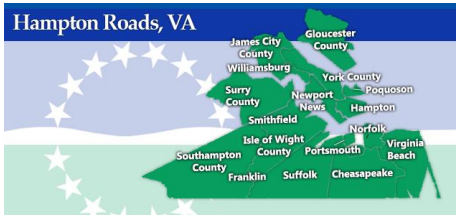


Making Data Actionable

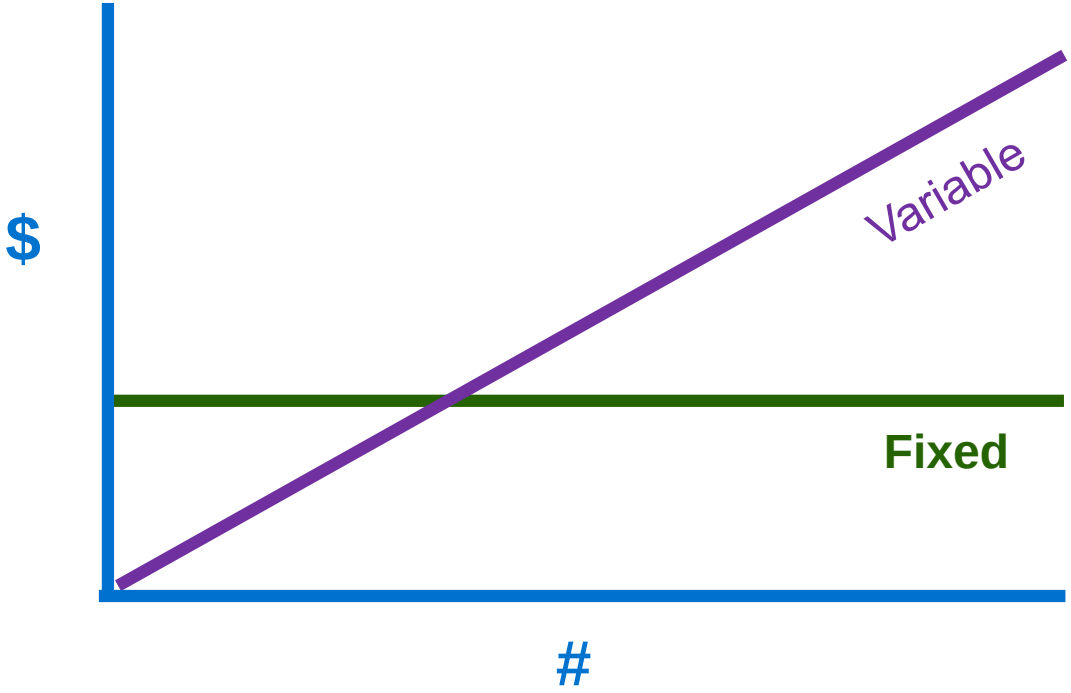
Success Stories

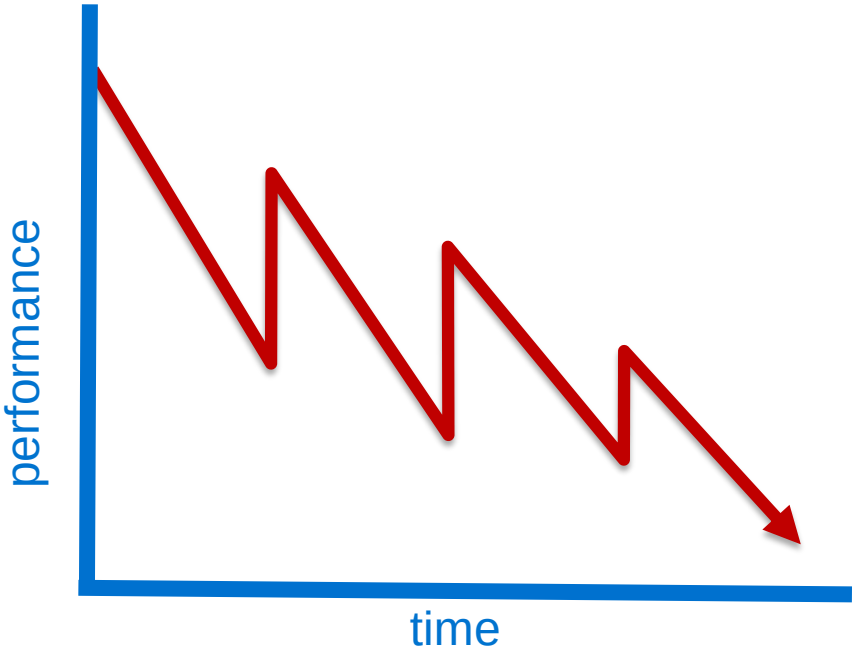
David Doll
Industry Principal, Critical Facilities

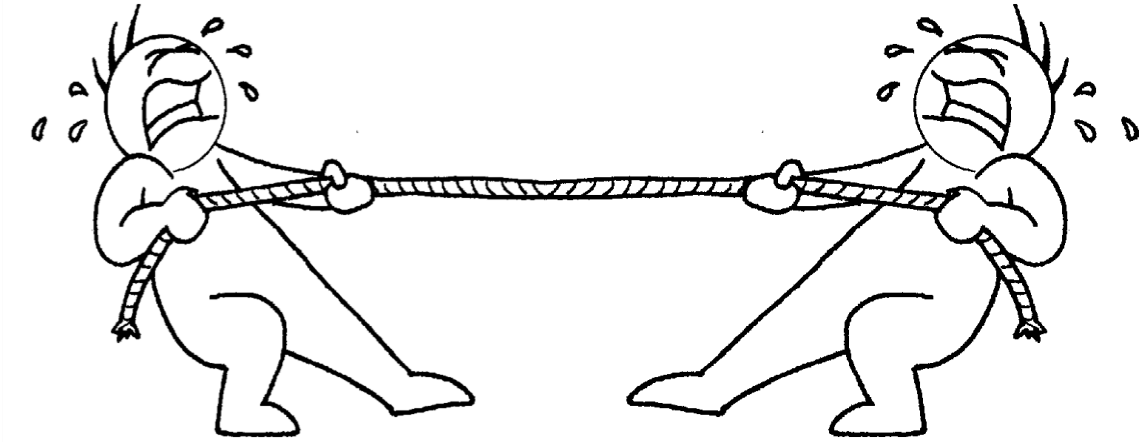
18 FEB 2016

OSIsoft.

Are you treating energy like a fixed cost or a variable cost?



