

Going Beyond Code – Green Building and Sustainable Communities



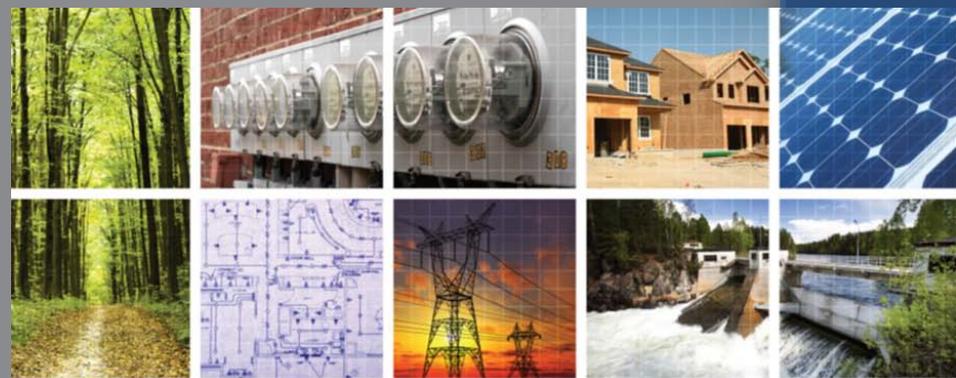
Great Plains Energy Conference

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October 18, 2012

- Introductions
 - Class
 - Instructor

- Class Objectives
 - Keys to Success
 - Critical Issues
 - Elements of Beyond Code Programs
 - Benefits, Savings and Cost Effectiveness
 - Resources



BUILDING TECHNOLOGIES PROGRAM | Green Building Codes

Going Beyond Code

A Guide to Creating Effective Green Building Programs for Energy Efficient and Sustainable Communities

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy | Building Energy Codes



Keys to Successful Adoption and Implementation

- Clear Goals
- Community Wide Assessment and Planning
- Stakeholders and the Decision Making Process
- Implementation and Integration
- Incentives
- Communication and Partnerships



Keys to Successful Adoption and Implementation – Goals

Phase I (adopted October 1, 2009):

- Implement energy efficiency and water conservation requirements for all residential and commercial developments. Specific objectives include:
 - Achieve a 7% reduction in greenhouse gas emissions from 1990 levels by 2012
 - Require that all new homes are built 15% more efficient than code and meet 4 of 6 water efficiency strategies
 - Commercial buildings less than 50,000 square feet must be 15% more efficient than code, while those greater than 50,000 square feet must meet 85% of LEED requirements

Phase II (began October 1, 2011):

- Expand initiatives for new buildings into a comprehensive green building standard requirement. Specific objectives include:
 - All commercial buildings must be LEED certifiable, with minimum of three Energy and Atmosphere points (17.5% better than code).
 - All new homes must meet LEED for Homes or the Green Built North Texas Standard

*The most effective beyond code programs have been developed in response to clearly articulated state or local **goals** with specific, measurable objectives.*



Keys to Successful Adoption and Implementation – Community Assessment

- What general policies already support or are complementary to green building?
- What ordinances and regulations relate to green building?
- What programs are provided by other utilities or regional agencies?
- Where are the gaps?
- If model codes/ordinances are in place, are they enforced?

Developing Green Building Programs, A Step-by-Step Guide for Local Governments (Global Green USA 2008);

EPA's Sustainable Design and Green Building Toolkit for Local Governments (EPA 2010)

Keys to Successful Adoption and Implementation – Stakeholders

- *Local elected officials*
- *A range of city staff representing affected departments*
- *Building industry*
- *Homebuilders association*
- *Architects*
- *Tradespeople, home inspectors, and raters*
- *Utilities*
- *Energy and water conservation specialists*
- *Interested community activists and representatives*





Keys to Successful Adoption and Implementation – Implementation and Integration

- Ideally, those responsible for program implementation also have participated in program development.



Provide training to staff to familiarize them with the local or third-party program. Staff members should be able to provide direction and support to applicants seeking third-party verification as well as assistance with local programs.



