

Technology-Assisted Maintenance at the University of Maryland, College Park

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Conference Theme & Keywords



Presentation Agenda

- About the University of Maryland, College Park (UMCP)
- Background of OSIsoft at UMCP
- Our Use Cases: Challenges, Solutions, and Results
 - Inconsistent data access
 - Alarm fatigue
 - Desire for distribution system awareness
 - Over-conditioning of classrooms
- What's Next

University of Maryland, College Park (UMCP)

Founded in 1856 as Maryland
Agricultural College

Almost 450 buildings and over 15.5m
gross square feet

39,000 students and 10,000 faculty and
staff



UMCP Facilities Management (FM)

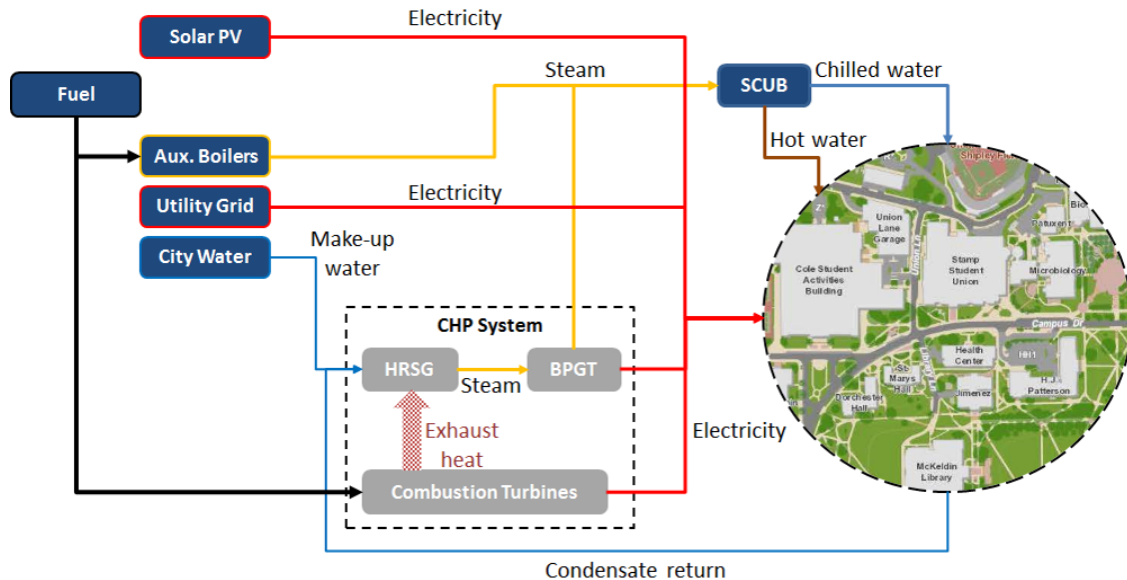
800 employees

10 electrical feeders

15 miles of underground steam and chilled water piping

On-campus Combined Heat and Power (CHP) Plant

CY2017 Consumption: 281,149 MWh



OSIsoft at UMCP

Power Outage

- April 2015

Full Implementation

- October 2016

April 2018

- 5,000 tags
- 2,150 analyses running
- 70 element templates
- 20,000 event frames generated
- 50+ PI Vision screens



NIST Collaboration

- October 2015

Release of NIST SP 1800-7

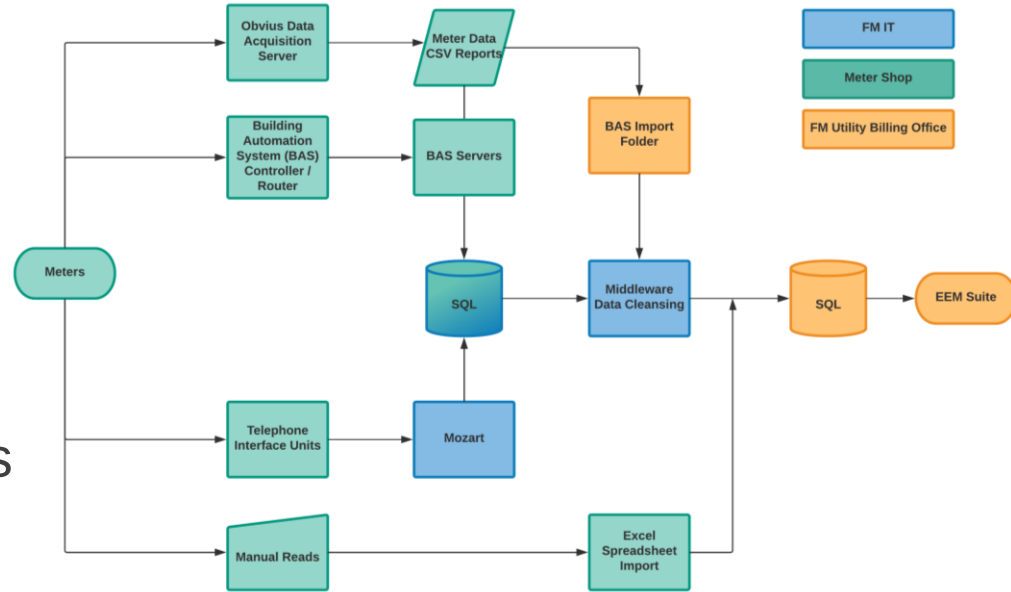
- February 2017

Use Cases

- Restore remote access to CHP Plant
- Billing management and data cleansing
- 3rd-party Services Provider accountability
- Situational awareness of distribution systems
- Improved incident response
- 2020 Sustainability goals
- Proactive (versus reactive) maintenance
- Data stream health monitoring