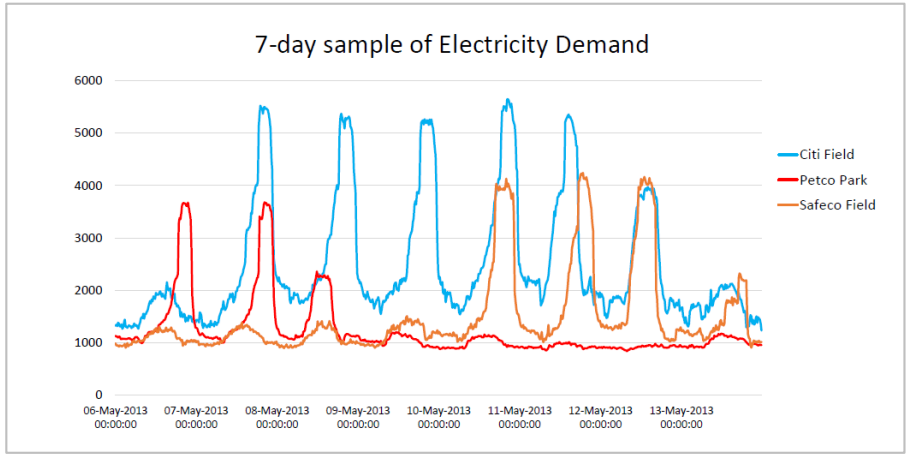


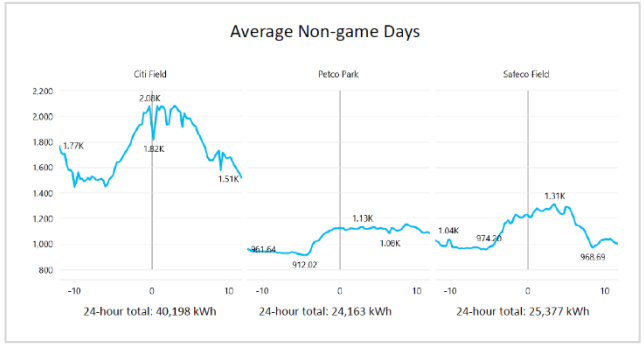


Efficiency Consumption

Story Time

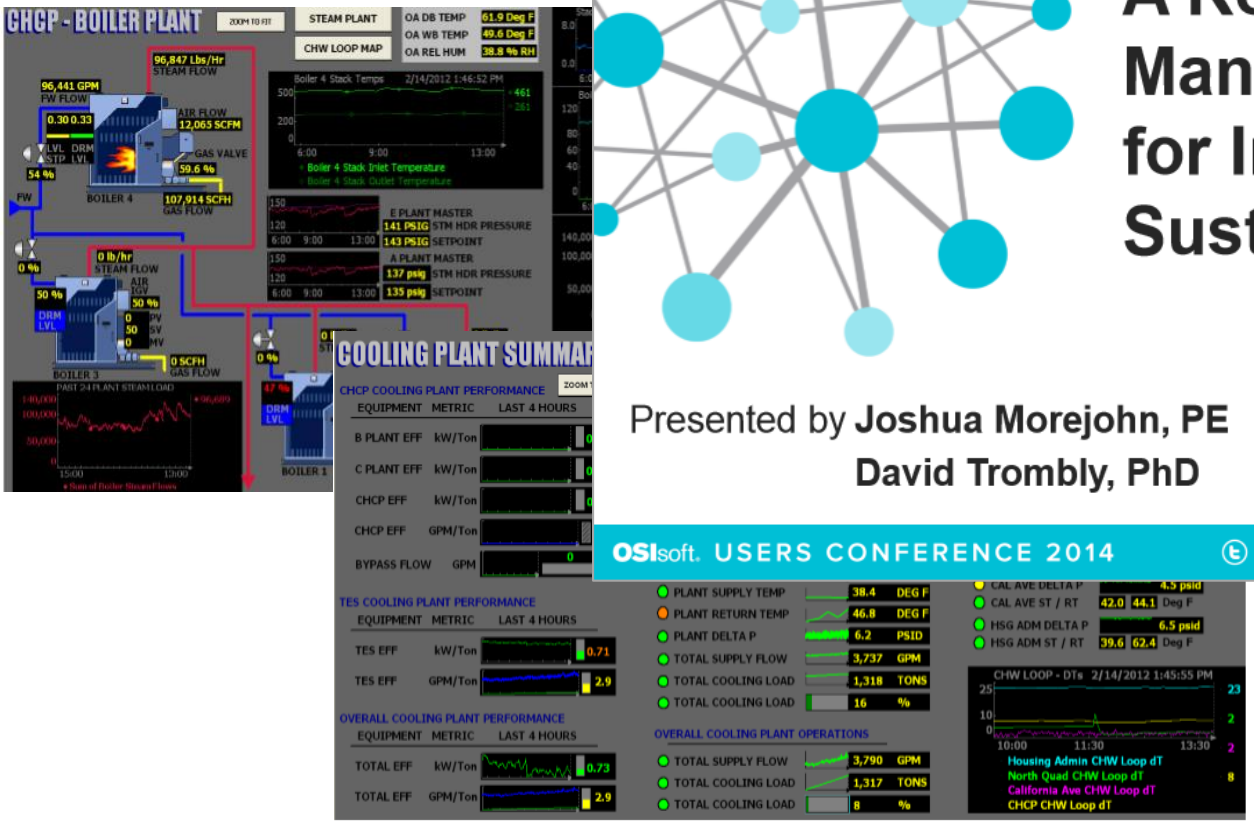
MLB: Self Service Intelligence





That's going to enable 29 other teams to adopt the kind of behavior that's helped us return more than $1.5 million to our bottom line in just 4 years."

