



# Stretch Code Workshop

## June 6, 2011



# Agenda

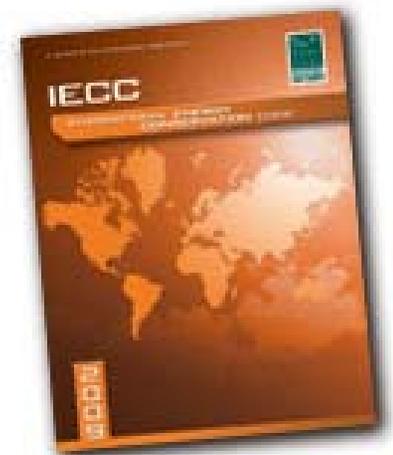
- ▶ Introductions
- ▶ What is the Stretch Code?
- ▶ What does the Stretch Code Mean to My Community?
- ▶ Stretch Code Compliance
- ▶ Discussion and Q&A





# Energy Codes in MA are changing

- ▶ New base residential energy code in July (IECC 2009)
  - Roughly 10 to 15% more energy efficient
- ▶ Towns and Cities can opt into the “Stretch Code” appendix
  - Approx 15 to 20% more energy efficient than IECC 2009 or ASHRAE 90.1–2007



# IECC and ASHRAE Codes

- ▶ ICC & ASHRAE develop model building codes and standards for the US.
- ▶ ICC: publishes IECC energy code
  - 3 year cycle IECC 2006, IECC 2009
- ▶ ASHRAE: publishes 90.1 standard
  - 3 year cycle 90.1–2007, 90.1–2010



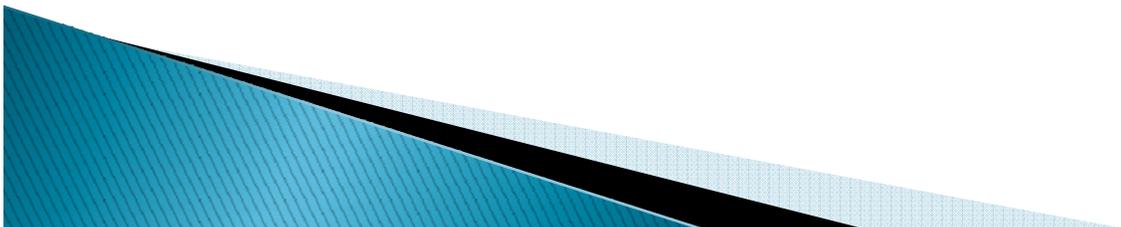
IECC = International Energy Conservation Code – of International Codes Council (ICC)  
ASHRAE = American Society of Heating, Refrigerating and Air-Conditioning Engineers

# IECC 2012 – Code Committee Endorses Stretch Code

- ▶ The International Code Council (ICC) finalized the 2012 residential and commercial codes in October 2010
  - The residential measures that were approved by the IECC committee will save an estimated 30% above the 2006 IECC
  - The commercial prescriptive portion of the MA Stretch energy code is the core of the commercial 2012 IECC



**STRETCH ENERGY CODE  
APPENDIX 115.AA  
(Appendix 120.AA under 7<sup>th</sup>  
Ed.)**



The Official Website of the Executive Office of Public Safety and Security (EOPSS)

# Public Safety



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## Energy Conservation 'Appendix 120 AA' Approved

A code change proposal relating to energy conservation was approved by the BBRs at the May 12, 2009 meeting and will become an appendix to the MA State Building Code (780 CMR) on or about August 1, 2009. It is based on the *International Energy Conservation Code (IECC) 2009* and can be viewed by following the 1<sup>st</sup> link below. The 2<sup>nd</sup> link will take you to a two-page overview of this new appendix.

This appendix may be adopted by any municipality in the commonwealth, by decision of its governing body. In a city having a Plan D or Plan E charter the governing body shall be the city manager and the city council, and in any other city the mayor and city council. In towns the governing body shall be the board of selectmen. In order to be adopted, the appendix must be considered at an appropriate municipal public hearing, subject to the municipality's existing public notice provisions. If adopted by a municipality this appendix rather than 780 CMR 13, 34, 61, or 93, as applicable, shall govern.

Also at the May 12 meeting a concurrency period and a training policy were approved. Concurrency period is a period when either the new code or the existing code can be used but not comingled. The BBRs approved a concurrency period of 6 months to a maximum of 12 months, with such period to begin on either January 1 or July 1 of any year. In addition a town or city which adopts the appendix must provide training to the building official. If you have comment or questions on this subject please forward them to [mike.quirgli@state.ma.us](mailto:mike.quirgli@state.ma.us)

[Appendix 120 AA July 9, 2009 Final](#) PDF (270kb)

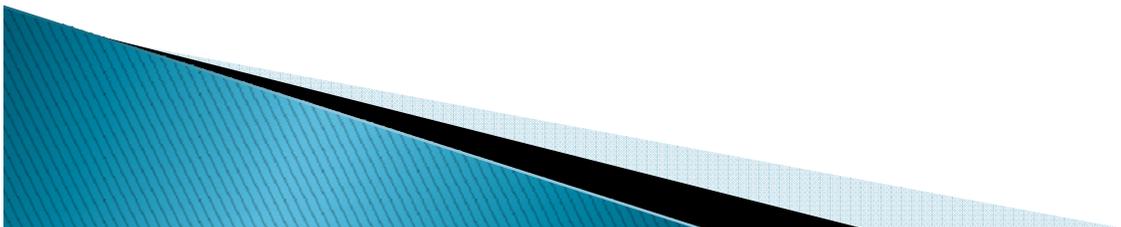
[Stretch Code Overview June 5, 2009](#) PDF (86kb)