Challenge: Inconsistent Access to Data

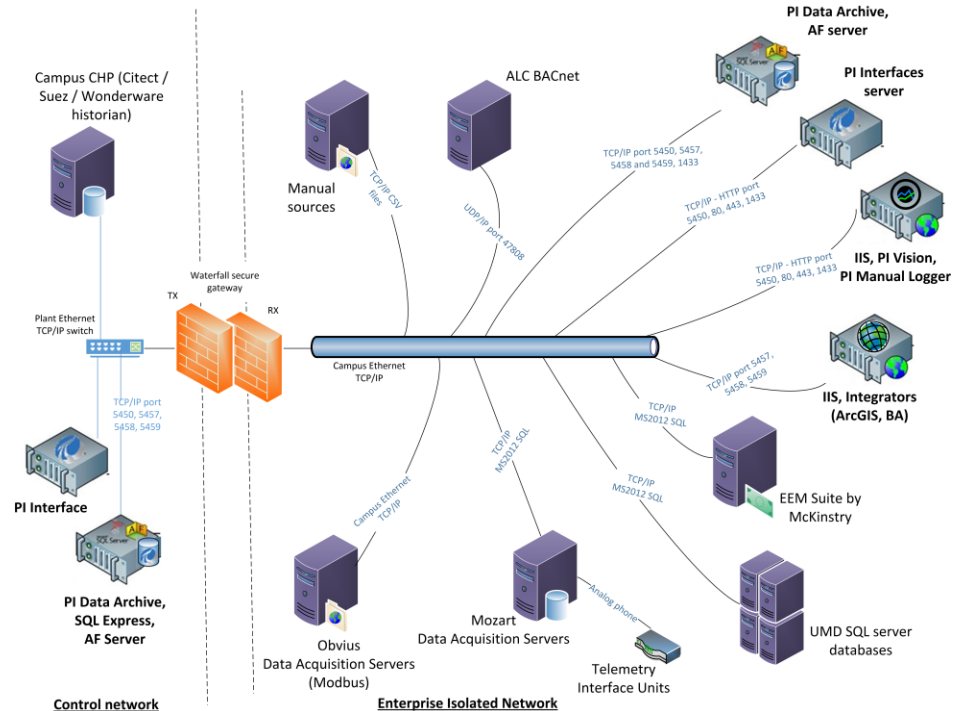
- No remote access to CHP plant data
- Disparate campus monitoring systems
 - Custom scripts
- Delayed awareness of loss of data feed



UMCP Meter Data Flow Path

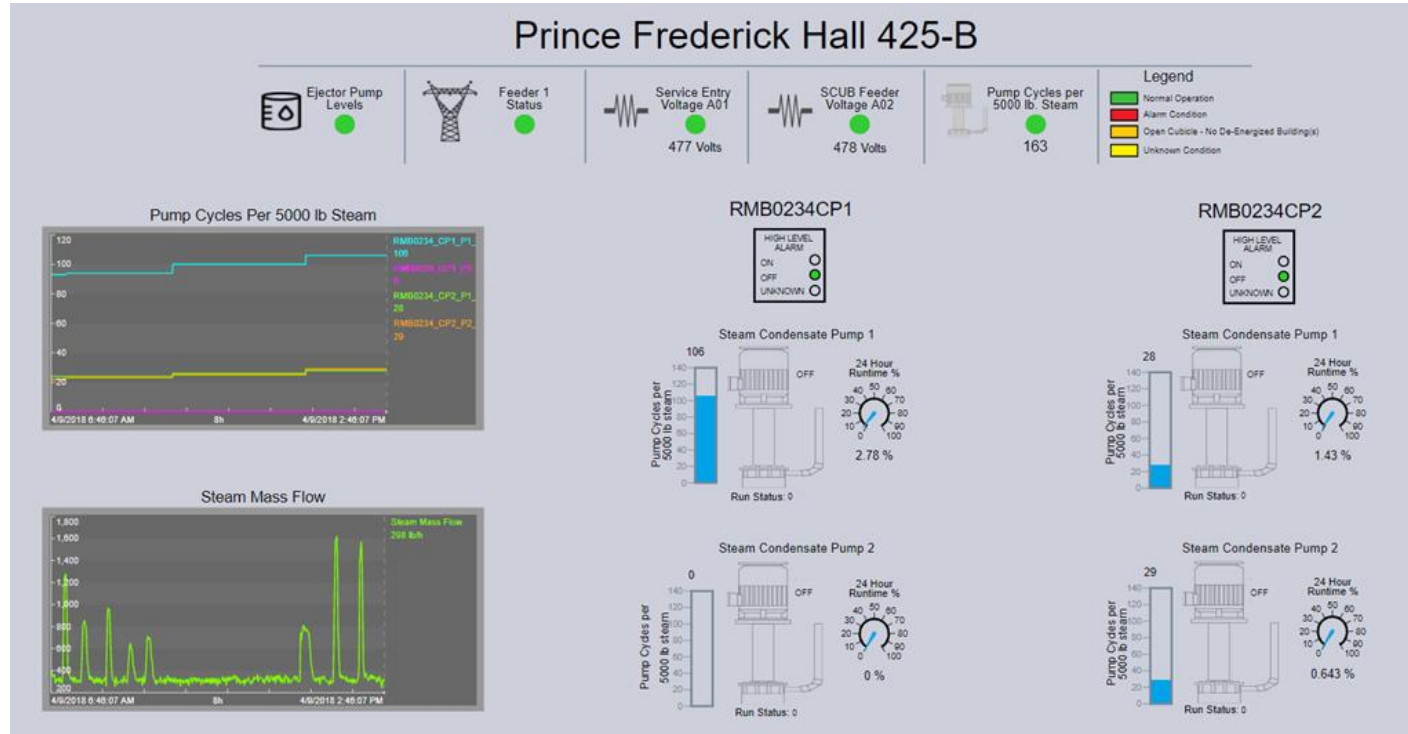
Solution: Secure, Centralized Data

- Waterfall Secure Gateway
- 5 different interfaces
- PI Manual Logger
- Daily tag reports

