OSIsoft

9TH ANNUAL PITT ELECTRIC POWER INDUSTRY CONFERENCE

Presented by the Swanson School of Engineering & the Center for Energy

OSIsoft's Academic and R&D Program
November 17, 2014

Empowering Business in Real Time

OSIsoft Fact Sheet

- **Corporate – Founded 1980, Private**
  - Dr. J. P. Kennedy, Founder and CEO
- Employees – 1100+
  - Engineering – 200 Cust. Support - 300
  - Sales & Mkt – 220 Operations - 135
- **Sales**
  - $ 300 MM (FYE 2013)
  - 14.2 % CAGR – 10 years
- **Geography**
  - Doing business in 110 + countries
  - 26 offices in 16 countries.
- **The business we are in…**
  - Enterprise Wide Infrastructure for streaming data & events
- **Installed Base**
  - 4 000 + Active Customers
  - 15 000 + Active System licenses (excluding OEM)
  - 400 000 000 DataStreams
  - Monitor 800 PI servers, 1 800 Host computers & 8 000 interfaces

OSIsoft's Core Industries

POWER & UTILITIES

- OSIsoft is ranked 1st in the power industry
- DTE Energy, PSE&G, Entergy, British Energy, Iberdrola

OIL & GAS

- 100% of the global Top 10 producers use the PI System
- BP, Shell, Chevron, ExxonMobil, Pemex, Total, Petrobras

CHEMICALS & PETROCHEMICALS

- 40 of top 50 Chemical Companies rely on the PI System
- Dow Corning, Eastman Kodak, Cytec, Rhodia

PHARMACEUTICALS, FOOD & LIFE SCIENCES

- Nine of the Top 10 pharmaceuticals use the PI System
- Amgen, Bayer, PDL, Allergen, Johnson & Johnson, Roche

MATERIALS, MINES, METALS & METALLURGY

- The PI System is installed in the world's largest mining companies.
- Cemex, Cargill, BHP Billiton Yabulu, Codelco

