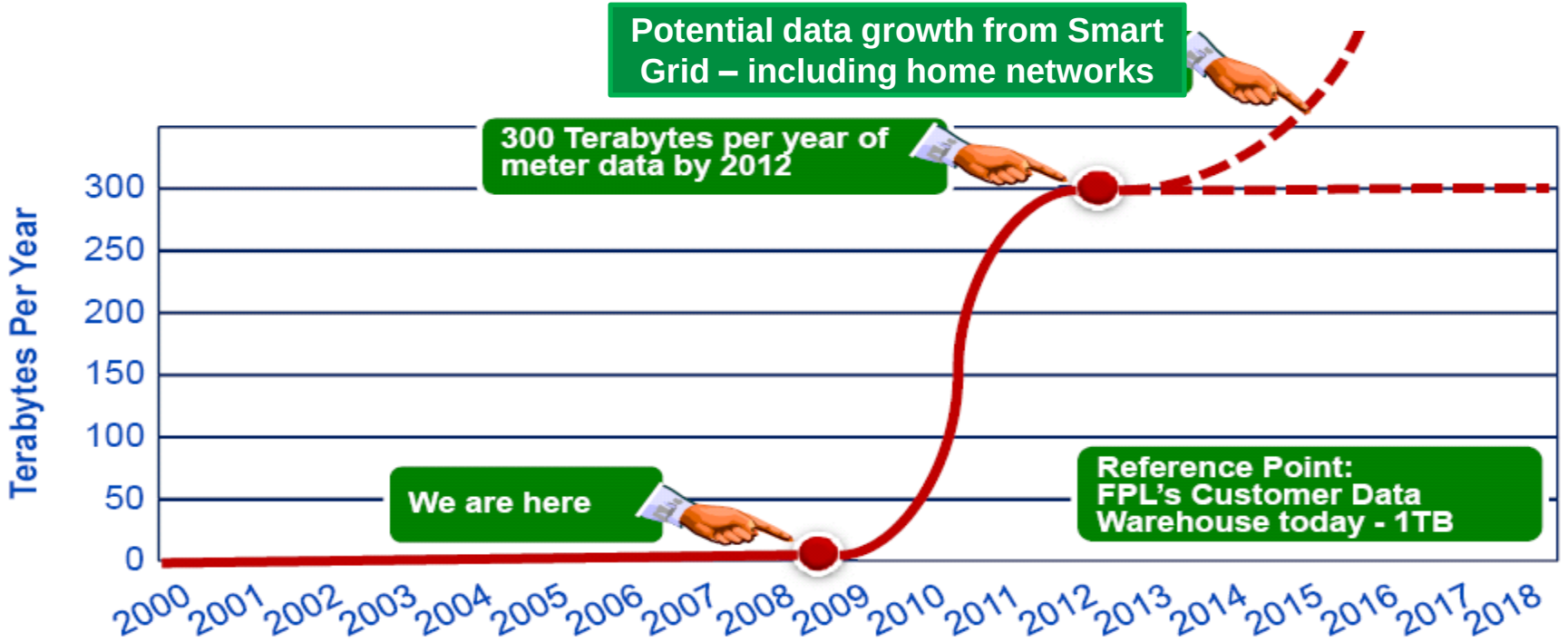
**Winner**

OSIsoft is proud to be the recipient of the first ever **Microsoft Sustainability Partner of the Year Award**. The award recognizes exceptional partners who have delivered software and technology innovations built on the Microsoft platform that help people and organizations around the world reduce their impact on the environment.

***"For their continued commitment to helping customers solve their environmental impact challenges, OSIsoft is recognized by Microsoft as this year's Sustainability Partner of the Year. OSIsoft's PI System illustrates the critical role of information in helping customers across multiple industries make informed decisions about energy and environment related challenges."***

**Rob Bernard**, Chief Environmental Strategist for Microsoft Corp.

# Data, Data & More Data…




**AMI & Smart Grid will increase the amount of measurement & control points far beyond anything we have today. How can we leverage this data?**

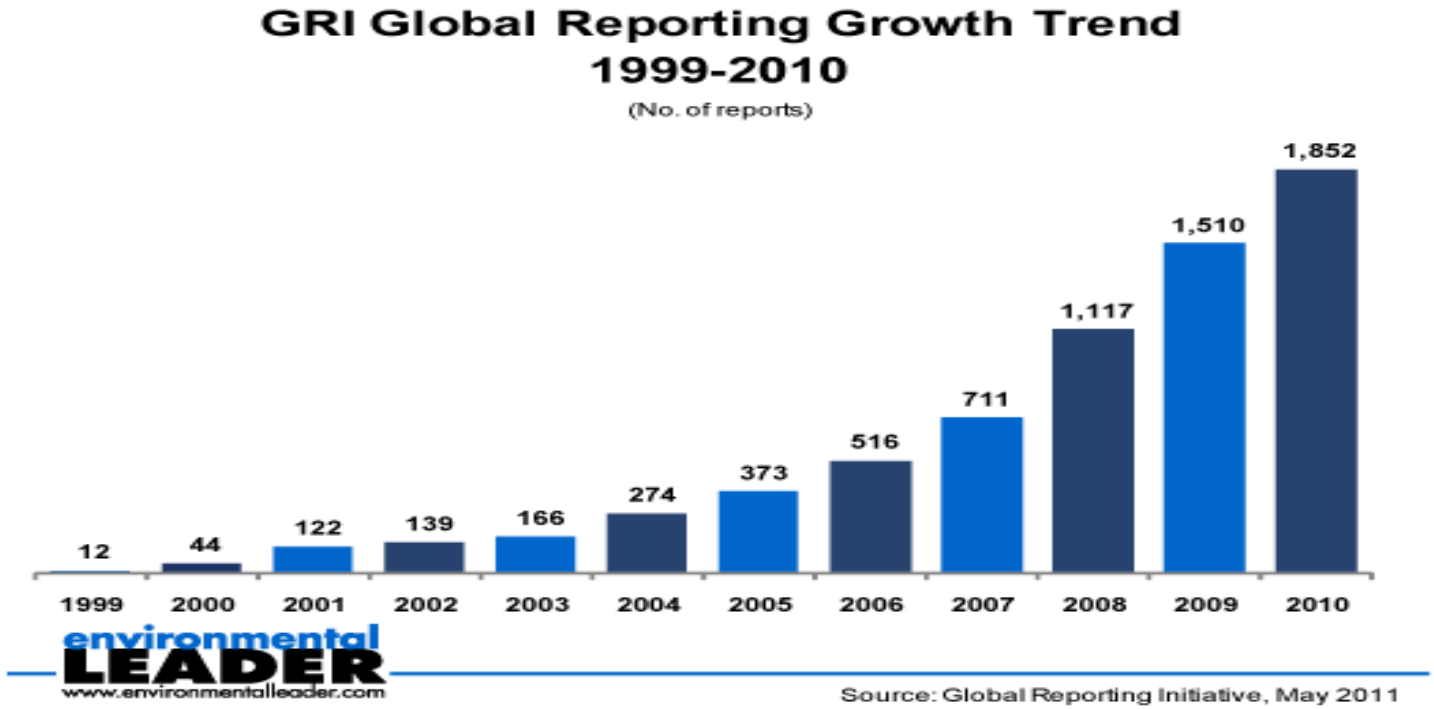
The New York Times Published: April 23, 2011

# When There's No Such Thing As Too Much Information

*"Today's organizational judgment is in the midst of a fundamental change – from a reliance on a leaders "gut instinct" to increasingly data based analytics*"*

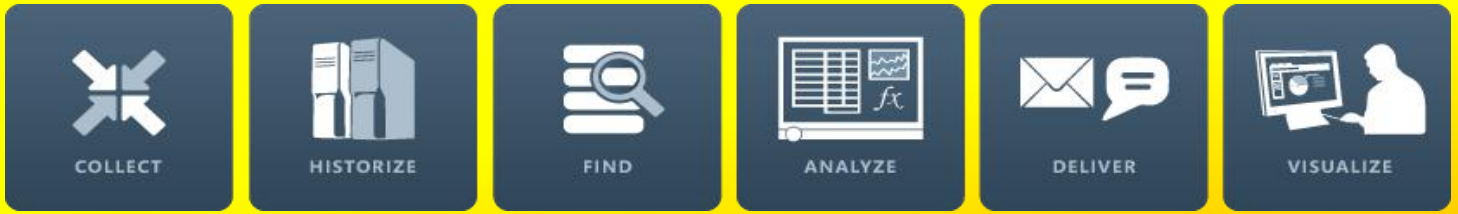
* Strength in Numbers: How Does Data-Driven Decision Making Affect Firm Performance., Brynjolfsson,

# Reporting Drives the Need for Timely, Accurate Information



# OSIsoft: what we do

***The PI System***



# Potroom Visibility with SMART

**Rodded Anodes**

Anode Properties

Raw Material Properties

Rod History

Stub Condition

**Power:**

Current Price of Power

Current LME

Value of Ancillary Services

Contract Utilization

**Operator Inputs**

Observations

Root Cause Analysis

Event tracking

**Fluoride**

Percent Fluoride

Trace Elements

**Alumina** %Fines Trace Elements

Flow times

**Emissions**

Link Operations and Pot Control to Emission Levels

**Butts and Rods**

Size, Weight

Shape

Location in Pot

Clean?