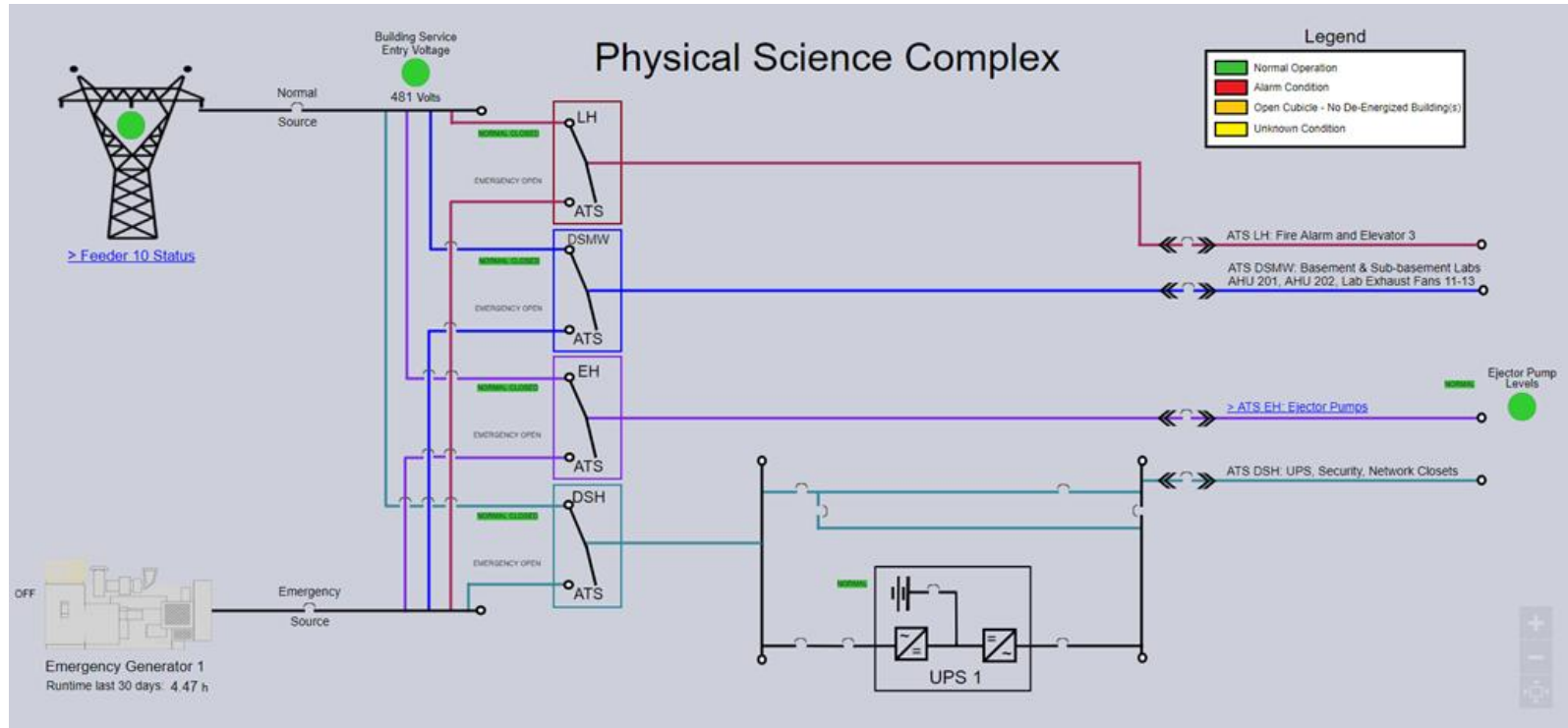


UMCP System Diagram

Result 1: Cost Avoidance through Unified Insight



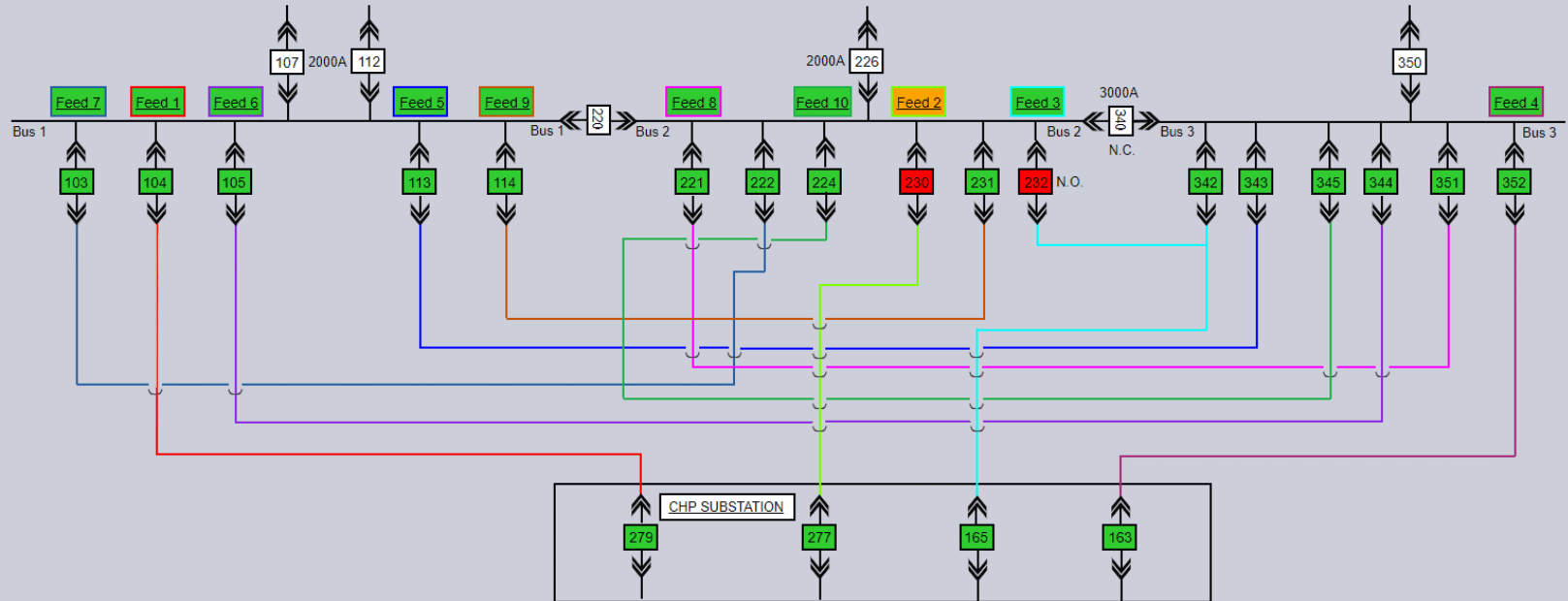
