How Maintenance Management + IoT Solutions Can Enable Smart Building for Building Owners

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Class summary

Valuable BIM data developed for construction is frequently lost at Building Hand-over. Additionally, that same BIM data may not be accurate or include all points needed by the Facility Management teams. Lastly, whole building energy management systems can be excessive for some client needs. Learn how new integrated solutions can utilize construction BIM data to dramatically expedite Facilities Maintenance Management System (FMMS) implementation. See how BIM data can be normalized and verified using cloud based QA/QC tools prior to FMMS implementation. Understand how new wireless power sensing devices integrate with cloud FMMS to offer real-time alarm and reporting of critical equipment. This presentation will focus on the integration of these solutions as an example of how technology can be coupled to leverage cloud to cloud services for a more powerful business solution.

Key learning objectives

At the end of this class, you will be able to:

- **Understand how positioning BIM and educating building owner/operators on these new technologies will help with broader appreciation of BIM practices**
- **Learn how new systems allow direct data transfer of BIM construction and commissioning data to Cloud FMMS to accelerate implementation.**
- **Finding out about wireless power sensing devices that integrate with FMMS and allow for power consumption analytics/reporting.**
- **Learning how separate technical solutions can be integrated together to provide powerful systems for sensing, notifying, reporting and analysis of facility equipment power data.**

Agenda

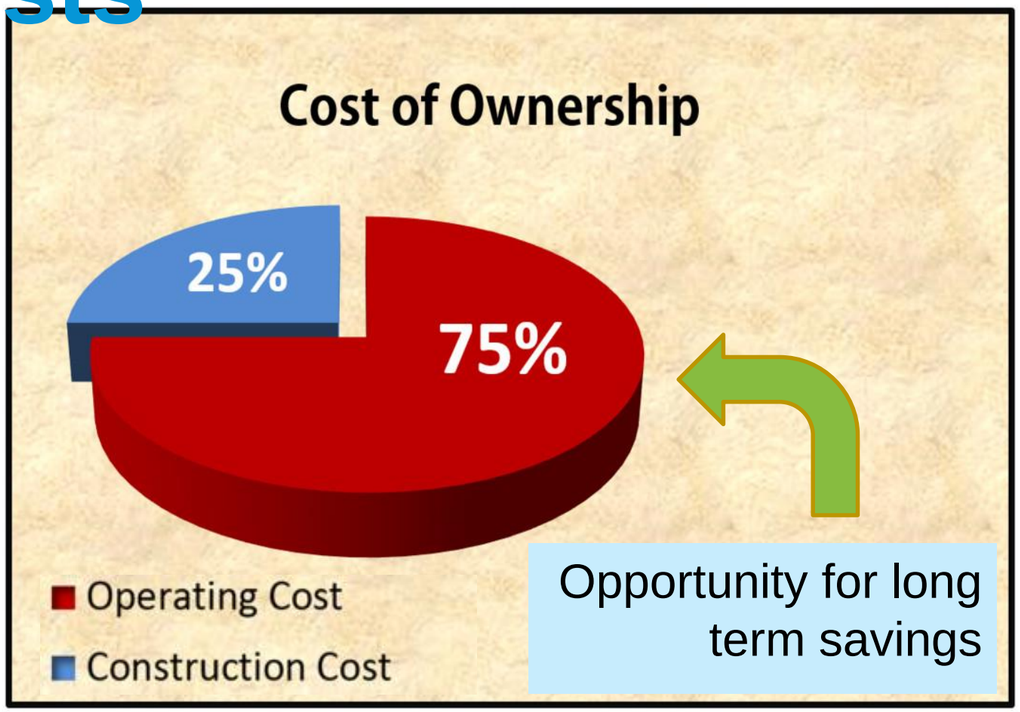
- Discuss business issues that are driving and influencing the technology we are covering today
- Review the Autodesk Building Ops platform
- Review the Panoramic Power Monitoring solution
- Explain the planning and integration processes and discuss best practices for a successful implementation
- Questions and Answers

Business issues - Lost BIM Dat

- Building owners and developers may not understand or appreciate the value that BIM brings to their facilities
- Many large building projects that do use comprehensive BIM methods during design and construction never see the benefit of the digital BIM information after building hand-over

Business issues – Energy Costs

- **The cost of electric energy is increasing, and will continue to do so.**
- **Building lifespan operational costs make-up 70%-80% of a total cost of ownership, construction and design are 20%-30%.**
- **Small operational improvements and energy savings across the life of the building can yield substantial cost savings over the life of the building.**



Operating costs include utilities costs and maintenance

Business issues – Year one warranty…and after

- Contractors can suffer profit loss and client dis-satisfaction when new equipment is not maintained or fails during the first year of operation.
- In the interest of maintaining customer relationships, many contractors will absorb most warranty cost factors that arise, again cutting into overall profitability.
- Many building contractors are looking for ways to increase post-handover services, enabling ongoing revenue and maintaining a closer client relationship.

What is Autodesk Building Ops?

- **Mobile-first** maintenance management solution with mobile and web clients
- For maintenance managers, **technicians**, and building occupants
- Connects **BIM asset data** to the people who need it most, when they need it, where they need it

What Are the Benefits of Building Ops?

Building Ops benefits to both general contractors and owners

- **Improves the handover experience** by allowing direct import of building operations data in a way that makes it immediately actionable and contextually relevant
- **Enables owners to begin operations on day one** with a turnkey maintenance and asset management solution
- **Helps contractors better service warranty requests** and reduce expenses from unmaintained equipment
- **Offers a simple and elegant mobile and responsive web interface** that meets the needs of the mobile maintenance workforce
- With **Panoramic Power**, makes **Predictive maintenance** accessible to everyone

Mobile-first
Easy to Learn
A Joy to Use

Occupants and technicians can **create tickets** on their phones, **attach photos** and **videos,** and **speed data entry** with **voice-to-text**

