

Massachusetts Deep Energy Retrofits Persistent Challenges and Performance

Building Energy 2012
Boston, MA



Deep Energy Retrofit

- Persistent Challenges
- (energy) Performance

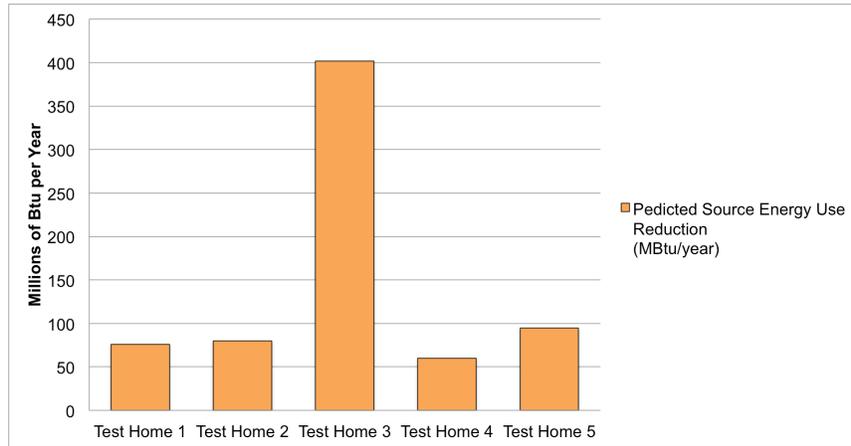
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Deep Energy Retrofits – Performance Data

Modeled Energy Savings



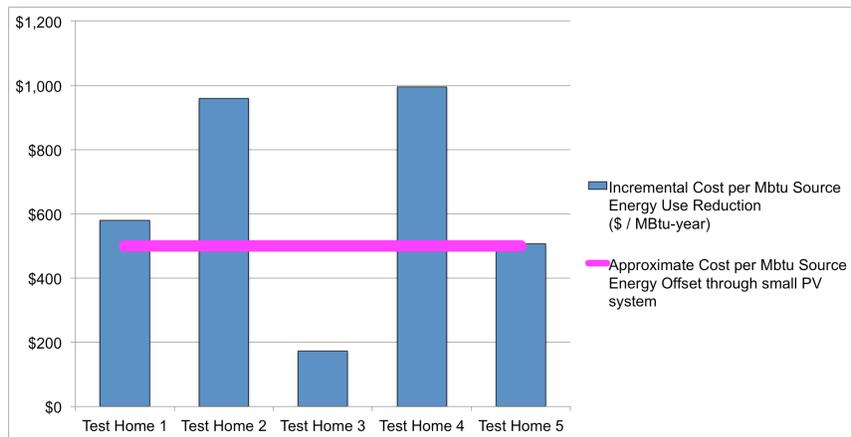
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Deep Energy Retrofits – Performance Data