Result 2: “Single Pane of Glass” Views

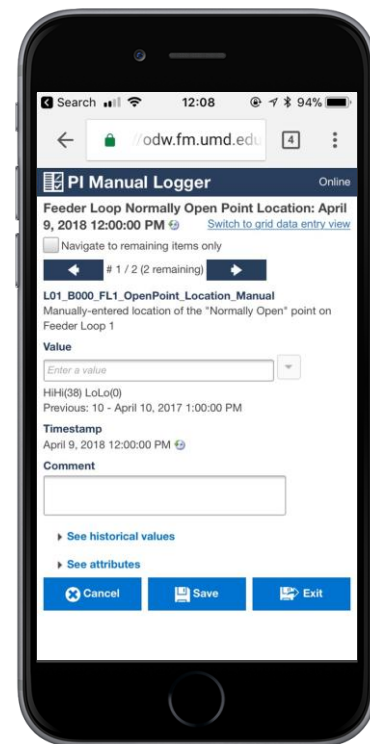
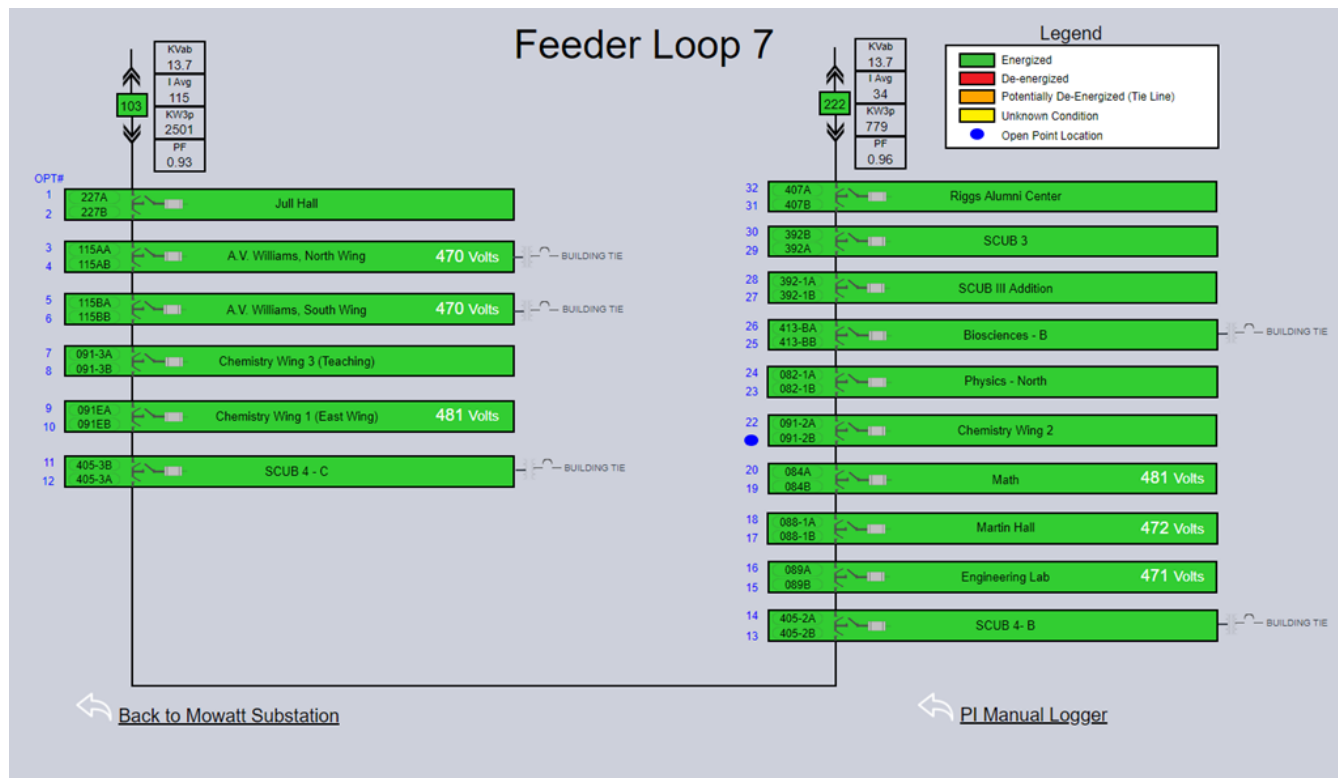