Keys to Successful Adoption and Implementation – Incentives

- Time
- Money
 - Certification Fee Reimbursement
 - Property Tax Relief
 - Income Tax Credit
 - Utility Rate Reduction
 - Access to Rebates, Grants, Other Incentives
 - Combination “Carrot and Stick”
 - Variance: FAR, Parking

To speed up the issuance of building permits, Whatcom County has developed a new expedited permit process that offers over the counter permits for waterless urinals, roof mounted PV solar panels, geothermal mechanical installations, solar water heating systems, and Energy Challenge projects.

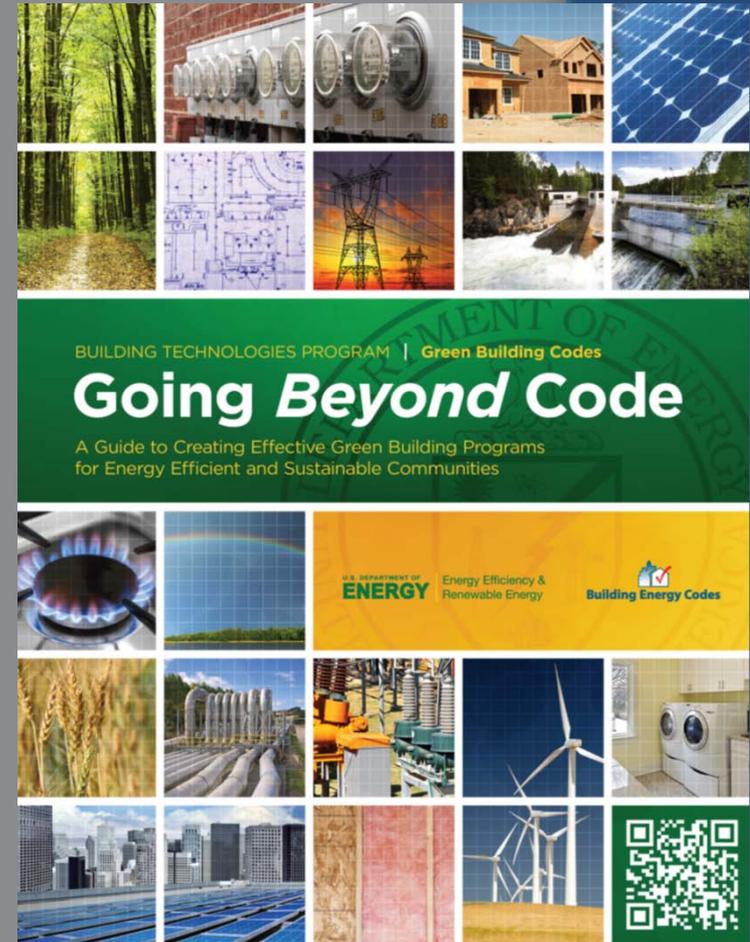


Keys to Successful Adoption and Implementation - Summary

- Clear Goals
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Critical Issues

- Locally Developed, Nationally or Regionally Developed Program
- Sustainability, Beyond Code – Beyond the Building Department
- Building Size
- Voluntary vs Mandatory





Critical Issues – Locally, Nationally, or Regionally Developed Program

Voluntary Program **in Transition** from Locally-Developed to National Standard: City of Scottsdale, Arizona Green Building Program

- Scottsdale's green building program was established in 1998 to reduce the environmental impact of building.. As of 2007, the city reported that 1,123 green single-family and 20 multi-family homes had been completed (AIA 2007)
- In the most recent program update, the Scottsdale City Council recently adopted the International Green Construction Code Public Version 2 as the core of the city's voluntary commercial green building program. The city continues to evaluate the most appropriate update for the residential checklist (Floyd 2011).
- Implementation Agency: Green Building Staff, Building Department
- Voluntary vs. Mandatory: Voluntary
- Types of Buildings: Residential and commercial
- Size of Buildings: N/A
- Incentives: Fast track plan review, marketing, education
- Enforcement: Projects not able to maintain qualification as a green building will be required to resubmit plans for revisions as a non-participating project



Critical Issues – Beyond the Building Department

Sustainability, Beyond Code – Beyond the Building Department

- Planning
- Engineering
- Water/Wastewater
- Building

All city staff members in Tampa, Florida, involved with plan reviews, building permitting, and inspections are provided training and materials on green building and sustainable practices, an effort that helps distinguish Tampa as a Florida Green Local Government and increases the level of integration of the Tampa green building program.

