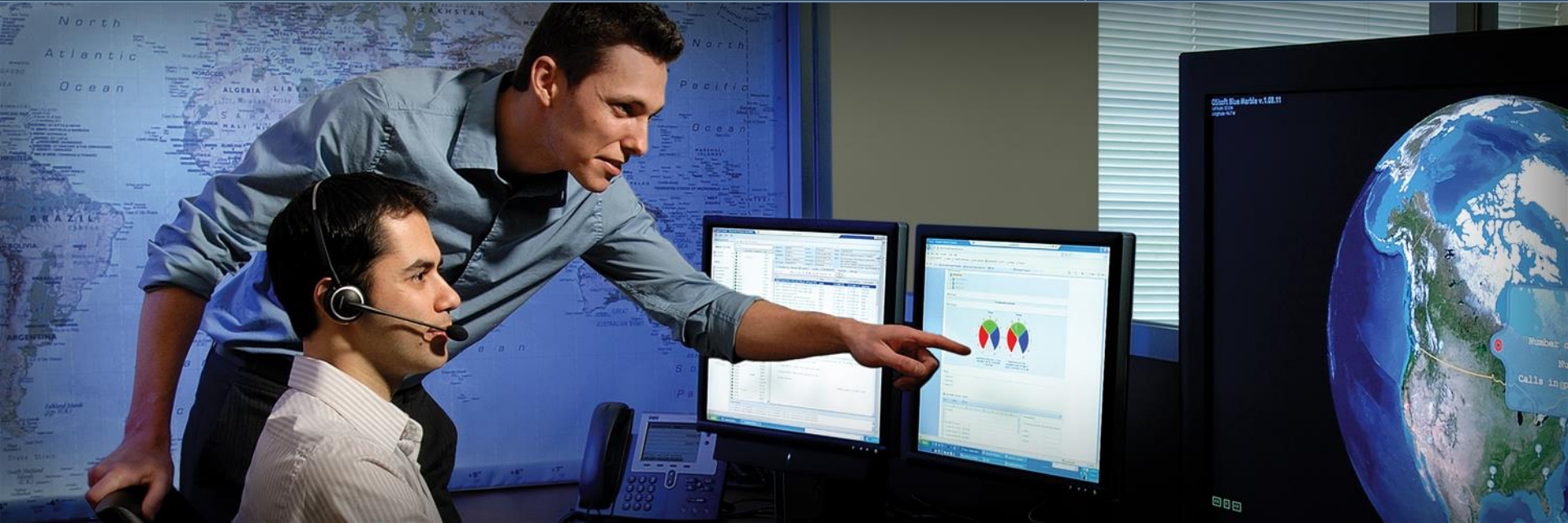




Regional Seminar Series Orlando



Critical Facilities Update

Robert Wheatley, OSIsoft
Alexis Stobbe, OSIsoft

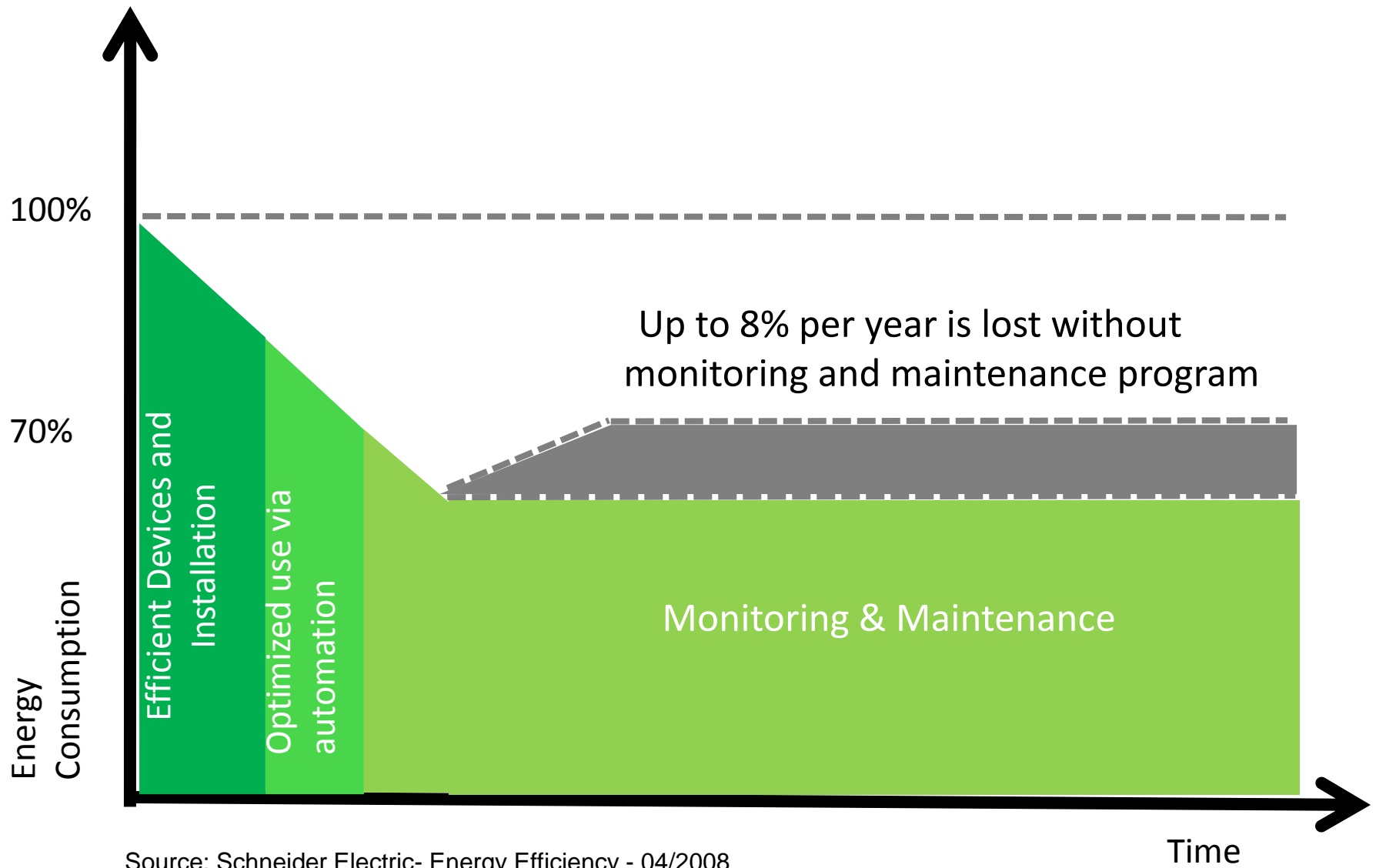
November 4, 2009

Empowering Business in Real Time.

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- Maintaining Availability Still the Top Priority
- Reducing Operational Costs
- Improving Energy Efficiency
- Potential Government Regulations

Why PI FOR Energy Management



Source: Schneider Electric- Energy Efficiency - 04/2008

Lines of Business/ Operations

IT Infrastructure

Data Center Infrastructure

Facility Infrastructure

Did you know PI
can be applied to
these
infrastructure's
for great value

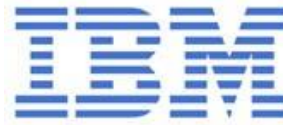
- OPC, RDBMS
- Modbus, Perfmon
- SNMP, Windows Event Log, Ping
- SNMP Traps, TCP Response, Syslog
- IP Flow (NetFlow)
- IPMI (in development)
- BACnet

- BACnet stands for building automation and control network
- BACnet provides a common protocol to interface with building automation and control systems. Typical building devices that can provide data are HVAC, lighting, and fire/safety systems
- BACnet is supported by many leading building control systems vendors:
 - Automated Logic Corporation
 - Johnson Controls Incorporated
 - Siemens Building Technologies
 - Tridium

- The BACnet protocol defines a number of services that are used to communicate between building devices
- The PI BACnet interface supports **BACnet/IP** over Ethernet
- The interface supports a BACnet Query Tool
 - Allows “Who-Is” query which returns a list of any listening BACnet devices
 - The returned list can be used to directly configure PI tags

Example Customers

Facility Customers



Data Center Customers



BUSINESS SITUATION

Campus purchasing over \$30M in utilities. Decision making is based on dated information that's hard to access.

SOLUTION

PI System with interfaces to plant control system and meters, building submeters, and building automation systems.