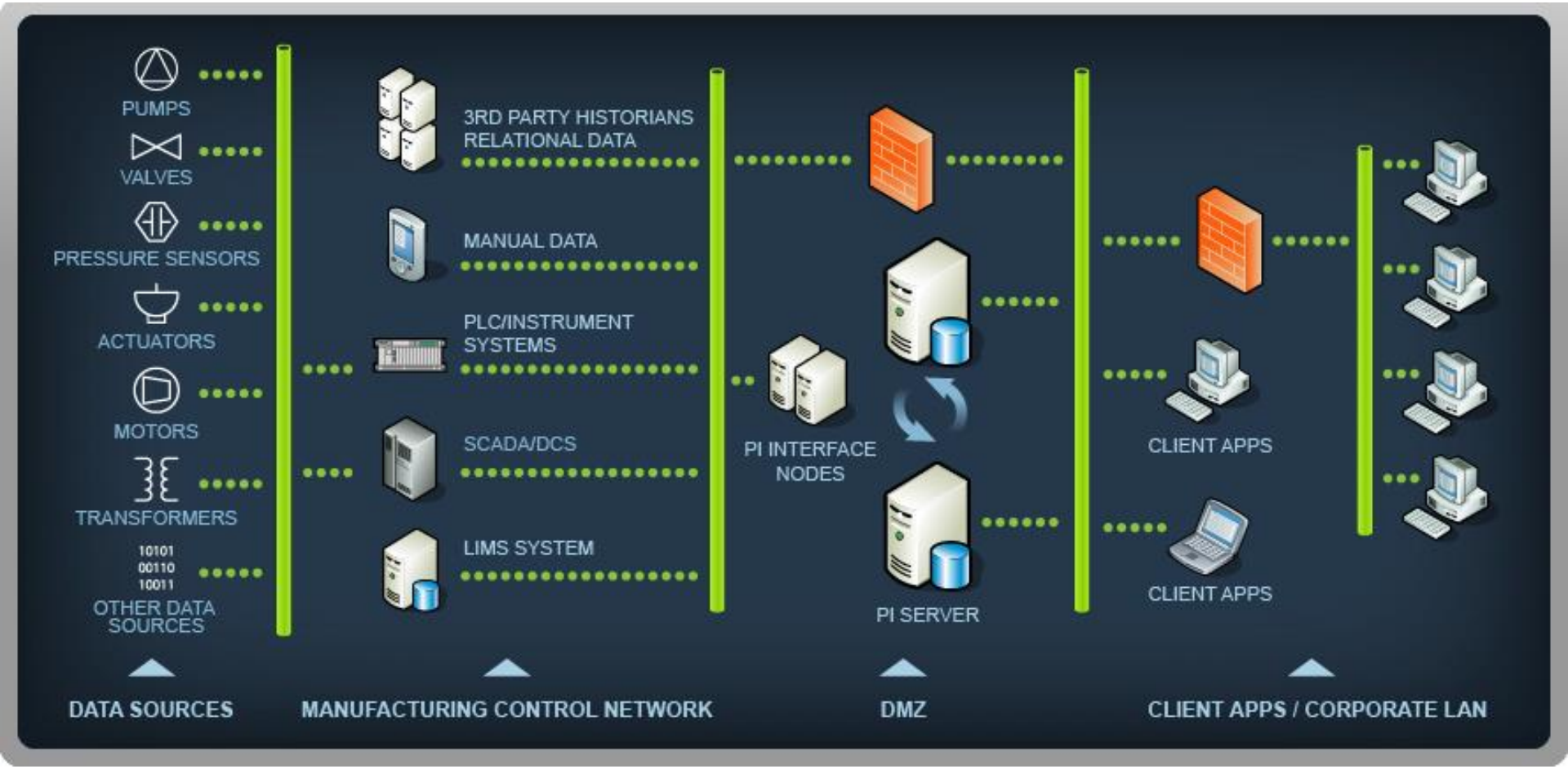
PULP & PAPER

- 400 sites from worldwide leaders use OSIsoft to manage their mills
- Abitibi, Cascades, Inc., International Paper, MeadWestvaco

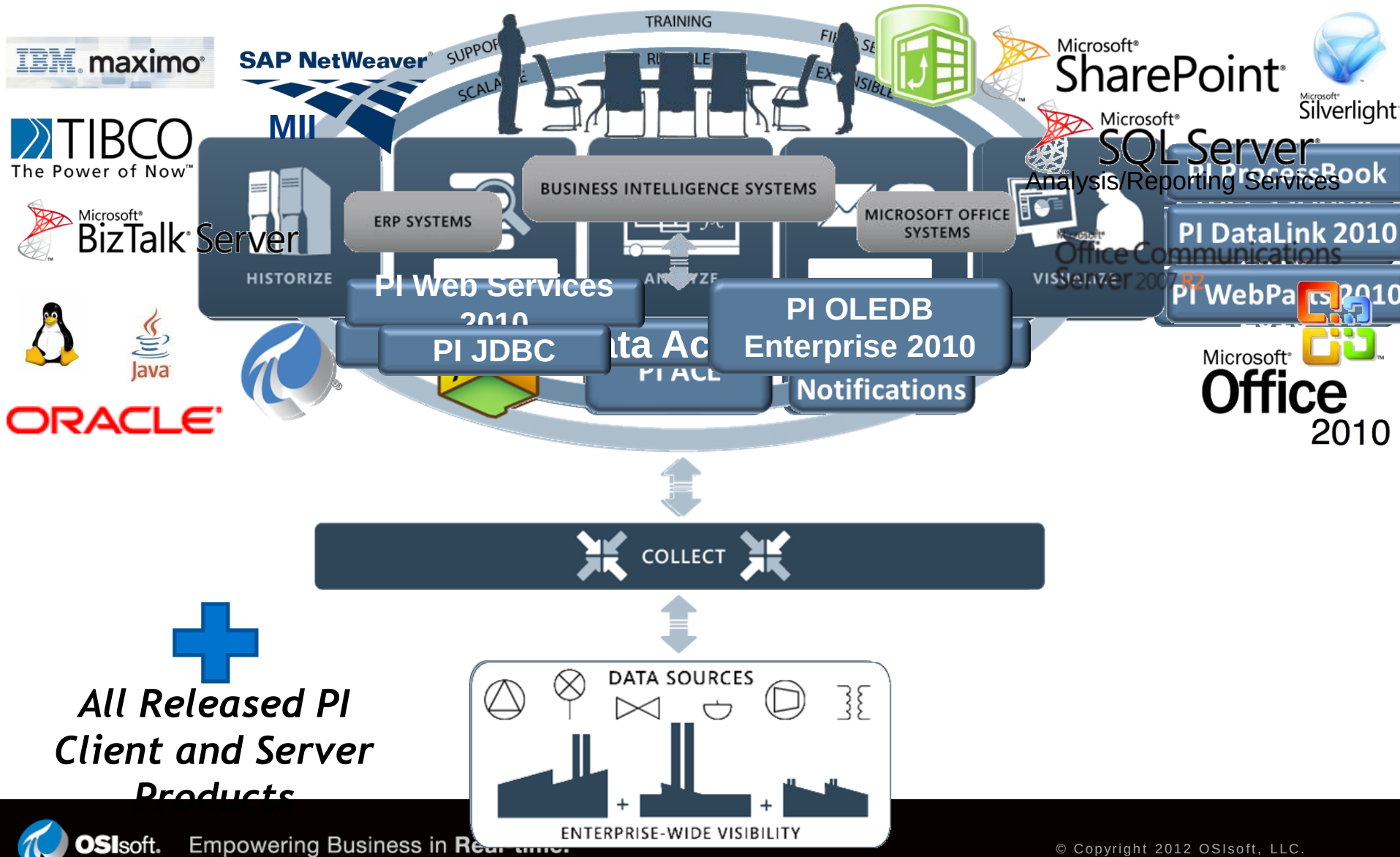
CRITICAL FACILITIES, DATA CENTERS & IT

- Innovative use of PI System to monitor complex IT environments
- Microsoft, Hewlett Packard, Thomson Reteurs, RBC

The PI System Architecture



How does the PI System work?



All Released PI Client and Server Products

OSIsoft's Academic and R&D Program

Why – do we have an academic and R&D program?