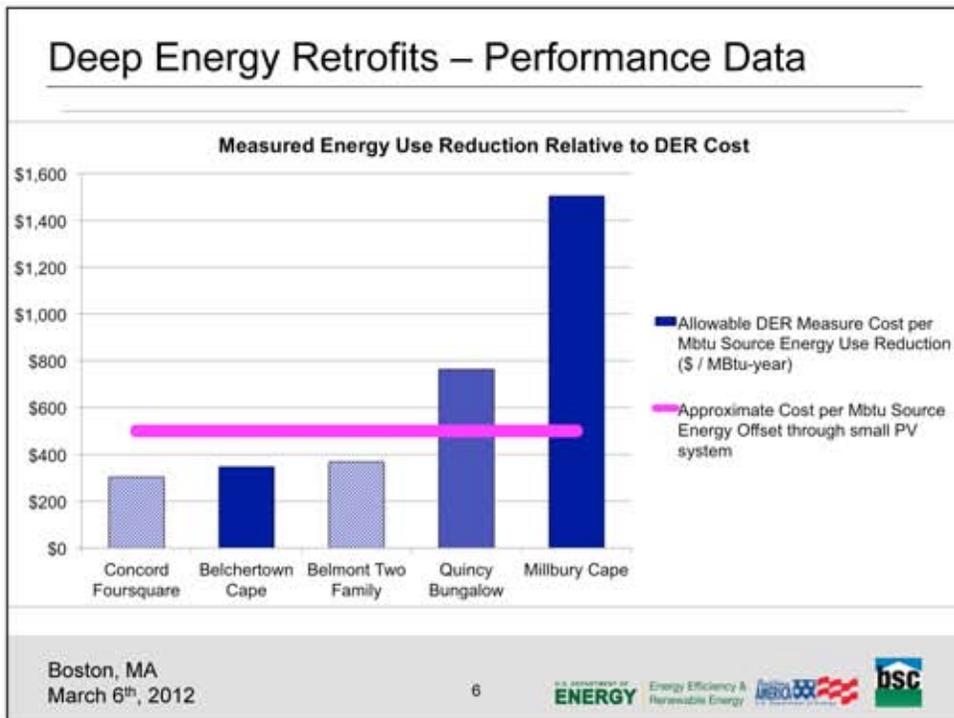
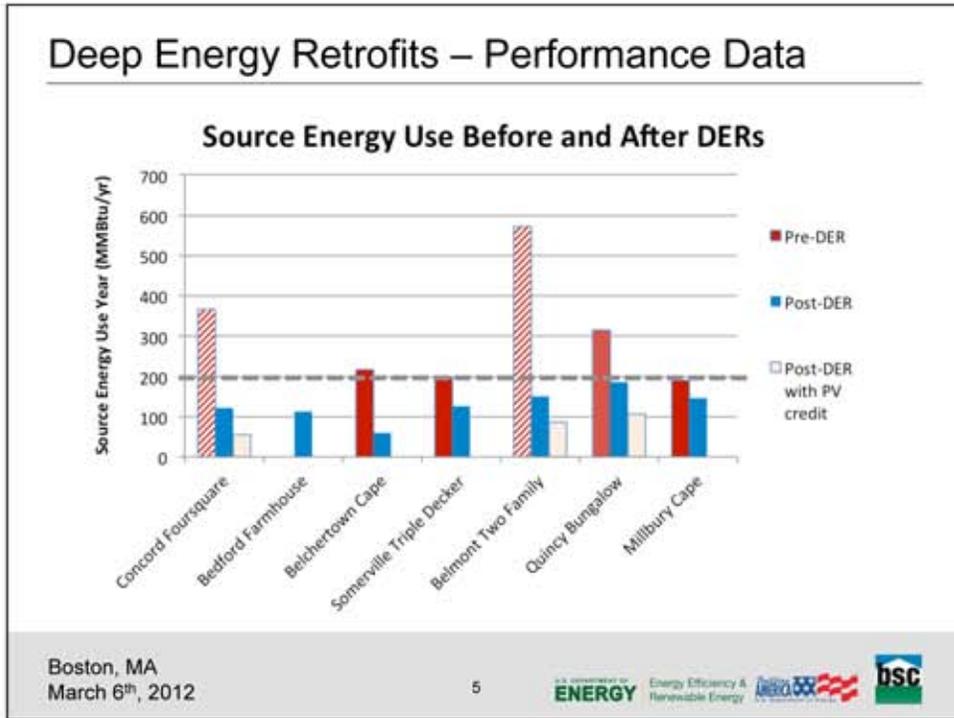
Incremental Cost of Energy Savings

