BUILDINGENERGY NYC

NOVEMBER 3, 2016 • TKP NEW YORK CONFERENCE CENTER

Northeast Sustainable Energy Association
Provider Number G338

Building Operations: The Front Line of Sustainability Compliance and Green Leadership

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November 3, 2016

NESEA

Retro-Commissioning in NYC Multi-Family Buildings

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NESEA BENYC 11/3/2016

What is Retro-Commissioning?

As defined by Local Law 87:

- **Energy Audit**
- **Retro-Commissioning** - A systematic process for optimizing the energy efficiency of existing base building systems through the identification and correction of deficiencies in such systems, including but not limited to repairs of defects, cleaning, adjustments of valves, sensors, controls or programmed settings, and/or changes in operational practices.

LL87 RCx Case Study

Retro-Commissioning Project Scope:

- Pipe insulation
- Boiler Controls
- Steam balancing
- Replaced DHW Mixing Valve
- Boiler Clean and Tune
- Water Leaks in Basement
- Door Weather-Stripping
- Implement Operations and Maintenance Protocols

Before Retro-Commissioning:

- High heating bills
- Severe heating imbalance with many windows open in the winter
- Complaints of loud water hammer

After Retro-Commissioning:

- Improved boiler operation
- 7% Reduction in overall energy usage
- 15% reduction of heating fuel usage
- Site staff reports of reduced heating complaints and water hammer