### SEARCH

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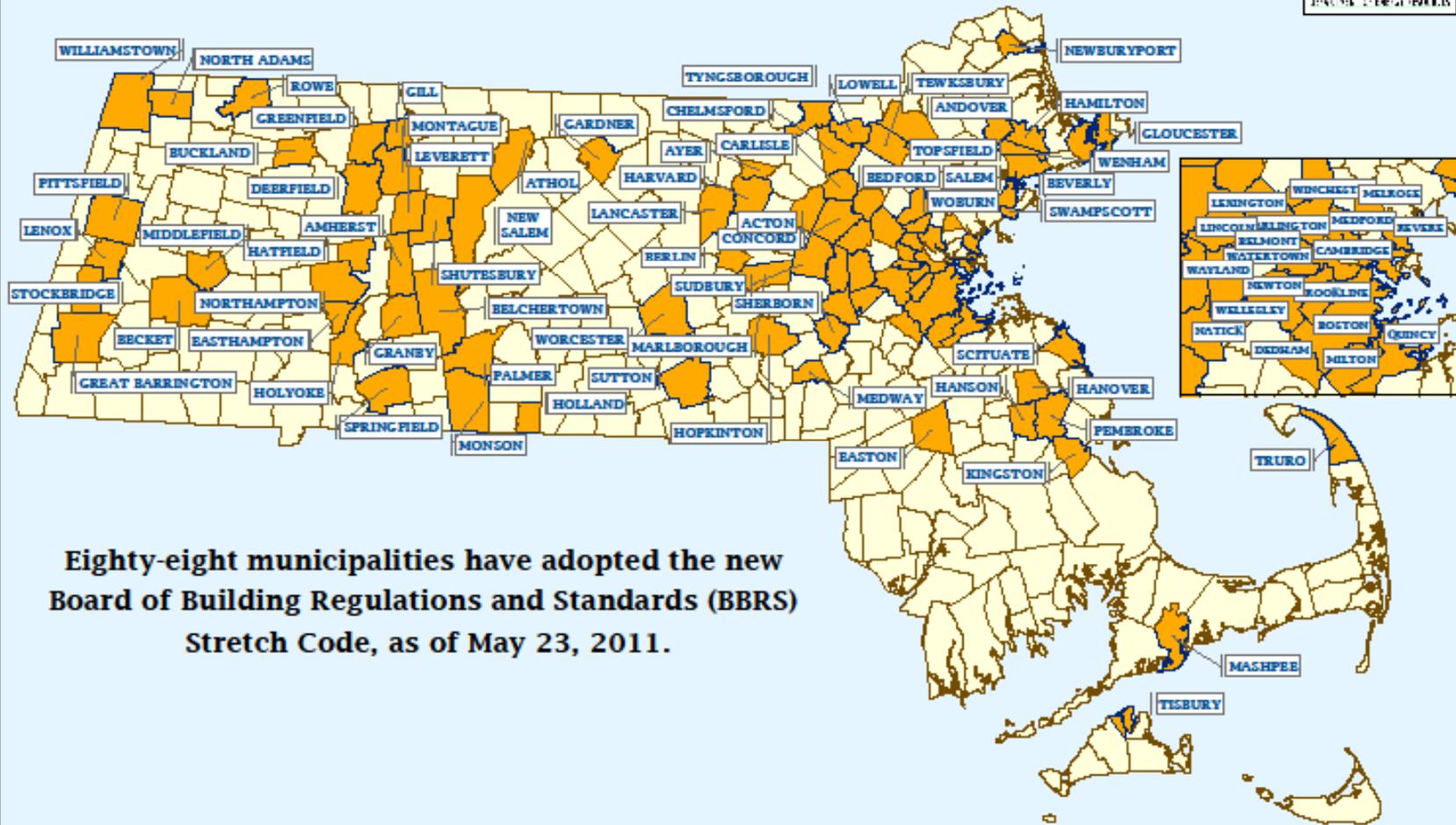
# Why an Optional Stretch Code?

- ▶ Growing desire to reduce costs, reduce dependency on imported fuels, and address climate change
- ▶ Several towns and cities asked for the ability to adopt stronger building codes
- ▶ BBRS developed one alternative code that is consistent across the state
- ▶ Green Communities Funding





## Stretch Code Adoption, by Community



**Eighty-eight municipalities have adopted the new Board of Building Regulations and Standards (BBS) Stretch Code, as of May 23, 2011.**

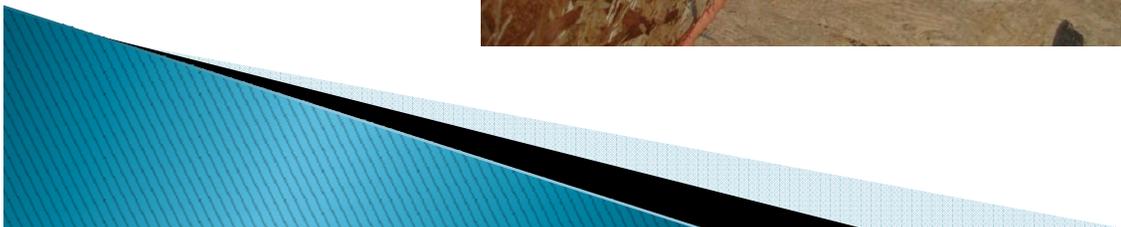
# What does the Stretch Code Apply to?

- ▶ Residential
  - New Construction
  - Additions
  - Home Renovations
- ▶ Commercial
  - New Construction
  - Additions