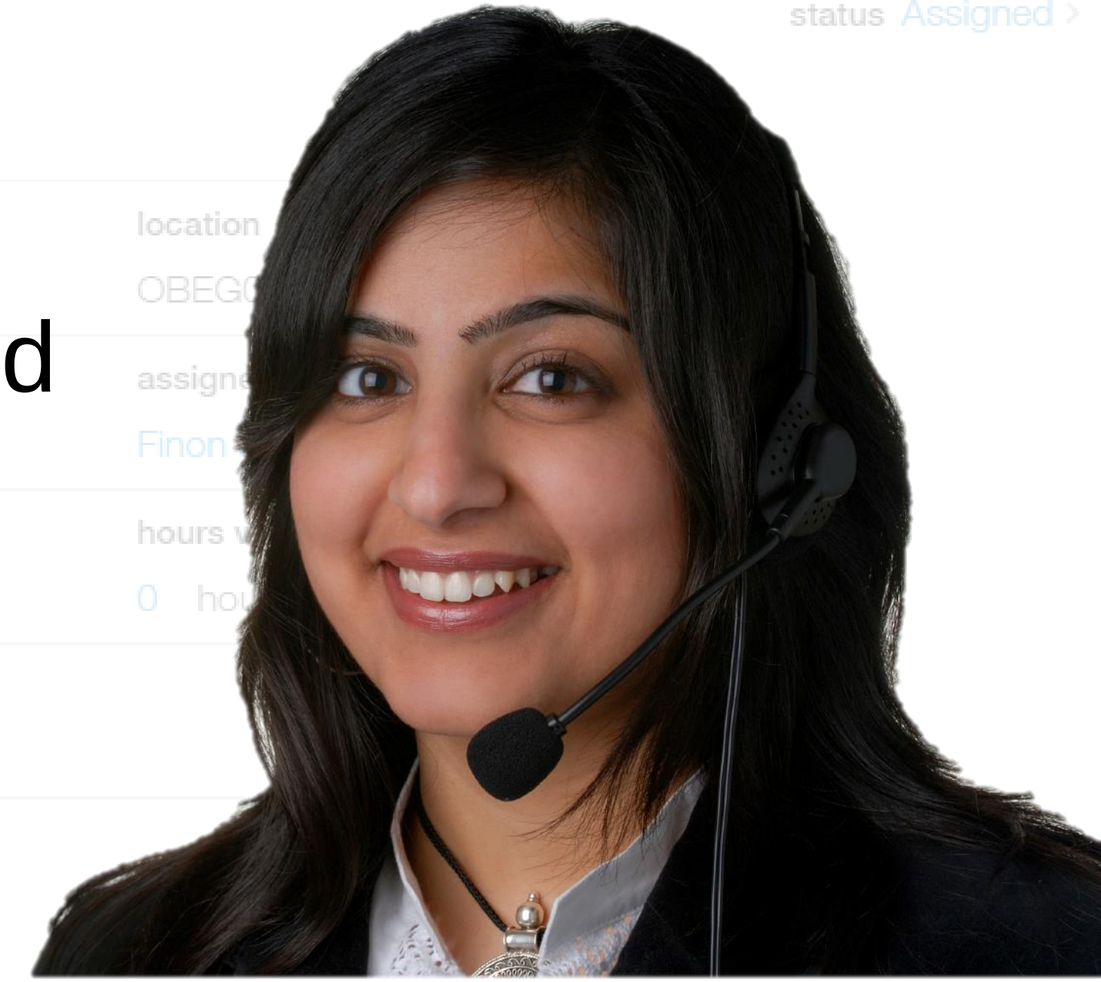
Complete Information

Don’t make your team search for what they need. Put everything in the palm of their hands:

asset history, checklists, documents, manuals, photos, videos, and models

Assign, Schedule, Notify

With Building Ops, you can assign **reactive tickets** and schedule **inspections** and **preventive maintenance** Notifications are sent automatically



Predictive Maintenance

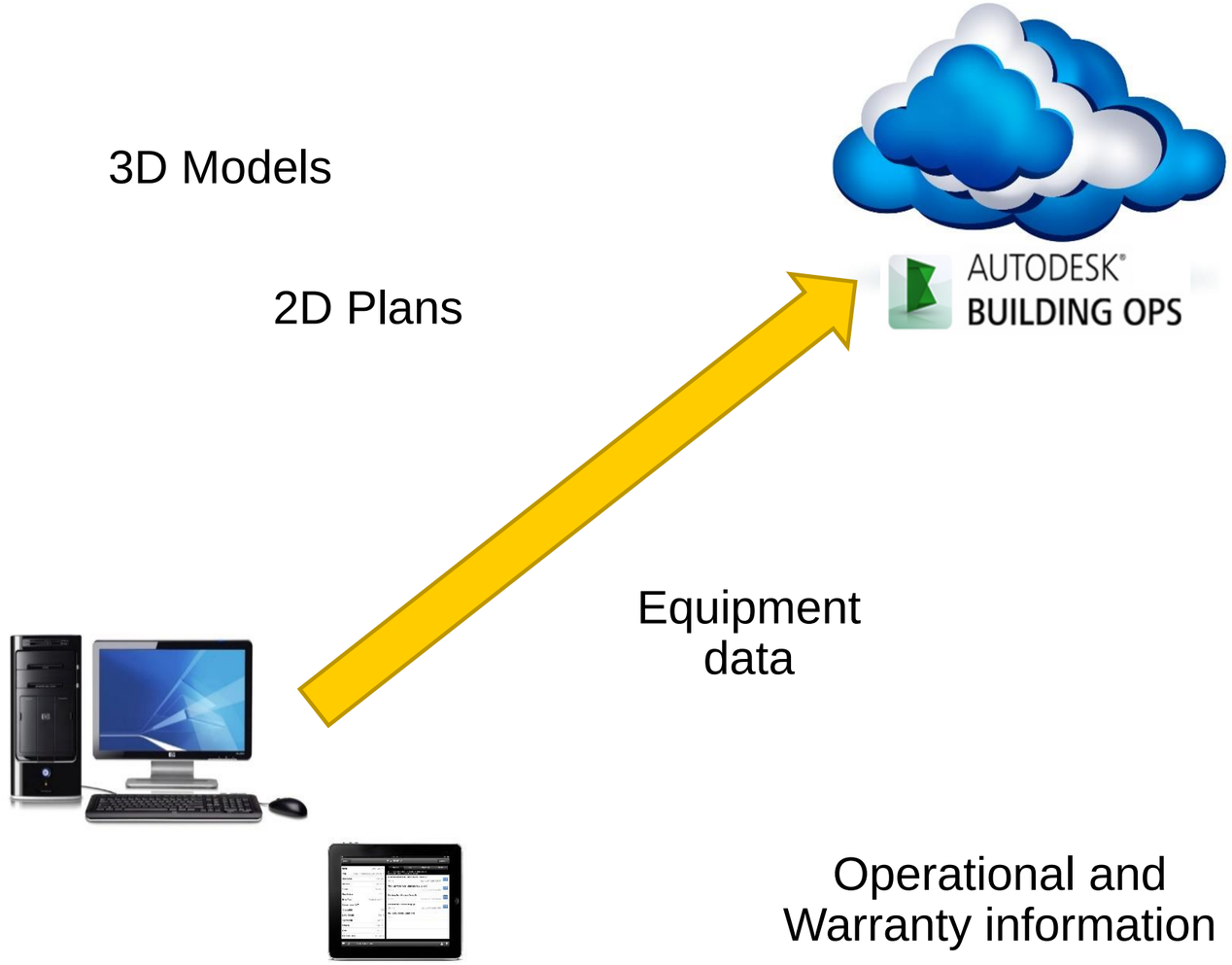
Panoramic Power's **induction powered, wireless sensors** and software generate alerts when an asset's performance changes, **automatically** creating **tickets in Building Ops**

Flexible Settings

- Limit domains from which occupants may join
- Specify days of the week on which tickets may be due
- Customize priorities and reasons for needing attention