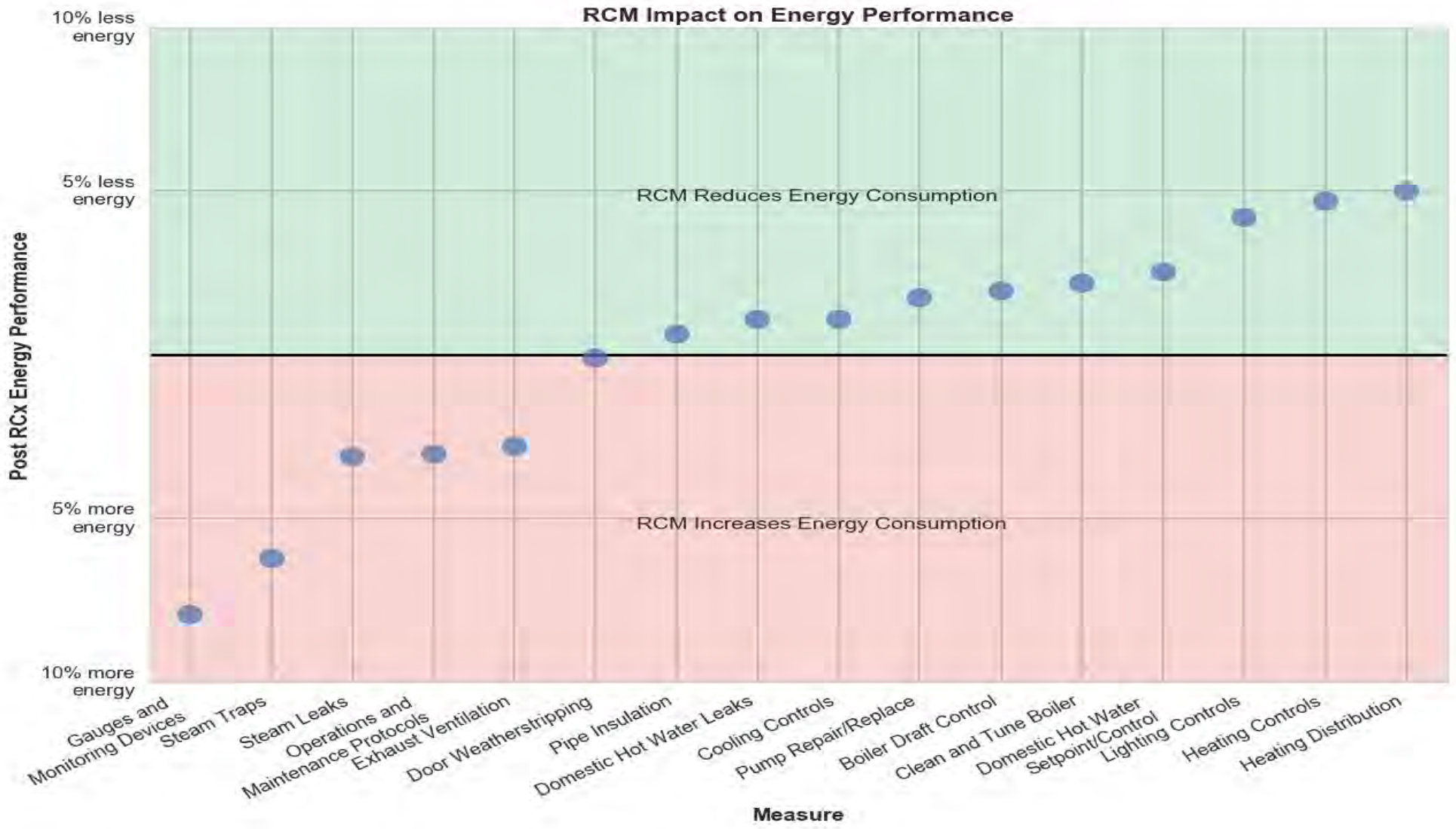
Retro-Commissioning Study

- Purpose: To quantify the impact that Local Law 87 required retro-commissioning has had on a sample of projects
- 45 Simple Multifamily Buildings
- No Central Cooling
- 1-2 Year pre- and post- Utility Data Available
- Adjusting for Weather
- Minimum Required Retro-Commissioning Was the Only Known Energy-Related Work Performed during the Time Period

Most Frequent RCMs in Data Set

- Door Weather-Stripping
- Heating Controls
- Pipe Insulation
- Gauge or Other Monitoring Device
- Steam Trap Replacement
- Domestic Hot Water / Mixing valve
- Exhaust Ventilation Repair / Replace / Clean
- Boiler Clean/Tune
- Boiler Draft Control
- Operations and Maintenance Process
- Steam/Hot Water Leaks
- Balance Heating Distribution / Repair TRVs and Zone Valves
- Cooling Controls
- Lighting Controls
- Failed Pumps
- Misc. Leaks
- AC/Wall Weather-Stripping

Correlating RCMs with Measured Energy Performance



M&V for Retro-Commissioning is Challenging

Data

- Low volume of properties with reliable utility data
- Unavailability of reliable occupancy data
- Unavailability of all energy related events at property
- Lack of Standardized RCM list in LL87 Submission Tools
- Energy impact is low relative to annual fluctuation
- Low Resolution Data (monthly)

Technical

- How is the Building Operated and Maintained
- Some RCMs have a short-term impact
- Some RCMs do not directly impact energy
- Some RCMs negatively impact energy

RCMs Which Negatively Impact Energy

- Inadequate Ventilation
- Inadequate Lighting
- Under-Conditioned Spaces
- Low Domestic Hot Water Temperature


206°F
HOLD
MAX
MIN
°C/°F
ON
OFF
UNLOCK


Psychrometer
98.5%
EXTECH
ON/OFF
°C/°F

Direct Benefits of Retro-Commission

- Energy Savings
- Water Savings
- Building Providing Stated Function
- Improved Operations and Maintenance Procedures
- Health, Safety, Comfort

Conclusions

- Continue to Study Retro-Commissioning Impacts
- Look Closely at Success Stories and Replicate
- Work has to be done well
- Building Ownership has to Have Buy-In
- Operations and Maintenance / Energy Monitoring
- Drive Toward Deep Retrofits
- Understand that Retro-Commissioning Won’t Always Save Energy
- Take Stock of Ancillary Benefits

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Credit(s) earned on completion of this course will be reported to AIA CES for AIA members. Certificates of Completion for both AIA members and non-AIA members are available upon request.

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Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.

Course Description

Operating buildings, especially in NYC, can be challenging all by itself. Now throw in additional compliance or organizational goals to operate more efficiently and the requirement to track the operational data, and you have an even bigger web of to-do's to get through as owners/operators. From this panel of experts, hear how data are helping building owners, where there are still gaps in what we are collecting, how to start to turn data collection into actionable items, and what groups are doing to stay involved and ahead of the curve. Hear what programs are helping organizations achieve the results they are looking for, and how the programs that cities have rolled out are impacting the industry.

Learning Objectives

At the end of the this course, participants will be able to:

1. Learn how data from LL84/LL87 and beyond are shaping how MF housing operates, and what we have learned from the data, where are the holes, and what is working for owners.

