We’ll be starting in just a few minutes….

Tell us…please send your response to the webinar organizers via the chat window:

1. What topics are you interested in for future webinars?
Cutting Edge Building Technologies – Join the Fun!

January 12, 2016
3:00-4:00 PM ET
Overview and Agenda

- Welcome & Introductions
- Case Study – New York Presbyterian
- Case Study – enVerid
- Additional Resources
- Question & Answer Session
# Today’s Presenters

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<td>Roberto Nunez</td>
<td>New York Presbyterian Hospital</td>
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Andrew Mitchell

U.S. Department of Energy
High Impact Technology (HIT) Catalyst

Goal: Identify, promote, and stimulate HITs

1. Identify High Impact Technologies
   - Stakeholder Interest
   - Energy Performance
   - Market Adoption Potential
   - What makes a High Impact Technology?
   - Cost Effectiveness
   - Manufacturing Capacity

2. Define the game plan for promoting identified High Impact Technologies
   - Set HIT's long term goal
   - Analyze gaps and barriers to HIT adoption
   - Assess existing resources supporting HIT
   - Evaluate HIT key drivers and audiences

3. Stimulate the market to adopt proven High Impact Technologies

http://energy.gov/eere/buildings/high-impact-technology-catalyst
Identify, Evaluate, Prioritize Building Technologies

Deployment prioritization enables partners to focus on market-ready, high potential technologies in a shifting landscape with multiple, complicated choices.

Initial Screen
(energy performance, stakeholder interest, manufacturing capacity)

Secondary Screen
(stakeholder input, criticality of federal involvement, cost effectiveness)

Broad Technology List
 drawn from:
• RFI
• Tech Analysis Tools
• Inter-Agency Input
• Manufacturers
• Market
• Utility programs

High Potential Technologies

HIT List
• LED Lighting + Controls
• Smart Buildings Systems
• Window Attachments / Shading
• Refrigerated Case Retrofits / Controls
• Fans / Blowers
The 5 High Impact Technologies (2015-16):

1. LED Troffers with Controls
2. Packages of Building Management and Information Systems (including submetering, control and automated fault detection and diagnostics)
3. Shading Attachments and Awnings
4. Refrigeration Controls & Display Case Retrofits
5. Commercial Fans and Blowers
Define the Game Plan by Selecting Core Activities

...the cost is too high.
HIT Solution → INNOVATION CHALLENGE

...there are too many barriers.
HIT Solution → develop RESOURCES to support simplified adoption.

...they are uncertain about real world performance.
HIT Solution → real building TECHNOLOGY DEMONSTRATION

......they are waiting until the broader market adopts.
HIT Solution → ADOPTION CAMPAIGN to lock in savings.
1) Stimulate the Market by Issuing a Challenge

When the building owners say “the cost is too high”...

• DOE and Commercial Building Owners Issue a Challenge for manufacturers to innovate toward more efficient performance and features

• Currently ongoing: The low cost wireless submeter challenge

• The Roof Top Unit Challenge was issued in 2010 zero RTU models met the 18 IEER criteria. By 2014, 21 RTU models exceeded the 18 IEER criteria.

• DOE verified performance and recognized winning manufacturers:

Credit: Peter Yuen, NAVFAC
2) Stimulate the Market by Providing Resources

When the building owners say “There are too many barriers, uncertainties, or unknowns”…

• Technical experts, manufacturers and end users collaboratively develop criteria.

• Provide boundaries for companies to select efficient technologies.

• 10 existing performance specifications represent 12% energy savings ($24 Billion) across commercial buildings
3) Stimulate the Market by Proving Performance with a Demonstration

• Market Stimulation Activity = Real Building Demonstration.

• Match HITs and Partners and National Laboratories:
  - Sites (as applicable)
  - 3rd party measurement and verification.

• Demonstration generates performance data and market information.

• Cultivate the path to market through dissemination of information and resources to enable adoption by partners.

• Better Buildings members notified first
• Sign up to host a demo site [HERE]
When the building owners say “I think I’ll wait”...