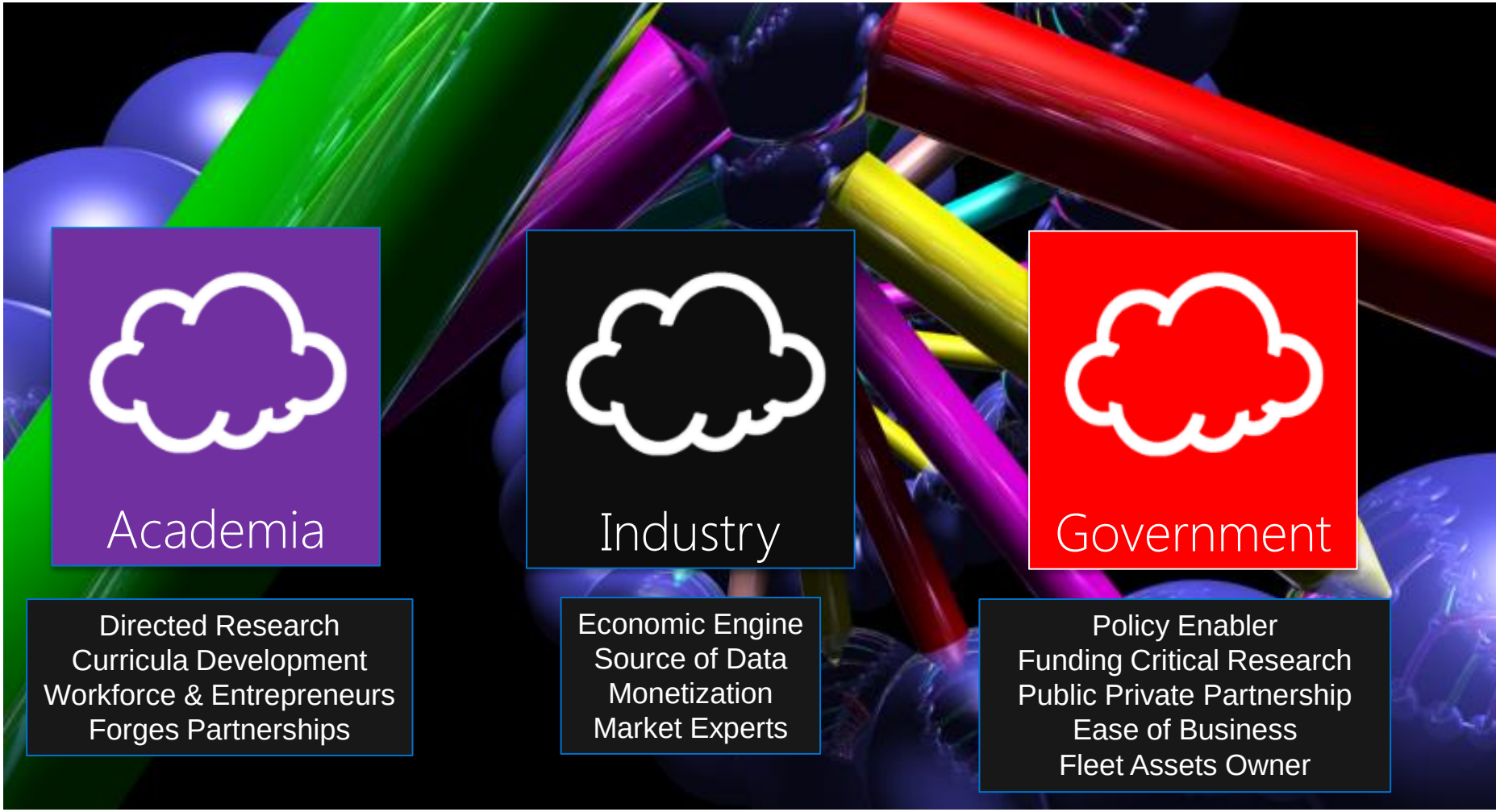
- Paying back to universities
- Paying forward to students
- Enhancing customer value

What – are we doing?