2. Understand what resources are available for multifamily owners to operate more efficiently.

3. Learn how to sell green operations and retrofits to organizational leaders, and where the savings are.

LISC Boston's Green Retrofit Initiative

Mike Davis, AICP, LEED AP BD+C

Senior Program Officer, LISC Boston

LISC Boston

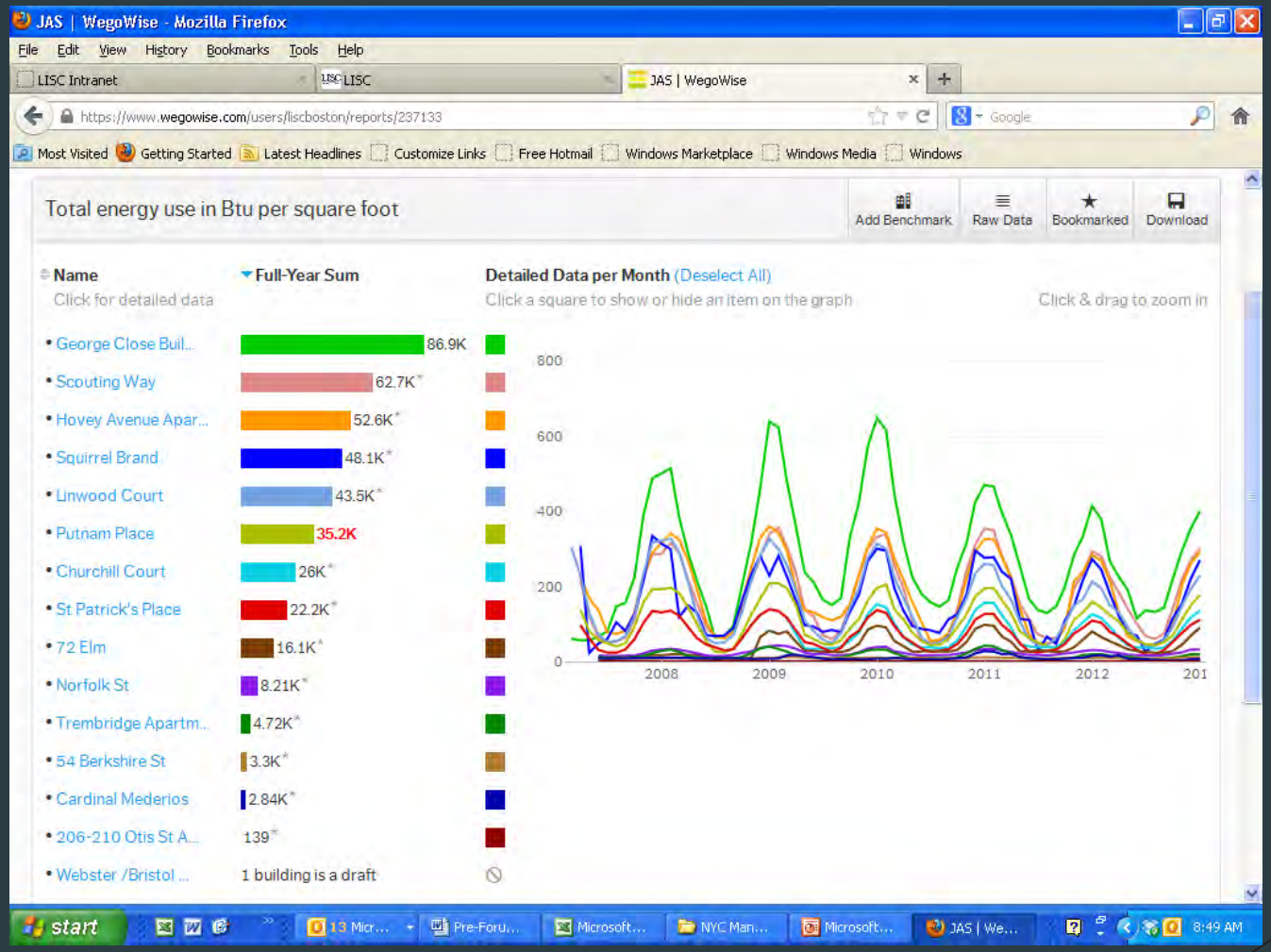
Evolution of Program…3 distinct phases

- Building owner demand (2010-2012)
  - New utility program created: LEAN Low-Income Multifamily
  - 11 Boston nonprofits enrolled in Green Retrofit Initiative
- HUD Energy Innovation Fund (2012-2015)
  - Achieve 20% savings
  - Expand statewide engaging nonprofits, for-profits, and public housing authorities
- Experience informs policy (2014-2016)
  - 20 owners: proactive approach across portfolio
  - Policy work focused on connecting utilities and housing finance agencies