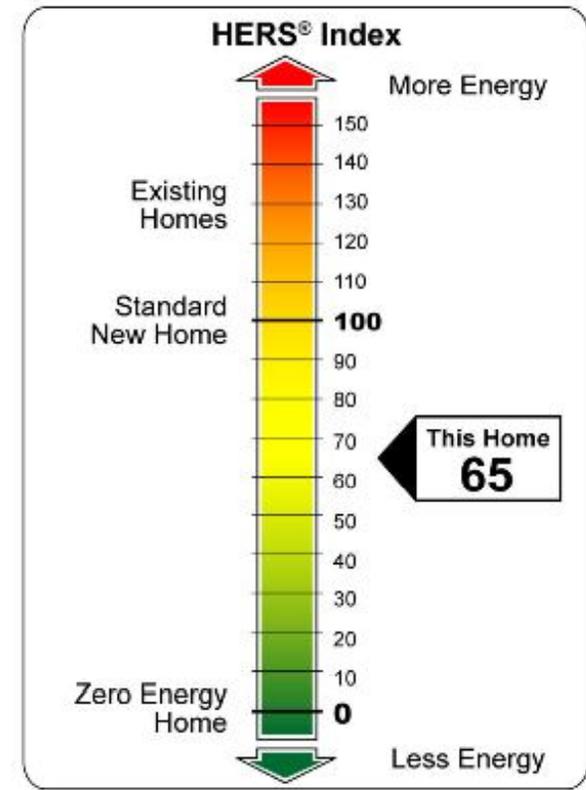
# Residential New Construction

*Single Family and Multi Family of 3 stories or less*



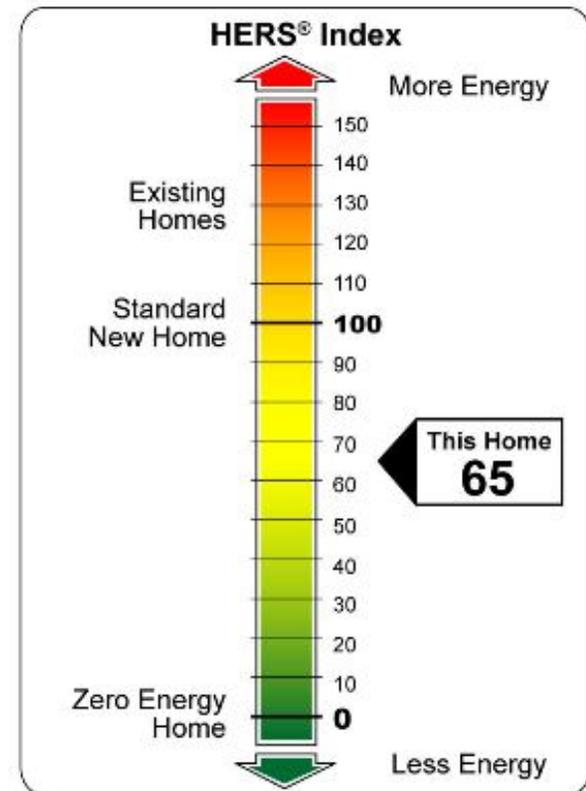
# Performance Path

- ▶ Performance Path is the only option
  - Uses Home Energy Rating System (HERS)
  - 70 or less < 3,000 sq ft.
  - 65 or less > 3,000 sq ft.
- ▶ Requires a certified HERS rater
  - Review building plans
  - Check insulation installation
  - Thermal bypass Checklist
  - Blower-door and duct testing



# What is a HERS Rating?

- ▶ Home Energy Rating System (HERS) Index
- ▶ Each home is tested, certified and labeled by an independent HERS Rating Company
  - Must follow Residential Energy Services Network (RESNET) testing procedures
  - A HERS Rater uses software to model the home's energy performance based on plan analysis and on-site testing to calculate a HERS Index. (Can be used instead of ResCheck)



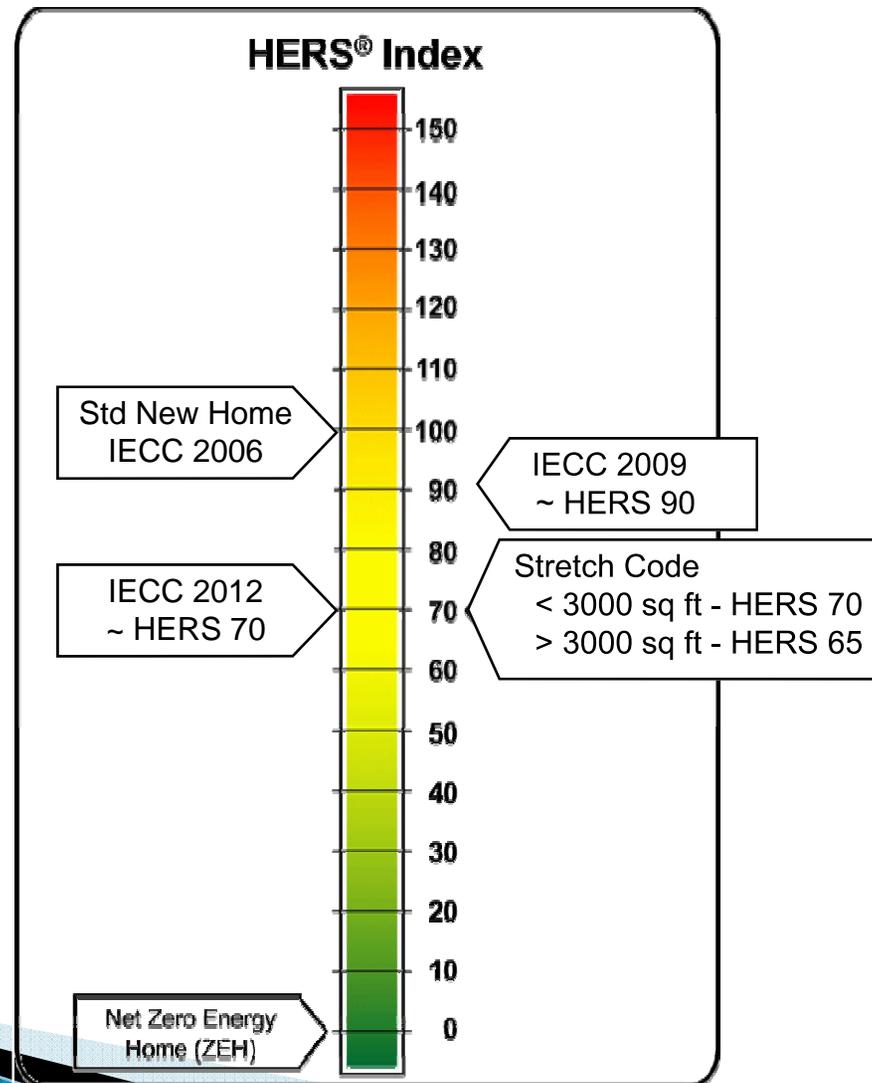
# What is the Thermal Bypass Checklist?



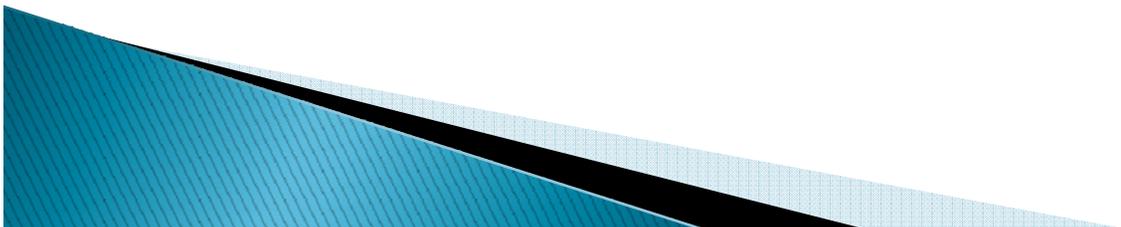
## ENERGY STAR Qualified Homes Thermal Bypass Inspection Checklist

Home Address: _____		City: _____		State: _____	
Thermal Bypass	Inspection Guidelines	Corrections Needed	Builder Verified	Rater Verified	N/A
1. Overall Air Barrier and Thermal Barrier Alignment	<b>Requirements:</b> Insulation shall be installed in full contact with sealed interior and exterior air barrier except for alternate to interior air barrier under item no. 2 ( <i>Walls Adjoining Exterior Walls or Unconditioned Spaces</i> )				
	<b>All Climate Zones:</b>				
	1.1 Overall Alignment Throughout Home	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.2 Garage Band Joist Air Barrier (at bays adjoining conditioned space)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	1.3 Attic Eave Baffles Where Vents/Leakage Exist	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Only at Climate Zones 4 and Higher:</b>				
	1.4 Slab-edge Insulation (A maximum of 25% of the slab edge may be uninsulated in Climate Zones 4 and 5.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<b>Best Practices Encouraged, Not Req'd.:</b>				
1.5 Air Barrier At All Band Joists (Climate Zones 4 and higher)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
1.6 Minimize Thermal Bridging (e.g., OVE framing, SIPs, ICFs)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
2. Walls Adjoining Exterior Walls or Unconditioned Spaces	<b>Requirements:</b>				
	<ul style="list-style-type: none"> <li>Fully insulated wall aligned with air barrier at both interior and exterior, OR</li> <li>Alternate for Climate Zones 1 thru 3, sealed exterior air barrier aligned with RESNET Grade 1 insulation fully supported</li> <li>Continuous top and bottom plates or sealed blocking</li> </ul>				
	2.1 Wall Behind Shower/Tub	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.2 Wall Behind Fireplace	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.3 Insulated Attic Slopes/Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.4 Attic Knee Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.5 Skylight Shaft Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.6 Wall Adjoining Porch Roof	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	2.7 Staircase Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.8 Double Walls	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

# Stretch Code vs. IECC Comparison



# Home Additions



# Performance or Prescriptive Path Addition Only

## ▶ Performance Path

- 70 or less < 3,000 sq ft.
- 65 or less > 3,000 sq ft.