**Bath**

Additions/Subtractions

Composition

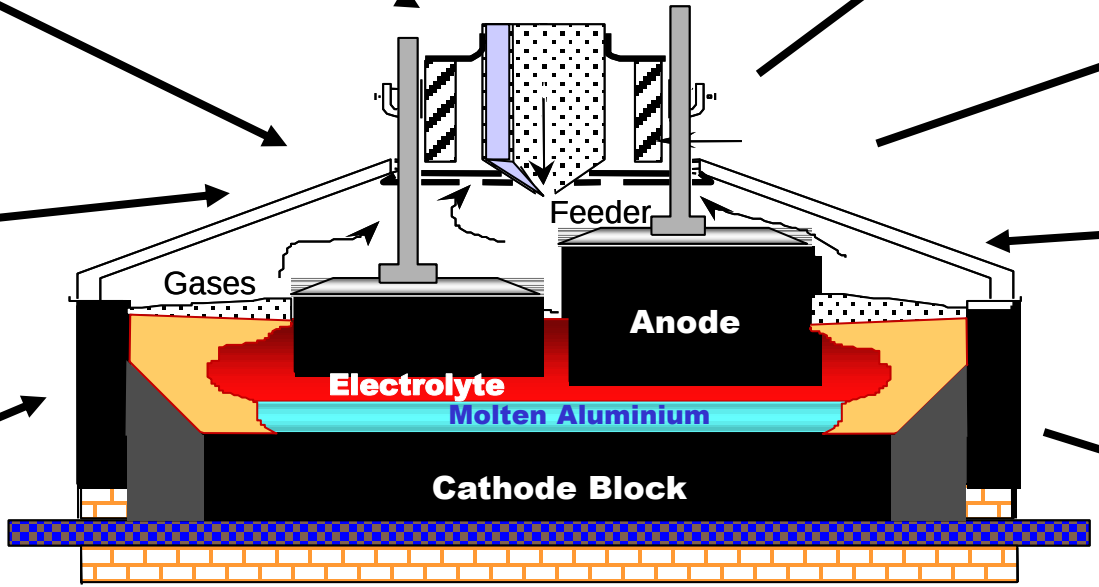
**Molten Metal**

How much Bath?

Metal Composition

Amount

Crucible ID




**Pot Information:** Volts, Amps, Pot Design, Age, Operator Inputs... (4000 tags)

# The Granularity of Real-time Data

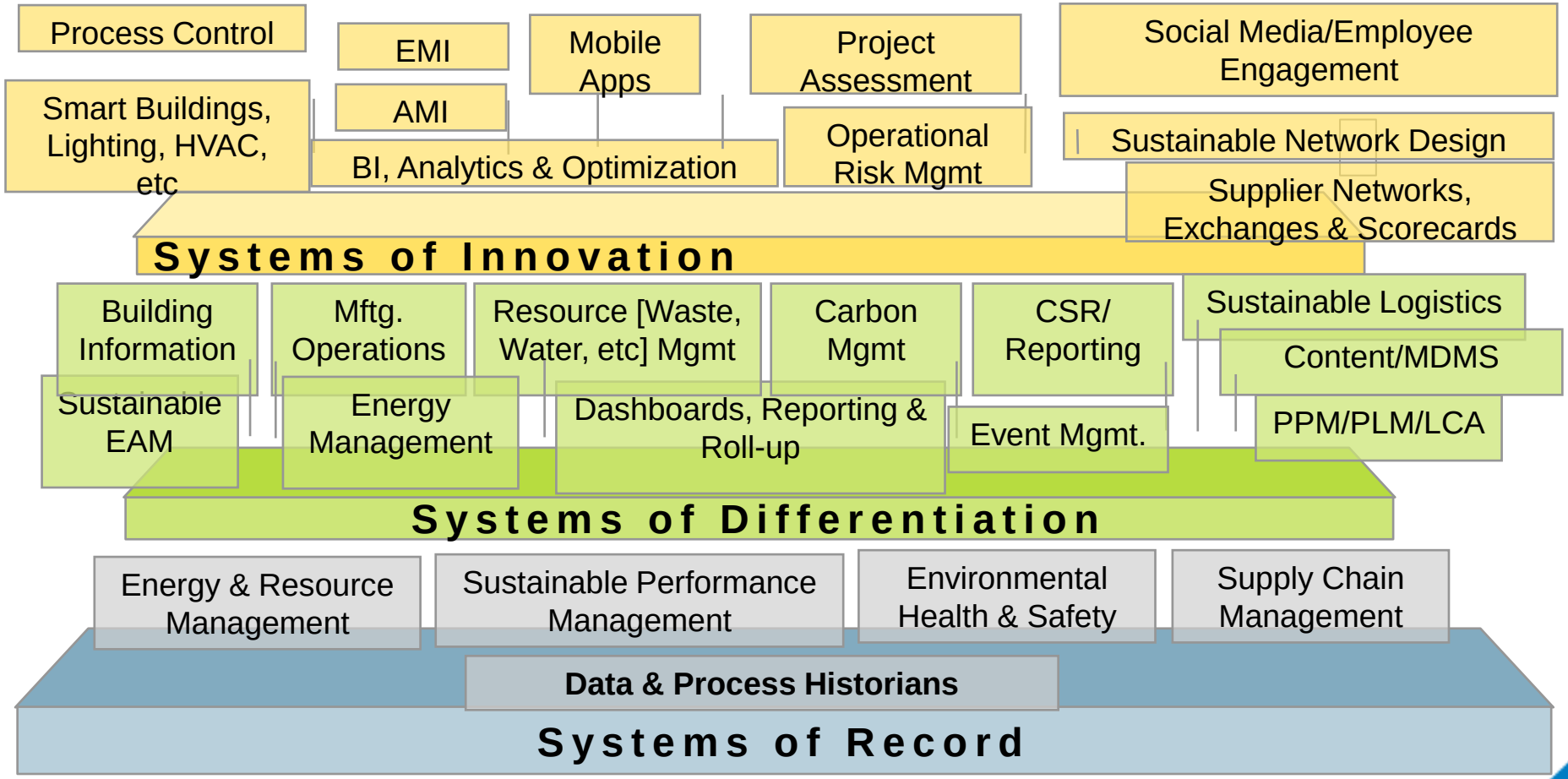
## 10 Minute Averages = Missed Events


**PI System Data**
**(1-3 seconds)**

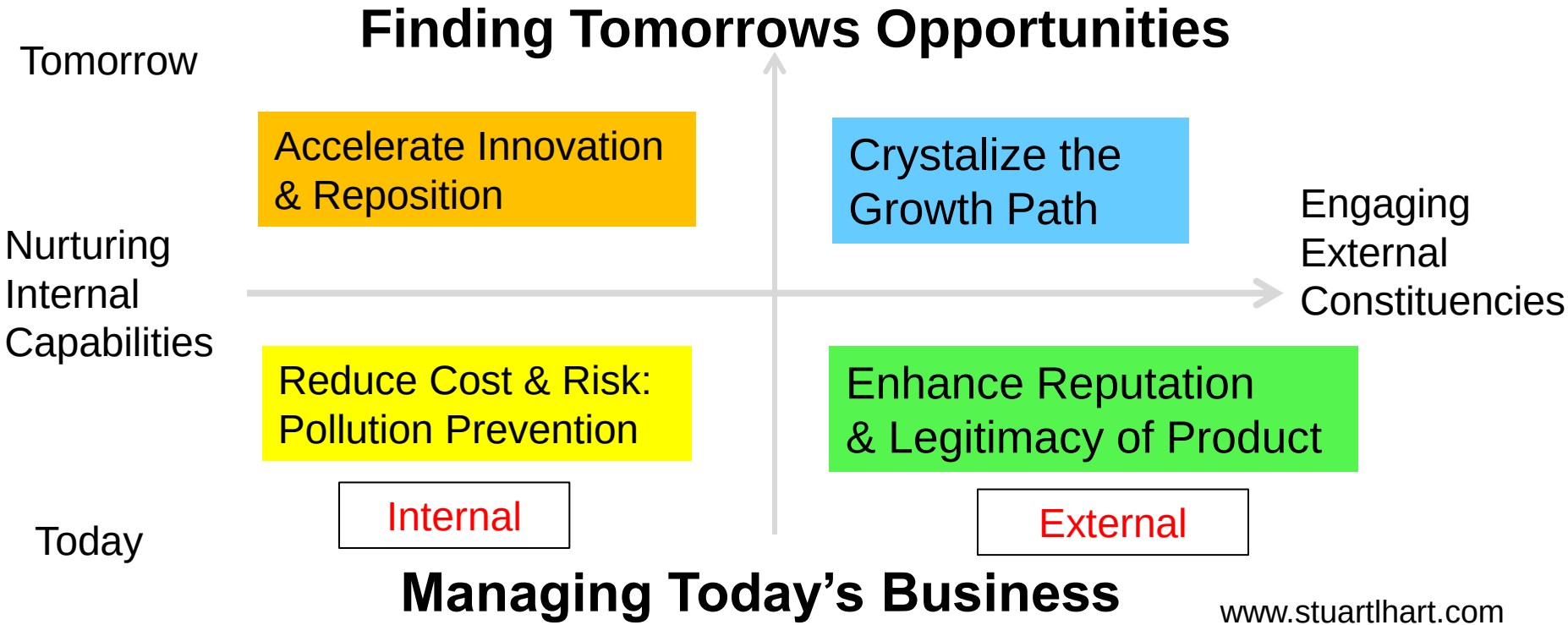
VS.