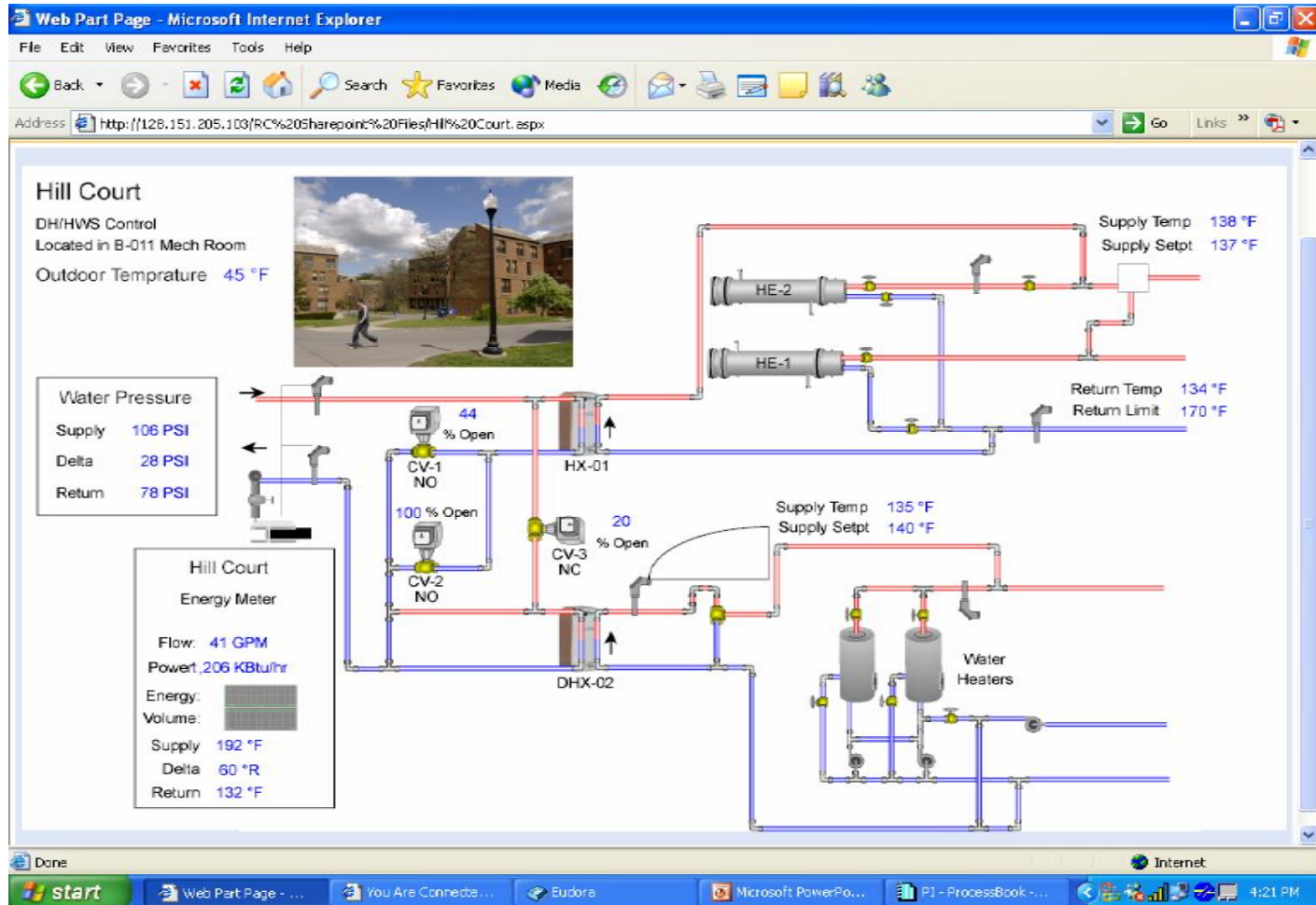
Measurements include hot water meters, electric meters including substations, assorted gas and oil meters, chilled water meters, and steam meters.

BENEFITS

Faster Decision Making – Data that took a month to access now available in real time. Information manually distributed to 80 cost centers now available electronically

Continuous Process Improvement – Facilities and financial analysts collaborating to make profitable decisions

Reduced Costs – Manual data management automated. Invaluable in commissioning 120 new heat exchangers



BUSINESS SITUATION

Executive management set a vision for creating a world class computational resource for the research staff

SOLUTION

PI System with IT Monitor interfaces (PI PerfMon, PI Ping, PI TCPResponse, PI SNMP, etc.)

BENEFITS

Faster Processing – Real time dashboard now available to research staff to optimize job scheduling

Continuous Process Improvement – Historical information available to drive future improvements

Reduced Costs – A 16% reduction in data center energy costs while maintaining a high service level



BUSINESS SITUATION

Kodak Park needed to find a way to get real-time data on the web in a way that was consistent with its corporate information requirements.

SOLUTION

PI System with interfaces to control systems (Westinghouse WDPF and Ovation, Emerson Provox and DeltaV) and building automation systems, ProcessBook/DataLink, and BusinessPackage iViews.

Measurements include 600 electric distribution meters and 600 additional distribution meters for steam, chilled water, brine, compressed air, process water, nitrogen, natural gas, etc.

BENEFITS

Significant ROI – Millions of dollars in savings . Improved demand side management and optimization of generation assets.

Continuous Process Improvement – Identified opportunities in manufacturing to implement an energy conservation mode between product runs

KODAK Workforce Portal

Welcome JAMES BREEZE

Welcome myHR KP Energy

Utilities Home | Utilities Generation | **Building Usage** | Ad-Hoc Trend

Detailed Navigation

- ▼ KPE
 - ▶ B6
 - ▶ B9
 - ▶ B10&36
 - ▶ B29
 - ▶ B38
 - ▶ B42
 - ▶ B52
 - ▼ B59
 - **B59 Utility Usage Overview**
 - B59 Electric
 - B59 Chilled Water
 - B59 9 Degree Brine
 - B59 LP Steam
 - ▶ B65
 - ▶ B69
 - ▶ B81
 - ▶ B81S
 - ▶ B82
 - ▶ B83
 - ▶ KPWX
 - ▶ KPM
 - ▶ KPS