## ▶ Prescriptive Path

- Base Code insulation and envelope (IECC 2009)
- ENERGY STAR Qualified Windows ( $U \leq .30$ )
- Builder Verified Thermal Bypass Checklist
- Ducts sealed ( $\leq 4$  cfm / 100 sq ft to the outside)

# Home Renovations



# Performance or Prescriptive Path

- ▶ Performance Path is easier than for new construction and additions
  - Easier HERS index requirement (mostly relevant for gut-renovations)
  - 85 or less < 2,000 sq ft.
  - 80 or less > 2,000 sq ft.
- ▶ Prescriptive Path
  - Almost the same as additions
  - Exception: Reroofing or residing over uninsulated roofs or walls where the sheathing is not exposed.
  - Empty ceiling, wall or floor cavities exposed during construction are filled with  $\geq R-3.5$ /inch.



# Stretch Code and ENERGY STAR

- ▶ The Stretch appendix puts the current ENERGY STAR Homes program into code
- ▶ ENERGY STAR is a proven cost-effective program
- ▶ Builder incentives/rebates
  - Incentives up to \$8000,
  - Rebates on appliances, heating and cooling, and lighting
- ▶ Builder training and materials
- ▶ Subsidized HERS raters
  - Third party verification



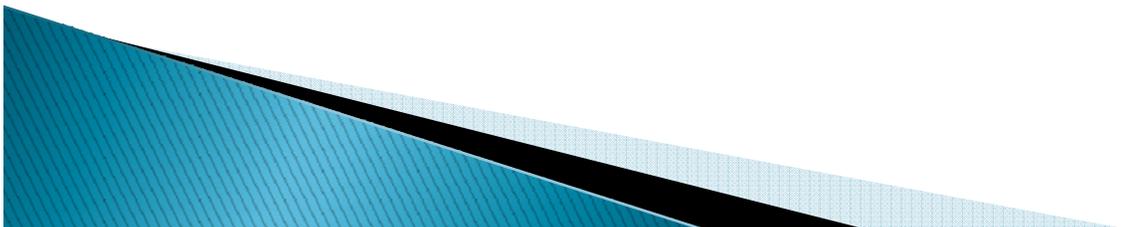
# Proven Program

- ▶ Cost effective and already proven in the voluntary market
  - ENERGY STAR 2008
    - ~ 9,600 Permits Pulled
    - 15% of all MA new residential in 2008
  - ENERGY STAR 2009
    - ~6,600 Permits Pulled
    - 31% of all MA new residential in 2009
- ▶ ENERGY STAR homes show clear \$\$ savings



# What Does the Stretch Code Mean to My Community?

Building Costs



## Massachusetts Stretch Code Improvement - Cash Flow

### Baseline Home (2,672 sf)

	IECC 2009 Code	Stretch Code	Stretch Code - with ENERGY STAR <sup>4,5</sup> -
HERS Index Modeled in REM/Rate	86	70	70
Improvement Measures (changes relative to Basecase)	<ul style="list-style-type: none"> <li>- Unconditioned basement</li> <li>- Floor, R30</li> <li>- Walls, R21</li> <li>- Ceiling, R38 G2</li> <li>- Heating, 80 AFUE</li> <li>- Cooling, 13 SEER</li> <li>- Water Heating, .59 EF</li> <li>- Duct leakage, 8%</li> <li>- Infiltration, 7 ACH50</li> <li>- Efficient lighting, 50%</li> </ul>	<ul style="list-style-type: none"> <li>- Ceiling, R38 G1</li> <li>- Heating, 94 AFUE</li> <li>- Water heating, .62 EF</li> <li>- Infiltration, 4 ACH50</li> <li>- Efficient lighting, 75%</li> <li>- Exhaust Only Ventilation</li> </ul>	<ul style="list-style-type: none"> <li>- Ceiling, R38 G1</li> <li>- Heating, 94 AFUE</li> <li>- Water heating, .62 EF</li> <li>- Duct leakage, 6%</li> <li>- Infiltration, 5 ACH50</li> <li>- Efficient lighting, 80%</li> <li>- Exhaust Only Ventilation</li> </ul>
Improvement Costs		\$ 2,049	\$ 2,155
HERS Rater Fee <sup>1</sup>		\$ 900	\$ 900
HERS Rater reimbursement <sup>2</sup>		-	\$ (650)
ENERGY STAR Incentive <sup>3</sup>		-	\$ (650)
Total Improvement Costs		\$ 2,949	\$ 1,755
Mortgage Interest Rate		6%	6%
Loan Term (Years)		30	30
Annual Incremental Mortgage Payment		\$ 214	\$ 127
Annual Energy Costs <sup>6</sup>	\$ 3,970	\$ 3,463	\$ 3,454
Annual Energy Savings from Baseline		\$ 507	\$ 516
<b>Annual Cash Flow</b>	<b>\$ -</b>	<b>\$ 293</b>	<b>\$ 389</b>

<sup>1</sup> Estimated Massachusetts ENERGY STAR Homes Program HERS Rater Fee (Range is from \$750-\$1500, but typically close to \$750). Includes cost for conducting Thermal Bypass Inspection

<sup>2</sup>HERS Rater Fees are reimbursed by the Massachusetts ENERGY STAR Homes program by between \$650-900 per unit, depending upon the HERS rating achieved.

<sup>3</sup>Massachusetts ENERGY STAR Homes Program may receive a minimum incentive of \$650.

<sup>4</sup>ENERGY STAR requirements have been added to the Stretch Code package.

<sup>5</sup>Stretch code homes may qualify for of \$1250 where the HERS rating is ~65 or lower

<sup>6</sup>Annual energy costs are based on most recently available fuel costs, from November 2009. Costs for heating are based on natural gas prices, the least expensive heating fuel. With oil, savings would increase.