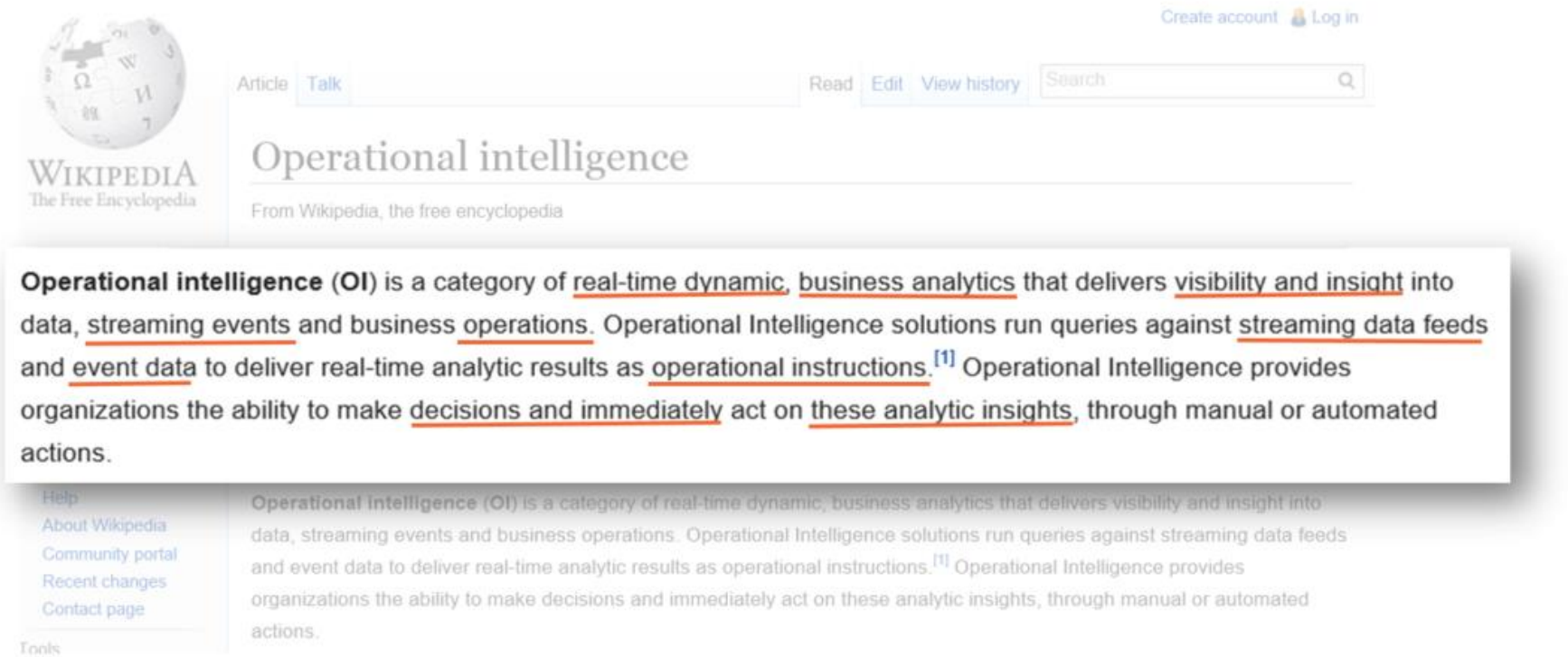
- Providing complementary software, services, coaching and training

How - we collaborate

- The triple helix – Academic, government and business



Case Studies – Operational Intelligence



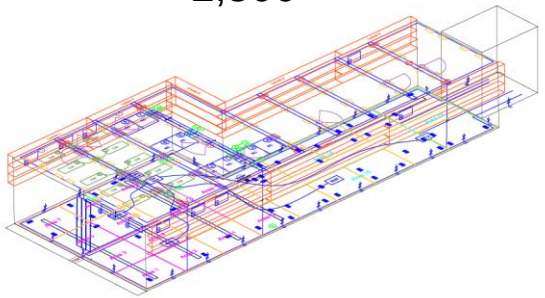
The Intelligent Workplace

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 2,500+



Intelligent Dashboards

Demonstrate real-time, analytic and visualization capabilities to integrate, monitor and diagnose building performance indices.

Generate knowledge and distribute it through the decision chain from the Occupant to the City Level.

Business Challenge

- Monitor, diagnose and optimize building performance.
- Inform, engage, empower occupants, building executives, decision makers.

Solution

- PI Server, PI AF, PI ProcessBook, PI Coresight, PI WebServices, PI WebParts
- Microsoft 365 solutions
- CMU dashboards and innovative solutions

Results and Benefits

- Ensure Energy Savings and Carbon footprint reduction.
- Increase Occupants Comfort, Satisfaction and Productivity.
- Prioritize investments and retrofift actions.