**SCADA Data**
**(10-minute average)**

# A View of Sustainable Business Technologies



# A Streaming Data & Events Infrastructure to Support a Multifaceted Sustainability Value Framework



# Conclusions

- Sustainability is a data rich challenge – in a world of big data & information the challenge is even greater.
- There is a need to move away from sustainability merely being an exercise in reporting emissions or resources to a suite of business process and competencies which are aligned clearly to business outcomes.
- OSIsoft's origin is in OT and has traditionally built bridges to IT
  - Now we want to extend that bridge to the sustainability community
  - The lessons and principles to leverage an infrastructure to gain business value are well established

# Halifax Water – Automatic Leak Detection

- Water service to 325,000 people.
- $650,000 / yr savings by reducing water leakage (DMA Night Flows).

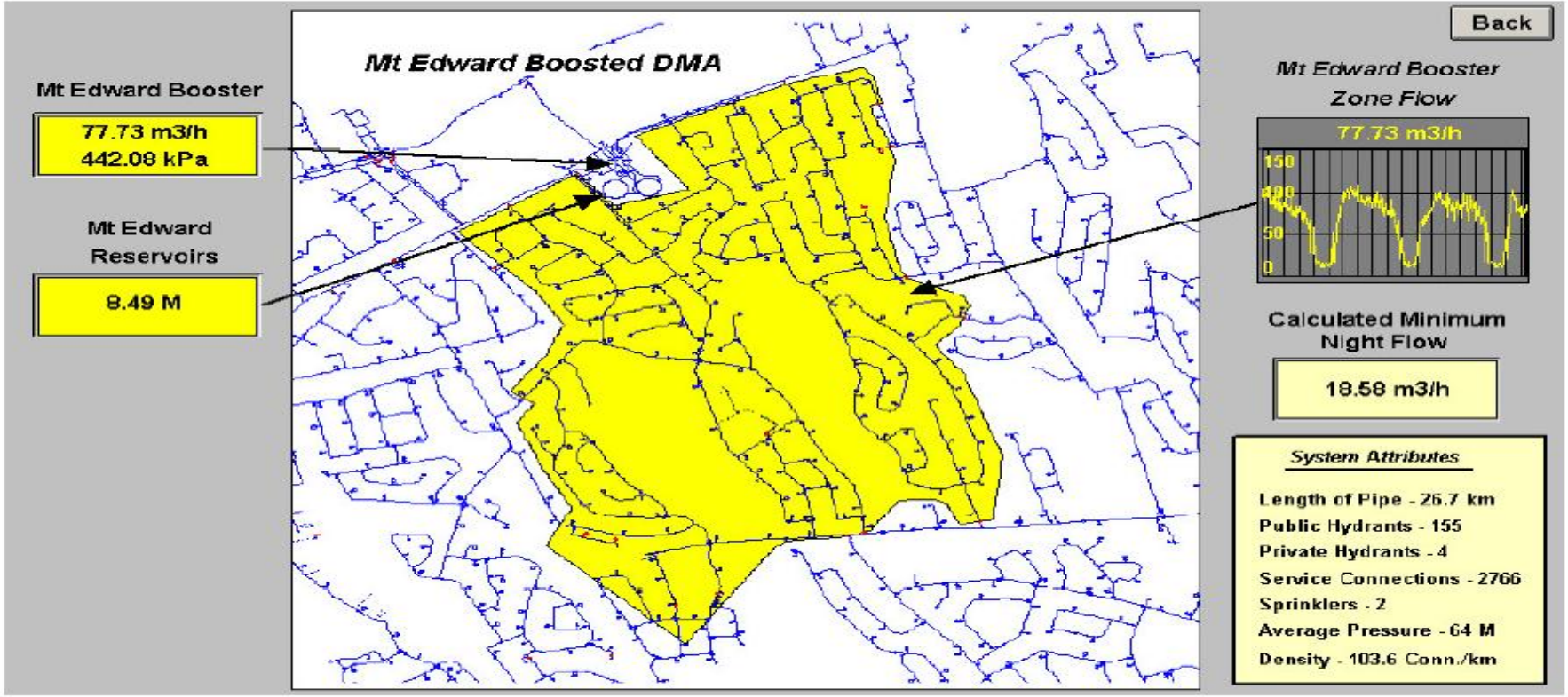
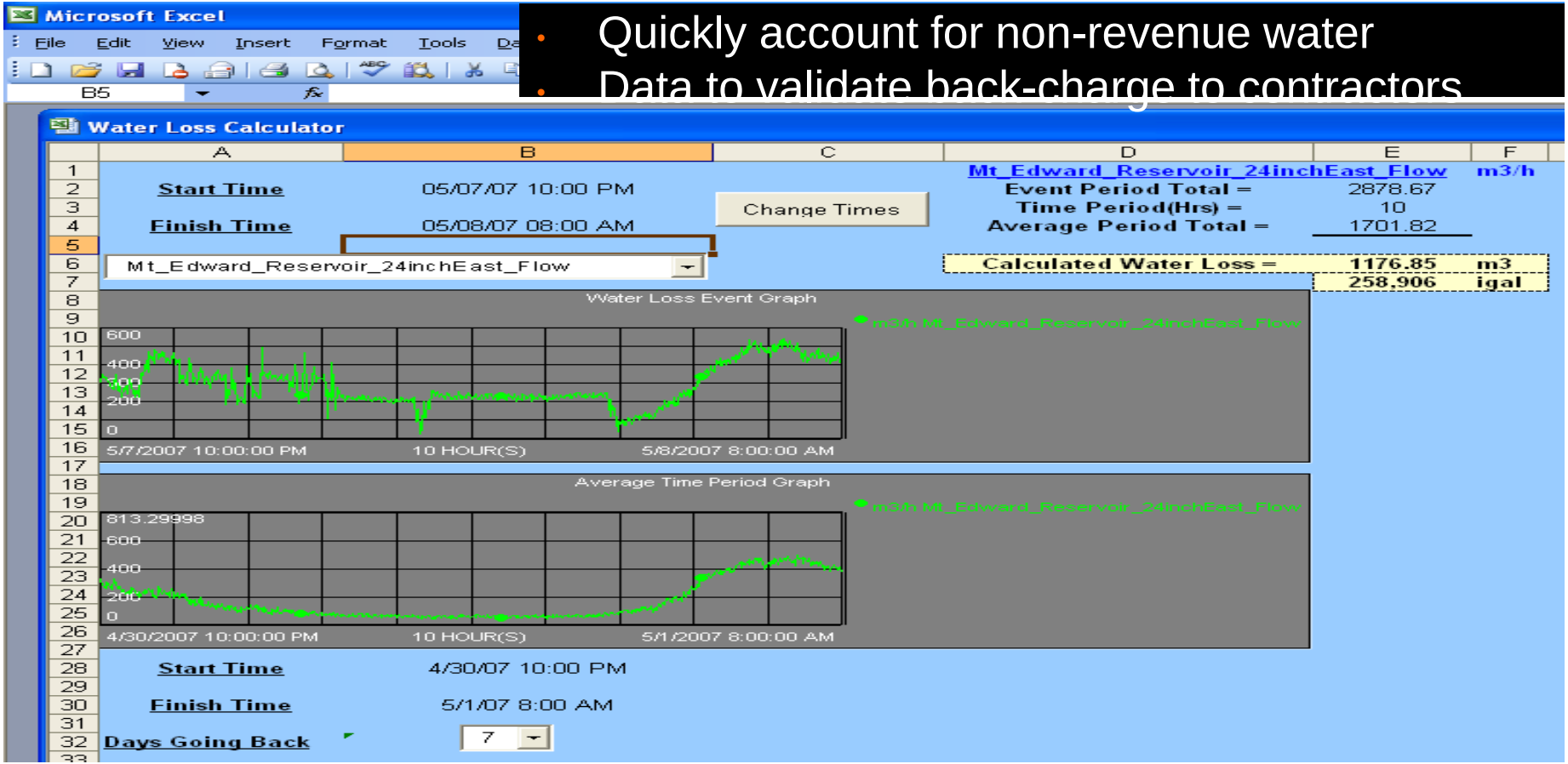