- Key industry partnerships for outreach, technical assistance, and recognition for best practices
- Resources and technical assistance from national experts
- Hub for technology information: case studies, specifications, guidance, incentives
- Commitments enable DOE to track metrics
Stimulating Adoption: Interior Lighting Campaign

- Goal: 1,000,000 lighting retrofits
- LED lights with controls produce 30-75% savings
- Awards at the Building Owners and Managers Association (BOMA) Conference in 2016
- Federal Lead by Example: GSA
- Commitments from Target, Macy’s, MGM, Sands, CKE, City of Milwaukee, DoD, Wendy’s, more...
- Recognition for best practices and energy savings at the BOMA Conference in 2016
- Join! At www.interiorlightingcampaign.org
Promotes high-efficiency RTU solutions high-efficiency replacements, and new

Advanced RTUs produce 20-50% energy savings and $900-$3,700 energy cost savings per RTU

Goal: 75,000 RTUs

Recognizing Best Practices at the Professional Retail Store Maintenance (PRSM) Conference in 2016

www.advancedrtu.org
Stimulating Adoption: Lighting Energy Efficiency in Parking

- Supported with multiple case studies and a performance specification
- Launched in 2013 to promote high performance lighting in parking lots and parking structures
- Savings = up to 80%
- 350 partners
- Over 475 million square feet, 1.4 million parking spots retrofitted
- Savings so far of 120 million kWh, over $10 million annually; 146M pounds of CO2
- [www.leepcampaign.org](http://www.leepcampaign.org)
Predictive Energy Optimization
New York Presbyterian Hospital
The Allen Hospital/The Spine Hospital

Roberto Nunez
Director-Facilities Operations
Introduction

Roberto Nunez (CHFM, MBA)
Director-Facilities Operations and Engineering
New York Presbyterian Hospital-
The Allen Hospital / The Spine Hospital Campus

-12 Years with Organization
-17 Years working with DDC (NYPH, Siemens & Johnson Controls)
Overview

Energy Management

BMS

HVAC

AIR Flow
BuildingIQ Functional Position

Decision Making Software

Set Points

AHUs

Auto Adjust
Supply Air Temp
Supply Air Pressure
BuildingIQ Interface Points

Chilled Water/Fan Coil Systems (per AHU)

- Actual supply air temperature
- Actual supply air static pressure
- **Supply air temperature Setpoint**
- **Supply air static pressure Setpoint**
- Chilled water valve position (AHU)
- Hot Water valve position (AHU)
- Zone/AHU return air humidity
- Outside air damper position
- BMS-side BuildingIQ enable/disable
- Occupied/Unoccupied
- Outside air temperature (global)
- Chiller(s) kW(h) usage (or % loading) (global)
- Whole-building kw/kWh metering (global)

DX AC Unit Systems

- Actual supply air temperature
- Actual supply air static pressure
- **Supply air temperature Setpoint**
- **Supply air static pressure Setpoint**
- Outside air damper position
- Outside Air Temperature (global)
- Zone/Unit return air humidity
- Compressor kw/kWh or % Load
- BMS-side BuildingIQ enable/disable
- Occupied/Unoccupied
- Whole-building kw/kWh metering (global)

*Note: Underlined points are control points*
The software’s algorithms continually model, learn and re-learn the unique behavior of the building

- Synthesizing this data, the software communicates sensible operational forecasts to the BMS, which the BMS automatically acts upon

Resulting in a **net drop in system demand**, without sacrificing occupant comfort
BuildingIQ calls this process:

*Predictive Energy Optimization™ (PEO)*

**PEO** results in lower energy costs, without sacrificing occupant comfort.
Advanced Artificial Intelligence (AI) algorithms learn and model thermal characteristics

- Continuously learn by analyzing energy, weather and BMS data coming from the building
- Intelligently determine optimal sequences, temperature set-points and other relevant system parameters
- Automatically adapt to changes in usage patterns, internal or external conditions
- Cumulatively improve performance
BuildingIQ Predictive Analytics

- Forecast future probabilities using current data and historical facts to better understand risks and opportunities.
BuildingIQ PEO: Dual Benefit

Financial Management Tool

- Reduce HVAC Energy Spend
- Create Cash in Form of Savings
- Finance Other Energy Projects
- Conserve the Cash of the Owners
- Avoid Costs
- Trim Budgets

Energy Management Tool

- Reduce HVAC Energy Consumption
- Reduce Demand
- Reduce Greenhouse Gases
- Analyze HVAC Performance
- Dynamic Energy Usage
- Continuous Optimization
BuildingIQ Predictive Energy Optimization (PEO) in Hospital Facility

![Graph showing average demand over time with Arrow labels: BuildingIQ Savings and TOTAL Energy Spend Savings = 20%]
Data profile from the Allen Hospital
Optimized Temperature Control
Optimized Power Profile
BuildingIQ Case Study