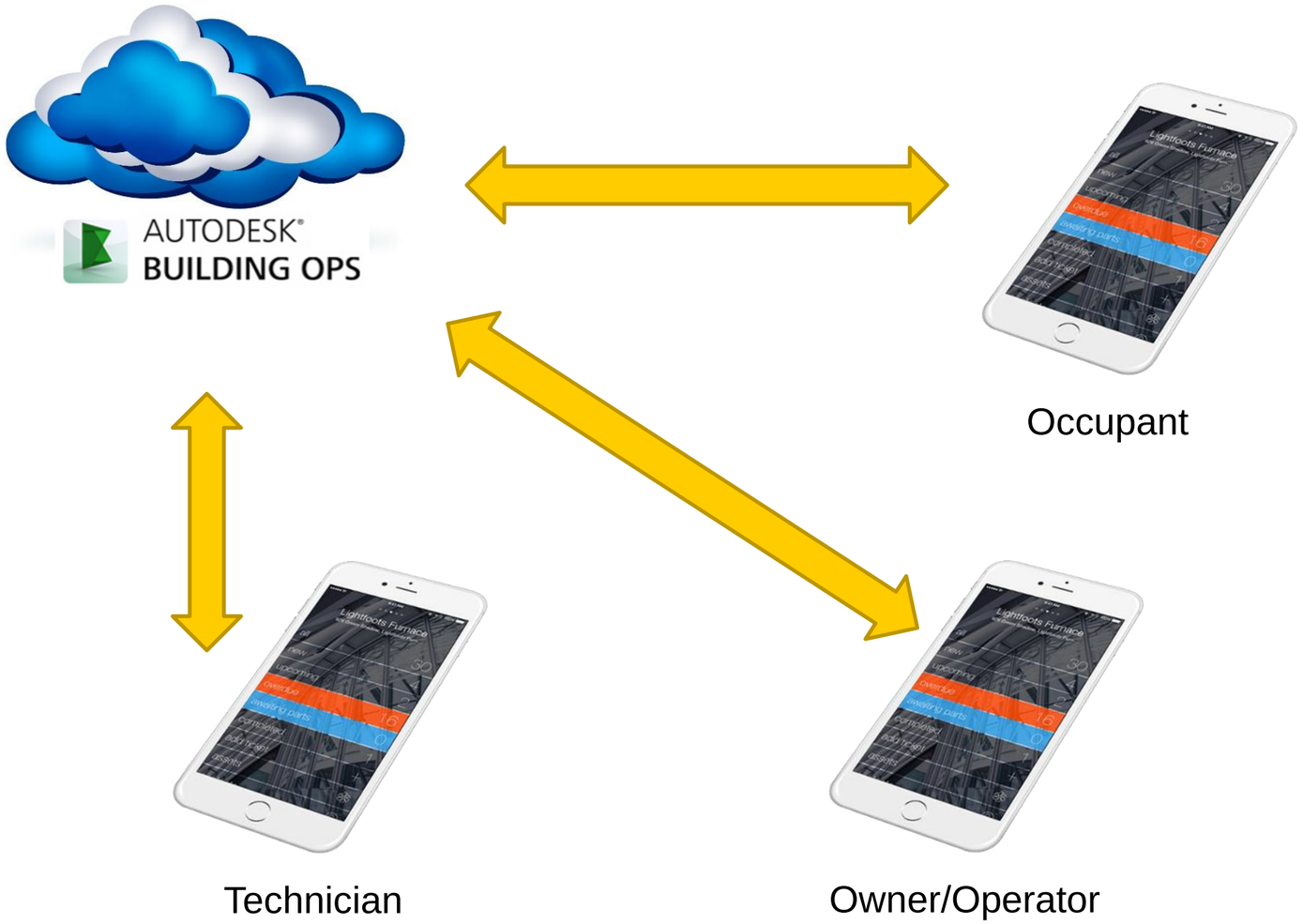
Data/Setup

Add assets directly from Autodesk **BIM 360 Field,** Autodesk **Revit 2016, CSV** or **Panoramic Power**