Figure 2.3 Mount Edward DMA, Dartmouth, Nova Scotia

# Halifax Water – Water Loss Calculator

- Quickly account for non-revenue water
- Data to validate back-charge to contractors



# Real-time Energy Management

## 15% or $200,000+ Annual Energy Savings

Moulton Niguel Water District

Energy Management Report

May 2008

| | Report Date | 6/15/2008 | | Days: | 31 | | | Average Daily Temp | | This Month | 63 (deg F) | Last Month | 62 (deg F) | July | 71 (deg F) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | Total Precipitation | | This Month | 0.08 (in) | Last Month | 0.00 (in) | July | 0.06 (in) | |
| | Facility | Efficiency (%) calc | Calc Rate ($/kwh) calc | Cost ($/acre-foot) calc | Tot Flow (acre-feet) sensor | Tot Energy (kwh) sensor | Energy per AF (kwh/acre-foot) calc | Run Time (hrs) sensor | Avg head (psig) sensor | Schedule --- bill | Est Utility Bill ($) calc | Act Utility Bill ($) bill | Bill Date --- bill | Bill Days --- bill | Billed Pwr (kwh) bill | Bill Rate ($/kwh) bill |
| 1 | Aliso Viejo | 18% | | $119.15 | 80 | 119,840 | 1502 | | 111 | TOU-P-S-1-AP | $9,504 | $7,915 | 30-May | 30 | 116,919 | $0.07 |
| 2 | Big Niguel | 0% | | -- | 0 | 766 | -- | | 77 | TOU-P-S-1-AP | $121 | $128 | 3-Jun | 32 | 785 | $0.16 |
| 3 | Country Village | 0% | | -- | 0 | 1,325 | -- | | 99 | PATICPP | $190 | $308 | 5-Jun | 30 | 2,043 | $0.15 |
| 4 | Crown Point | 53% | | $58.56 | 128 | 63,308 | 496 | | 110 | PATI | $7,475 | $6,121 | 17-Jun | 32 | 55,760 | $0.11 |
| 5 | Crown Valley | 120% | | $40.82 | 20 | 4,239 | 212 | | 106 | PATICPP | $814 | $3,683 | 16-Jun | 32 | 34,003 | $0.11 |
| 6 | El Dorado | 55% | | $34.76 | 94 | 39,811 | 424 | | 98 | TOU-P-S-1-AP | $3,260 | $3,254 | 30-May | 30 | 38,525 | $0.08 |
| 7 | Galivan | 53% | | $67.92 | 183 | 62,037 | 339 | | 75 | PATICPP | $12,420 | $8,073 | 9-Jun | 32 | 75,684 | $0.11 |
| 8 | Highlands | 45% | | $60.67 | 65 | 46,848 | 726 | | 137 | TOU-P-S-1-AP | $3,913 | $3,736 | 29-May | 30 | 45,538 | $0.08 |
| 9 | JRT AWT No 2 | 50% | | $54.16 | 568 | 283,443 | 499 | | 104 | TOU-CPP-GCCD | $30,769 | $29,355 | 4-Jun | 30 | 279,997 | $0.10 |
| 10 | La Paz | -- | | $0.00 | 63 | 0 | 0 | | 0 | TOU-P-S-1-AP | $2,709 | $2,709 | 22-May | 30 | 37,547 | $0.07 |
| 11 | PID-1 | 0% | | -- | 0 | 1,317 | -- | | 88 | PATI | $244 | $187 | 17-Jun | 30 | 1,246 | $0.15 |
| 12 | PID-2 | 60% | | $30.88 | 46 | 13,543 | 294 | | 74 | PATICPP | $1,423 | $1,485 | 17-Jun | 30 | 13,625 | $0.11 |
| 13 | Rancho | 47% | | $38.35 | 161 | 51,022 | 317 | | 63 | PATI | $6,174 | $6,669 | 17-Jun | 32 | 53,680 | $0.12 |
| 14 | Sheep Hills | 62% | | $30.25 | 142 | 62,056 | 436 | | 115 | TOU-P-S-1-AP | $4,305 | $4,655 | 3-Jun | 32 | 67,054 | $0.07 |
| 15 | Southridge | 22% | | $99.30 | 52 | 56,081 | 1078 | | 99 | TOU-P-S-1-AP | $5,165 | $3,814 | 3-Jun | 32 | 57,873 | $0.07 |
| 16 | Wood Canyon | 53% | | $41.69 | 78 | 36,954 | 476 | | 106 | TOU-P-S-1-AP | $3,238 | $2,769 | 4-Jun | 30 | 33,862 | $0.09 |
| Totals (Average) | | 46% | | $54.63 | 1679 | 842,591 | 502 | | 97 | | $91,725 | $84,861 | | | 914,141 | $0.09 |
| | Design Efficiency | 72 | | | | | | | | | | | | | | |

**MNWD Key Energy Indicators**

| | Efficiency (%) | Calc Rate ($/kwh) | Cost ($/acre-foot) | Tot Flow (acre-foot) | Tot Energy (kwh) | Energy per AF (kwh/acre-foot) | Water Inc/Dcr | Sys Head (psig) | Est Utility Bill ($) | Act Utility Bill ($) | Bill Inc/Dcr | Billed Pwr (kwh) | Bill Rate ($/kwh) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Dec | 55 | | $47.07 | 822 | 342,403 | 416 | | 97 | $38,696 | $43,423 | | 419,390 | $0.1035 |
| Jan | 53 | | $45.37 | 848 | 362,033 | 427 | 3% | 98 | $38,465 | $43,228 | 0% | 419,532 | $0.1030 |
| Feb | 50 | | $46.16 | 744 | 317,760 | 427 | -12% | 89 | $34,343 | $40,618 | -6% | 400,549 | $0.1014 |
| Mar | 56 | | $44.85 | 1574 | 681,860 | 433 | 112% | 102 | $70,607 | $72,990 | 80% | 767,675 | $0.0951 |
| Apr | 53 | | $44.10 | 1847 | 825,528 | 447 | 17% | 99 | $81,451 | $78,292 | 7% | 848,073 | $0.0923 |
| May | 46 | | $54.63 | 1679 | 842,591 | 502 | -9% | 97 | $91,725 | $84,861 | 8% | 914,141 | $0.0928 |

# **Nalco:** Knowledge Platform

CHEMICALS & PETROCHEMICALS


The Nalco Refined Knowledge offering combines the best of the three industry leaders: OSIsoft's operational infrastructure SharePoint and Nalco as the Solutions Provider

"'*Actionable Knowledge from Refined Data* with PI System & Microsoft Business Intelligence"

**John Schlitt - Business Manager**
*Automation COE, Nalco*

## Customer Business Challenge

- Process data held in various "islands of information"
- Performance data was collectedly manually
- Personal Service Reports (PSRs) were time-consuming
- The goal: Centralize data collection to bring greater value