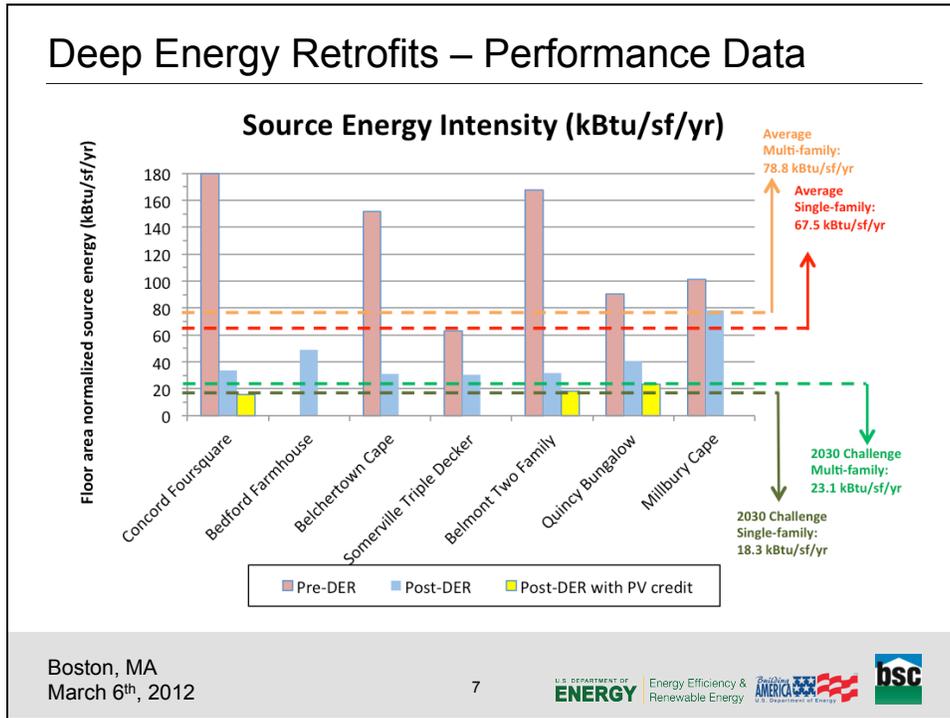


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- ### Deep Energy Retrofits – Performance Data
- Desiderata:**
- Energy use data
 - How to normalize?
 - Site-source
 - Some fuels have sporadic delivery
 - Energy for what end use?
 - Causality
 - Incremental cost data
 - What portion of cost gets assigned to energy?
 - What is the cost baseline?
 - Cost of cost data
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Deep Energy Retrofits – Persistent Challenges

- Inspection of critical details revealed problems in existing conditions



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Retrofitting Air Barriers



Millbury, MA

1.4 ACH 50
0.09 cfm/sf enclosure

Rigid foam as air barrier, “chainsaw” retrofit of roof overhangs/eaves, blower door tests in progress



Photo credit: Henry MacLean
Quincy, MA

1.26 ACH 50
0.11 cfm/sf enclosure

Multiple air barriers exterior plus cavity spray foam interior, “chainsaw” transitions at new and existing roofs



Belmont, MA

0.7 ACH 50
0.06 cfm/sf enclosure

Rigid foam as air barrier, “chainsaw” retrofit of roof overhangs/eaves, blower door tests in progress

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Retrofitting Interior Air Barriers



Photo credit: Dave C. Legg

Belchertown, MA

1.9 ACH 50

0.12 cfm/sf enclosure

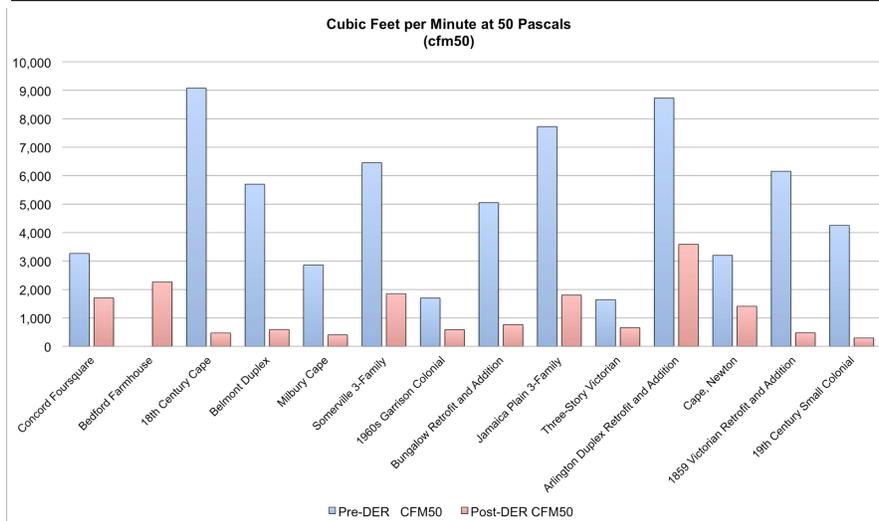
Closed-cell spray foam to interior roof, walls, and foundation walls.