Savings Attributed to Communication/Function

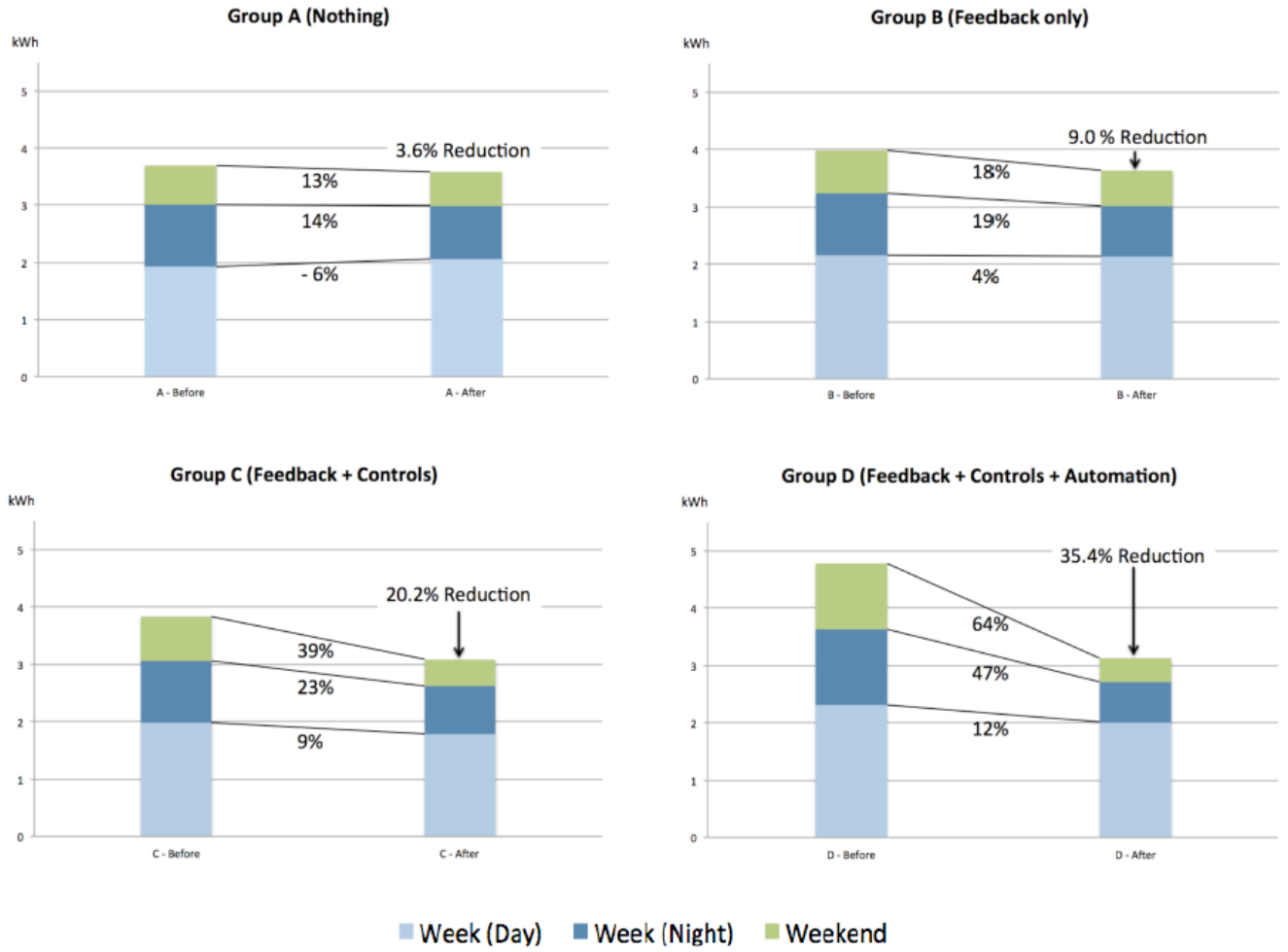
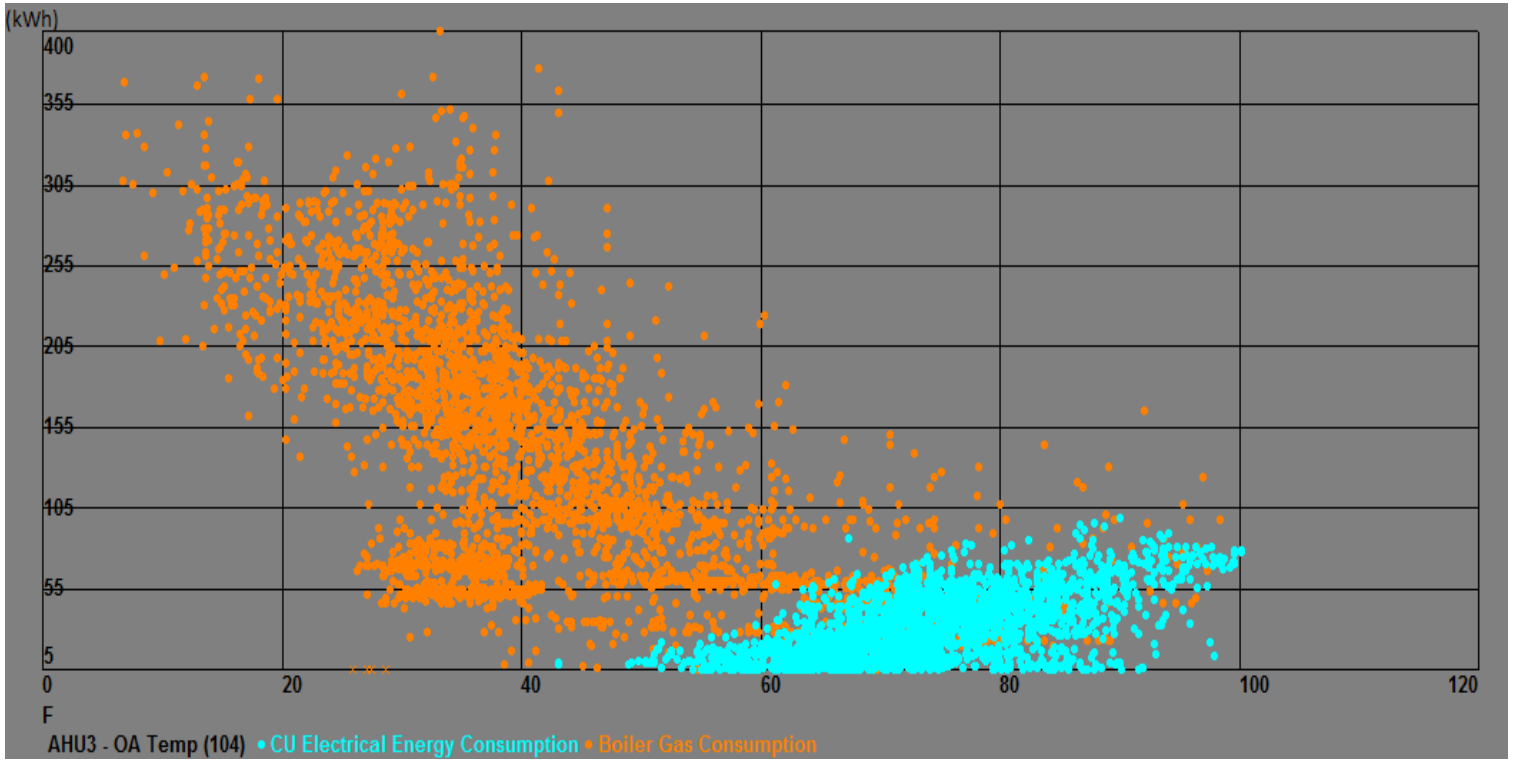