## Massachusetts Stretch Code Improvement - Cash Flow

Large Home (4.462 sf)

	IECC 2009 Code	Stretch Code	Stretch Code - with ENERGY STAR <sup>4,5</sup> -
HERS Index Modeled in REM/Rate	92	65	65
Improvement Measures (changes relative to Basecase)	<ul style="list-style-type: none"> <li>- Unconditioned basement</li> <li>- Floor, R30</li> <li>- Walls, R21</li> <li>- Ceiling, R38 G2</li> <li>- Heating, 80 AFUE</li> <li>- Cooling, 13 SEER</li> <li>- Water Heating, .59 EF</li> <li>- Duct leakage, 8%</li> <li>- Infiltration, 7 ACH50</li> <li>- Efficient lighting, 50%</li> </ul>	<ul style="list-style-type: none"> <li>- Ceiling, R60 G1</li> <li>- Heating, 94 AFUE</li> <li>- Water Heating, .62 EF</li> <li>- Duct Leakage, 6%</li> <li>- Infiltration, 3 ACH50</li> <li>- Efficient Lighting, 90%</li> <li>- Exhaust Only Ventilation</li> </ul>	<ul style="list-style-type: none"> <li>- Ceiling, R60 G1</li> <li>- Heating, 94 AFUE</li> <li>- Water Heating, .62 EF</li> <li>- Duct Leakage, 6%</li> <li>- Infiltration, 3 ACH50</li> <li>- Efficient Lighting, 90%</li> <li>- Exhaust Only Ventilation</li> </ul>
Improvement Costs		\$ 5,576	\$ 5,576
HERS Rater Fee <sup>1</sup>		\$ 900	\$ 900
HERS Rater reimbursement <sup>2</sup>		-	\$ (650)
ENERGY STAR Incentive <sup>3</sup>		-	\$ (650)
Total Improvement Costs		\$ 6,476	\$ 5,176
Mortgage Interest Rate		6%	6%
Loan Term (Years)		30	30
Annual Incremental Mortgage Payment		\$ 471	\$ 376
Annual Energy Costs <sup>6</sup>	\$ 6,510	\$ 5,055	\$ 5,055
Annual Energy Savings from Baseline		\$ 1,455	\$ 1,455
<b>Annual Cash Flow</b>	<b>\$ -</b>	<b>\$ 984</b>	<b>\$ 1,079</b>

<sup>1</sup> Estimated Massachusetts ENERGY STAR Homes Program HERS Rater Fee (Range is from \$750-\$1500, but typically close to \$750). Includes cost for conducting Thermal Bypass Inspection

<sup>2</sup>HERS Rater Fees are reimbursed by the Massachusetts ENERGY STAR Homes program by between \$650-900 per unit, depending upon the HERS rating achieved.

<sup>3</sup>Massachusetts ENERGY STAR Homes Program may receive a minimum incentive of \$650.

<sup>4</sup>ENERGY STAR requirements have been added to the Stretch Code package.

<sup>5</sup>Stretch code homes may qualify for of \$1250 where the HERS rating is ~65 or lower

<sup>6</sup>Annual energy costs are based on most recently available fuel costs, from November 2009. Costs for heating are based on natural gas prices, the least expensive heating fuel. With oil, savings would increase.

## Massachusetts Stretch Code Improvement - Cash Flow

Small Home (1,708 sf)

	IECC 2009 Code	Stretch Code	Stretch Code - with ENERGY STAR <sup>4,5</sup> -
HERS Index Modeled in REM/Rate	86	70	70
Improvement Measures (changes relative to Basecase)	<ul style="list-style-type: none"> <li>- Unconditioned basement</li> <li>- Floor, R30</li> <li>- Walls, R21</li> <li>- Ceiling, R38 G2</li> <li>- Heating, 80 AFUE</li> <li>- Cooling, 13 SEER</li> <li>- Water Heating, .59 EF</li> <li>- Duct leakage, 8%</li> <li>- Infiltration, 7 ACH50</li> <li>- Efficient lighting, 50%</li> </ul>	<ul style="list-style-type: none"> <li>- Ceiling, R60 G1</li> <li>- Heating, 94 AFUE</li> <li>- Water Heating, .62 EF</li> <li>- Infiltration, 5 ACH50</li> <li>- Efficient lighting, 75%</li> <li>- Exhaust Only Ventilation</li> </ul>	<ul style="list-style-type: none"> <li>- Ceiling, R60 G1</li> <li>- Heating, 94 AFUE</li> <li>- Water Heating, .62 EF</li> <li>- Infiltration, 5 ACH50</li> <li>- Duct leakage, 6%</li> <li>- Efficient lighting, 80%</li> <li>- Exhaust Only Ventilation</li> </ul>
Improvement Costs		\$ 3,262	\$ 3,643
HERS Rater Fee <sup>1</sup>		\$ 900	\$ 900
HERS Rater reimbursement <sup>2</sup>		-	\$ (650)
ENERGY STAR Incentive <sup>3</sup>		-	\$ (650)
Total Improvement Costs		\$ 4,162	\$ 3,243
Mortgage Interest Rate		6%	6%
Loan Term (Years)		30	30
Annual Incremental Mortgage Payment		\$ 302	\$ 236
Annual Energy Costs <sup>6</sup>	\$ 3,754	\$ 3,171	\$ 3,159
Annual Energy Savings from Baseline		\$ 583	\$ 595
<b>Annual Cash Flow</b>	<b>\$ -</b>	<b>\$ 281</b>	<b>\$ 359</b>

<sup>1</sup> Estimated Massachusetts ENERGY STAR Homes Program HERS Rater Fee (Range is from \$750-\$1500, but typically close to \$750). Includes cost for conducting Thermal Bypass Inspection

<sup>2</sup>HERS Rater Fees are reimbursed by the Massachusetts ENERGY STAR Homes program by between \$650-900 per unit, depending upon the HERS rating achieved.

<sup>3</sup>Massachusetts ENERGY STAR Homes Program may receive a minimum incentive of \$650.

<sup>4</sup>ENERGY STAR requirements have been added to the Stretch Code package.

<sup>5</sup>Stretch code homes may qualify for of \$1250 where the HERS rating is ~65 or lower

<sup>6</sup>Annual energy costs are based on most recently available fuel costs, from November 2009. Costs for heating are based on natural gas prices, the least expensive heating fuel. With oil, savings would increase.