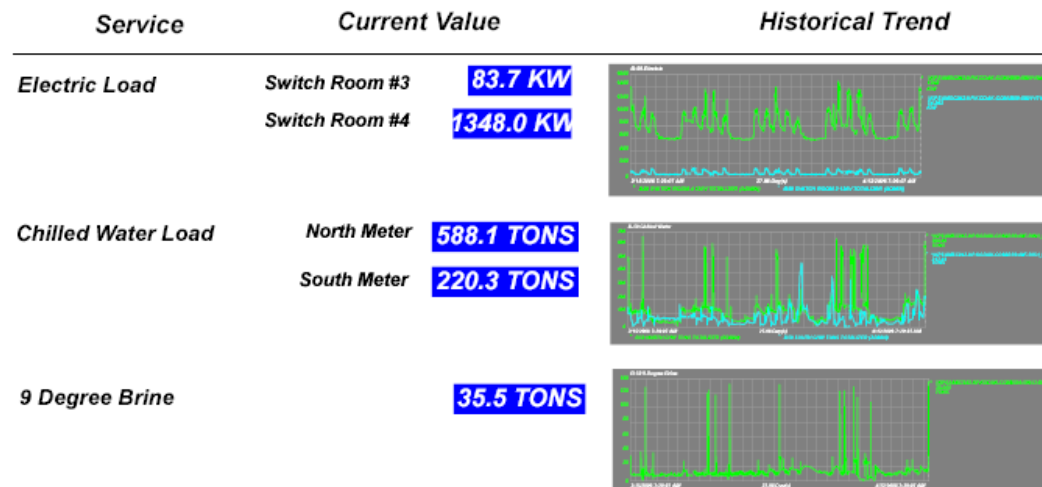
Start Time: *-4w

End Time: *

Apply



B-59 Utility Usage



- Active member of Green Grid
- Sponsoring Data Center Operations research at Georgia Tech
- Active Industry Group Member
 - Datacenter Dynamics
 - Uptime Green Symposium
 - Regional participation in Association For Computer Operations Management (AFCOM) chapters
- Chill OFF II - Data Center Pulse

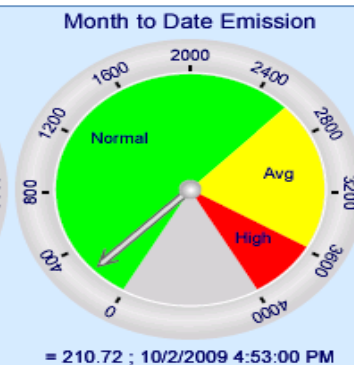
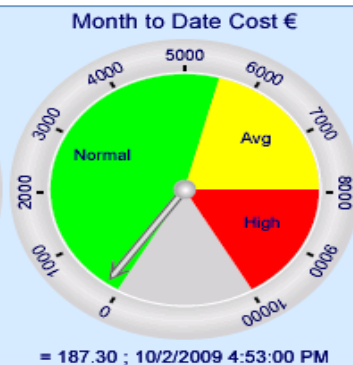
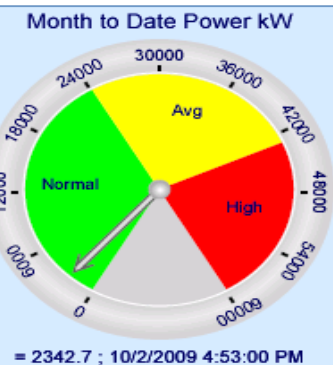
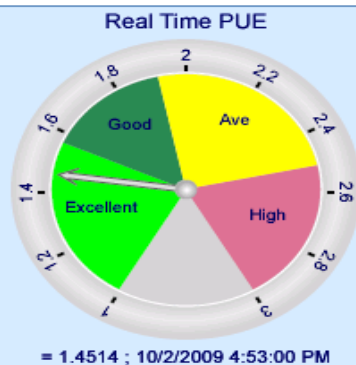
- First step is understanding and benchmarking your operations
- PI has capabilities to help you in the areas of Critical Facilities and IT
- We would be happy to talk with you further and understand your situation to see how PI could create value
- Stay up to date by visiting our Critical Facilities and IT industry page

“We are using the **OSIsoft PI System to monitor all the critical points within our data centers**, and in turn are laying the foundation for a **high-availability, global Live infrastructure**,”

“**The return on investment is tremendous.** We are enabling innovation through increased collaboration, social networking and commerce—leading to breakthroughs in software plus services. We are setting industry standards **with increased utilization of facility resources, real time business continuity, and green computing technologies.** As we continue to expand our Live services, the combination of **OSIsoft and Microsoft technologies** are bringing new levels of performance and reliability to our world-class data centers.”