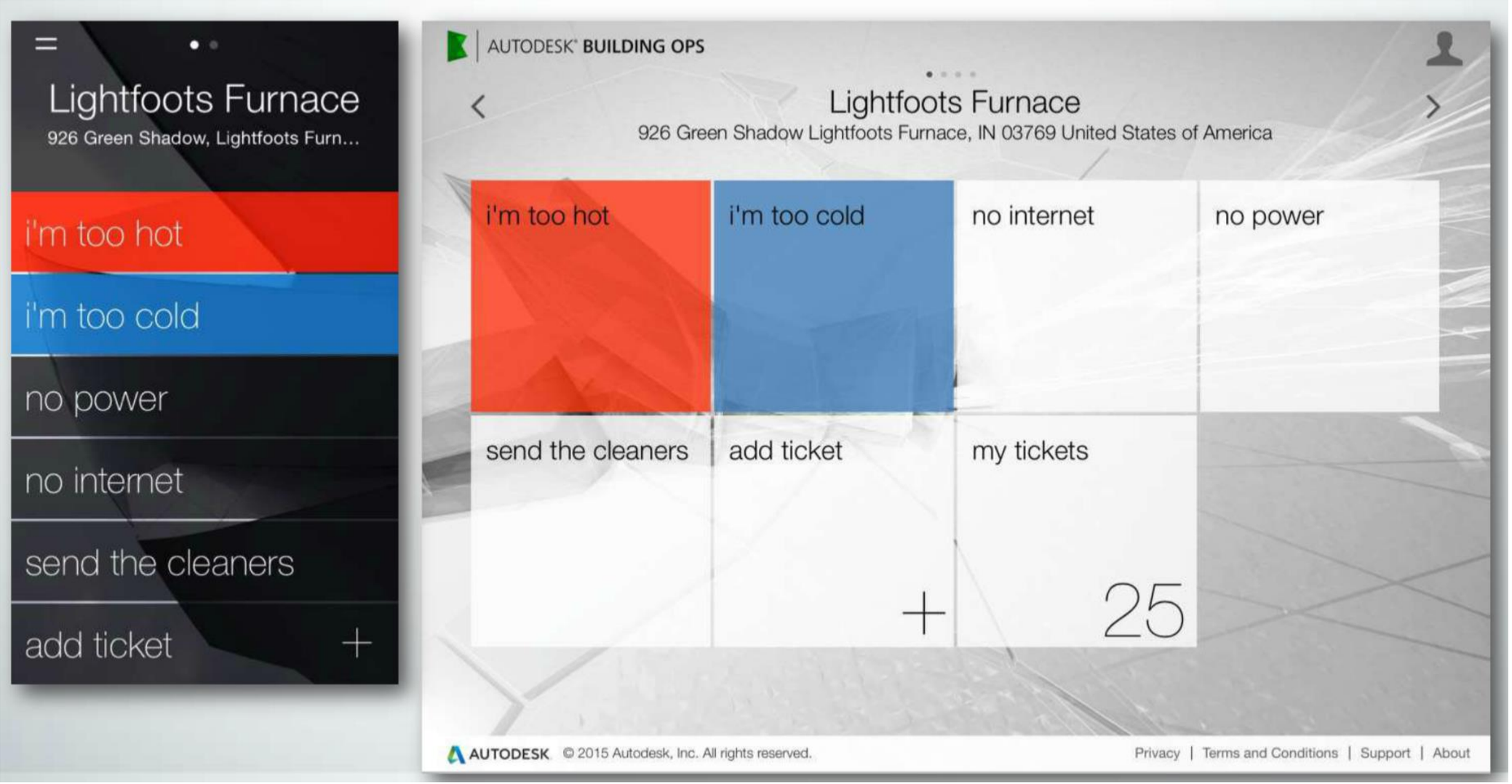


Data/Workflow: Reactive

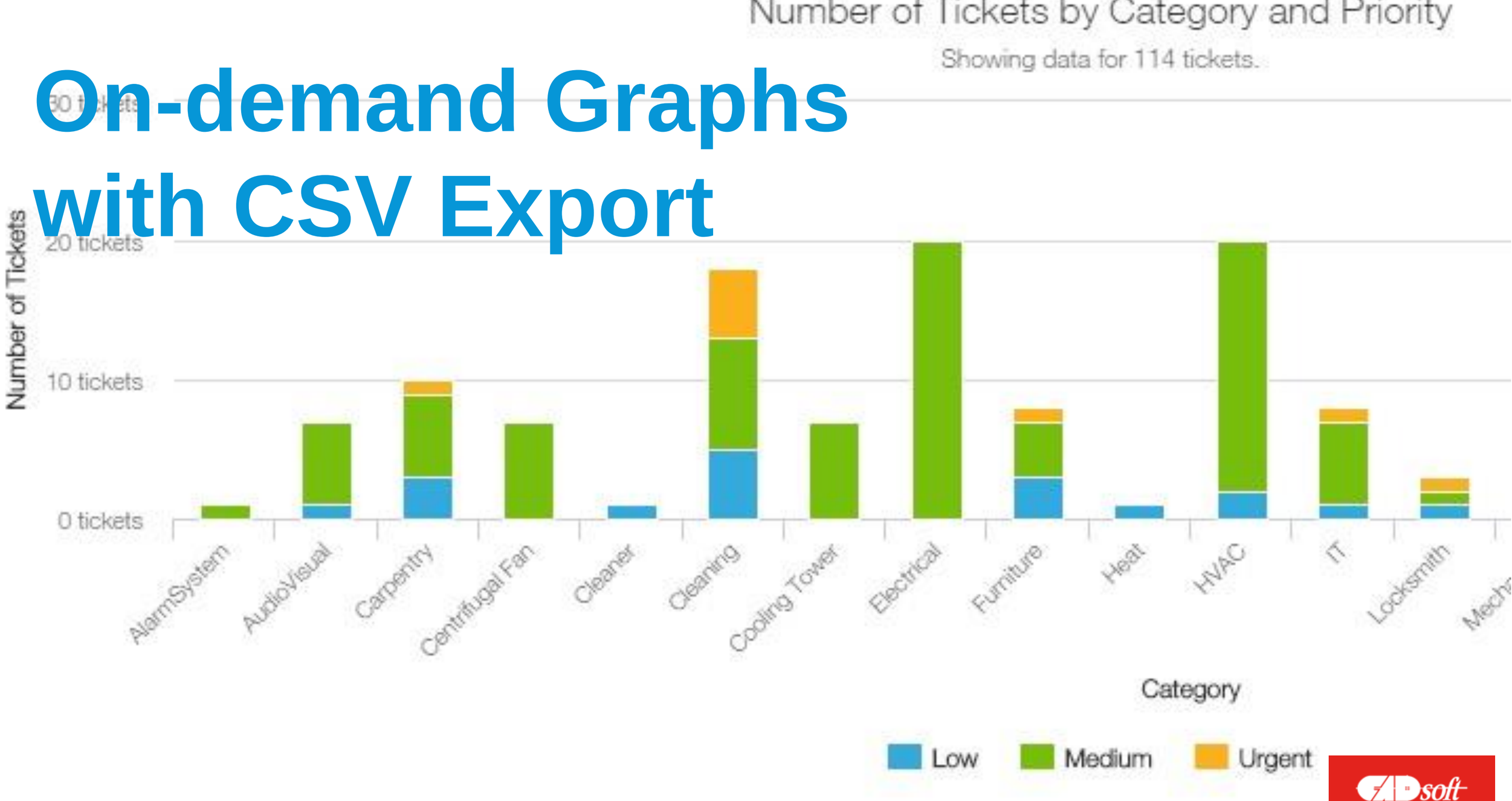
- Occupant initiates ticket
- Technician receives ticket and solves issue
- Owner/Operator tracks progress runs reports



Simple User Interface



On-demand Graphs with CSV Export



A new approach to energy management

Energy awareness

This happens every day at facilities

- Heating and A/C on at the same time
- Lights running off hours
- HVAC poorly adjusted to weather
- Unscheduled, emergency maintenance

Common challenges for Facility Managers

- Which device used how much energy and when?
- Did the lighting retrofit really deliver ROI?
- Is my Building Automation System correct?
- Start/stop times not correctly set
- Lack of visibility into system performance

You can't manage what you don't measure!

Yesterday

Today

FROM metering buildings TO device monitoring

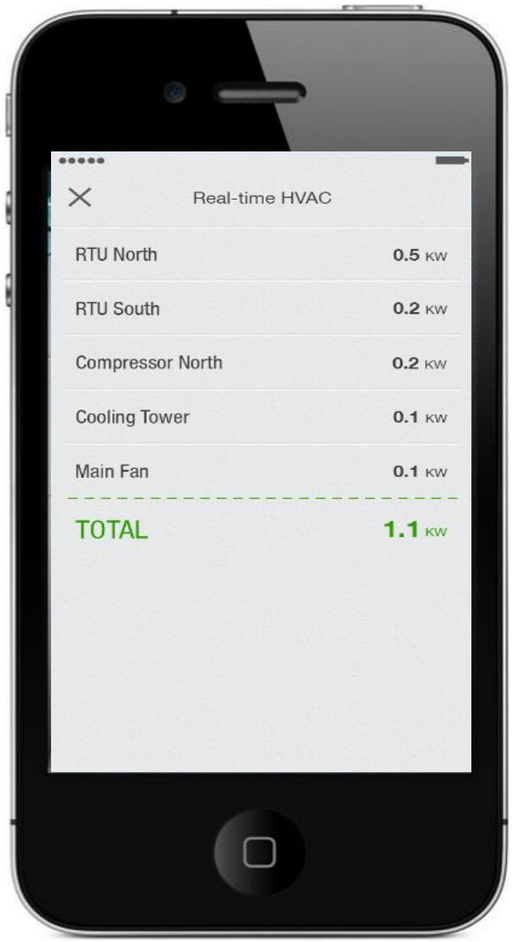
Every asset has an energy profile…..

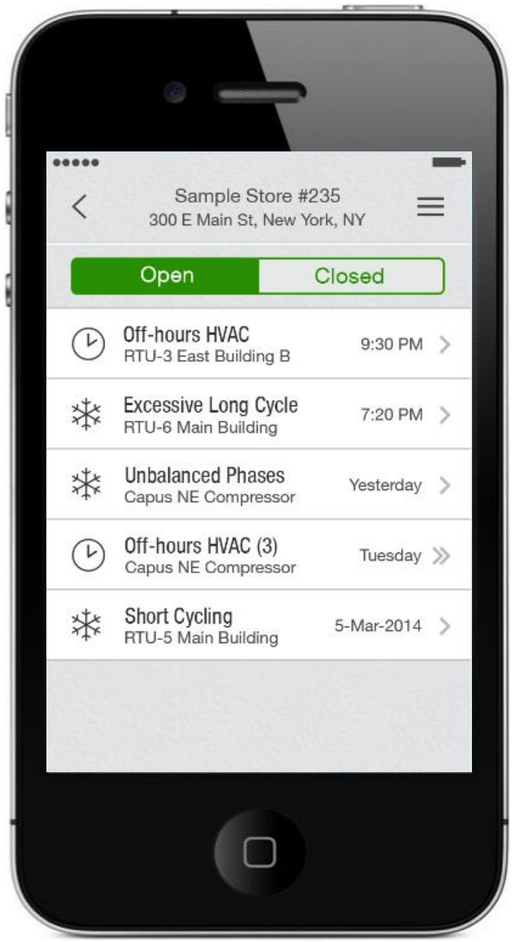
…That's why monitoring devices matters

A cardiologist can pinpoint issues by looking at the electrical pulses of the heart

A facilities manager can predict asset failures and waste via its device energy profile

Actionable intelligence at your fingertips





Easy to deploy in a couple of

Panoramic Power

Wired Solution

Our Solution & Technology

Quick and effective state of the art technology for device-level monitoring

1 Snap

- Non-Invasive
- Self-Powered
- Wireless
- No Disruption
- No Maintenance

2 Connect

- Plug & Play
- Cellular or Wi-Fi
- Up to 250 sensors

3 Set Up

- Role Definition
- Executive Reports and alerts
- Set Goals
- Measure Benchmarks