Fig 8. Energy savings before and after the dashboard intervention.

(ID-F) Data Analytics



Real Time Measured data for meaningful diagnostics

Smart Campus

Demonstrate real-time, analytic and visualization capabilities to integrate, monitor and diagnose central utilities and campus-wide facilities.

Drive student behavior for green activities and outcomes for energy and water use.

UC DAVIS

PI System Timeline @ UC Davis

Business Challenge

- Monitor, diagnose and optimize on campus central utilities and campus-wide facilites
- Electricity, Water, Steam, Chilled Water, Purified Water,…
- Allow operations to manage cross system demands and responses. Empower Students to drive green behavior.

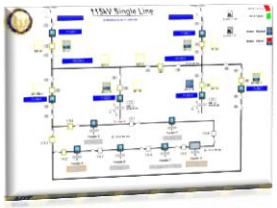
Solution

- PI Server, PI AF, PI ProcessBook, PI Coresight, PI WebServices, PI WebParts
- Microsoft 365 solutions with Power BI and Power BI Q&A
- Student designed views and benchmarking contest

Results and Benefits

- Reduced maintenance efforts.
- Increased student ownership of energy and water to drive down use.
- Common visibility and action plans spanning
  +1,000+ buildings,
  + 180 over 10,000SF
  + 11.3M SF total
  + 5,300 acres land.

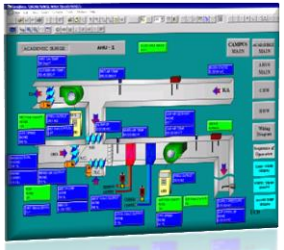
“Hub” for Smart City Data



Substation Metering

Building Utility Metering

Heating & Cooling Plant Operations



HVAC Operations & Smart Thermostats

PI System

Water & Wastewater Operations

Interior Lighting & Occupancy

Exterior Lighting Controls

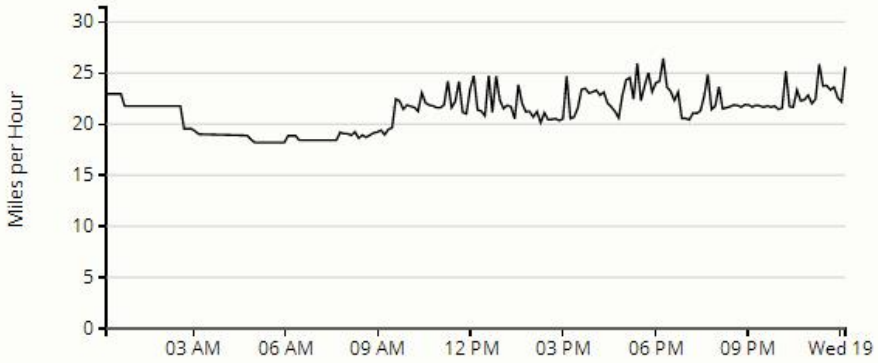
Building Level — Campus Level

CAMPUS ENERGY FEEDBACK SYSTEM

~1,000 dorm residents!

BUILDING: Campbell ▾ ROOM #: 101 ▾ LOG IN

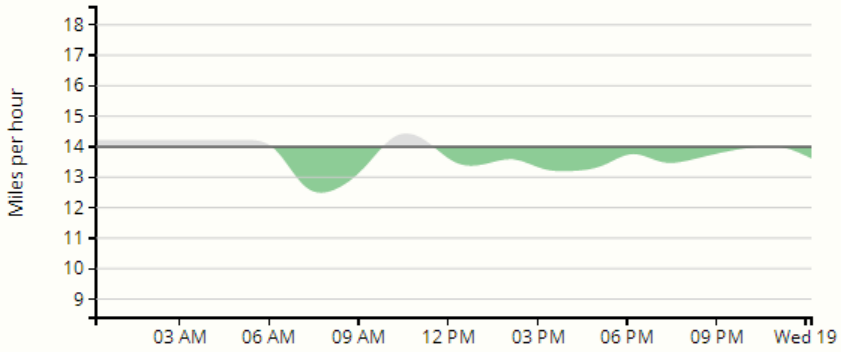
This graph shows you your historical energy demand. The trend line represents the speed, in mph, each person in your building would have to bike to produce the current energy demand of your building.