## Massachusetts Stretch Code Improvement - Cash Flow

### Cambridge Triple Decker (5,136 sf)

	IECC 2009 Code	Stretch Code
HERS Index Modeled in REM/Rate	<b>92</b>	<b>85</b>
Improvement Measures (changes relative to Basecase)	<ul style="list-style-type: none"> <li>- Unconditioned basement</li> <li>- Foundation Walls, R0</li> <li>- Frame Floor, R30</li> <li>- Walls, R13</li> <li>- Ceiling, R38 G2</li> <li>- Heating, 80 AFUE</li> <li>- Water Heating, .59 EF</li> <li>- Infiltration, 7 ACH50</li> <li>- Efficient lighting, 50%</li> </ul>	<ul style="list-style-type: none"> <li>- Infiltration, 4.5 ACH50</li> <li>- Efficient Lighting, 75%</li> <li>- Exhaust Only Ventilation</li> </ul>
Improvement Costs		\$ 2,202
HERS Rater Fee <sup>1</sup>		\$ 900
Total Improvement Costs		\$ 3,102
Mortgage Interest Rate		6%
Loan Term (Years)		30
Annual Incremental Mortgage Payment		\$ 225
Annual Energy Costs <sup>2</sup>	\$ 6,828	\$ 6,263
Annual Energy Savings from Baseline		\$ 565
<b>Annual Cash Flow</b>	<b>\$ -</b>	<b>\$ 340</b>

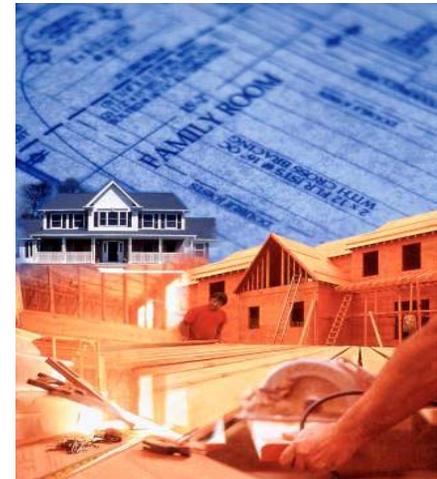
#### Notes

<sup>1</sup> Estimated Massachusetts ENERGY STAR Homes Program HERS Rater Fee (Range is from \$750-\$1500, but typically close to \$750). Includes cost for conducting Thermal Bypass Inspection

<sup>2</sup> Annual energy costs are based on most recently available fuel costs, from November 2009. Costs for heating are based on natural gas prices, the least expensive heating fuel. With oil, savings would increase.

# Code Compliance & Inspections

- ▶ Essentially the same as base code
- ▶ Code Official has the same authority
  - Same building inspections
  - Approves building documents, and HERS rating as documentation of energy savings
- ▶ Final HERS Rating is required for Certificate of Occupancy

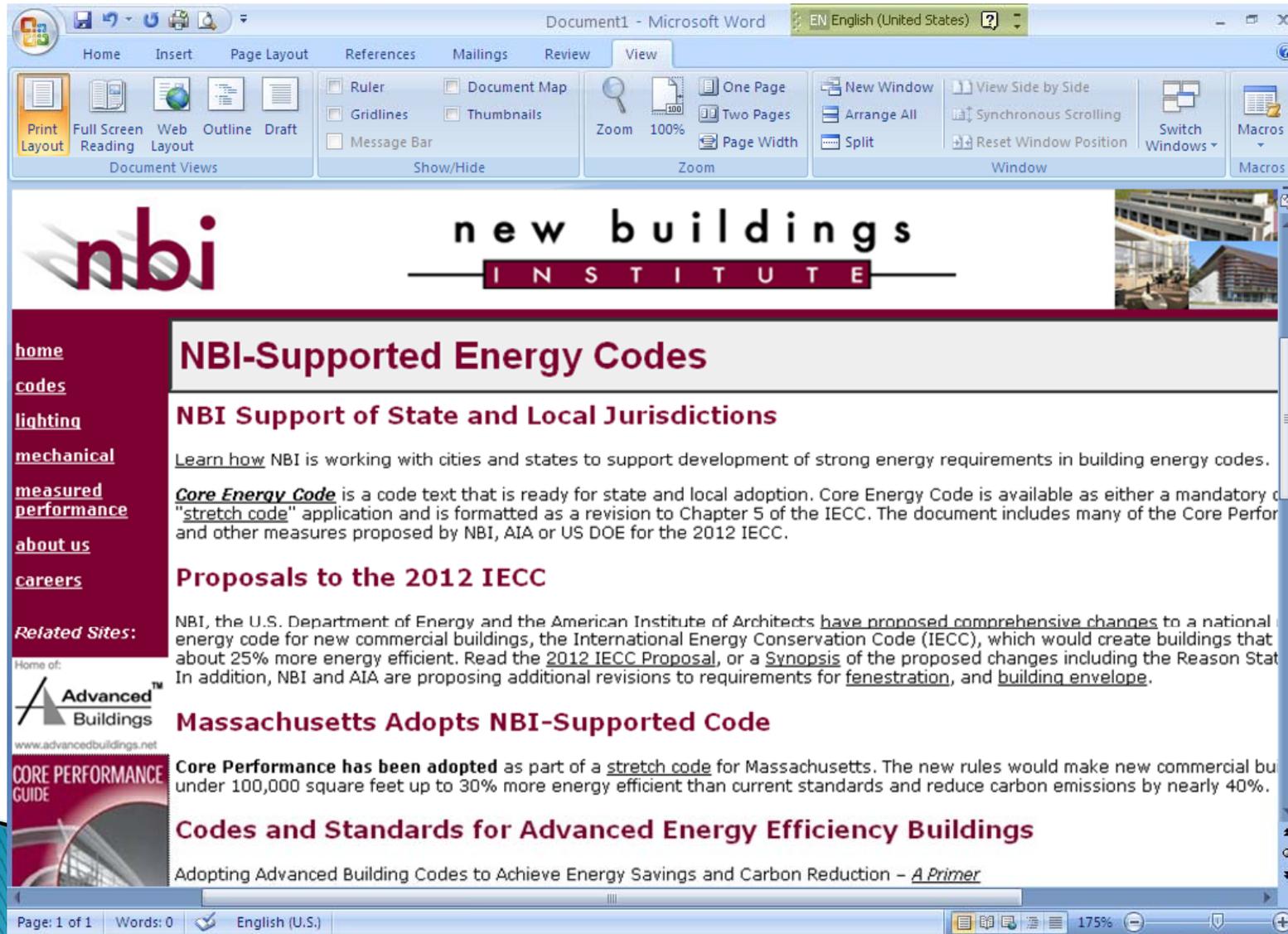


# Commercial Stretch Code



# Commercial 'Stretch' Appendix

Based on New Buildings Institute – 'Core Performance' Energy Code



The screenshot shows a Microsoft Word document titled "Document1 - Microsoft Word" with the language set to "EN English (United States)". The ribbon is set to "View". The document content is a webpage from the New Buildings Institute (NBI) website. The page features the NBI logo and the text "new buildings INSTITUTE". The main content area is titled "NBI-Supported Energy Codes" and includes sections for "NBI Support of State and Local Jurisdictions", "Proposals to the 2012 IECC", "Massachusetts Adopts NBI-Supported Code", and "Codes and Standards for Advanced Energy Efficiency Buildings". A sidebar on the left contains navigation links for "home", "codes", "lighting", "mechanical", "measured performance", "about us", and "careers". A "Related Sites" section lists "Advanced Buildings" with the website "www.advancedbuildings.net". A "CORE PERFORMANCE GUIDE" graphic is also visible in the sidebar. The status bar at the bottom indicates "Page: 1 of 1", "Words: 0", and "English (U.S.)".