Mowatt Substation

Legend

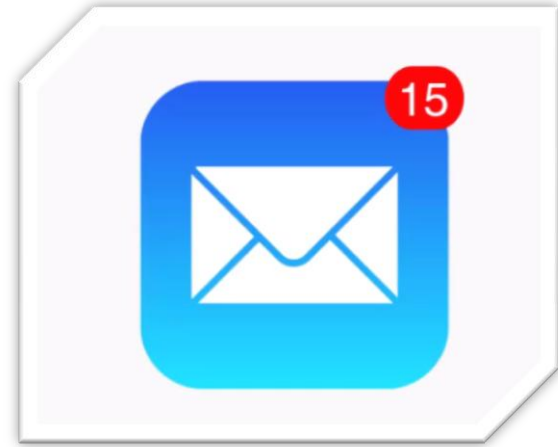
	Closed Cubicle
	Open Cubicle
	Open Cubicle & De-energized Building(s)
	Open Cubicle - No De-energized Building(s)
	Cubicle Unknown Condition





Challenge: Alarm Fatigue

- Too many notifications
 - What is truly urgent?
- Single point of failures
 - No escalation
- Lacking in context
- False alarms



Solution: Intelligent Notifications

- “Rollup” notifications
- Data cross-checks
 - Is this a true event?

CHW: ChemistryBuilding - Wing 3 - Supply/Return Temp Difference > 12 degF
To Kelsey Bobeck

B091 - ChemistryBuilding - Wing 3 Supply/Return Temp difference has been > 12 °F for over 15 minutes

Return Temp	55 °F
Supply Temp	40 °F
Flow	490 GPM
OP	20 %
Man OP	20 %
Target Set Point	45 °F
Current Set Point	45 °F
SCUB dT	6.5 °F

CHW Distribution Map: <http://arcg.is/0uiDea>

Notification Start Time: 4/12/2018 1:53:16 PM Eastern Daylight Time (GMT-04:00:00)

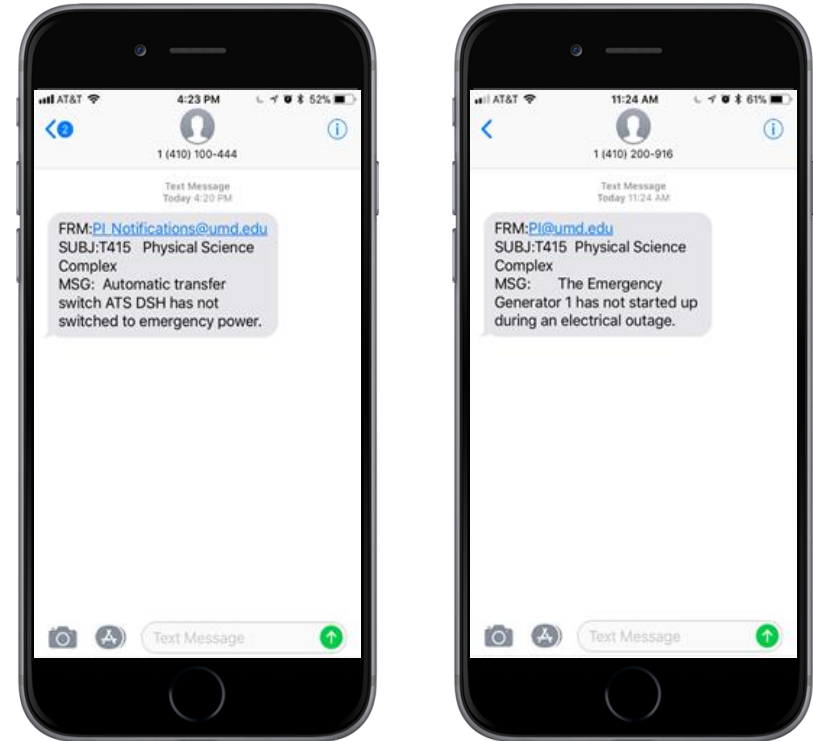
[Event Details Hyperlink](#)

Note: This is an automated message provided as a rapid 'first alert' for situational awareness and does not alter or replace any internal protocols among the CRC, service shops, or strategic personnel at other University programs.

Example Return/Supply deltaT Notification

Result: Improved Incident Response Times

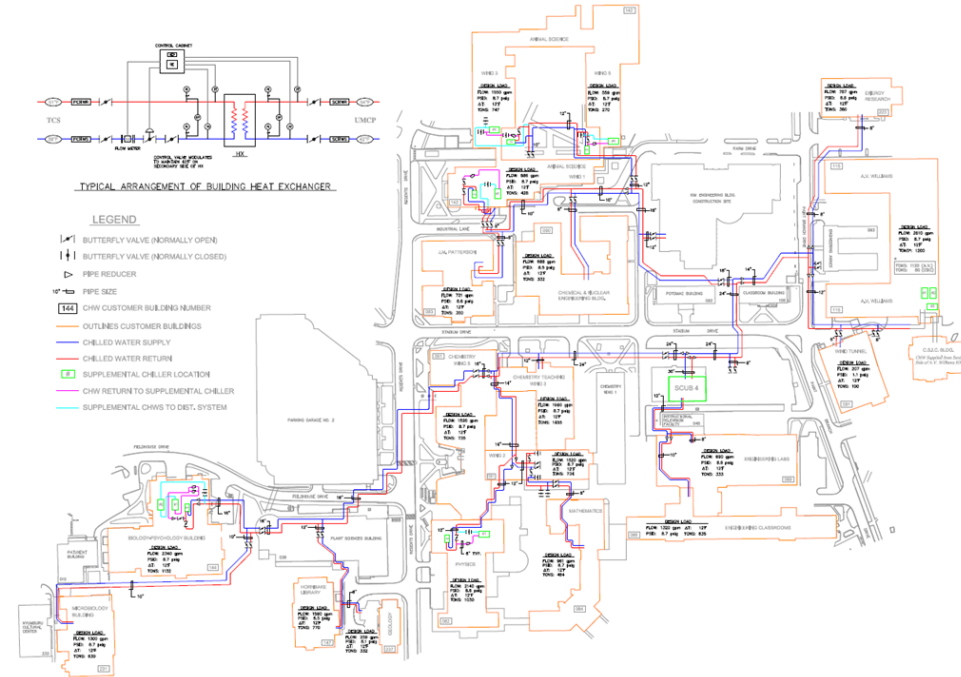
- 60-90 minute head start
- Timely and accurate information
- Optimized resource deployment