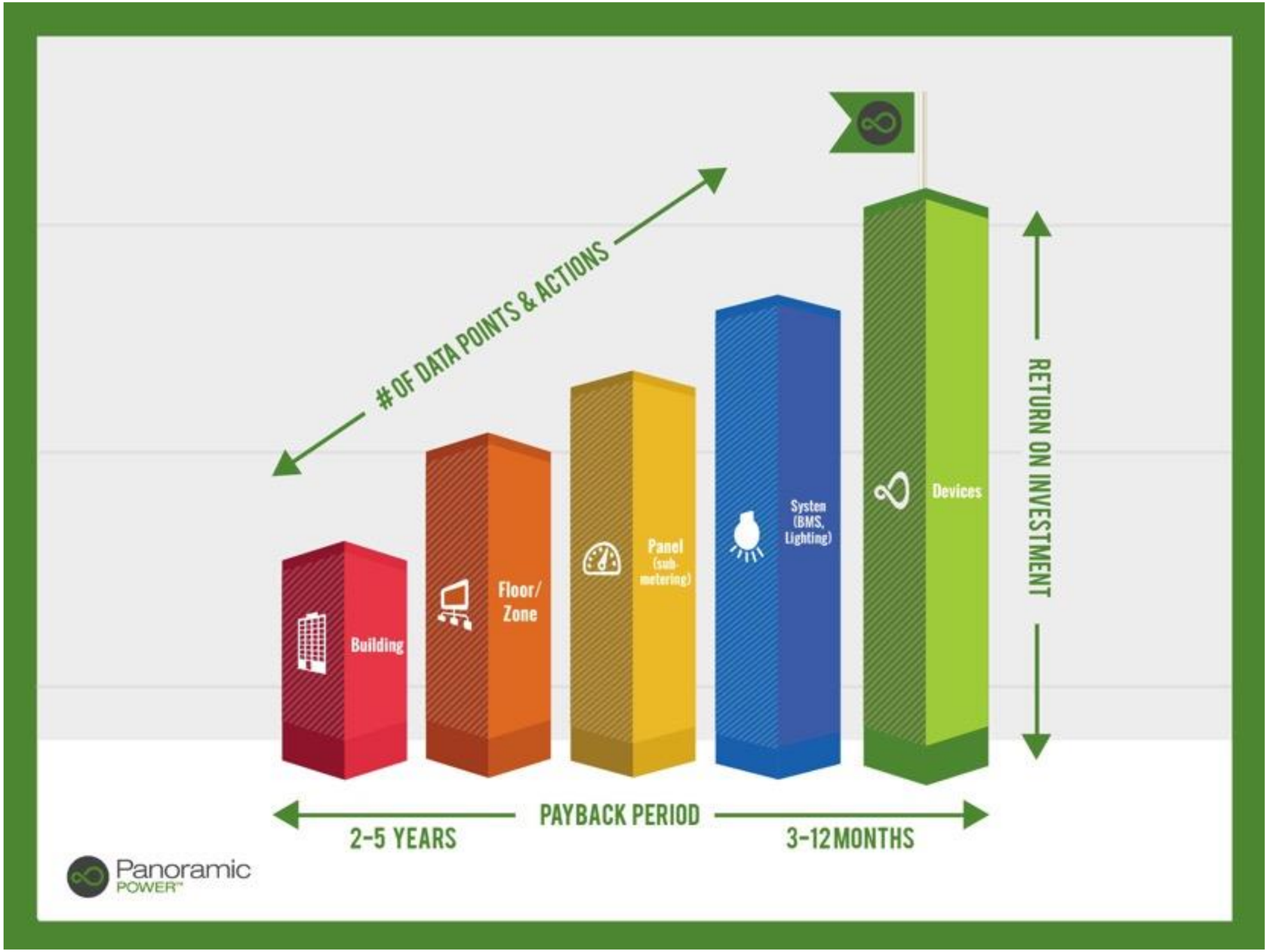
4 Start Saving

- Management By Exception
- Scheduled Reports
- Real-Time Alerts
- Online Analytics
- Manage Chain-wide

Data ›› Insight ›› Actionable Results

Full Portfolio Of Sensors & Meters

5 levels of energy visibility

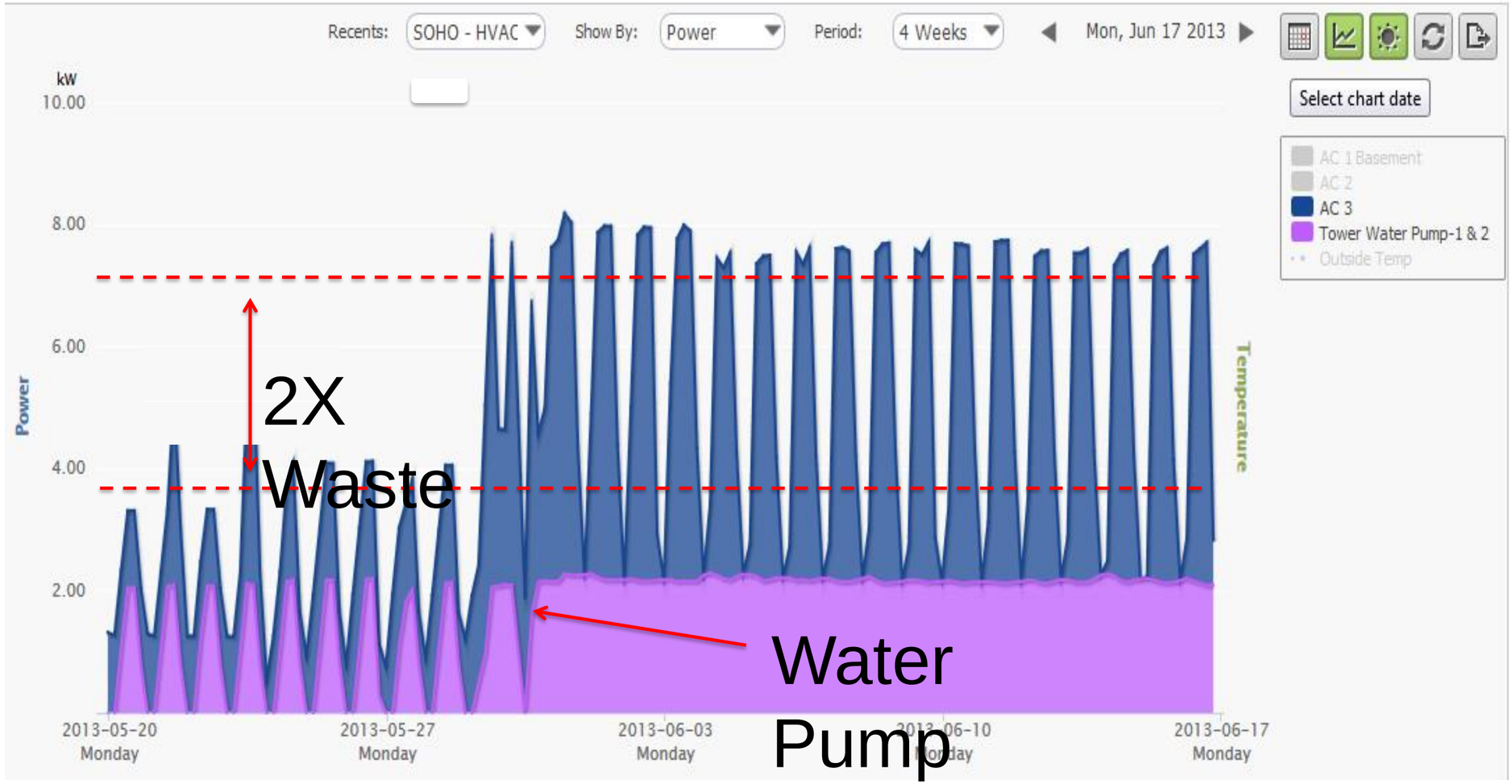


Energy intelligence: what if we could predict it?