EMEA

EMEA KPI's

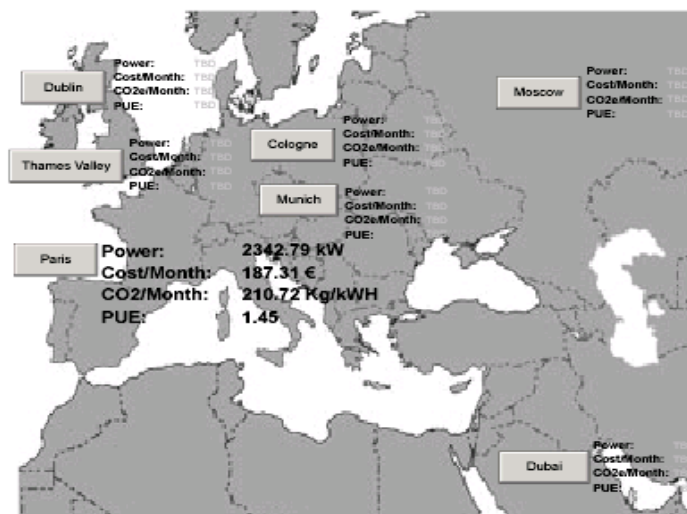


Navigation

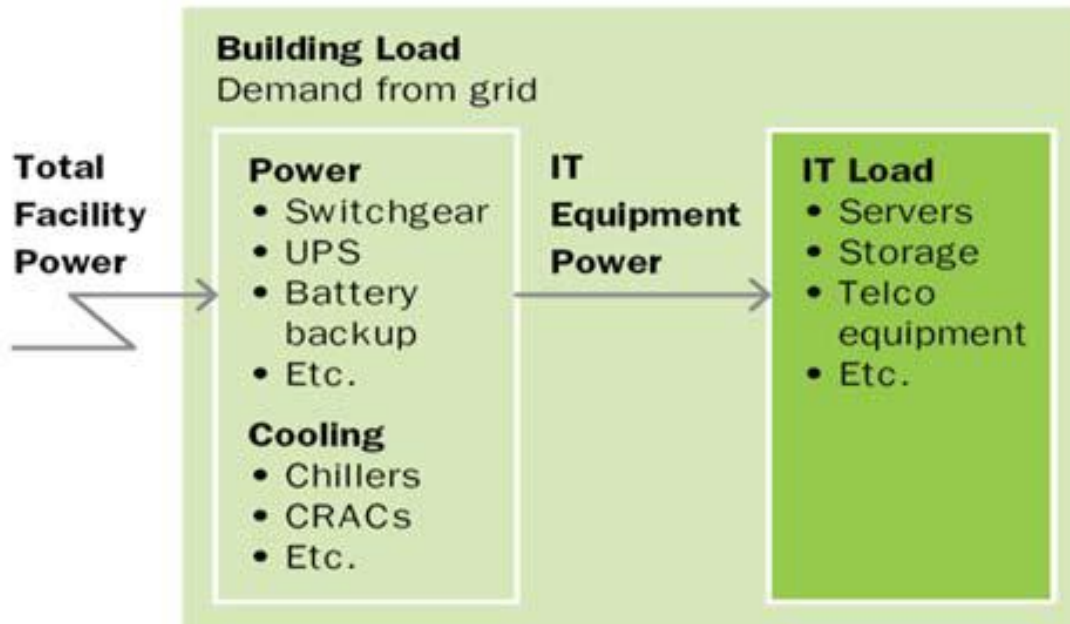
- EMEA
 - Cologne
 - Dubai
 - Dublin
 - Munich
 - Paris
 - APC Products
 - Environment
 - InRow Coolers
 - Racks
 - Architecture
 - Networks
 - SANs
 - Servers
 - Collectors
 - PI Servers
 - Storage
 - HP Storage
 - Thames Valley

EMEA MTC's

Microsoft Technology Centers — EMEA



PUE: Power Usage Effectiveness
DCE: Data Center Efficiency

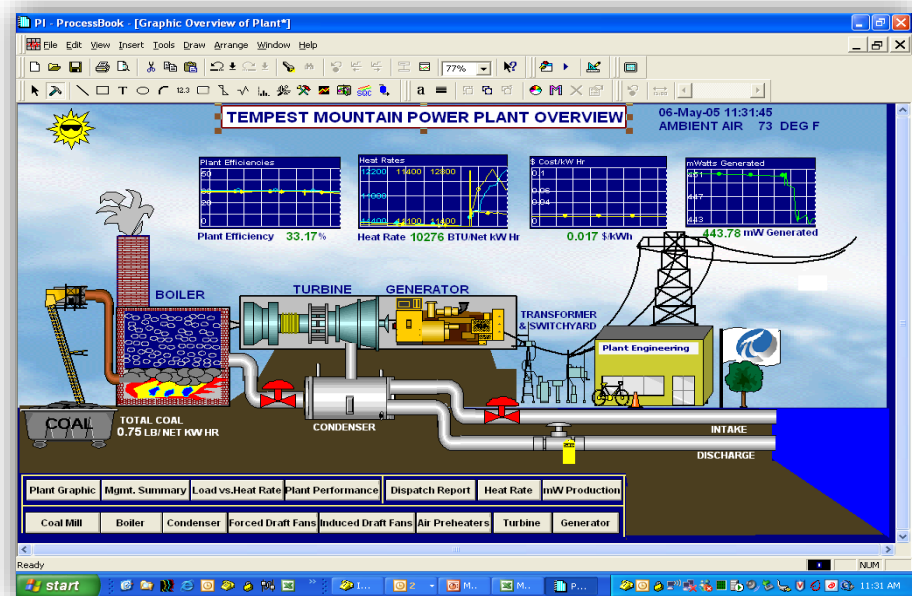
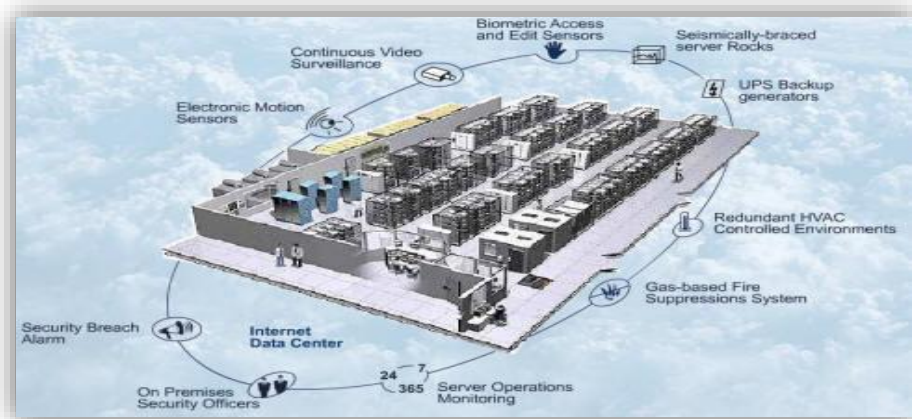