## Solution

Used OSIsoft's Operational Infrastructure

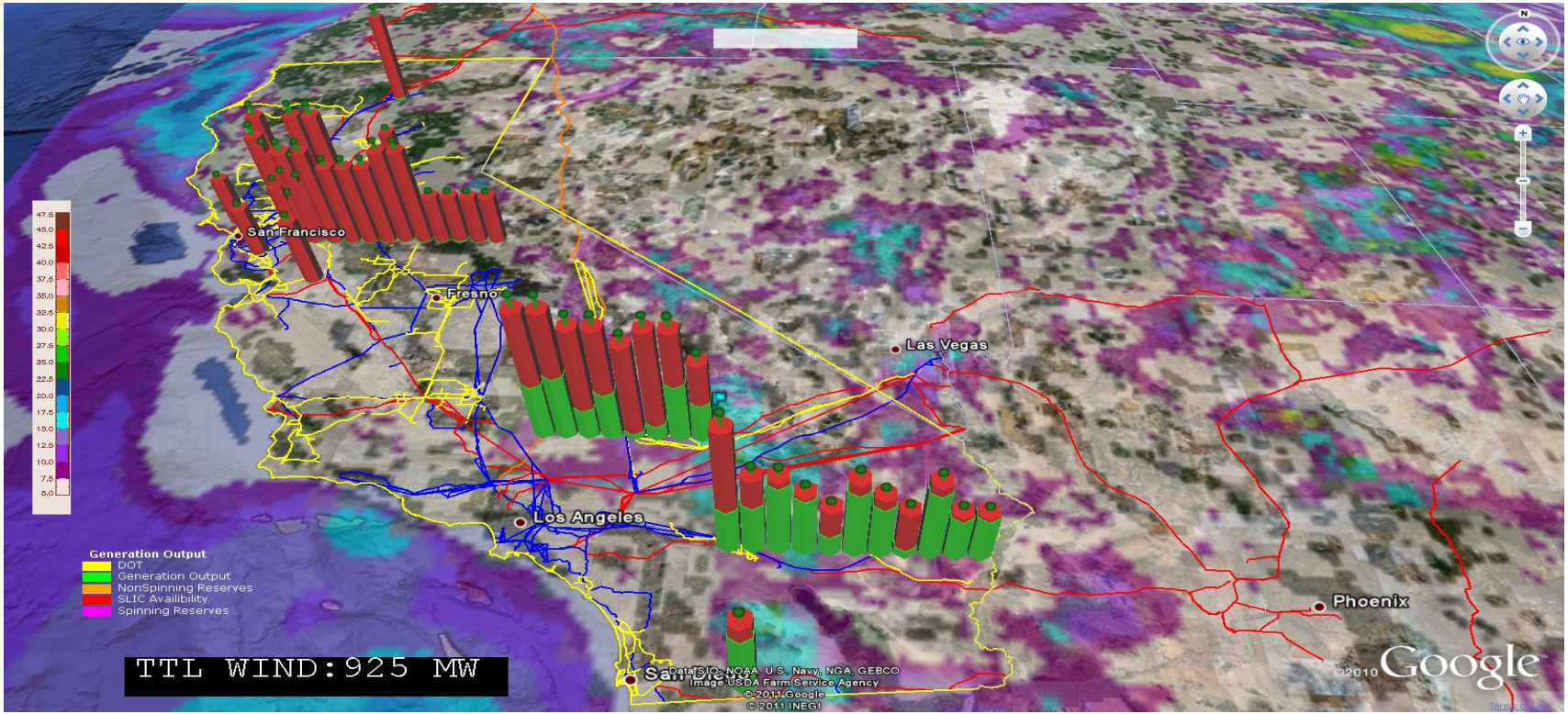
- Central Data Collection
- Tech View & Analysis
- Calculation Engine
- Value Generation Tool
- PI Notifications/OCS = Real-time alerting

## Customer Results / Benefits

- Centralized data collection
- Condition based maintenance and performance optimization
- Role-based visibility into plant operations and performance
- On-demand Summary & KPI info to customers & Nalco
- Actionable data now at

# California ISO Control Room

# **CAISO Display:** Wind speed contour & wind generation using PI System data

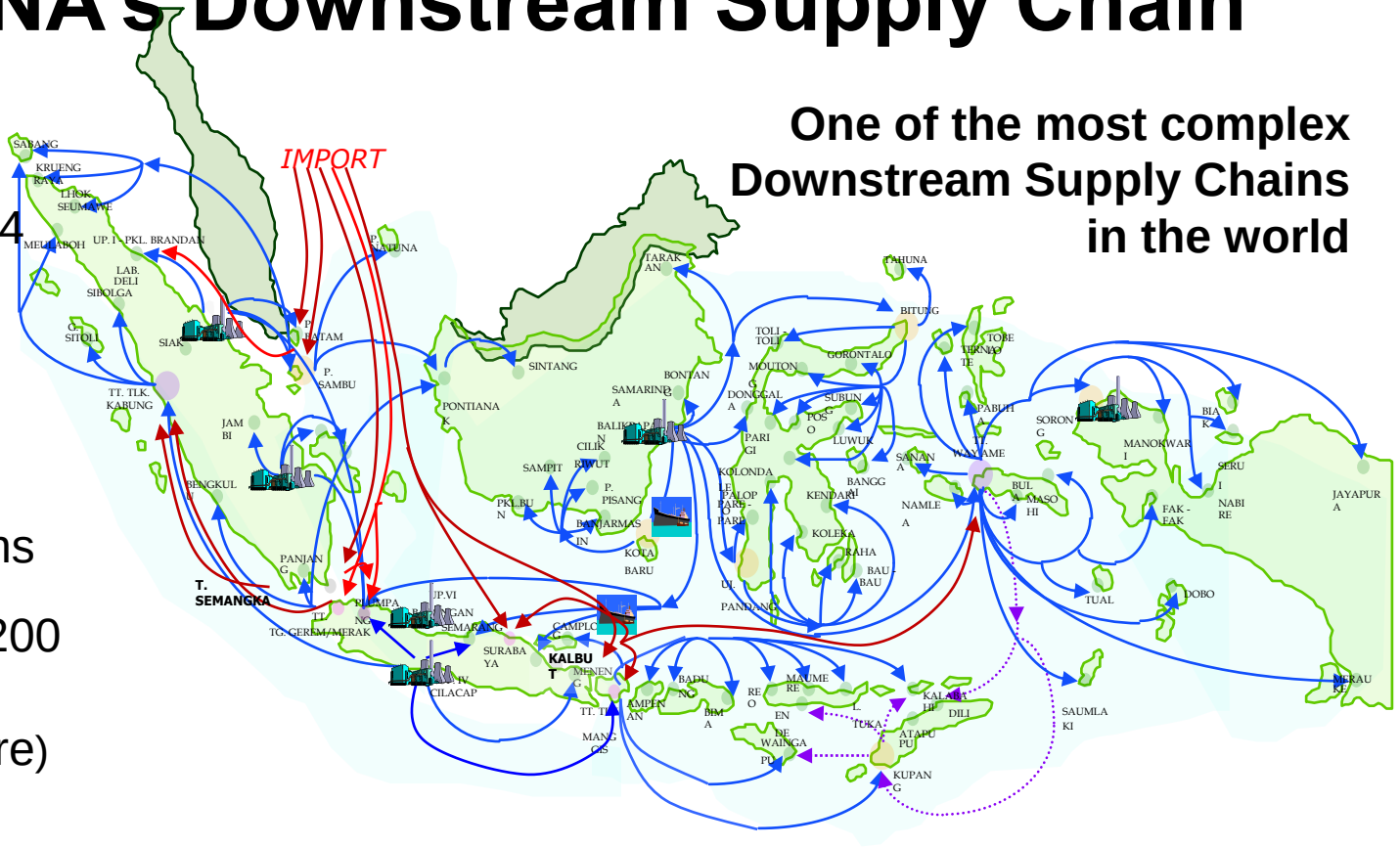


# PERTAMINA's Downstream Supply Chain

## Assets:

- 6 Refineries: 1,034 Million bbl/day
- 120 + Depots
- 98 Vessels
- 3,400 Fuel Stations
- Sales Volume: 1,200 Million bbl/day (92% Market Share)

**One of the most complex Downstream Supply Chains in the world**



**e-Field** make data available for every user no matter where they are.

PETROJARL FOINAVEN

FOINAVEN

Trondheim

GLITNE

BANFF

VARG

RAMFORM BANFF

PETROJARL I

PETROJARL VARG

- Real-time servers on all FPSO's Tot.150.000 datastreams
- Onshore server replicating data from offshore servers

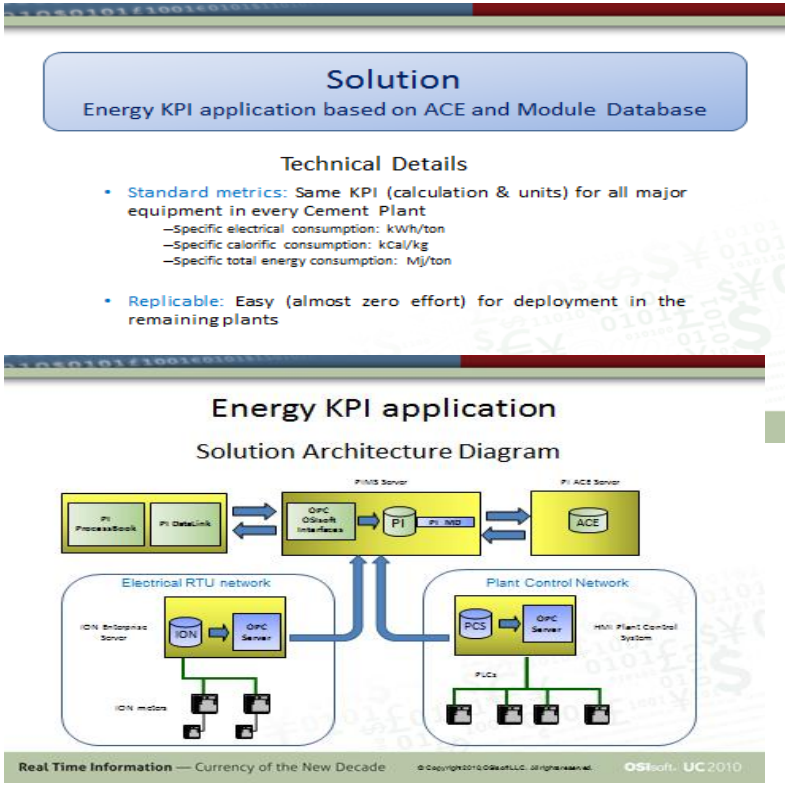
# **CEMEX:** Smart Monitoring on Cement Plants