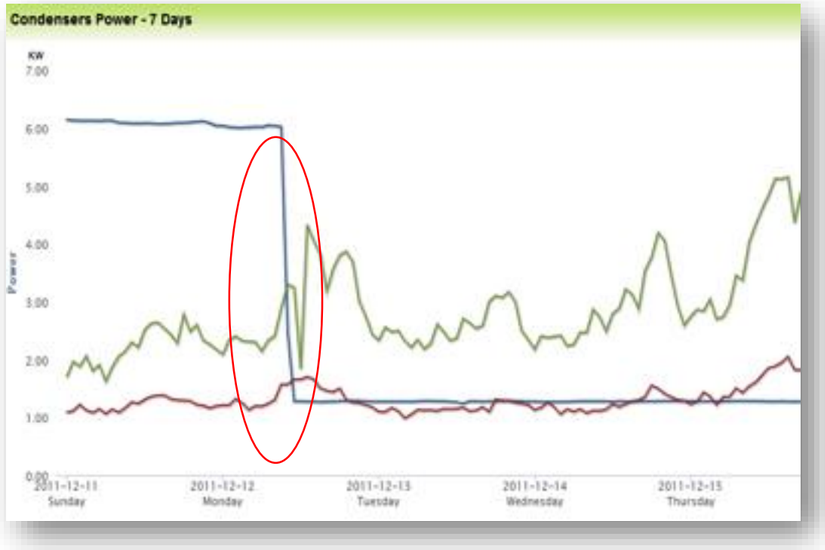
- ✓ Advanced Failure Detection
- ✓ Interrelated Systems Performance

Interrelated systems performance

- Customer discovered that a water pump malfunction affected AC unit 3 causing 100% increase energy waste



Emergency maintenance fault detection



After power outage, Condenser unit rack lost control (running flat out 100%)

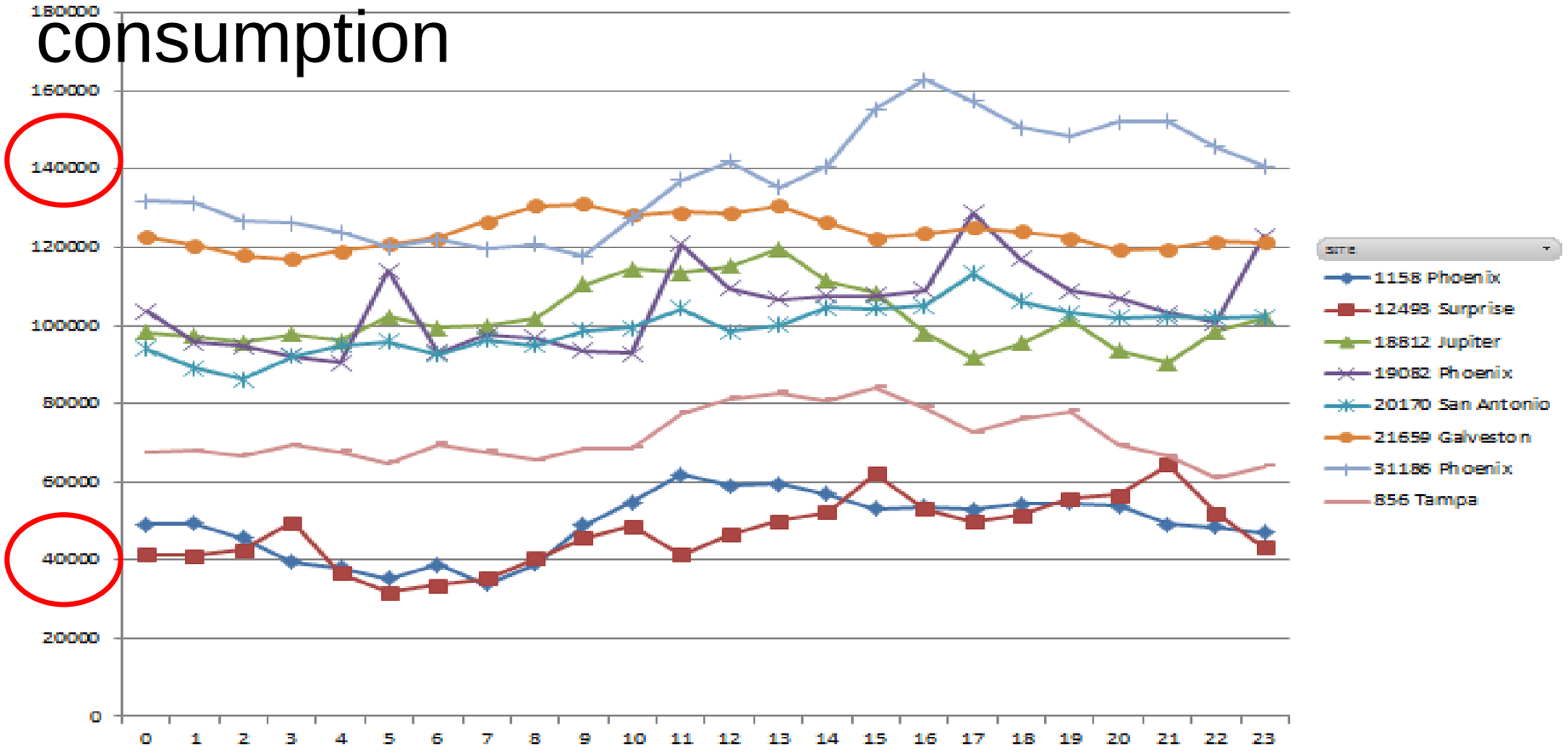
Six weeks later: total failure

Improving performance with benchmarking

How do I find inefficiencies in a large campus environment?
(hospital, university, corporate business park)

Identifying inefficiencies through benchmarking

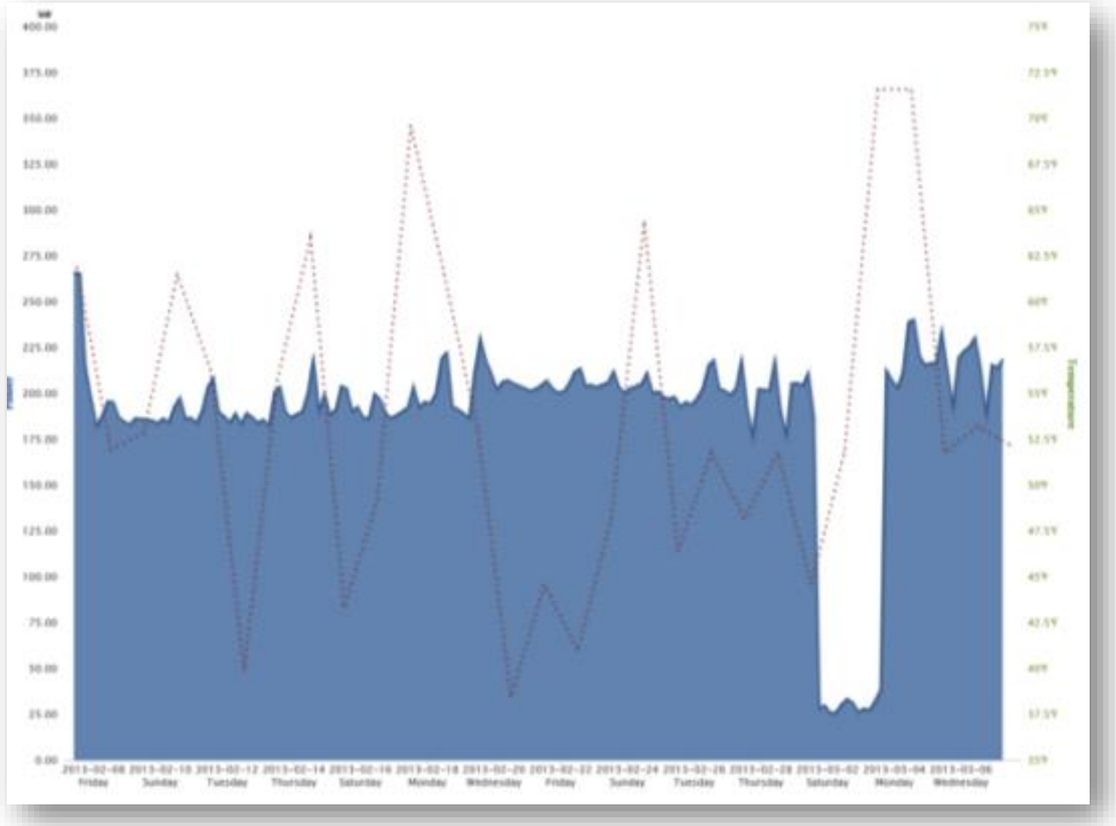
RTU: 350% difference in energy consumption