$$\text{PUE} = \frac{\text{Total Facility Power}}{\text{IT Equipment Power}}$$

$$\text{DCE} = \frac{1}{\text{PUE}} = \frac{\text{IT Equipment Power}}{\text{Total Facility Power}} \quad \leftarrow \text{(Multiply both terms by 100\%)}$$

Data Centers - The “Plant for IT”

- Requires “holistic” monitoring for continuous improvement
- Efficient energy consumption with most profitable outcome
- Identify the bottlenecks
- Treat all individual systems as ONE
- Mechanical, Power, IT and Security as a complete system



Not Just Servers



UPS



Switch Gear



Chillers



Cooling Towers



Air Conditioners



Pumps



Generators



PDU's



Batteries



Lighting



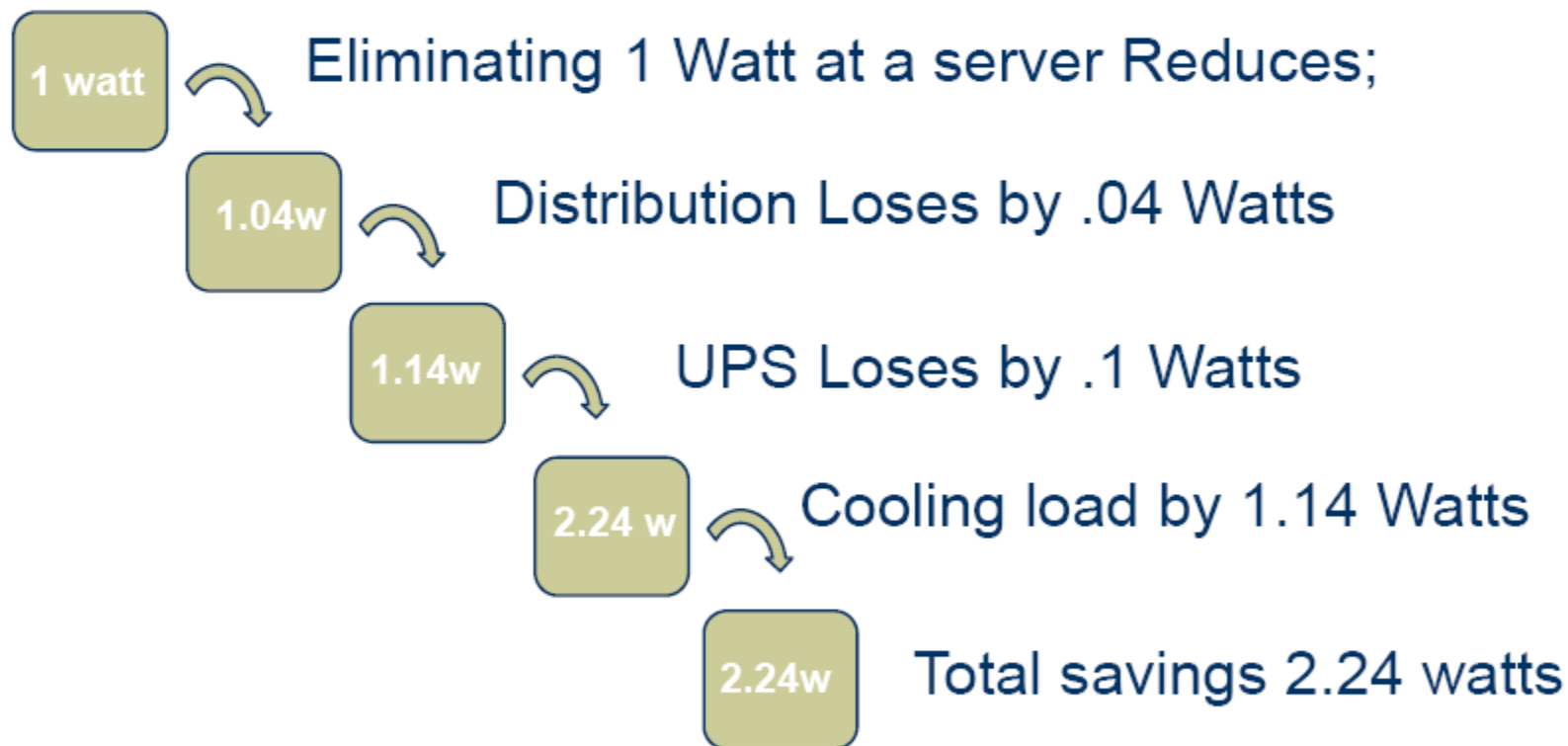
Servers



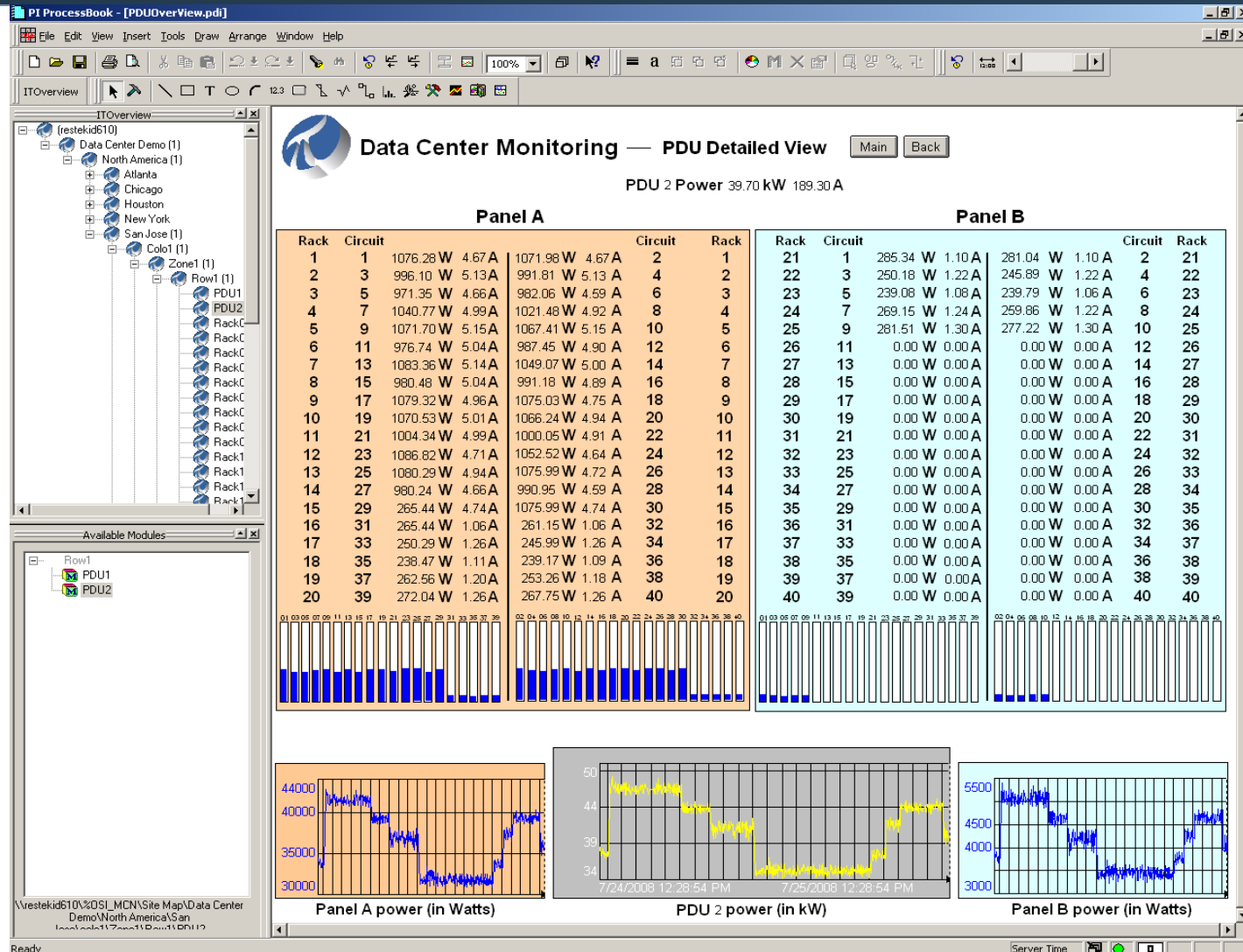
Storage



Reducing Demand First



ProcessBook – PDU Detail



ProcessBook – UPS Detail



APC UPS: Symmetra Bldg1

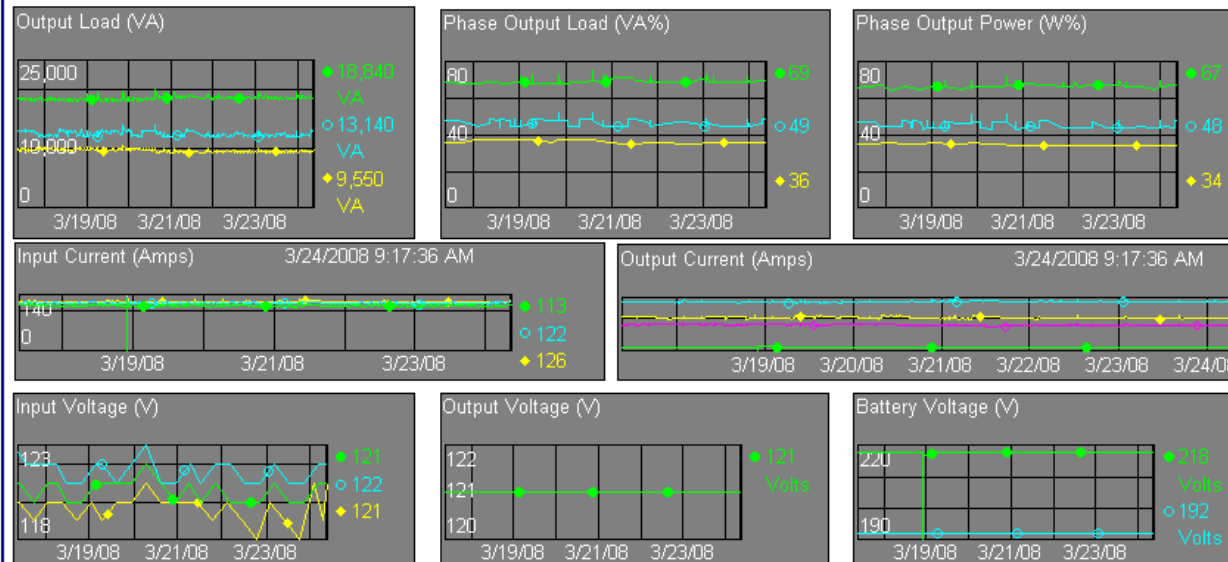
Main Back



APC UPS

Model: Symmetra 80K	Phase 1 Output Load%: 69	Basic Battery Status: Normal
Basic Output Status: online	Phase 2 Output Load%: 49	Battery Run Time Remaining: Over Range
Reason for Last Transfer to UPS:	Phase 3 Output Load%: 36	Battery Replace Indicator: noBatteryNeedsReplacing
selfTest	Output Current: 12 Amps	Battery Last Replace Date: 05/11/07