Example ATS and Emergency Generator Notifications

Challenge: Desire for Distribution System Awareness

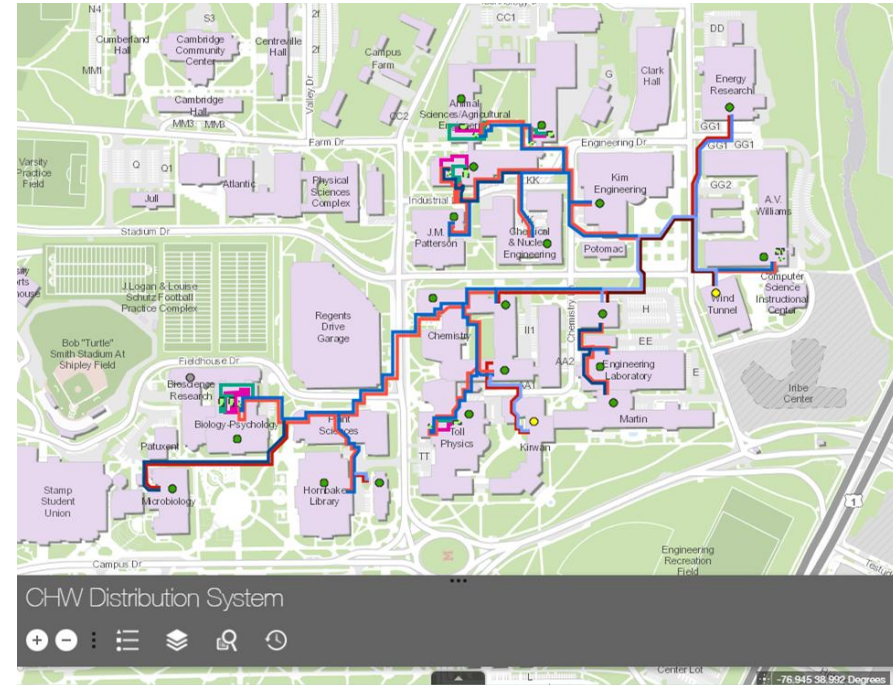
- Static CAD drawings
- No insight into “hotspots”
- Data access impractical or non-existent