Energy efficiency: detection

ISSUE DETECTION:

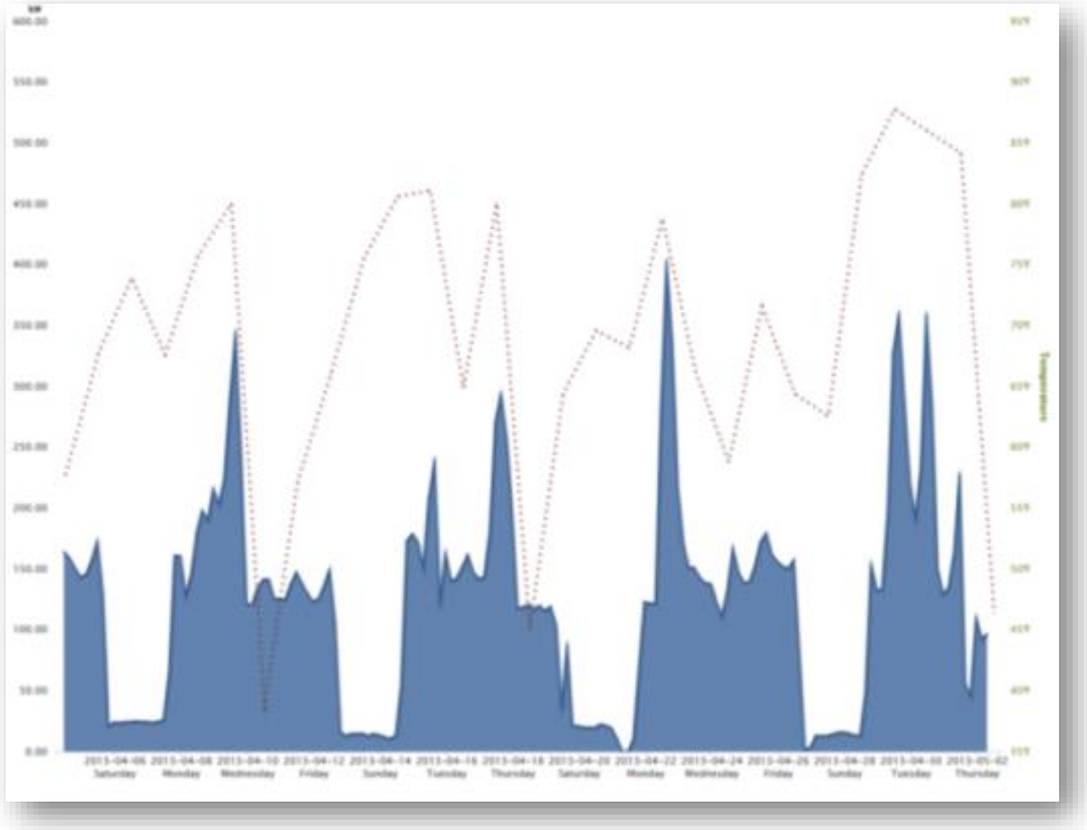
- RTUs Running 24/7 With Excessive System Cycling
- KPIs 3 Times Above Average
- No Correlation With Outside Temperature
- BMS Settings Incorrect
- 5 Economizers Broken



Energy efficiency: data analysis & correction

BOTTOM LINE:
$48,230 SAVINGS (30%)

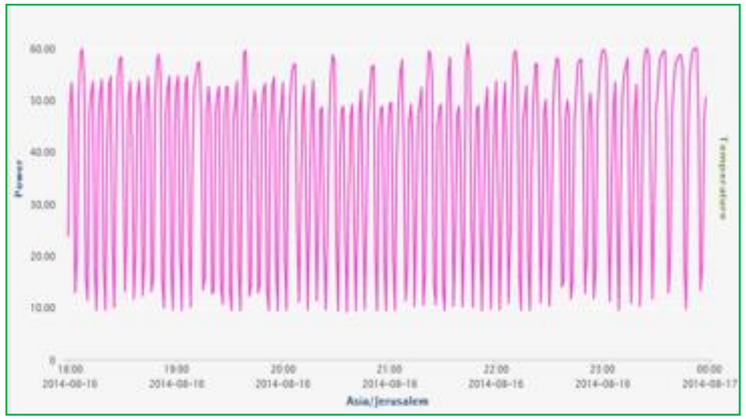
- Simple ROI 5 Months
- Increased Site Profitability
- Quantifiable Results