- Scott Jenkins, VP Operations
Seattle Mariners



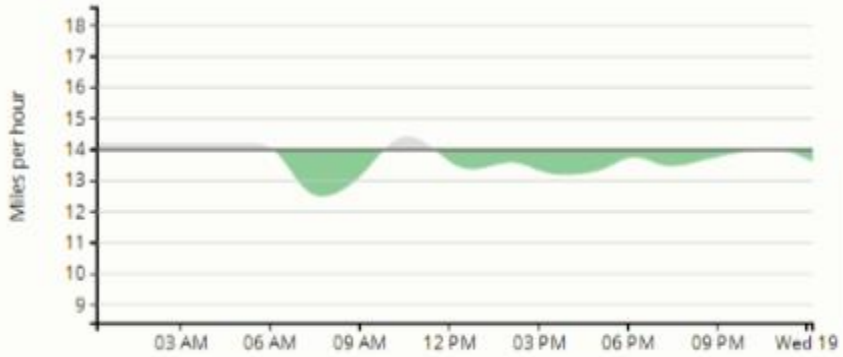
A Robust Data Management System for Integrating Campus Sustainability Goals

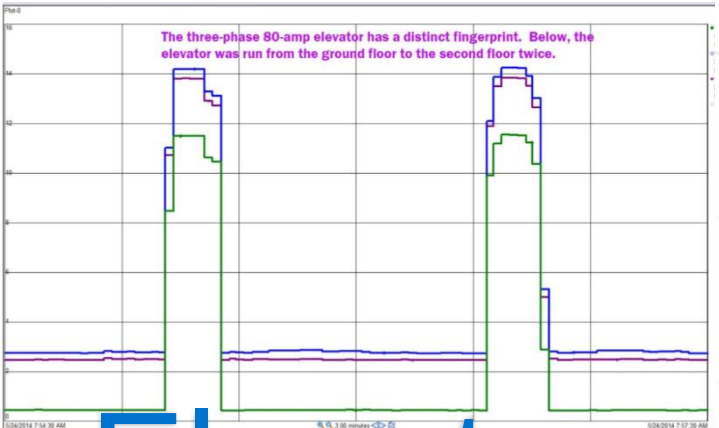
Presented by **Joshua Morejohn, PE**
David Trombly, PhD

UCDAVIS

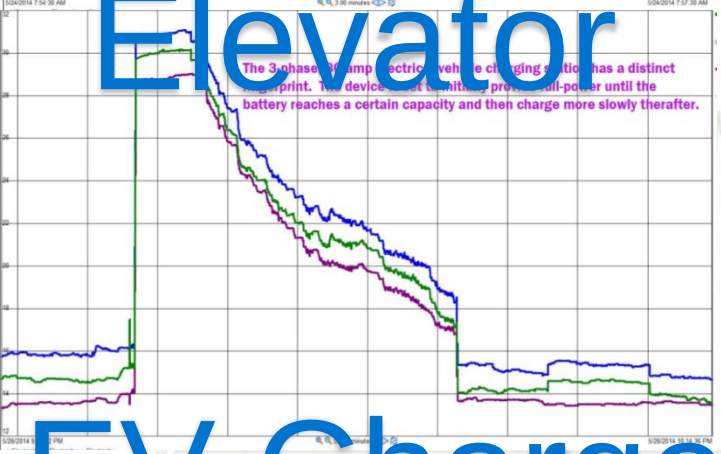
OSIsoft. USERS CONFERENCE 2014 @OSIsoftUC | #UC2014

This graph is a comparison of your current energy demand and your daily goal. If your energy demand is below your goal and the area on the graph is green, you're doing great!



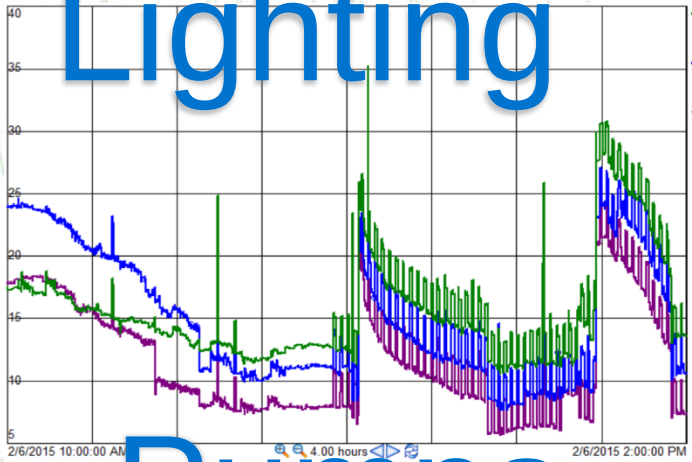


Elevator

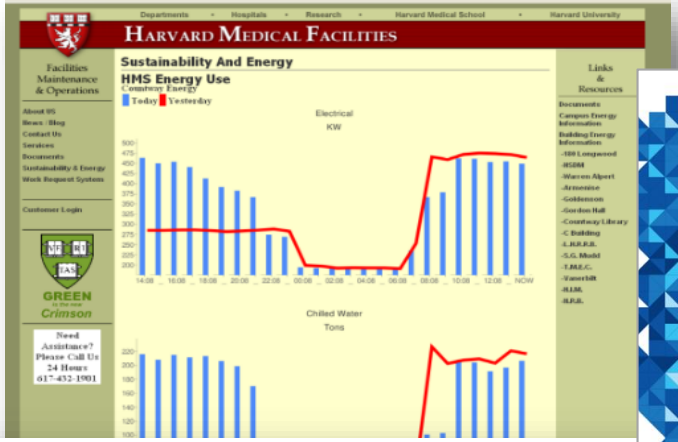


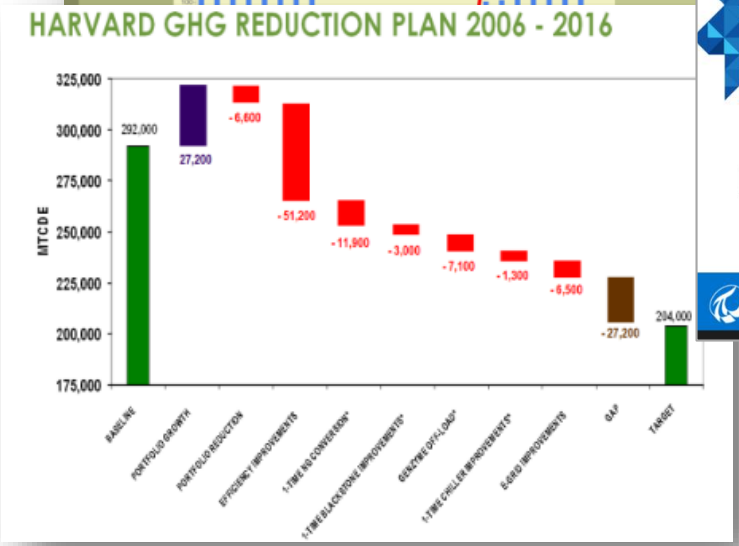
EV Chargers

Lighting



Pumps





Automated Meter Reading and Data Acquisition using the OSIsoft PI System

Presented by **Craig Bradford, PE, Engineering & Utilities**
craig_bradford@harvard.edu