Chilled Water System CAD Drawing

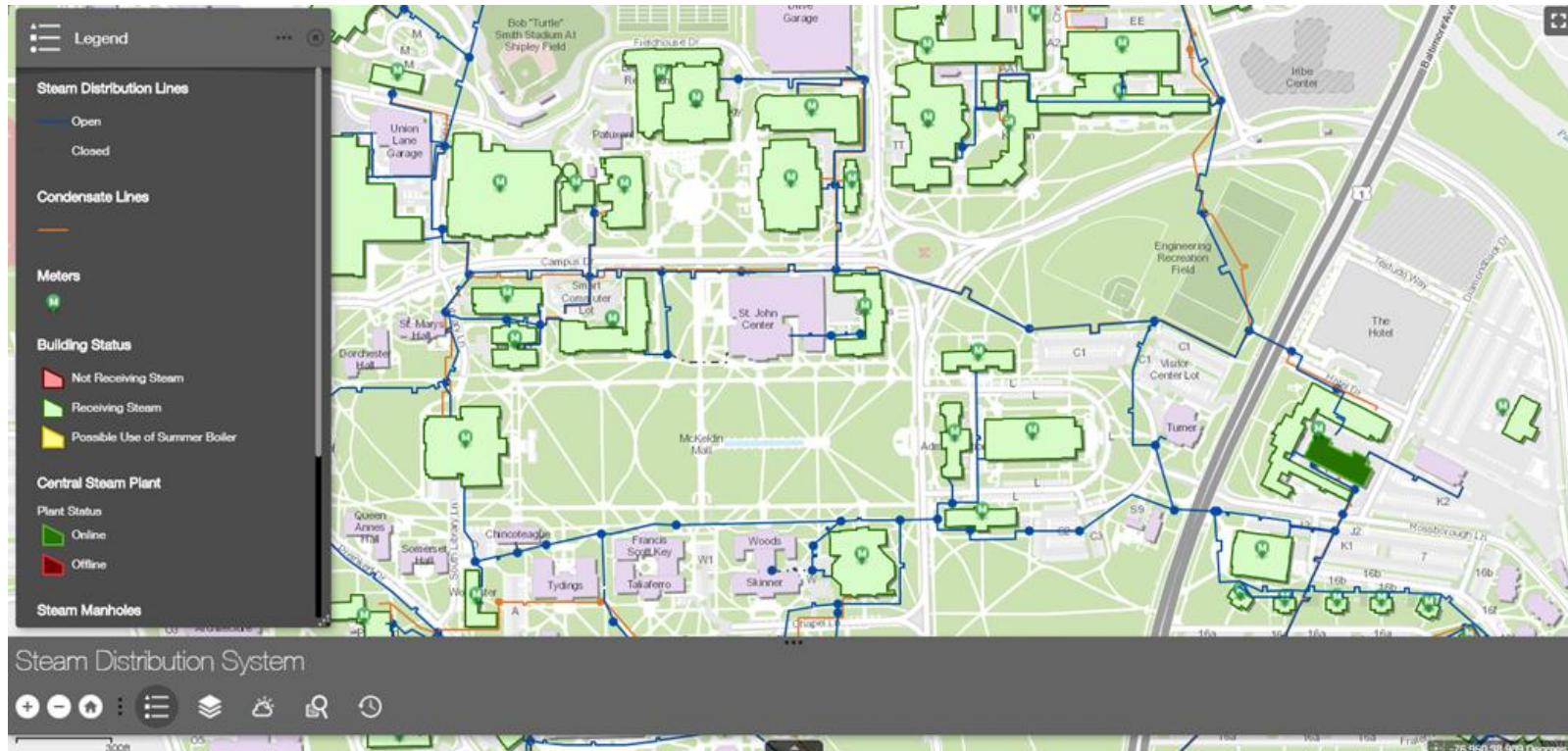
Solution: Multi-Platform Awareness

- PI Integrator for Esri® ArcGIS®
 - Transformed CAD drawings
 - Enriched layers with data
 - Created ArcGIS® WebApps
- PI Vision-based drill-downs



Chilled Water Distribution ArcGIS® WebApp

Result: Intuitive Visuals with Actionable Data



SouthCampusDiningHall

OAT 51.4 °F 74 % RH

[Return to Central Plant Overview](#)
[Return to Steam Dist. WebApp](#)

Building Status



Velocity

9,688.8 fpm

Temperature (Derived)

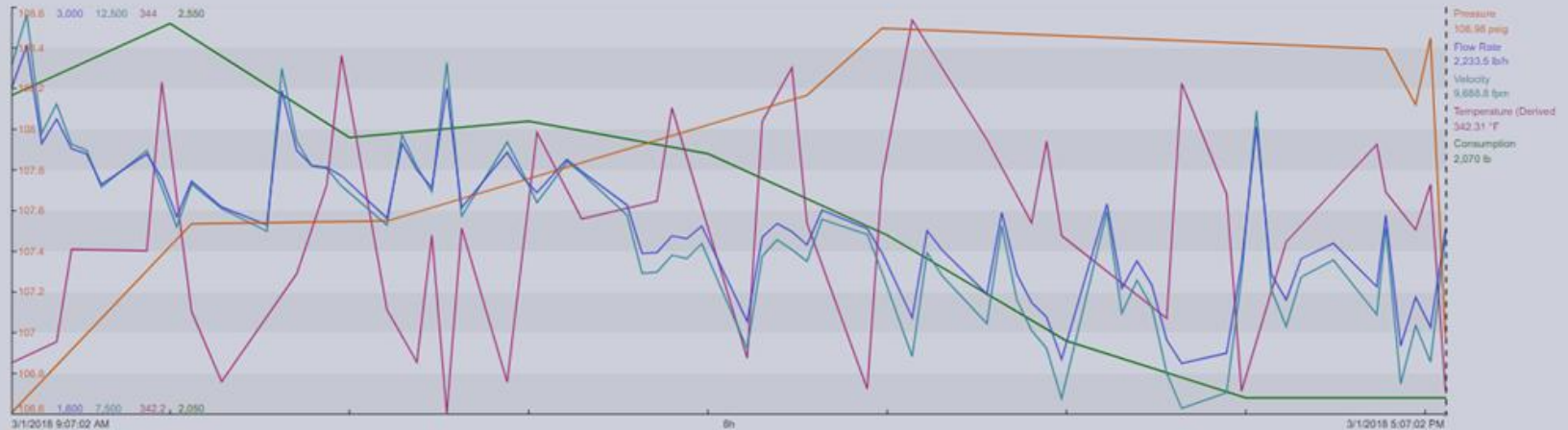
342.31 °F

Flow Rate

2,233.5 lb/h

Consumption (Past Hour)