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DER Air Leakage Assessment

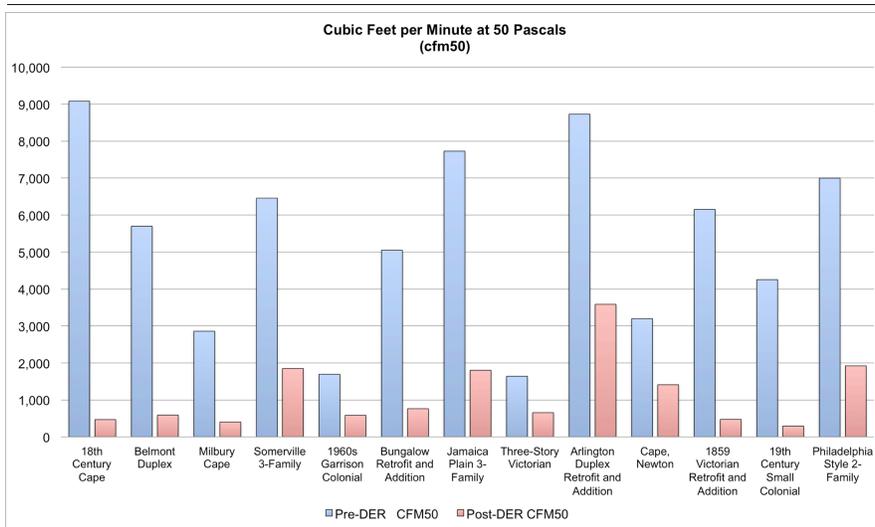


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DER Air Leakage Assessment

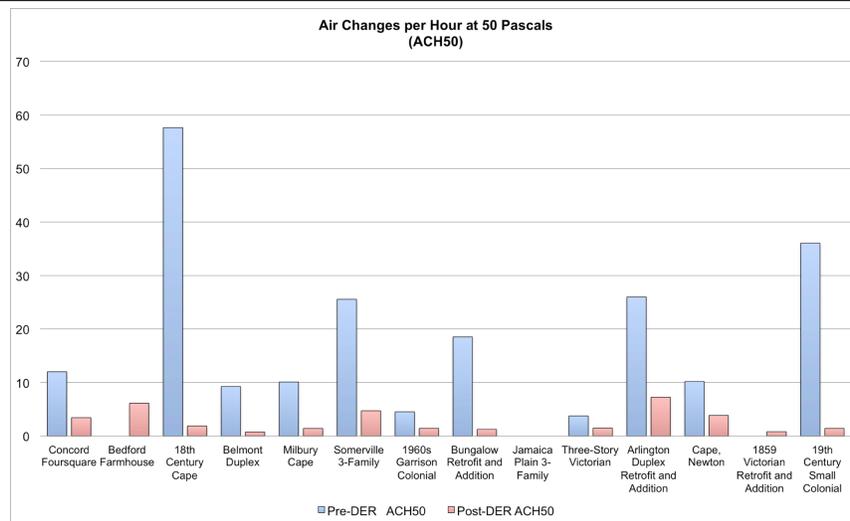


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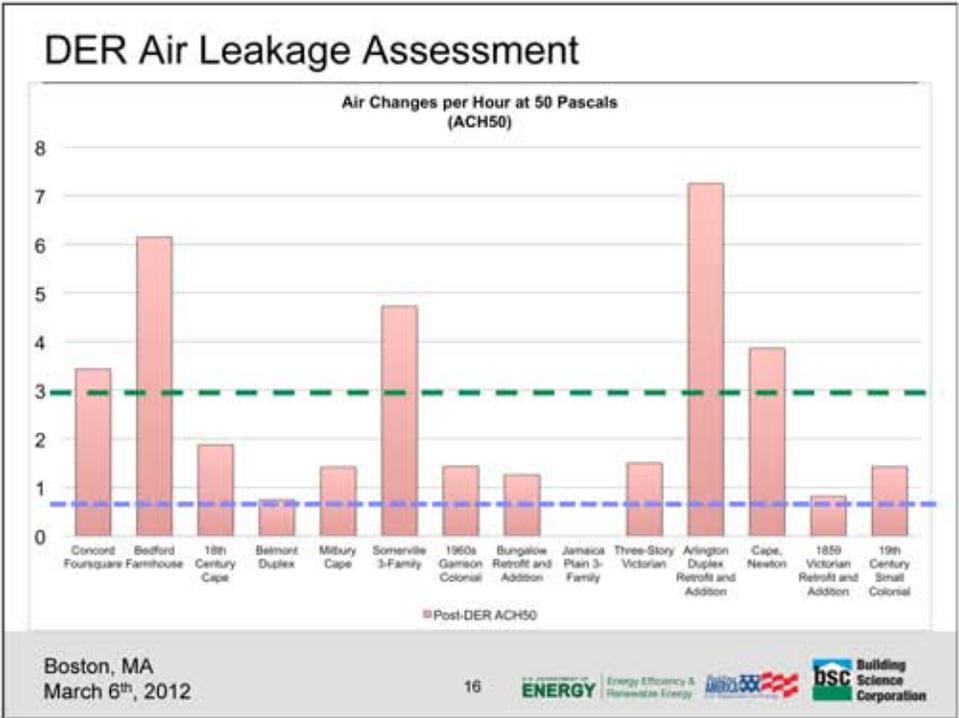
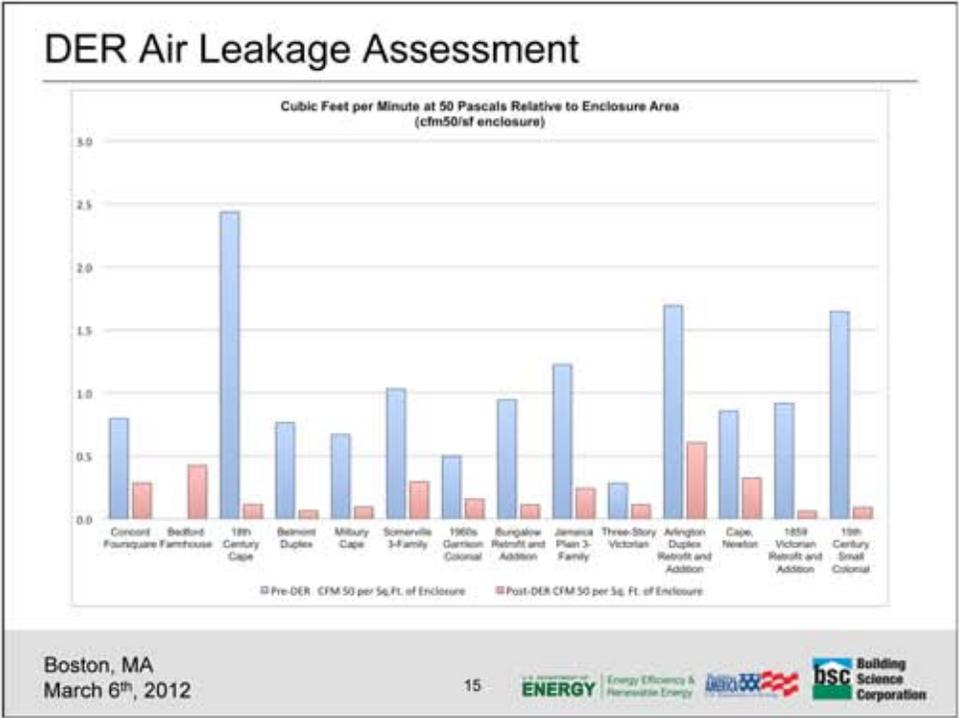
DER Air Leakage Assessment