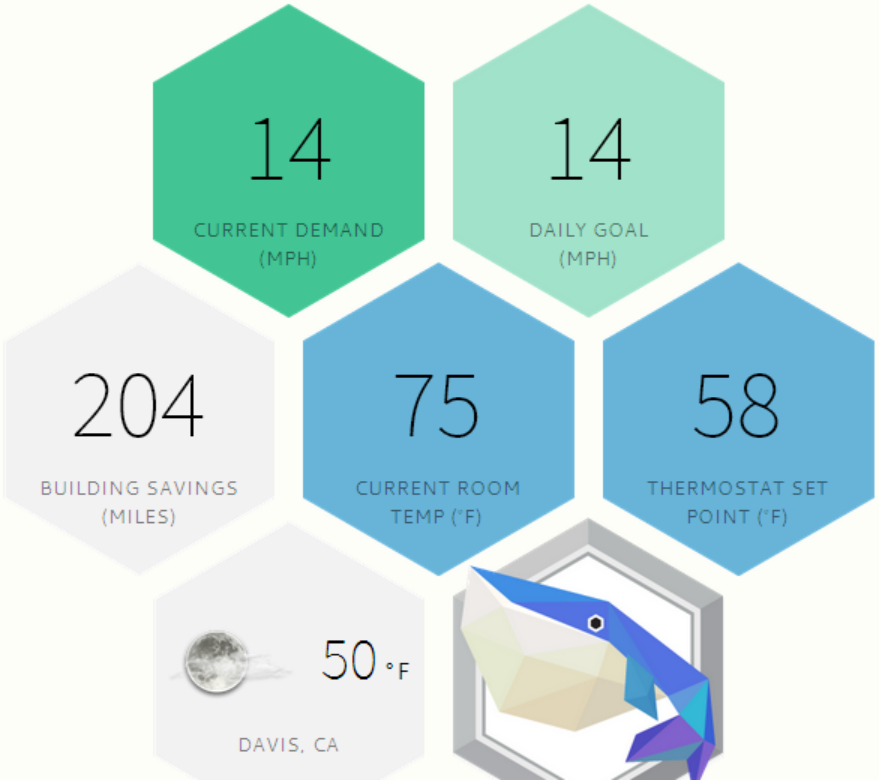


CEFS

HELLO, CAMPBELL 102

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!





Microgrid of IIT Campus

High Reliability
13 S&C Vista Switches

Storage
One ZBB battery - 500kW

Visibility
OSIsoft SCADA – Live Monitoring

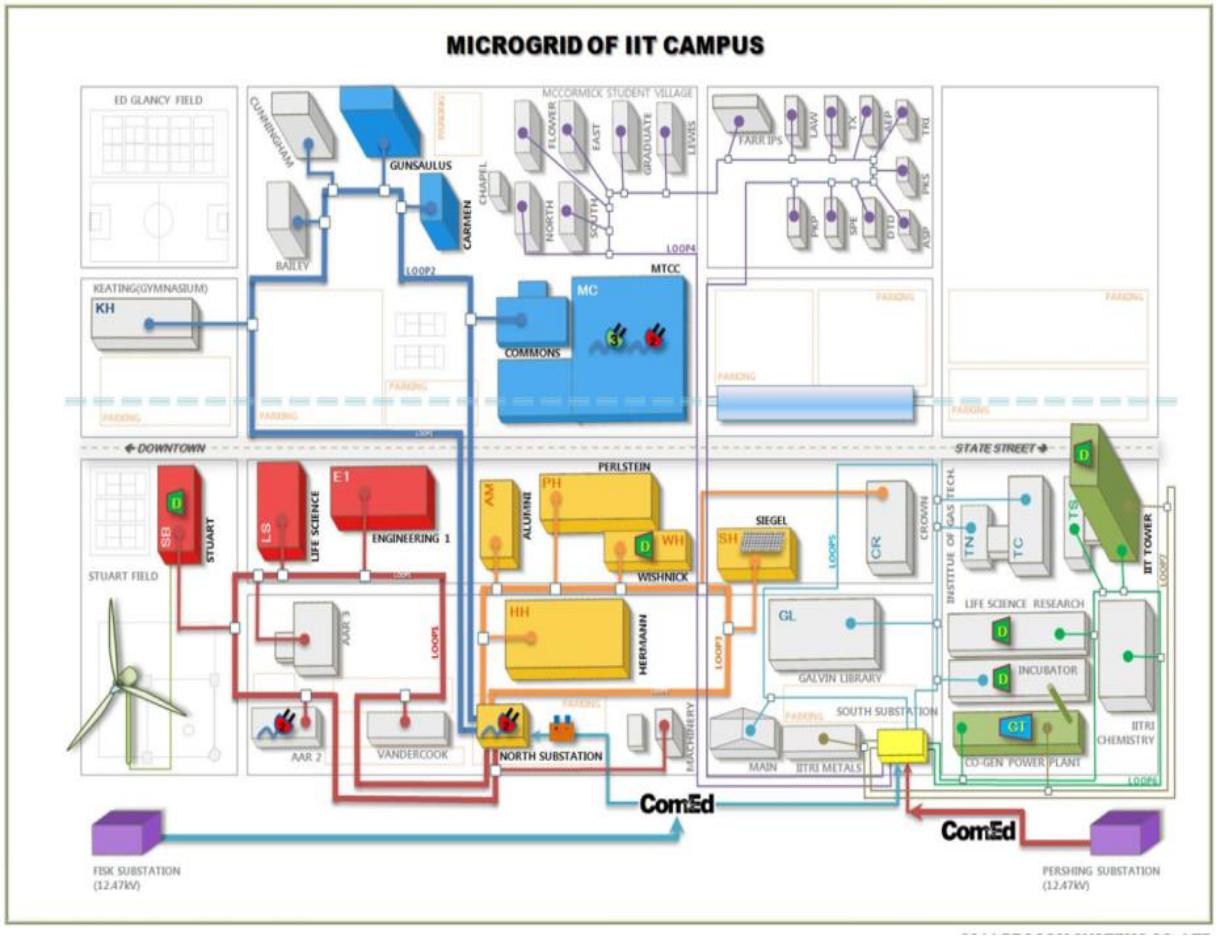
IIT Distributed Generation (DG)