HARVARD Campus Services

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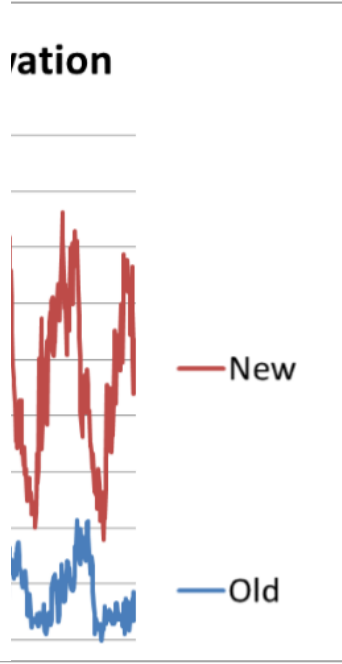
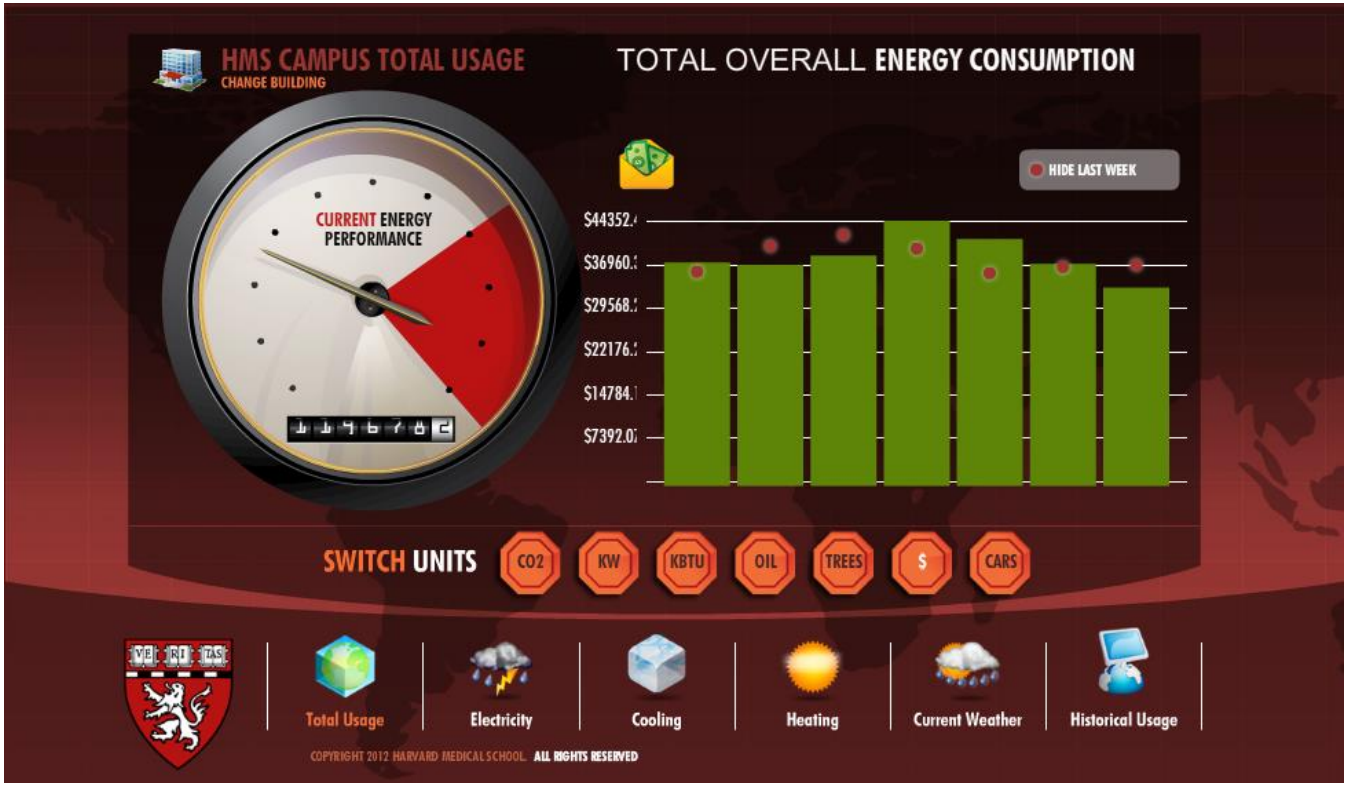
Dunster House Renovation