NYC Office Tower

Largest Gold LEED-EB in NYC
2.5 million square feet

$1.6 Million Saved
Over 4 Years

HVAC Spend
Reduction = 17%
BuildingIQ Portal: Building Visualization

Overview
- Name: Tyler Tower
- Location: 123 Broadway St
- Size: 234k ft

Savings
- $2,300
- 30-day total savings

Notifications
- 3 Critical
- 1 Warning
- 1 Info

Demand Response
- Events: Past 7 + Next 7 Days
- Pending: 1 Completed
- Scheduled: 1 Aborted
- In Progress: 1 Canceled

7-Day Energy Savings Performance
- Actual Usage
- Baseline Model
- Energy Savings
- Energy Overage
- Actual Weather Temperature

Communication Status
- Control of BMS: On
- New Notifications: 3 Critical
- Demand Response: 1 Events
- Building Time: 14:52
- Outside Temp: 72.9 F
- Site Agent: 4.1.8
BuildingIQ Customers

- Aetna
- Adventist HealthCare
- NV Energy
- EPRI
- DGS
- Citi
- Lend Lease
- Transwestern
- Brandywine Realty Trust
- NewYork-Presbyterian
- ACT Government Health
- Eastside Cannery Casino & Hotel
- Briarhill Realty Group Inc.
- Akamai
- Equity Office Properties
- Associated Students UCLA
- Akamai
- Lesner Inn
- Nicor Gas
- Gatski Commercial
- St. Vincent’s Hospital Sydney
- Genzyme
- Renaissance Resort Spa Casino Las Vegas
- Duke Energy
- Xcel Energy
- International Market Centers
- Schneider Electric
- Challenger
- American Nevada Company
- Museum of Contemporary Art Australia
- KILROY REALTY CORPORATION
- University of Nevada, Reno
- Australian Technology Park Sydney
- Australian Innovation, Sustainability, Community
- Genzyme
Summary

• Combining advanced machine data analytics and predictive modelling to deliver intelligent, automated optimization of HVAC maintaining comfort

• Proven 10-25% HVAC energy savings and up to 20% peak load reduction during demand response (DR) events

• Backed by industry-leading vendors and partnered with U.S. and Australian national labs
Thank You for Your Time
Commercial buildings use a lot of outside air

The reason: ensuring indoor air quality (ASHRAE 62.1)

A universal, but inefficient practice
A Better Alternative: Clean & Recycle Indoor Air

- Remove all molecular contaminants
- Reduce amount of outside air
- Lower energy costs & maintain indoor air quality
Introducing HLR® “Smart Scrubber” Technology

Add-on units perform four key Functions:

- Treat the indoor air
- Automatic self-cleaning ("regeneration")
- Manage the outside air intake
- Monitor, report and validate

HLR-1000E
Enabled by technological and regulatory convergence.

- Manned Space Travel Technology
- Research on Greenhouse Gas Mitigation
- Evolution of ASHRAE Rules (62.1 IAQP)

enVerid develops the HLR solution
Energy Savings Benefit and ROI

- Typical annual savings ~ 20%
- Peak savings > 40%
- Payback for retrofit is 1.5 – 3 years
- Even better for new construction is

- Other benefits
  - Reduction in equipment size / load
  - Less outside air = less pollution brought in
  - Extend life of HVAC filters
DOE-supported demo Project: Univ. of Miami Wellness Center

- 29% reduction in energy consumption with HLR ON
- All air quality parameters improved
Recognition
Accelerate Performance

A new construction initiative for superior energy performance

• U.S. Department of Energy initiative to scale performance-based procurement for new construction

• Achieve zero energy (or near zero energy) buildings at little to no cost premium

• Technical assistance and financial incentives to support your next project

• Projects must be in pre-design (prior to design team being selected) and in specific geographic region to qualify

Now recruiting pilot projects in the following states. For more details, visit www.seventhwave.org/accelerateperformance
Additional Resources
For More Information

U.S. Department of Energy
  • Energy Management & Information Systems
  • High Impact Technology Hub

New York Presbyterian Hospital
  • Partner Profile
  • Gallery Walks Implementation Model

enVerid
  • Technology
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Registration is now open!

Downstream Savings: From Water Efficiency to Energy Savings

February 2, 3:00 – 4:00 PM ET

Presenters:
United Technologies Corporation
The City of Atlanta
InterContinental Hotels Group

Register here.
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## Additional Questions? Please Contact Us

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