Solar
Total - 300kW

Wind
Viryd wind turbine - 8kW

Grand Ridge wind turbine - 1.5MW

Gas Turbine
Total - 8MW capacity



Unfortunate Event

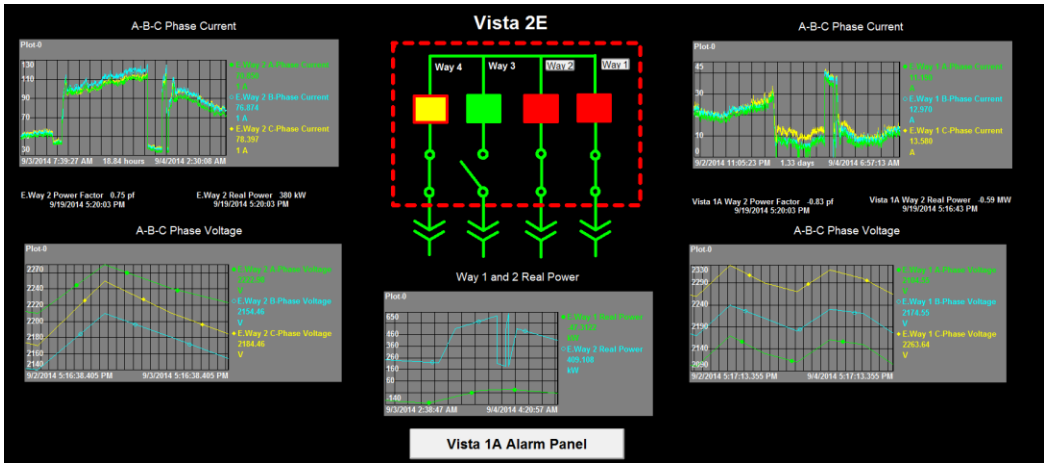
- January 29th, 2014 - Power outage
  - Data Center
  - Classes in session
- IIT Maintenance search for the problem
- An entire day of classes were canceled

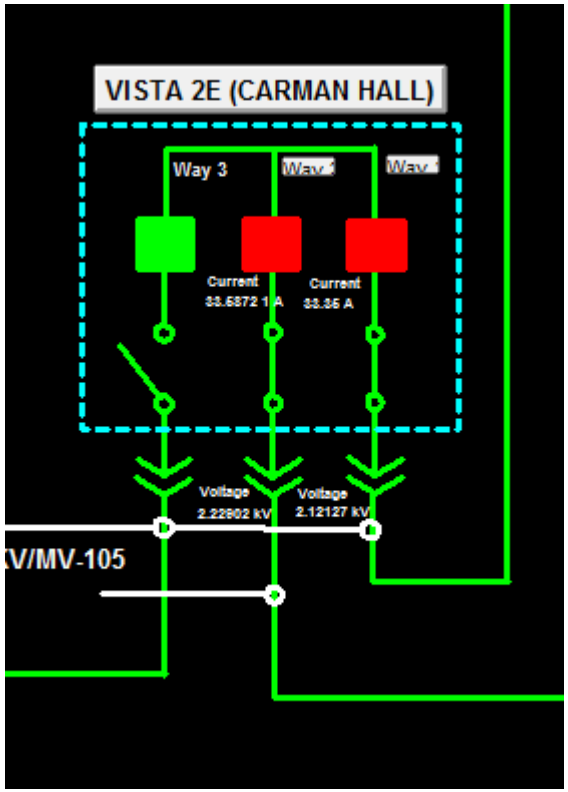
Second event

- September 3rd, 2014 - Outage in residence halls and fraternity houses
- IIT Maintenance search for problem, again

Resolution

- Accessed real time data
- Distributed to key people
- Outage was over in under 20 minutes
  - Saved time
  - Protected resources on UPS





PI ProcessBook (IIT SCADA)

Thank you

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