Total Output Load %: 70	Output Voltage: 121 Volts	Battery Voltage: 218 Volts
SwitchGearStatus: OK	Output Frequency: 60 Hz	Battery Temperature: 31 F

Trends



Switchgear Status

SwitchGear Input Switch Status: **closed** SwitchGear Output Switch Status: **closed** SwitchGearBypassSwitchStatus: **opened**

Battery Status

Number of Battery Packs: **32**



Legend

- Not Configured
- Unknown
- Not Installed
- OK
- Failed
- High Temperature
- Replace Immediately
- Low Capacity

Microsoft Excel - IBM_Rpt_Chilled Water_Ver2007-10-14.xls

File Edit View Insert Format Tools Data Window PI Help PI-SMT WebEx

Type a question for help

A2 Chilled Water Report

Chilled Water Report

Version : 10/14/2007

Start time: 5/1/2007 (yyyy-mm-dd)

End time: 6/1/2007 Non inclusive.

Supply flows

Flow meters	M1	M2/MDC		TOTAL
Average	1,021	2,600	gpm(us)	2,226 tonnes
Maximum	7,996	5,080	gpm(us)	6,164 tonnes
Minimum	456	1,396	gpm(us)	279 tonnes

note: calculated based on tic

Chiller operation

Chillers	#800	#802	#803	#804	#805	#806	#807	#808	#809	TOTAL
Run time	304.3	52.0	348.7	169.1	698.2		0.8	32.8	32.2	1,638.1 hours

Cooling demand/production

Production	201,044	2,904	119,285	53,996	595,195		0	1,575	1,480	975,480 tonnes
Average demand	661	56	342	319	852		0	48	46	2,128 tonnes