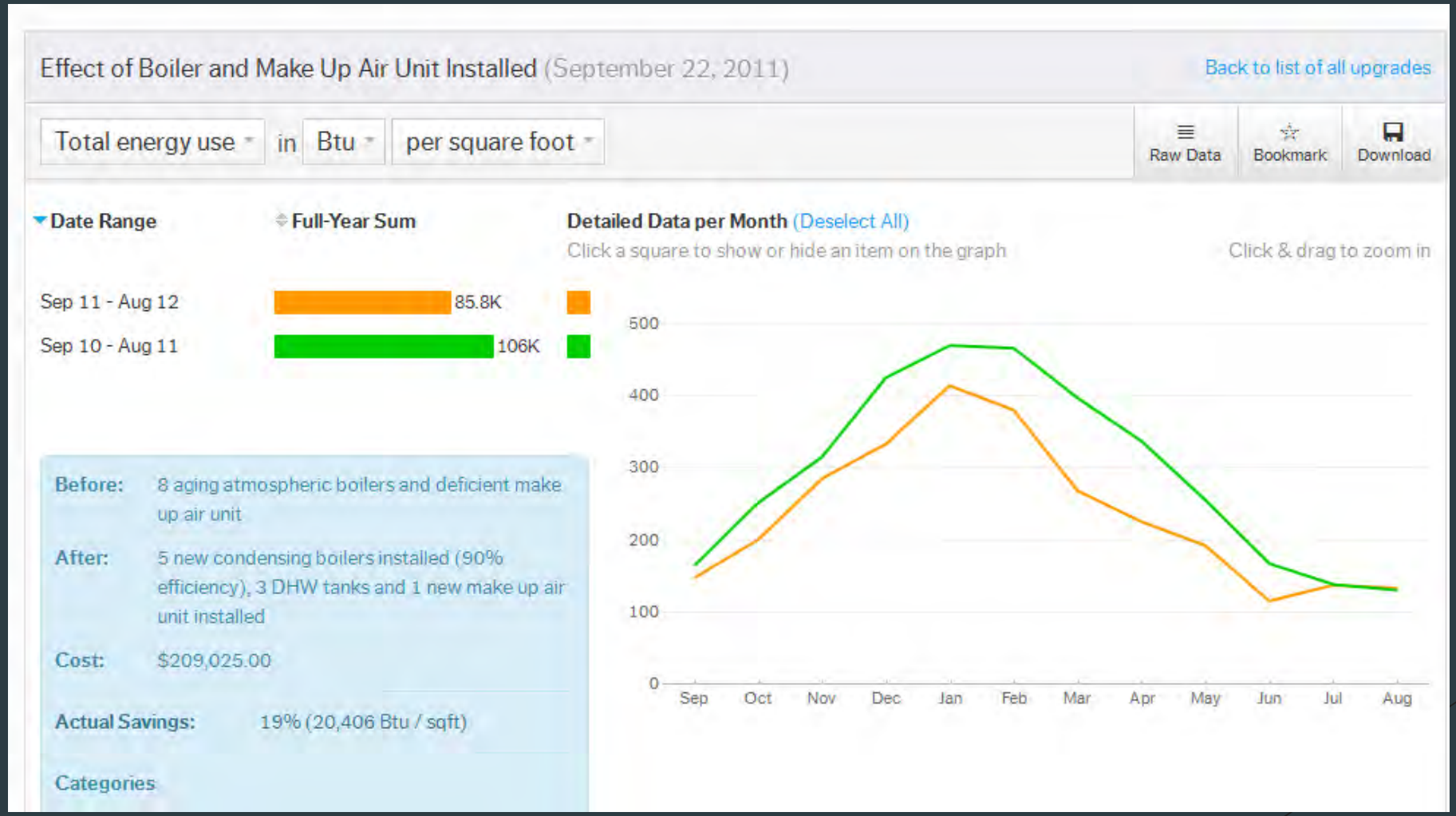
What Kinds of Buildings?

- Small to large, wood and masonry, scattered site and centrally located – each building is unique
- Urban, town, and rural
- Mostly master-metered heat, water, and DHW. Mostly individual meters for electricity in units.

Where Do I Start?
Benchmarking Used to Prioritize Efforts



Post-Retrofit Savings Analysis



Green & Healthy Property Management

A Guide for Multifamily Buildings

February 2013

Local Initiatives Support Corporation

LISC

Green Cleaning

Goal

Maintain properties cost-effectively using green cleaning products that minimize the use of harmful or toxic chemicals. Ensure property management staff and vendors use green cleaning products.