Show energy, heating, cooling

By building, day, week, month

Units in kW, kBTU, $$, or green equivalents

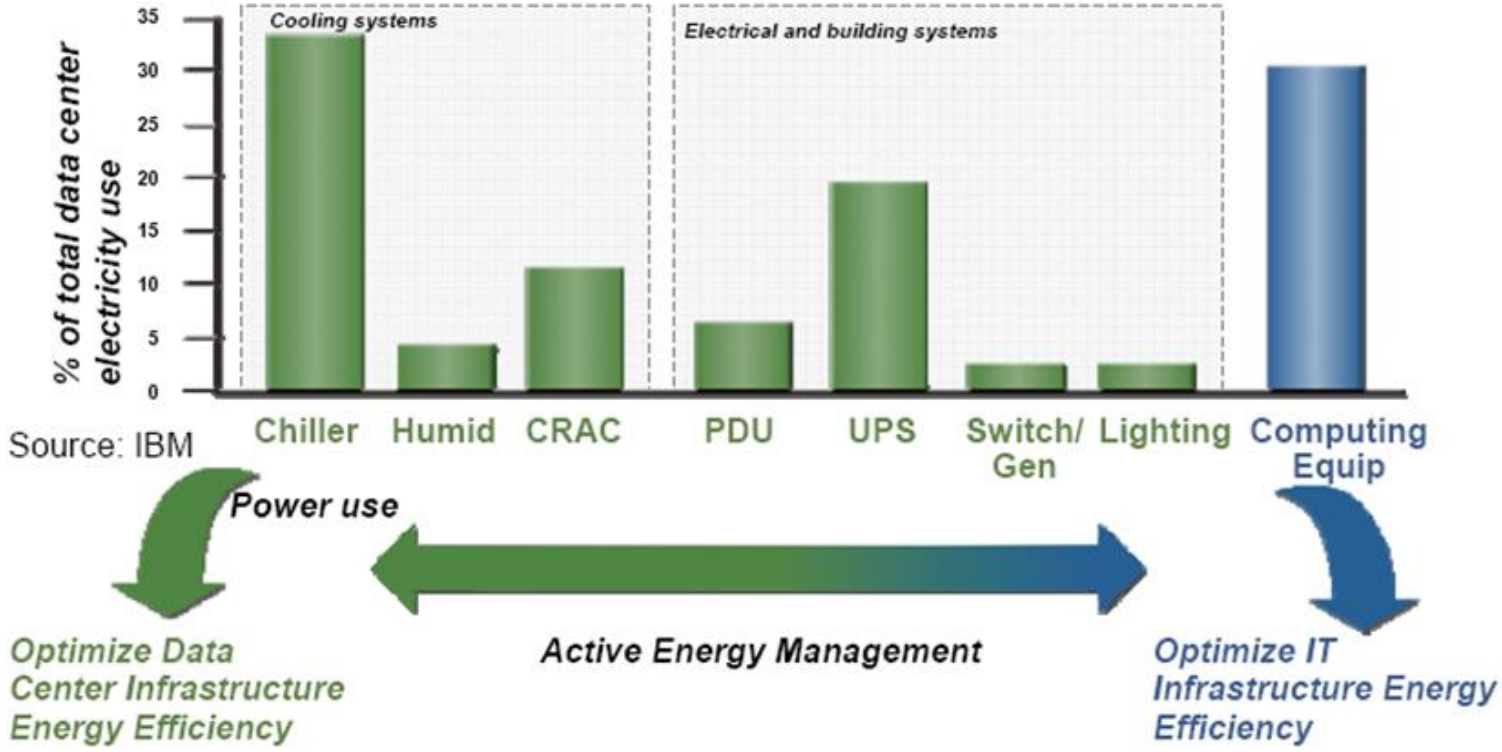


Driving Business Value through Enterprise Agreements and Partnering

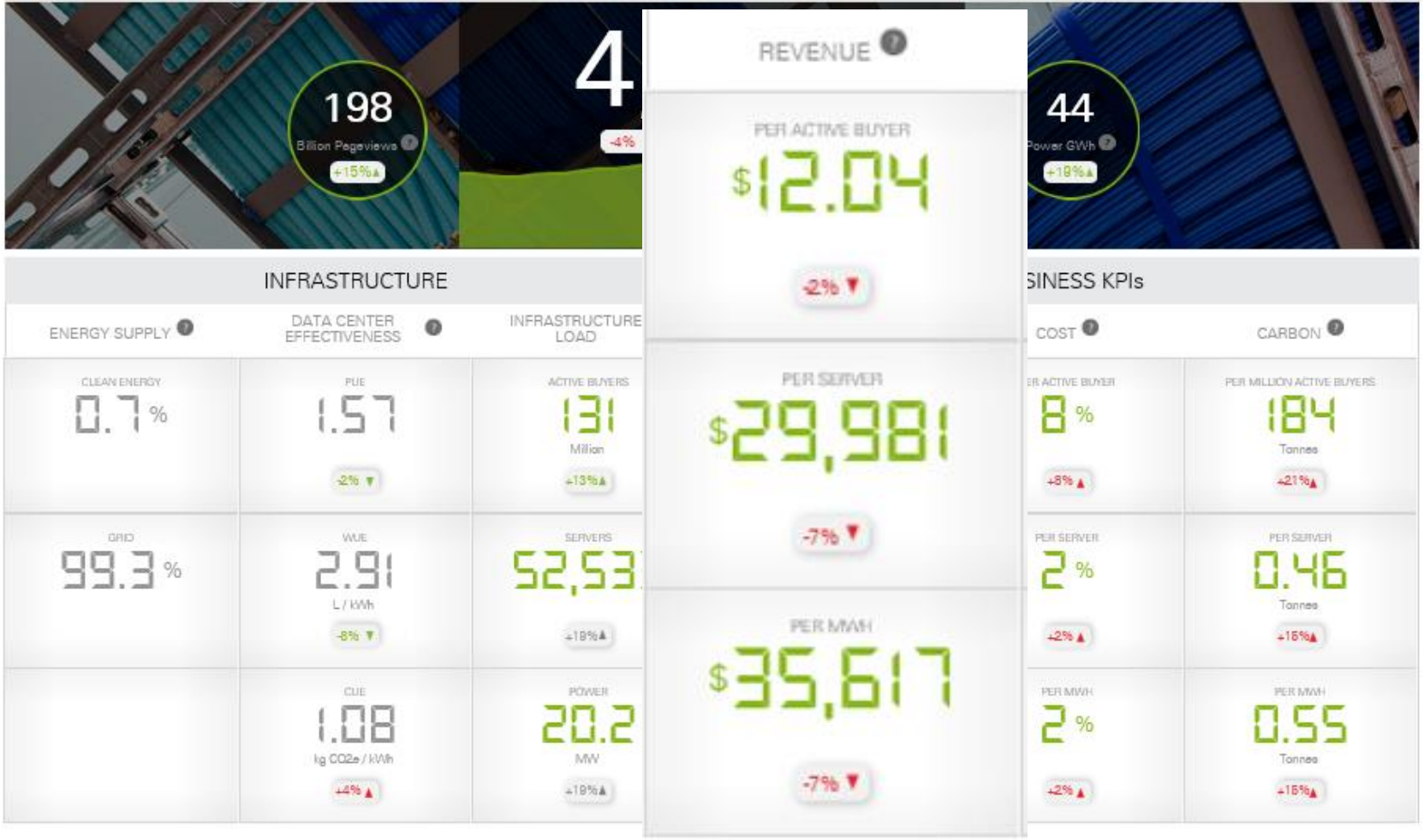
Presented by Dwayne Kalma and Tyler Duncan

ebay inc DELL

OSIsoft. USERS CONFERENCE 2015



CRAC = computer room air conditioning; PDU = power distribution unit; UPS = uninterruptible power supply



MDC (Modular Data Center) Major Elements

100% free-air w/ evaporative cooling

Integrated switchboard

N+1, concurrently serviceable and maintainable

24-rack MDC

50kW/rack

Redundant power to rack

"Hot" removable racks for easy IT refreshes

ebay inc DELL

MDC Partnership Results

Standardize	Repeatable process
Simplify	Reduce human error
Maintenance	Improved warranty/SLA via commissioning data
Shorten	Reduced integration from 2+ weeks to 4 hours