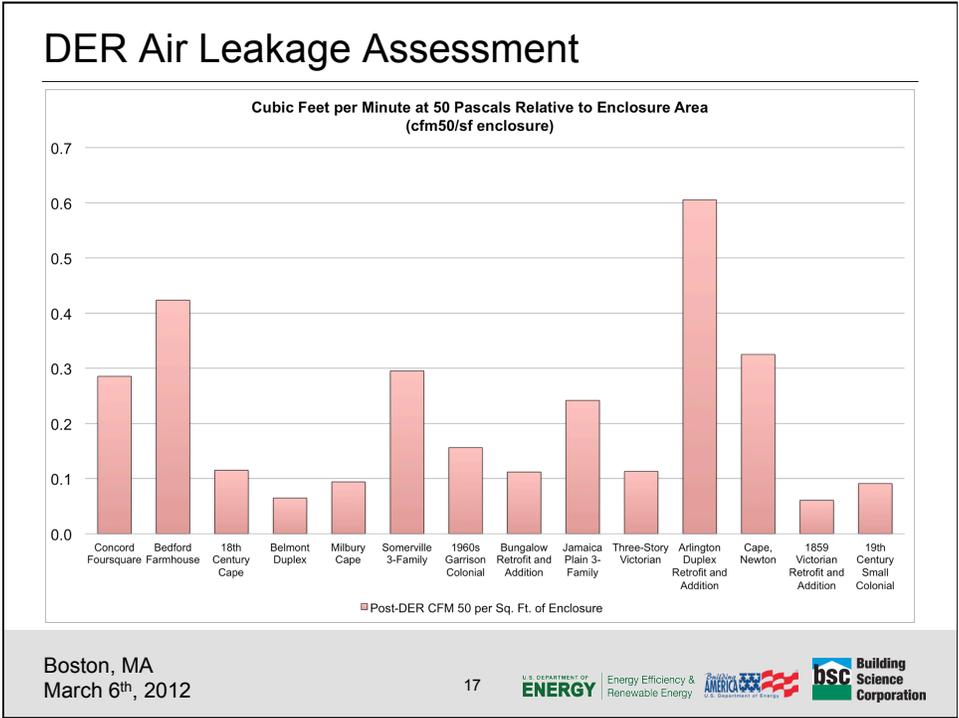


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- ### Deep Energy Retrofits – Performance Data
- What performance data should we be collecting?
- Energy
 - Cost
 - Comfort
 - Moisture content within assemblies
 - Air quality
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