**nbi** new buildings  
INSTITUTE

## NBI-Supported Energy Codes

### NBI Support of State and Local Jurisdictions

Learn how NBI is working with cities and states to support development of strong energy requirements in building energy codes.

**Core Energy Code** is a code text that is ready for state and local adoption. Core Energy Code is available as either a mandatory or "stretch code" application and is formatted as a revision to Chapter 5 of the IECC. The document includes many of the Core Performance and other measures proposed by NBI, AIA or US DOE for the 2012 IECC.

### Proposals to the 2012 IECC

NBI, the U.S. Department of Energy and the American Institute of Architects have proposed comprehensive changes to a national energy code for new commercial buildings, the International Energy Conservation Code (IECC), which would create buildings that about 25% more energy efficient. Read the 2012 IECC Proposal, or a Synopsis of the proposed changes including the Reason Stat. In addition, NBI and AIA are proposing additional revisions to requirements for fenestration, and building envelope.

### Massachusetts Adopts NBI-Supported Code

**Core Performance has been adopted** as part of a stretch code for Massachusetts. The new rules would make new commercial buildings under 100,000 square feet up to 30% more energy efficient than current standards and reduce carbon emissions by nearly 40%.

### Codes and Standards for Advanced Energy Efficiency Buildings

Adopting Advanced Building Codes to Achieve Energy Savings and Carbon Reduction – *A Primer*

home  
codes  
lighting  
mechanical  
measured performance  
about us  
careers

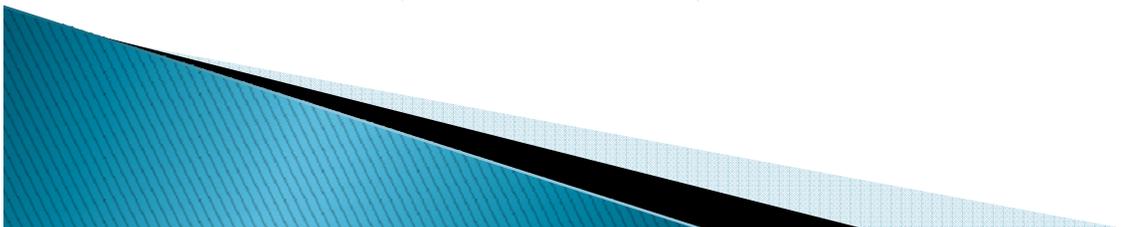
Related Sites:  
Home of:  
**Advanced Buildings**  
www.advancedbuildings.net

**CORE PERFORMANCE GUIDE**

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# Commercial 'Stretch' Appendix

- ▶ Only New Commercial Buildings or Additions over 5,000 ft<sup>2</sup>
- ▶ 2 Options (depending on size)
  - Performance option – 20% below Code
  - Prescriptive option for most building types  
5,000 – 100,000 ft<sup>2</sup>



# Commercial 'Stretch' Appendix

- ▶ **Performance option**
  - 20% below Code (ASHRAE 90.1–2007 appendix G)
  - all buildings over 100,000 ft<sup>2</sup>
  - Special Energy Use Buildings over 40,000 ft<sup>2</sup> (Labs, Supermarkets, Warehouses)
- ▶ **Prescriptive option for most building types**
  - 5,000 – 100,000 ft<sup>2</sup>
- ▶ **Special Code Exemptions (comply with base code)**

**Fidelity Bank**  
**Corporate Office and Branch Case Study**  
 Leominster, MA

**Advanced Building Features**

- High Efficiency T-5 Pendant Lighting
- Lighting Control Efficiency
- Reduced Lighting Power Density
- Efficient Site Lighting
- Additional Wall Insulation
- High Performance Glazing
- Efficient VAV RTU's, with ECM Motors
- Demand Control Ventilation
- Part Load HVAC Efficiency Enhancements

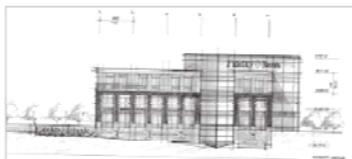
**Funded Utility Services Support**

- Early Life Cycle Cost Analysis
- Integrated Design Team Approach
- Commissioning



**Project Description**

The 47,000 SF Fidelity Bank Corporate Office and Branch was constructed as a design-build project in Leominster, MA. The four story building will provide office space plus a ground floor branch bank office. This project is acclaimed for its highly successful implementation of the national Advanced Buildings program. The project demonstrates the validity of the Advanced Buildings program assertions. The guideline cost effectively delivered even more than the expected 20% to 30% reduction in annual energy costs compared to a code based design.



**Envelope Improvements**

- Walls: Added 3-1/2" batt insulation to planned 2" rigid.
- Glazing:
  - Upgrade U value from 0.42 to 0.31
  - Upgrade SHGC from 0.50 to 0.30
- Projected envelope savings: \$1,500

**Project Team**

Owner:  
**Fidelity Bank**  
 Project Management:  
**Habitat Advisory Group**  
 Architect:  
**Maugel Architects**  
 General Contractor:  
**Construction Dynamics**  
 Energy Efficiency Incentives and Support:  
**National Grid and Keyspan Energy Delivery**



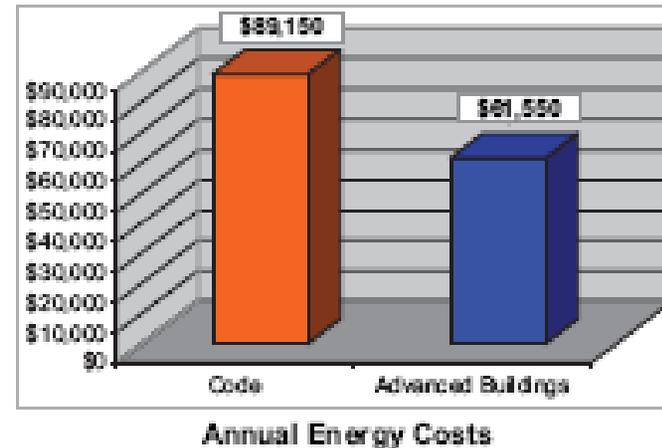
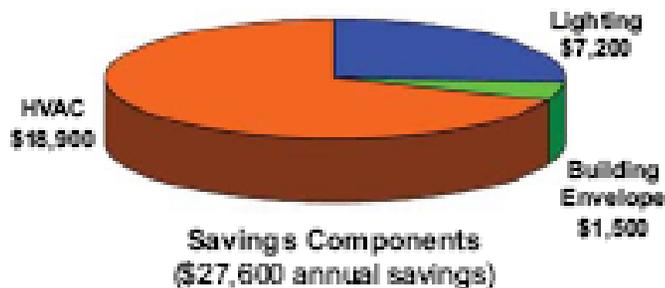
# High Performance Building Design Uses 31% Less Energy