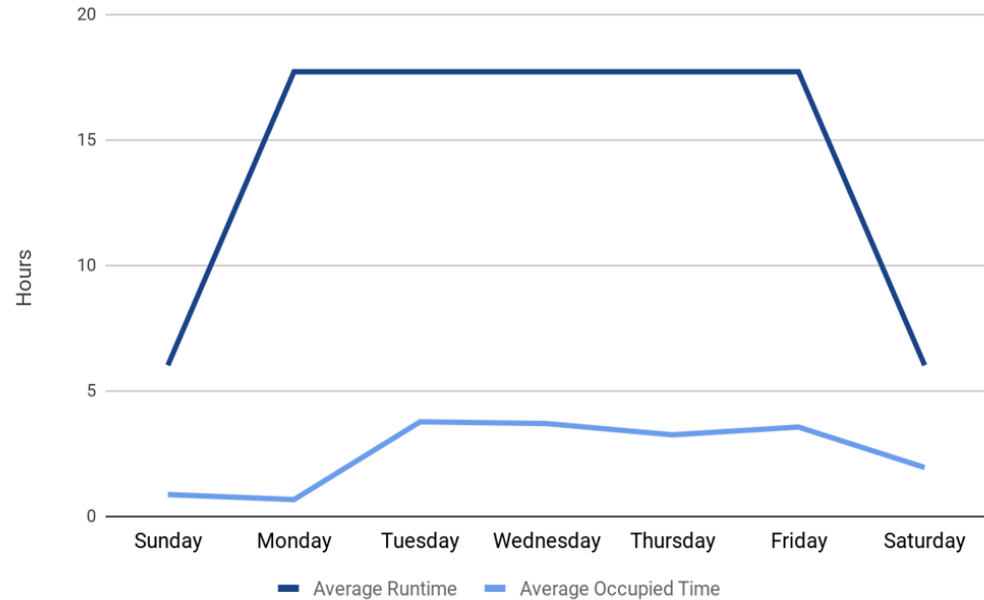
2,070 lb



Steam Drill-down Screen

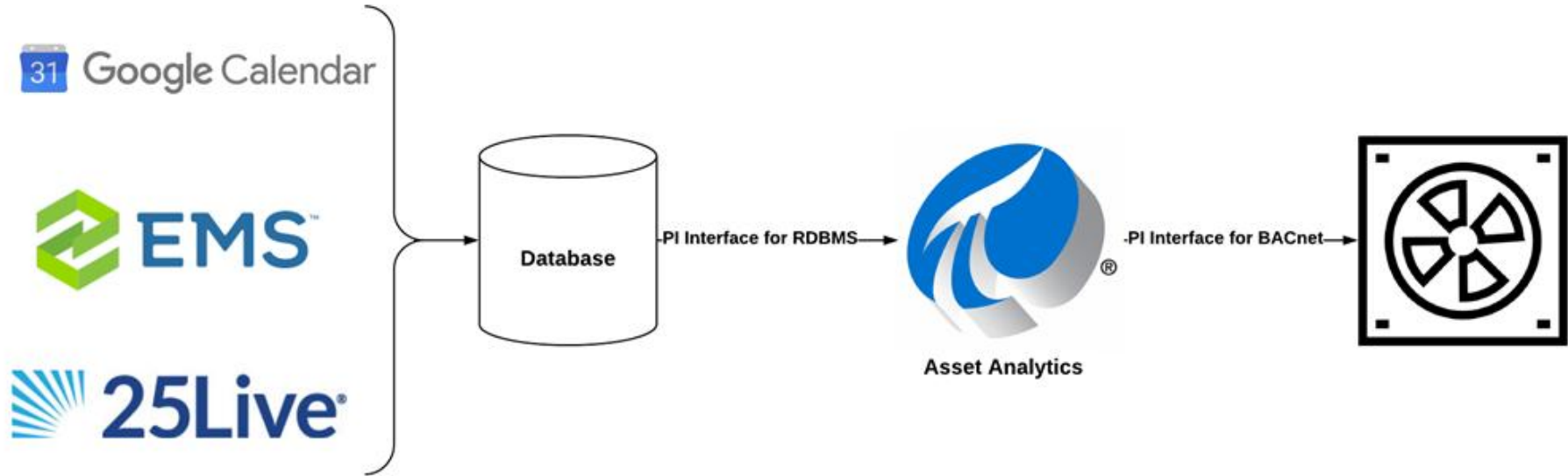
Challenge: Reduce Conditioning of Classrooms

- Manual scheduling
- Overuse of equipment
- Unnecessary energy use



Average Occupied vs. Run Times

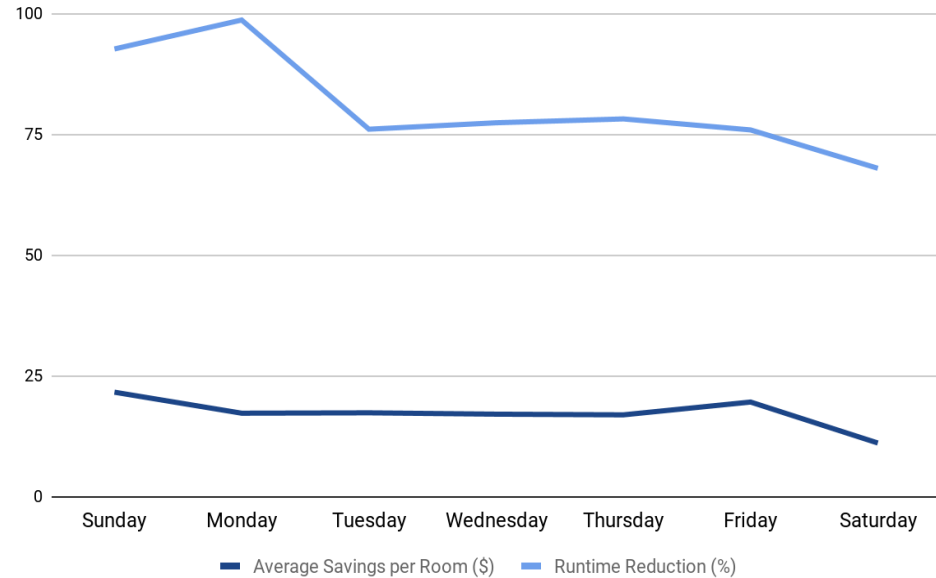
Solution: Smart HVAC Scheduling



Automated HVAC Scheduling Process

Result: Resource Optimization

- Automated scheduling
- Reduced runtime
- Energy savings



Average Savings and Runtime Reduction

Connecting a Campus Infrastructure



The University of Maryland, College Park Facilities Managements (FM) aims to continuously improve responsiveness, cost effectiveness, and service quality while meeting or exceeding customer expectations.



CHALLENGE

No real-time operational transparency, causing delayed response and recovery times

- No remote monitoring of CHP Plant, requiring a physical visit
- Highly customized scripts and multiple UIs required to capture and view data from other systems

SOLUTION

Situational Awareness through data centralization, visualization, and analysis using the PI System

- Utilizing 5 interfaces to collect data
- Waterfall Secure Gateway for secure connectivity to Plant data
- PI Vision and Esri ArcGIS® to visualize data

RESULTS

Resource optimization, improved incident response, and empowered FM staff

- Reduced electrical outage response times from up to 90 minutes to almost instantaneous
- Up to \$500,000 annually in cost avoidance from mechanical room flood prevention

What's Next

- Expansion to all campus satellite utility buildings
- ArcGIS® integration of remaining utility grids
- Outage map
- Monitoring of Emergency Power Generation and UPS units
- Smart HVAC Scheduling expansion
- Integration with work order management system



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- DSA

Questions

Please wait for the **microphone** before asking your questions

State your **name & company**



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Merci

谢谢

Спасибо

Danke

Gracias

Thank You

감사합니다

ありがとう

Grazie

Obrigado

Come see us at Booth 48!