Data management and analysis for energy efficient HPC centers

Ghaleb Abdulla, Anna Maria Bailey and John Weaver

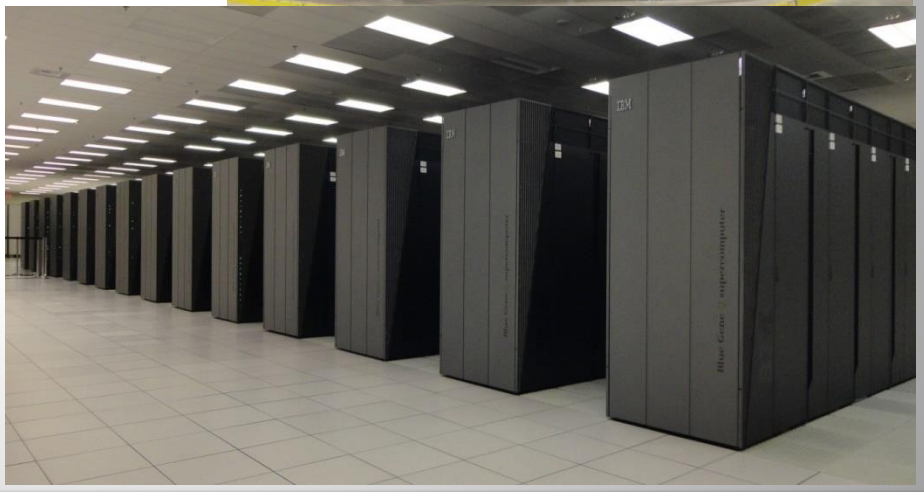
Lawrence Livermore National Laboratory

LLNL-PRES-XXXXXX

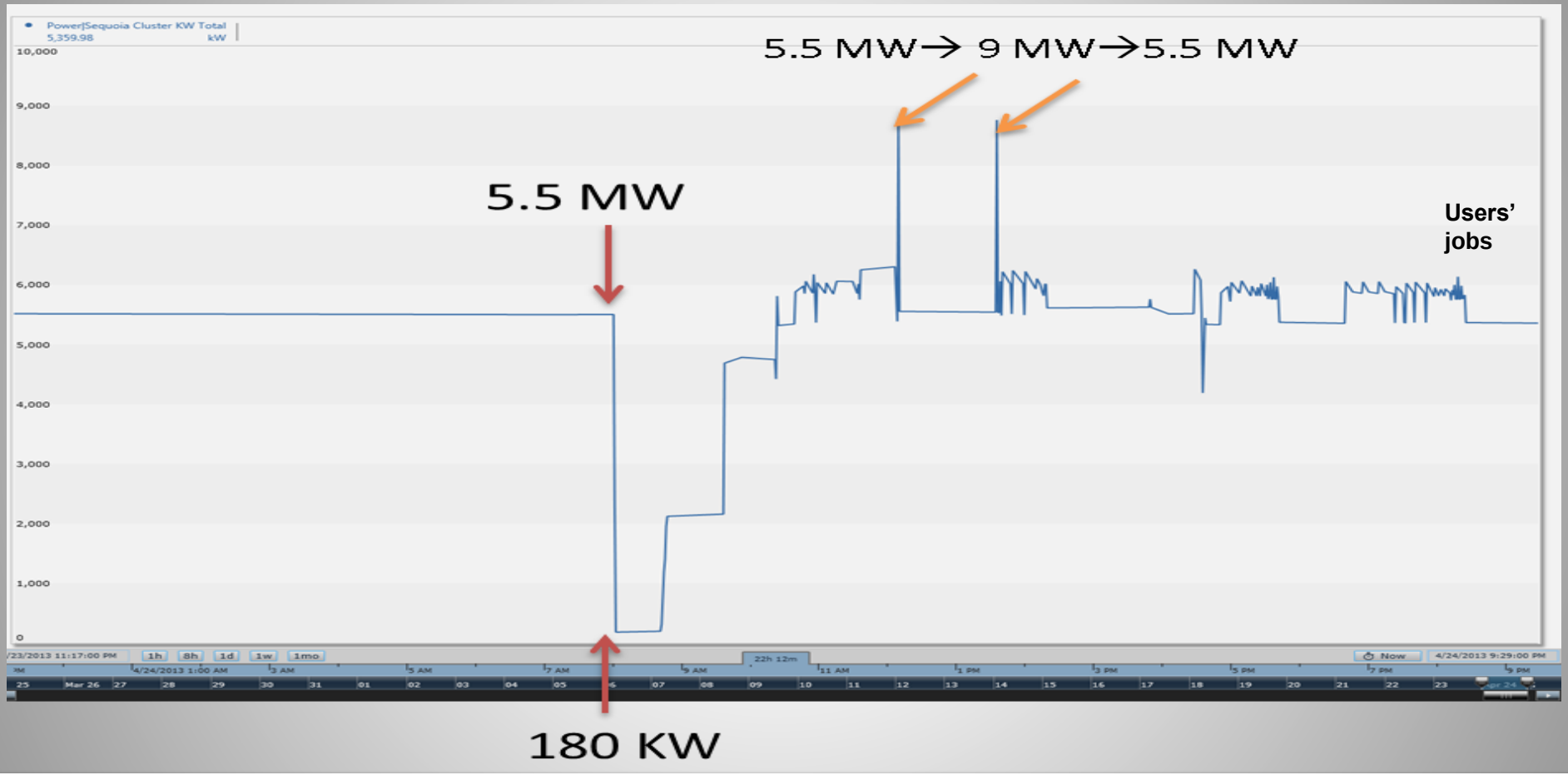
This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. Lawrence Livermore National Security, LLC