## Problem Addressed

- Need of tools and indicators to accurately measure and control all the energy being consumed by each piece of equipment.
- “You can control only what you can measure”

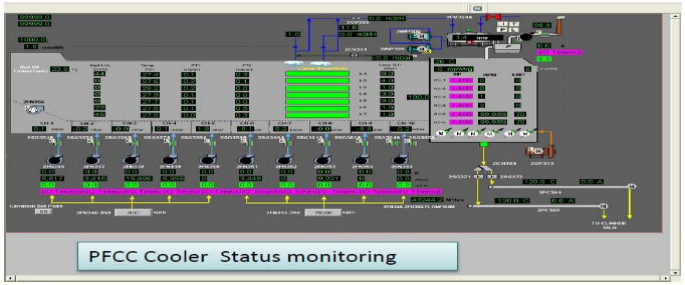
## Problem Details

- Detailed energy consumption not available for control purposes
- Calorific consumption detail available only in certain cases
- Electrical energy measurement only for control demand and billing purposes
- Need of a tool to make operational process adjustments for the efficient use of total energy (calorific & electrical), avoiding waste



# **UltraTech Cement:** Improvement Case Studies

"A PI System for data acquisition is the first step towards a fully integrated plant management system"




**R.R. Mehta**

*General Manger India*

## Customer Business Challenge

- Large number of plants
- Development of plan for improvement cases across plants
- Improve Production Rates
- Achieve High Energy Efficiency Rating by International Organizations
- Six Sigma on Processing Units
- Increase Production runs

## Solution

- PI System with PI DataLink, PI ProcessBook
- SAP for plant maintenance currently manual integration

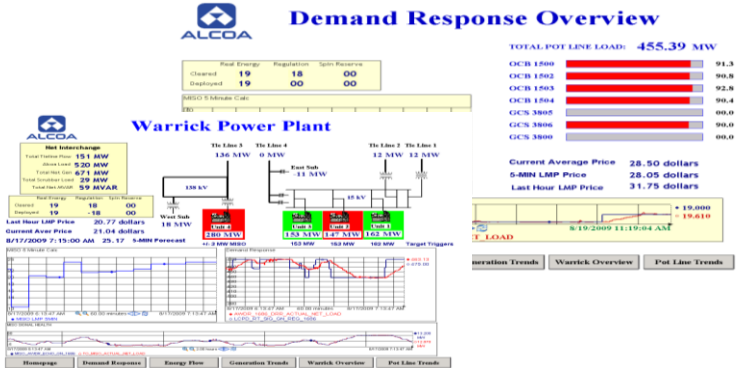
## Customer Results / Benefits

- Improvement cases have resulted in 1 million in savings in single plant
- Case – Idle Running of compressors hrs reduction saved KW
- Case – Kiln Feed Consistency from model developed for PI System data increased hrs of operation
- Case Equipment Availability- root cause analysis reduced process disturbance and operating temperatures

# **Alcoa:** Industrial-scale Demand Response

Warrick Operations is Alcoa's Largest Operating U.S. Smelter

- 330,000 MT capacity/year
- Energy is 30-40% of Aluminum Production Costs
- Generates power for Aluminum Smelter and Rigid Packaging




**Brian Helms**
*Power Markets Coordinator*
*Alcoa Power Generation*

## Customer Business Challenge

- Faced with competition in a worldwide commodities market
- Business took a major hit due to economic downturn
- Needed to find a way to sustain the business; keep it from going under

## Solution

- Uses the PI System for energy regulation – generate electricity & feed it back into Midwest ISO (MISO)
- Monitor MISO for energy demand notifications, & respond accordingly
- Submit forecasted load data from the PI System
- Focused on selling regulation (20MW) and spinning reserve (40MW)

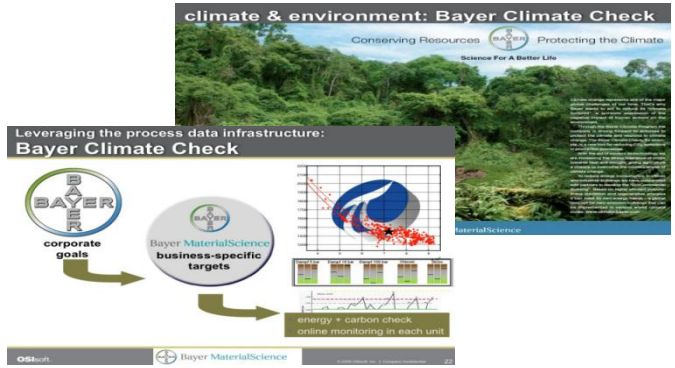
## Customer Results / Benefits

- Total project cost was $700,000
- Project payback was in 4 months
- System runs efficiently
- Gets a weekly check from MISO for the power they generate in the grid
- Use this money to sustain their Aluminum business – revenues are now above their competition

# Bayer Material Science: Emissions Tracking

Bayer MaterialScience

- Emissions track record 1990-2007: 37% absolute reduction in green house gas (GHG) emissions
- Improvement in energy efficiency and change in corporate portfolio
- Best-in-class ranking by Carbon Disclosure Leadership Index




## Customer Business Challenge

- New Climate Targets in the subgroups:
  - Bayer MaterialScience -25%
  - Bayer CropScience – 15%
  - Bayer HealthCare – 5%
- €1 billion program for climate-related research, development & projects

## Solution

- Uses the PI System as a new instrument to reduce $CO_2$ in production by monitoring and analyzing 100 production plants worldwide
- Company-wide $CO_2$ emission & energy efficiency check
- 85% of greenhouse gas emissions covered

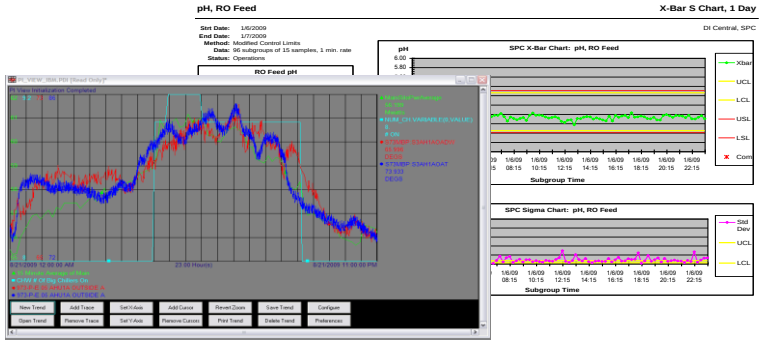
## Customer Results / Benefits

- The PI System enables Bayer to provide production units with detailed and real time information from utility provider
- Calculate KPIs: Costs, Energy Quality, Peak Consumption
- Support aggregated reports: month, site, organizational entity, & type of energy
- Employees use the PI System data to ultimately reduce GHG emissions to

# **IBM Burlington:** Sustainable Water Management

Advanced Industrial Water & Energy Management saves $10 M annually

Advanced Water Management Case Study:
IBM 200 mm Wafer Fabricator




**Jeff Chapman**
*Ultra Pure Water Engineer, Senior Technical Team Leader*
*Center of Excellence for Enterprise Operations*

## Customer Business Challenge

- Reduce water consumption (& associated need for energy, chemicals, maintenance and labor) to reduce operating cost & minimize environmental impact
- Leverage end-to-end data acquisition, storage and visualization techniques to monitor water usage & improve efficiency

## Solution

- Implemented data collection & storage infrastructure: sensors, IT network and servers
- Statistical process control techniques used to continually analyze vast amounts of operational data and present information in efficient, concise interface
- IBM's Green Sigma methodology – for reducing water & electrical power consumption & increase process efficiency

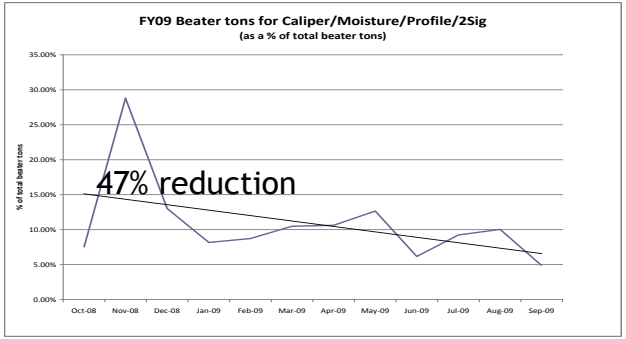
## Customer Results / Benefits

- IBM has achieved over $3.6M in annual savings, reduced water usage by 27% while increasing manufacturing capability over 30%

# **RockTenn:** Enhancing Six Sigma Projects

RockTenn is a leading manufacturer of paperboard, containerboard, and consumer and corrugated packaging. PI was used in their plants to enhance six sigma methodology and ideals. As a result, they experienced a 47% reduction in beater tons due to sheet variation and out of spec material. This went straight to the bottom line as a reduction in wasted energy, labor, and profit opportunity.