## Savings Projection

Annual Energy Savings:	\$ 27,600
Additional Cost for Upgrades:	\$100,622
Utility Incentives:	<u>- \$ 66,587</u>
Net Owner Costs:	\$ 34,035

Payback with Incentives: **1.2 years ROI: 83%**  
 Payback without Incentives: 3.7 years ROI: 27%

### 31% Improvement Over Code



## Lighting Savings Summary

The lighting layout consisted mainly of T-5 pendants in open office areas, and the latest generation of recessed T-5 fixtures in the remaining areas.

Projected Lighting Savings: \$7,200

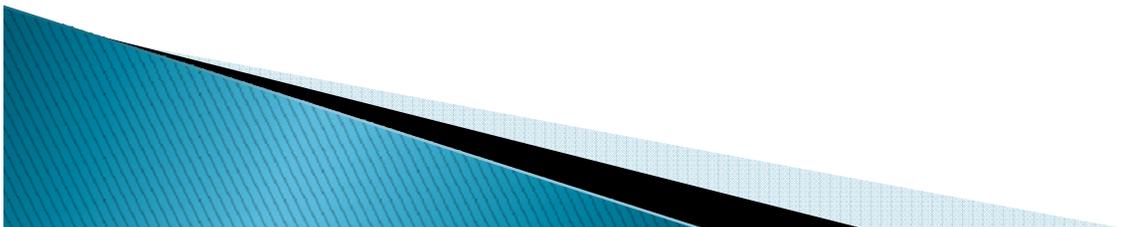


	Mass Energy Code	Advanced Buildings Criteria	Final Design	% Reduction
Lighting Power Density	1.34 w/SF	0.96 w/SF	0.86 w/SF	36%

*Improved lighting quality while using less energy!*

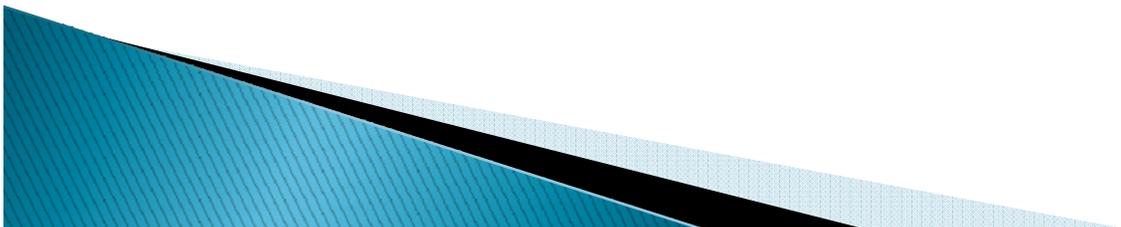
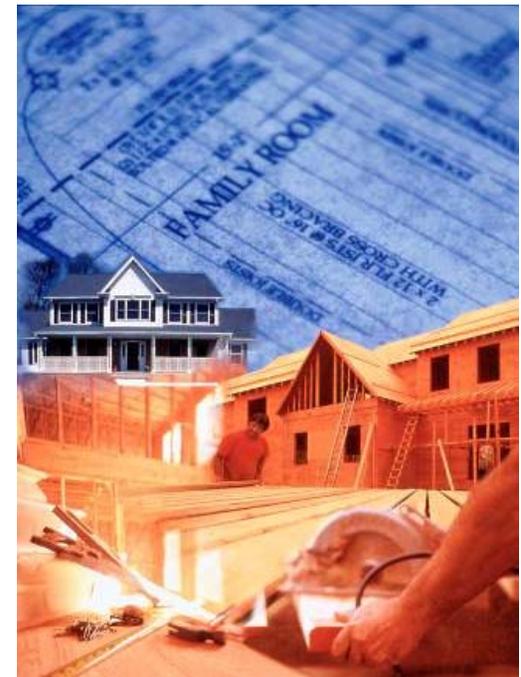
# Commercial 'Stretch' & LEED(v.3)

- ▶ LEED and Commercial 'Stretch' code are fully compatible
  - Both use ASHRAE 90.1-2007 app. G as the energy modeling baseline.
- ▶ LEED energy model = Stretch code model
  - ASHRAE 90.1-2007 - 20% = 5 LEED energy points
- ▶ LEED also has non-energy requirements



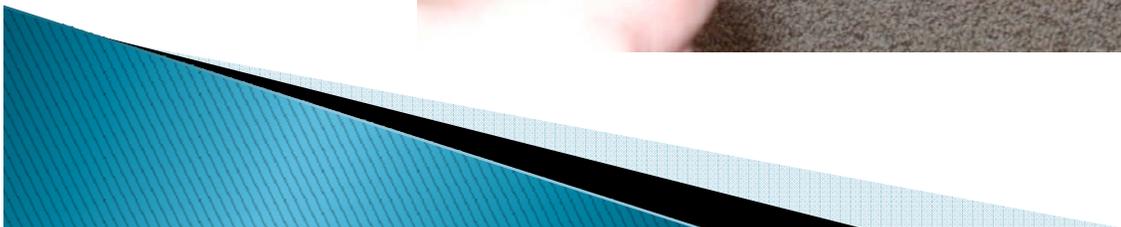
# Code Compliance & Inspections

- ▶ Essentially the same as base code
- ▶ Code Official has the same authority
  - Same building inspections
  - Approves building documents, and ASHRAE modeling as documentation of energy savings
- ▶ Certificate is required



# Compliance

## Codes and Training



# Training on new energy codes

- Covering both the IECC 2009 & Stretch code
- Provided free to all Code Officials
  - Includes IECC code book and Stretch appendix
- Provided at cost to building professionals
- Register online:  
[www.cetonline.org/Events/events.php](http://www.cetonline.org/Events/events.php)
  - Separate Commercial and Residential sessions
- ▶ Energy star homes training available for free:  
[www.energystarhomes.com/](http://www.energystarhomes.com/)
- ▶ Utilities offer commercial ‘Core Performance’ energy training

# Questions ?

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Image source: Manulife building, Fort Point Associates, Inc.

[http://www.fpa-inc.com/111111%20Files/Projects\\_Com.htm](http://www.fpa-inc.com/111111%20Files/Projects_Com.htm)

# Questions?