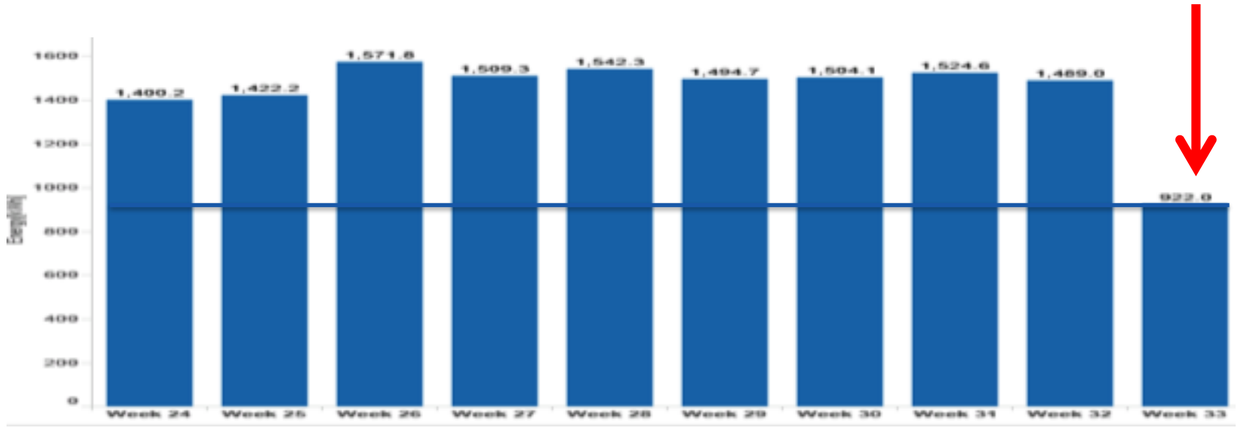


HVAC compressors

1. HAVC compressors before monitoring

2. Operation after monitoring

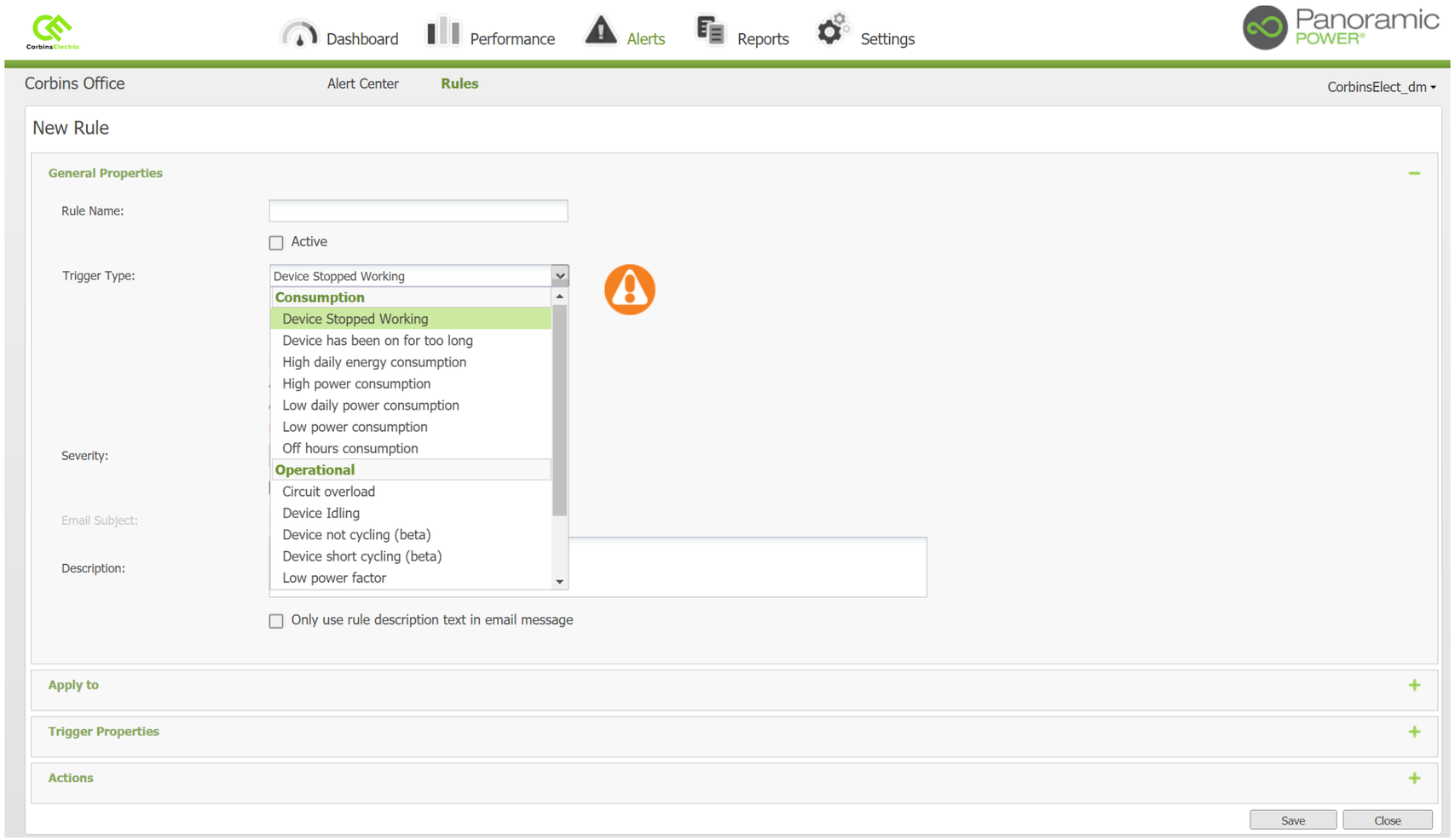




21% reduction in HVAC operations

Rules and Alerts

- **Build custom Rules and Alerts, utilize standard logic scenarios built into configuration tools**



Where are we heading?

Device Analyzer and Machine Learning

- **Utilize device power signatures to establish “normal” operations, save signature in Power Radar System, then Alert on abnormal**

- Partnership with Corbins Electric

- **Installation**
- **Consulting**
- **Trends**
- **Analytics**
- **Energy Savings Recommendations**

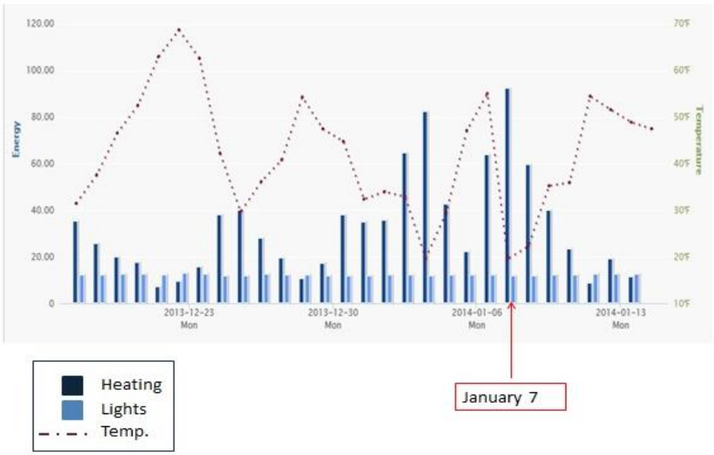
Systems Integration, planning, cost metrics, and business alignment

AUTODESK® BUILDING OPS

+

Panoramic® POWER

Systems Integration – Building Ops and Panoramic Power



Technician

Planning the systems…begin with the end in mind

Obtain following info from Maintenance team…as early as possible in project

1. **Existing workflow of maintenance ticket process**
2. **List of all equipment to be in Building Ops or Panoramic Power**
3. **Determine where Equipment data is sourced from (ie Revit, BIM360 Field, CSV…)**
4. **Names, assignments, and contact information for field techs and Owner(s)**
5. **Determine preventive maintenance schedules for each equipment type**
6. **Determine critical warranty dates for each equipment type**
7. **Define alert triggers for critical Panoramic monitored equipment (Predictive Maintenance)**
8. **Define automated report data and intervals**

Cost Factors - Sample #1 Project Pricing Estimates

Single Building-small-medium sensor install-Building Ops and 16 PanPower sensors

All inclusive, system planning, hardware components, installation, training and analysis of data.

Year one, includes system planning, hardware components, cloud services, installation, training and analysis of data…. $9,000

Year two, includes Cloud service costs and analysis of data…$3,960

Cost Factors - Sample #2 Project Pricing Estimates

Single Building-small-medium sensor install-Building Ops and 32 PanPower sensors

All inclusive, system planning, hardware components, installation, training and analysis of data.

Year one, includes system planning, hardware components, cloud services, installation, training and analysis of data…. $15,095

Year two, includes Cloud service costs and analysis of data…$4,920

Business Alignment

- Contractors can provide either or both integrated systems for first year as part of whole solution or optional added scope
- Provides high visibility of new systems under required first year of warranty, protecting contractor from potential losses from maintenance based failures
- Establishes simple and cost effective equipment monitoring and maintenance system for the building owner to benefit from for the life of the building, they can simply take over the annual Cloud service fees
- Can support and facilitate new building maintenance service agreements as established system will be incumbent

Summary

- Autodesk Building Ops provides a simple, cost effective, cloud based computer maintenance management system that can leverage construction BIM data to expedite implementation.
- Panoramic Power provides a simple cost effective device level power monitoring system that implements quickly and has powerful analytic tools.
- The two cloud based systems both have their own IOS apps for nearly instant communication, collaboration, and facility/equipment information access.
- The two systems provide great value separately on their own, and even greater value when integrated to leverage their individual strengths together.

Q & A

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- Give feedback after each session.
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