**Matt Corcoran**
*RockTenn*




## Customer Business Challenge

Business Case
- Customers requiring a more consistent product not just in spec

Shrinking Market
- Strategic positioning to be the prime supplier to the market

Healthy Customers
- A happy and healthy customer base is a prime ingredient for long term success

## Solution

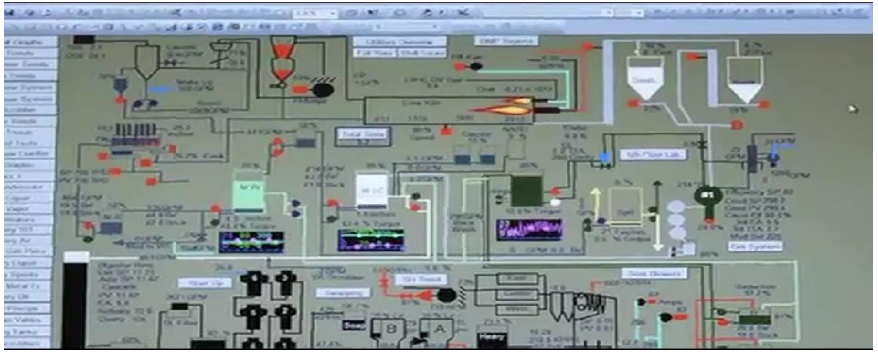
- Used PI for data collection from various data sources as well as archiving.
- Used PI DataLink for filtering data and exporting data to Minitab for analysis.
- Access to such data was nearly impossible before PI was installed.
- With fiber feed managed stock consistency variation decreased
- Run stock refiners in automatic rather than manual
- Utilize PI ProcessBook and PtAlerts to

## Customer Results / Benefits

- More consistent product for customers
- More consistent process for better production efficiency
- 21.2% over all improvement in caliper process capability
- 10.4% over all improvement in moisture process capability
- 47% reduction in beater tons due to sheet variation and out of spec material. This went straight to the bottom line as a reduction in wasted energy, labor, and

# **Sappi:** Sustainable Manufacturing delivers Brand Benefits

PULP & PAPER



"Because all of our operations have access to data from the PI System, they're able to make good decisions in real time and help drive waste out of the operations."

Laura M. Thompson, PhD, Director of Sustainable Development, Sappi Fine Paper North America

sappi

## Business Challenge

- Shareholders require continuous improvement to profit margins and increased return on capital assets.
- Complex assets make access to operational data difficult to obtain.
- Customers and regulators seek increased environmental monitoring and reporting

## Solution

- Data from the PI System enables real-time decision-making that reduces costs and environmental impacts.
- The PI System gathers real-time and historical data about all equipment.
- Data can be used not only in day-to-day operations, but also in sustainability reports.

## Results and Benefits

- Sappi now optimizes power that it buys from the grid, resulting in reduced costs and reduced emissions at its North American facilities.
- Sappi IT infrastructure consumes less energy than ever, while remaining online 99.9% of the time.
- Recognition as a sustainability leader has helped Sappi win new business

# **CFE:** Business Intelligence

CFE Comisión Federal de Electricidad

"We knew that OSIsoft and Microsoft could help us save money through superior BI. But we didn't appreciate the extent of the savings until we began to see what their solutions could do."

**Fernando Barradas**

*Director of Information Application, CFE*


## Customer Business Challenge

- Higher costs, difficult economy & the need to make decisions across mix of energy sourced
- Need to make optimal decisions on the mix of energy sources to make electricity at the lowest cost
- Need better communication & collaboration
- High IT costs for management of

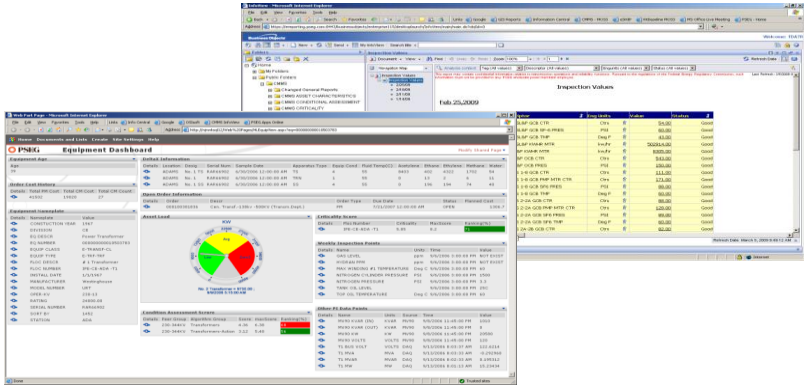
## Solution

- PI System for collection & storage of real-time data
- Microsoft Power Pivot tables, charts, slicers, data analysis
- Microsoft SharePoint & PI WebParts

## Customer Results / Benefits

- Improved decision making could save CFE US $4.7 million/year
- IT Staff can be redeployed to create self service applications
- Time savings, increased collaboration & business decisions in real-time

# **PSE&G:** Condition-based Maintenance




"We get a detailed breakdown on equipment costs and man/hours to service that gives us important business benefits. Without the use of the PI System, it would have taken us several months to gather and analyze the information."

**Angela Rothweiler**
*Principal Engineer*

## Customer Business Challenge

- Providing the highest reliability Power Distribution is requirement
- Minimize Maintenance Costs

## Solution

- Implemented automatic data collection and notifications to SAP PM
- Set up standard business rules for condition based maintenance using PI System Analytics
- Provided focused view into equipment

## Customer Results / Benefits

- Holds Reliability award for Mid Atlantic States for last 7 years
- Named most reliable Power Company in America
- Focused maintenance expenditures on needed targets

# **British Gas:** Advanced Metering Infrastructure (AMI)

"OSIsoft's MDUS is positioned to be a core technology for Smart Metering at British Gas, and we will be able to leverage the time-series data management infrastructure across other areas of the company. This makes it a strategic product for the company."

**Peter Allison**
*Director of Smart Metering*

## Customer Business Challenge

- Enable customers to cut down on energy use as well as reduce fuel bills and carbon emissions
- Meet government's target for smart metering 2020
- Provide the customer with accurate and automated billing

## Solution

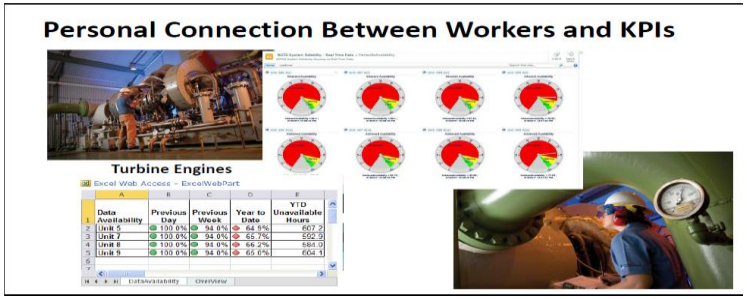
- Develop consortium of companies to provide the technology for the high-profile project
- OSIsoft MDUS for Advanced Metering
- SAP Utilities & AMI for billing
- SAP HANA

## Customer Results / Benefits

- Largest Smart Meter trial in the U.K.
- Planned rollout of 2 million smart meters by 2012

# **NiSource:** Gas Transmission and Storage

“At the core data must be transformed into knowledge and connected to tangible actions for risk mitigation.”




**John Cox,**
*Team Leader*
*Optimization and Gas Quality*

## Customer Business Challenge

- Largest Pipeline east of the Mississippi
- Industry Drivers – aging equipment, new share production for gas on east coast, need for people in the field to be informed
- Need for defect elimination & reliability growth

## Solution

- PI System with PI WebParts, PI Manual Logger, PI Notifications, PI DataLink Server, PI ACE
- Sigmafine
- SharePoint

## Customer Results / Benefits

- Target is to exceed customer requirements
- Assessment strategy for ranking project impact on safety, regulatory issues, integrity
- On-line condition monitoring for strategic compression stations
- Front line workers connected to

# Saudi Aramco:
# Performance Monitoring

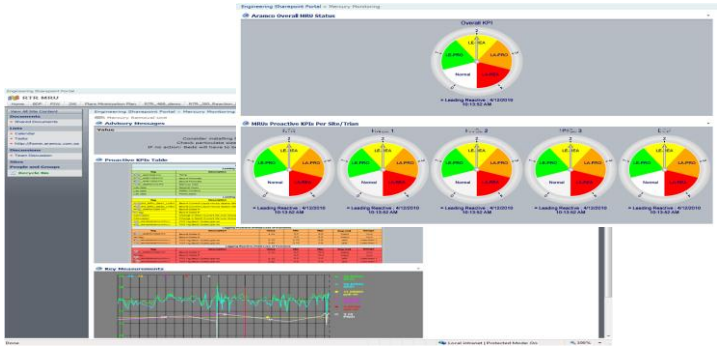
OIL & GAS

ارامكو السعودية
Saudi Aramco

**Proactive Performance monitoring with Dashboards**

Saudi Aramco needed a proactive solution to monitor and improve performance. After implementing PI WebParts, the impact on performance improvement meant multiple millions of dollars in additional revenue.