Sequoia Parameters

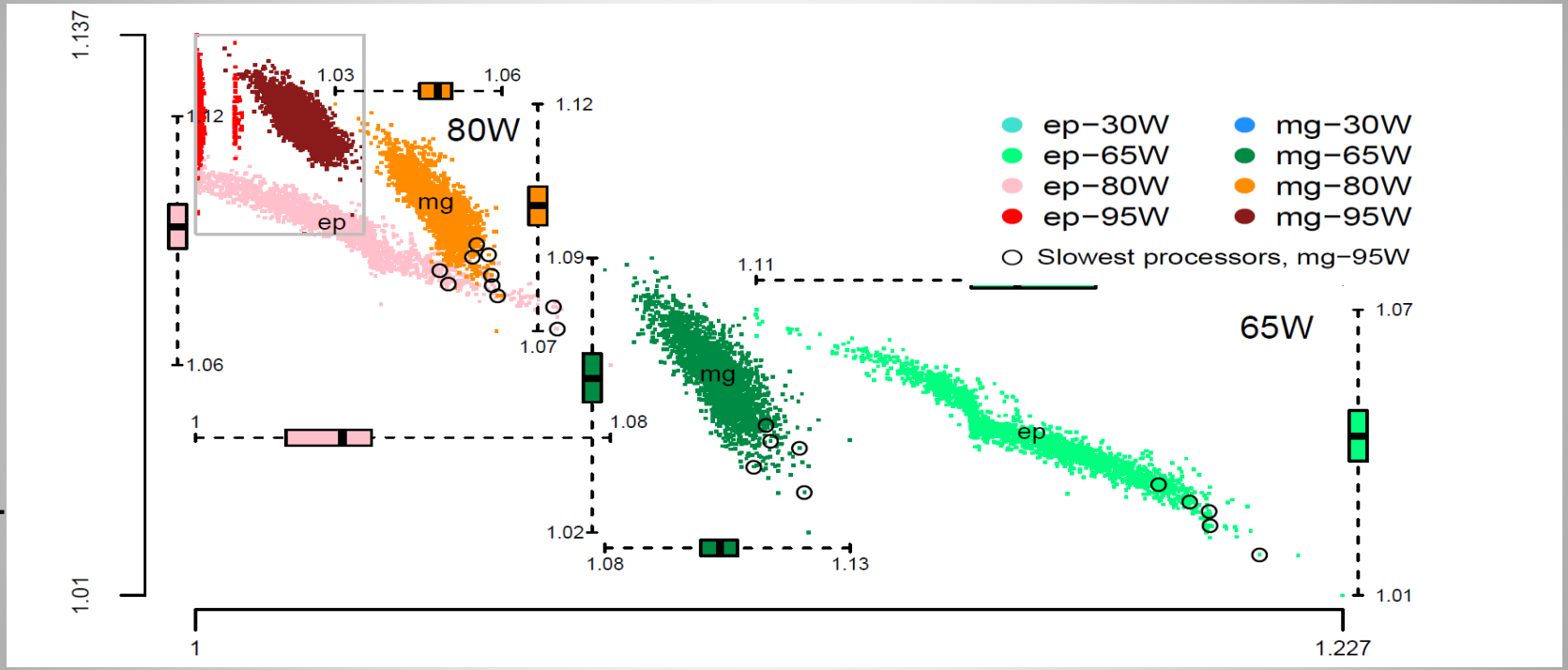
- IBM Blue Gene*/Q architecture
- 98,304 nodes
- 1,572,864 cores
- 20 PF, 3rd on Top 500 – June 2013
- 96 racks
- 91% liquid cooled
- 30 gpm/rack at 62 F
- 9% air cooled
- 1700 cfm/rack at 70 F
- 4800 square feet



Current data sources spread across LLNL


Power|Sequoia Cluster KW Total
5,359.98 kW
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
5.5 MW→ 9 MW→5.5 MW
5.5 MW
Users' jobs
180 KW

Processor performance



Carnegie Mellon University

Smart Campus, Smart City

Bertrand Lasternas
Researcher
Center for Building Performance and
Diagnostic, School Of Architecture

Background: Carnegie Mellon University

Founded in 1900 by Andrew Carnegie

12,991 Students (6223 undergrad)

5000 faculty / staff

CMU annual energy budget over $20M

That's over $1,600 per year per student!

Goal:

Improve by 30%

Why we didn’t save energy?

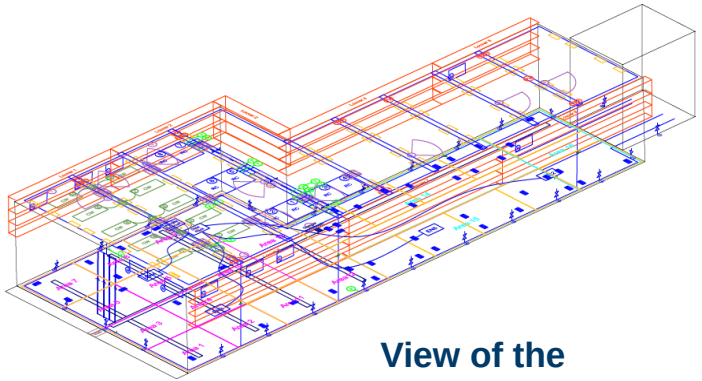
- ✗ We had no idea what we are using
- ✗ We had no idea how important it was
- ✗ There was no easy way to change outcomes
- ✗ We didn’t know what metrics to use

The Intelligent Workplace

The Robert L. Preger Intelligent Workplace, built in 1997, is a 7000 square foot living laboratory of office environments and innovations located on the campus of Carnegie Mellon University.

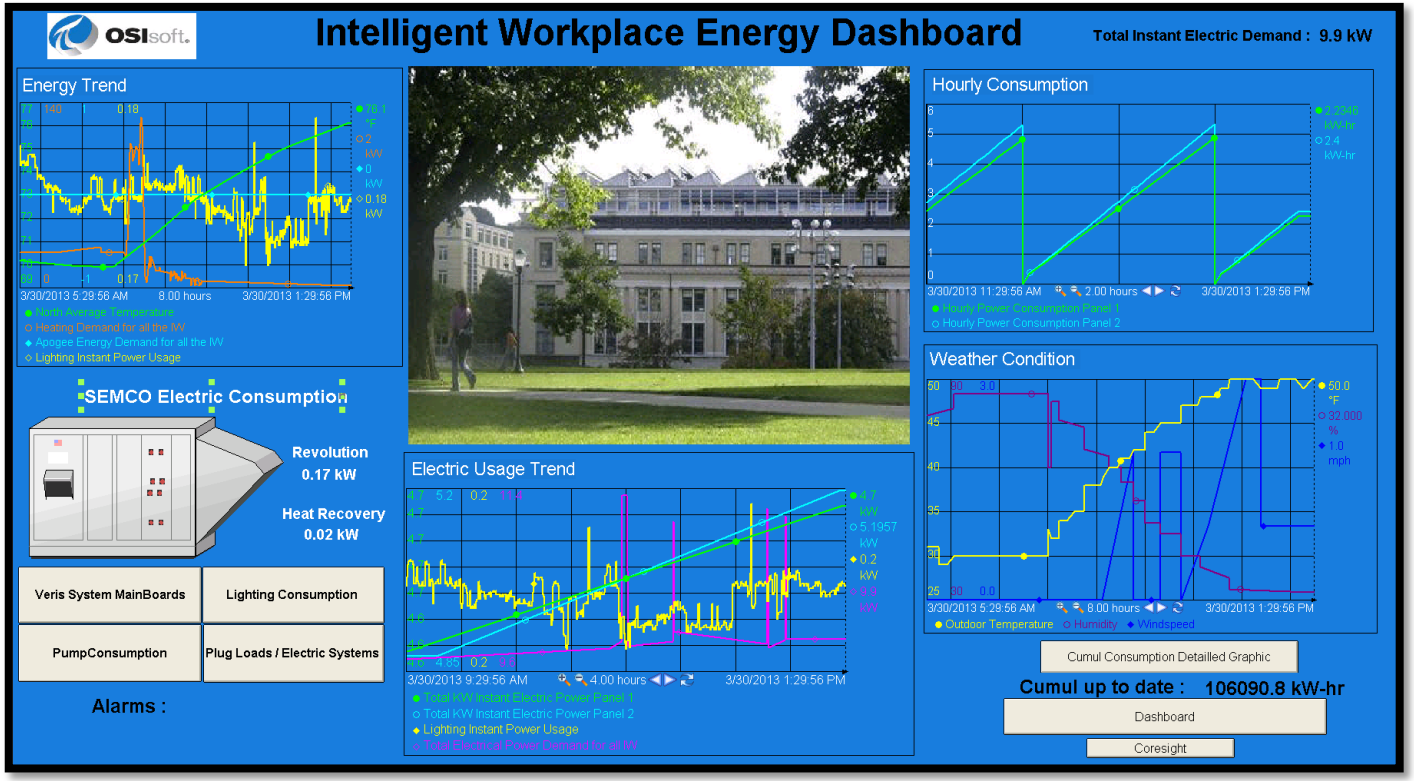
Test and Integration of several systems:

- **Heating**
- **Cooling**
- **Ventilation (mechanical and natural)**
- **Lighting, and day-lighting**
- **Electrical / Plug load**



View of the sensors/actuators density 1500+

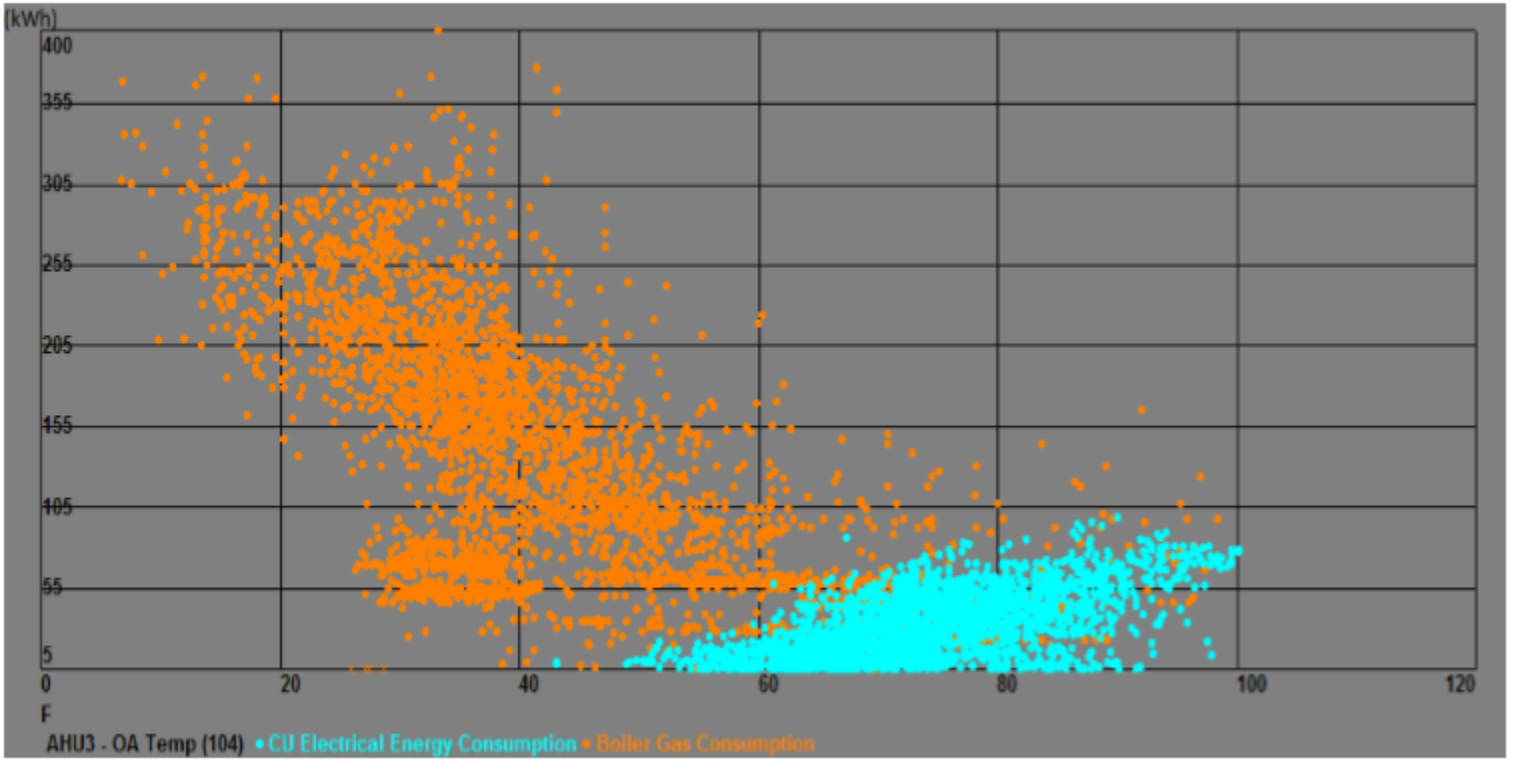
Facility Manager Interfaces



Public Interface

Real-time Dashboard on Touchscreen Displays

(ID-F) Data Analytics



Real Time Measured data for meaningful diagnostics

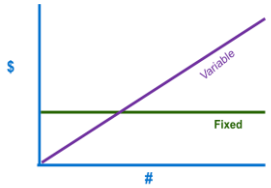
What we learned?

Integrate ALL information	Continuously monitor and diagnose building performance	Information needs to be accessible to the consumers (public, faculty, students)	Building occupants need control in order to change behaviors

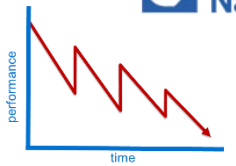
Reduced Energy Consumption by 30%

What did we cover?

- The variable cost of energy
  - What is your product?



- Continuous Improvement
  - Enable creativity for future ideas



- Help them help you
  - Enable stakeholders to have an impact

Contact Info

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Industry Principal, Critical Facilities

OSIsoft, LLC

Thank You

www.osisoft.com/corporate/facilities