Key Actions

Property Owner

Require staff, Property Manager, vendors and contractors to use green cleaning products that meet third party certification unless such products are not available or cost-effective. Acceptable green certifications include: Greenseal, U.S. EPA Design for the Environment (Dfe), and Eco Logo.

Property Manager

1. Require all vendors (cleaning, other rehab contractors) to use green certified cleaning products unless the product is not available. If vendors cannot identify an available cost-effective cleaning product that is GreenSeal or EcoLogo Certified, or Dfe approved for a particular use, the vendor shall evaluate if that specific product is needed. If the product is critical the vendor shall provide the Property Manager a written request to justify the use of a non-third party certified cleaning product and obtain written authorization. Such authorization is not required during emergency cleaning activities.

2. Encourage the use of: dilution control systems (to reduce packaging waste and supplies), Microfiber wipes and mops, HEPA filtration vacuums, Green Seal certified or Forest Stewardship Council (FSC) certified paper products

Tracking

Annually review Green Cleaning progress.

Resources

Design for the Environment (Dfe)—www.epa.gov/dfe

EcoLogo—www.ecologo.org/en/

GreenSeal—www.greenseal.org

New York State Green Cleaning Program—www.greencleaning.ny.gov

Green Retrofit Initiative 2012 to 2015

- Goal: Achieving 20%+ savings – give us your worst buildings
  - Funders: Barr Foundation and HUD
  - Building science partner: New Ecology, Inc.
- 1 of 12 HUD Energy Innovation Fund grantees
  - 10+ year affordability means mostly mid-capital cycle projects
- Results
  - Benchmarked 12,000 units
  - Retrofitted 3,500 units
  - Leveraged $12+ Mill
  - **Lesson learned: Owners do not want additional debt between capital cycles. Increase focus on the point of rehab.**

2012-2015 Savings Summary

- Over half of participating units achieved >20% savings
  - Electric savings averaged 29%
  - Gas savings averaged 23%
- The same level of savings is achievable regardless of building size or type (low-, mid-, or high-rise).
- Importance of providing data to state housing policymakers - need to align resources at time of rehab.

Read the full report at www.bostonlisc.org

WegoWise Dating Savings Analysis with review by Cadmus

Green Retrofit Initiative 2014 to 2016

- Work with owners informs policy opportunities
  - Funders: Barr Foundation, MassHousing, and Massachusetts Housing Partnership
  - Building science partner: New Ecology, Inc.
- 20 orgs enrolled for 1 year: combined portfolios = 29,000+ units
- 17 nonprofits get $10k; 3 for-profits participate
  - Benchmark portfolio
  - Green Asset Management Plan
  - 2 priority retrofit projects
- Six orgs joined Better Buildings Challenge

Green Retrofit Initiative 2014 to 2016

- Results
  - Savings achieved, yet large opportunities remain
  - Noticeable trends with nonprofit v. for-profits
- Importance of organizational leadership buy-in
  - Education: How much money are we leaving on the table?

What if…	Water Savings ($.018/gallon)	Electricity Savings ($.18/kWh)	Gas Savings ($1.10/therm)	Annual Totals
Your buildings matched* the WegoWise median for all metrics?	$364,736	$3,700	$51,189	**$419,625**
Your portfolio decreased use by 20%**, across the board?	$188,881	$41,622	$124,289	**$354,792**

*Buildings already at or below the metric were not included in this savings estimate.

**20% is the portfolio reduction target for participants of the DOE Better Buildings Challenge

Source: New Ecology, Inc.

Program Work Informs Policy

- Goal: How do we make it easier for owners to do efficiency work at rehab?
  - Housing Finance Agencies are now sharing pipeline with MA's Low-Income Multifamily Utility Program (LEAN)
  - Utilities will create program roadmap for owners
  - All LEAN audits will be given to owners
  - LEAN now accepts 3rd party comprehensive audits
  - LEAN will provide incentive commitment 6 months or less from rehab's construction closing
  - Owner can choose their own general contractor for LEAN rehab work

What's Next?

- Massachusetts Clean Energy Center grant
  - Collaborate with Housing Finance Agencies to provide audits for projects approaching rehab
  - Retrocommission underperforming renewables
- Grant goals
  - Audits – Getting all parties (owners, lenders, building science providers, state agencies, utilities) to talk to each other about deep energy savings opportunities
  - Retrocommissioning – How do we make sure renewables are installed and maintained correctly to ensure savings?
  - Inform program and policy design so there are more resources and technical assistance from state level

Contact Information

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