**Rayan Hafiz**
*Saudi Arabian Oil Company*
*OSIsoft UC 2010*



## Customer Business Challenge

- The process is not fully monitored
- Final products selling prices are highly sensitive to mercury levels in the process and need to be better monitored
- Needed a proactive solution to monitor and improve performance

## Solution

- Implemented PI WebParts as a way to see into the process from anywhere
- Built dashboards and KPI screens to fully monitor the process
- Built a predictive model to prevent problems in the process

## Customer Results / Benefits

- Complete monitoring & management with proactive tools
- Solutions template could be used for other functionalities/applications
- The integration/utilization of OSIsoft tools removed layers of complication
- Impact on performance improvement means multiple millions of dollars in additional revenue

# **SunPower:** Solar Monitoring and Operation

SUNPOWER

"OSIsoft's PI System is a proven, robust, scalable architecture with event detection and notifications that allowed us to meet our business objectives."

**Steve Hanawalt**
*Vice President O&M*
*SunPower*


## Customer Business Challenge

- To compete, need to effectively manage and optimize the large labor/ many generators cost structure

## Solution

- Implemented PI system to provide critical secure data for high speed Data Collection
- Solar Alarm System
- Engineering tool for diagnostics
- SharePoint Portal with PI WebParts

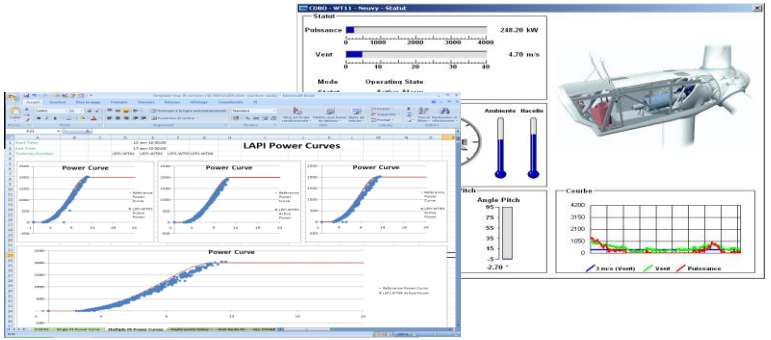
## Customer Results / Benefits

- Customer visibility via web portal
- 24/7 monitoring
- Able to compete by minimizing labor for asset-monitoring while managing performance of many generators

# **EDF Énergies Nouvelles:** Solar and Wind Farm Operation

"The PI System has allowed us to remotely support and monitor Solar and Wind Assets providing better asset utilization and cost reductions."

**Louis Blais**
*EDF Énergies Nouvelles*




## Customer Business Challenge

- Allow a uniform and consistent supervision system
- Allow feedback on performance problems with better data for investigation with visibility to management
- Provide services that allow the owner to increase revenues on wind & solar assets

## Solution

- Implemented PI system to provide critical secure data for high speed Data Collection
- Developed standardized architectures based on type of site for easy roll-out
- PI Notifications for power alerts
- Developed Reports and graphics

## Customer Results / Benefits

- 24/7 monitoring system
- Asset bill generation
- Condition based monitoring of assets resulting in reduced downtime
- Remote detection of hardware failures in solar panels

# The PI System for UC San Diego's 42 MW Campus Microgrid

- With a **daily population of over 45,000,** UC San Diego is the size and complexity of a small city
- As a **research** and **medical** institution, the energy density is twice that of commercial buildings
- **11 million sq. ft.** of buildings
- **Self-generate 80%** of annual demand
  - 30 MW natural gas cogen plant
  - 2.8 MW of fuel cells contracted
  - 1.2 MW of solar PV installed, additional 2 MW planned

# **eBay:** Data Centers

eBay uses Skanska's "Green Plant" Technology:
OSIsoft's PI System + Controls + Calculus + Experience = Breakthrough Efficiency

*"The foundation of our revenue is our data centers…"*

**Dean Nelson**

***eBay Director, Global DC Strategy***

## Customer Business Challenge

- Facilities & IT not managed as a system
- No real-time data for decision-making
- No enterprise-wide interface to share data/information
- Inability to benchmark performance

## Solution

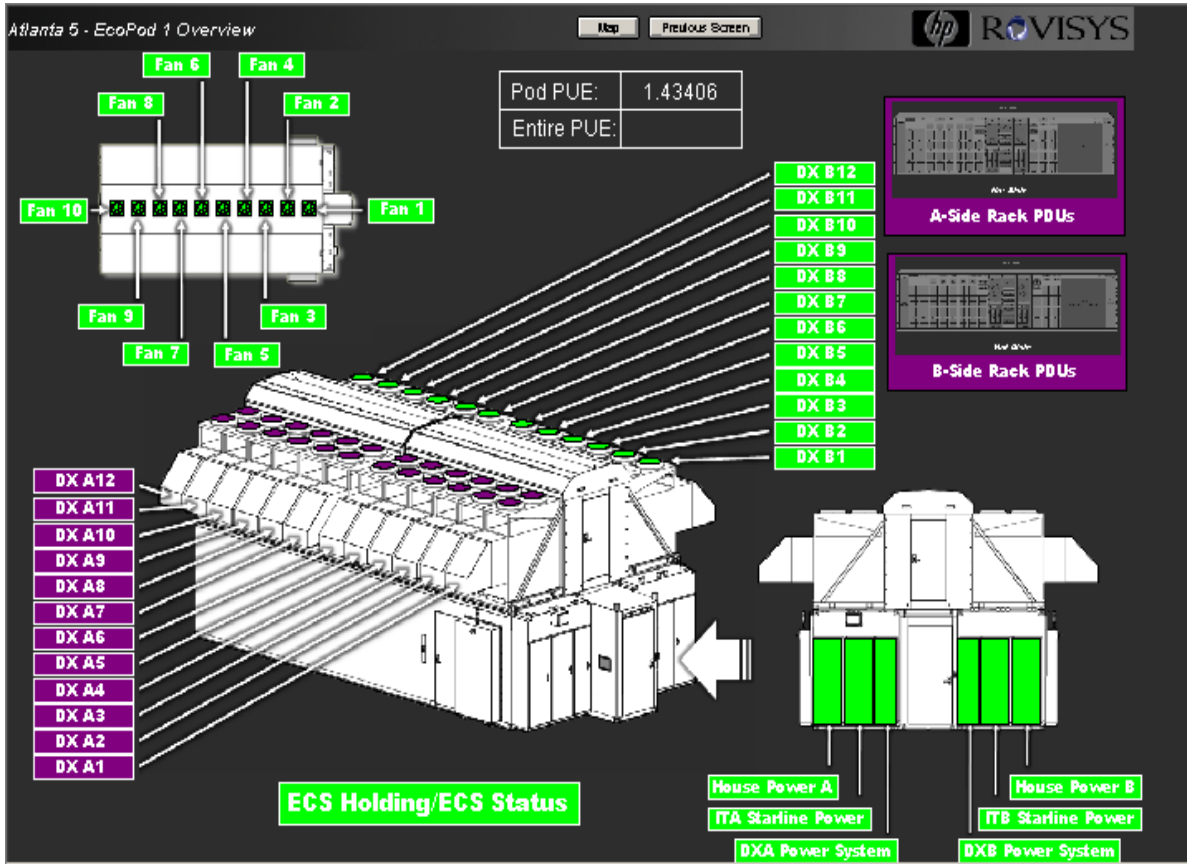
- PI system used to monitor 110,000 points
- PI System allows skilled engineers to manage facilities remotely
- Real-time visibility into PUE, IT load, total power
- Implement condition-based

## Customer Results / Benefits

- A Holistic system is created to create a dynamic, living building that can be managed more cost-effectively

# Monitoring HPs EcoPOD

- Monitoring Elements
  - Power
  - Cooling
  - Control & Safety System
- Leveraged OSIsoft Components
  - ACE
    - Status Roll up Calculation
  - AF
    - Elements/Tags
    - Dynamic alarm limits/thresholds




# Thank you



777 Davis St.

San Leandro, CA 94577