Maximum	2,000	1,000	1,000	1,000	1,200		0	1,150	1,150	4,631 tonnes
Minimum	0	0	0	0	0		0	0	0	0 tonnes

Electrical consumption

	323,076	27,444	184,665	138,941	426,268		423,963,2547	4,240		1,105,058 kWh
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note: calculated based on i

Make up water

										218.9 gallons
--	--	--	--	--	--	--	--	--	--	---------------

Cooling tower operation

Cooling towers	#340	#350	#360	#370	#380	#390	#400	TOTAL
Temps de marche								
Pumps	191.5	104.7	63.9	0.0	19.1	139.7	701.7	1,220 hours
Fan - Low speed	524.6	437.0	397.1	0.0	0.0	64.7	678.3	2,102 hours

Instructions Rapport Tag_PI Config_Tag_PI ALL_Tag_Metasyss Original_REFROID-TOURS Original_DATA Question

DataLink Reporting



Cornell University

Time: *-48h



- Monitor server temperatures
- IPMI data via XML interface
- Native IPMI interface coming soon

- Leverage PI for your IT / Facilities environment
- Baseline today
- Understand your infrastructure and power usage
- Make improvements and gain efficiencies
- **Apply the PI System (infrastructure) you use to run your business...**

**...to the infrastructure your business
relies on to run.**



Thank you

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777 Davis St., Suite 250 San Leandro, CA 94577