Critical Issues – Building Size

With few exceptions, the beyond code programs highlighted in this guide link house size to the HERS Index rating, overall points required, or both



Critical Issues – Voluntary vs Mandatory

Green Building Code

Residential Green Building Code for Single-Family Residential Structures

The City of Santa Fe's [Residential Green Building Code](#) applies to all building permits for new single-family residential units, attached and detached, including guest houses.

To apply you may download the [excel spreadsheet](#) or, if you are planning to also comply with the ANSI 2008 National Green Building Standard (one of two programs which can qualify for the New Mexico Sustainable Tax Credit), you can download [a spreadsheet with the items for both programs together](#).



Generally speaking, Municipal and Commercial Green Building Programs are more accepted as mandatory

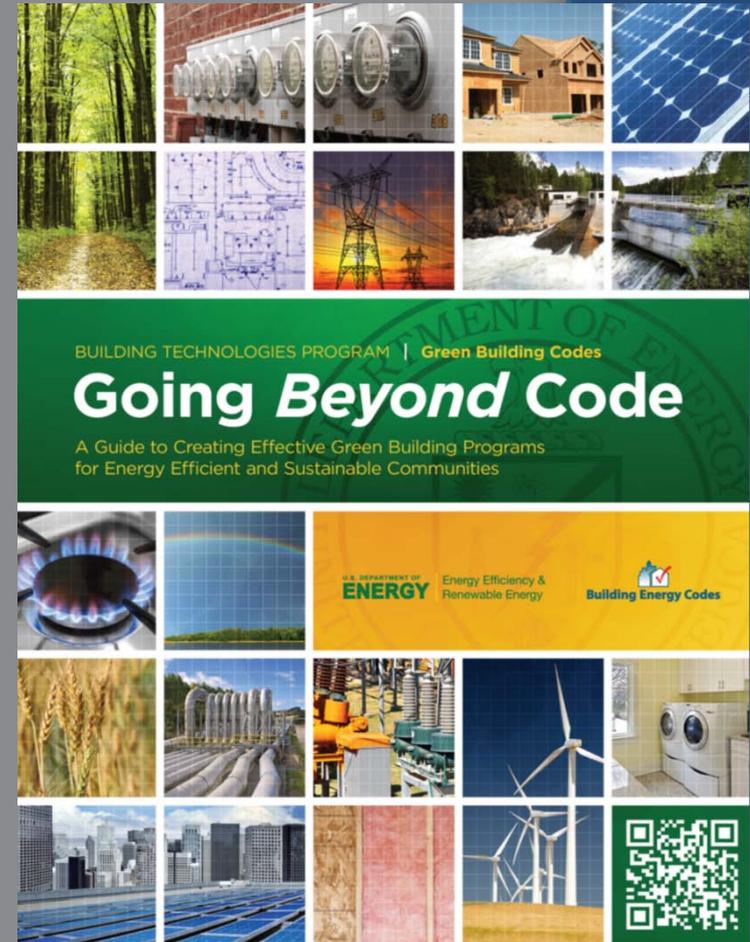


Critical Issues - Summary

- Locally Developed, Nationally or Regionally Developed Program
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- Building Size
- Voluntary vs Mandatory

Program Elements

- Site Selection and Development
- Energy Efficiency
- Water Efficiency
- Materials Conservation and Waste Avoidance
- Indoor Environmental Quality
- Operations, Maintenance and Owner Education





Program Elements

Site Selection and Development

- Orientation – Zoning
- Orientation – Building Code
- Location/Access
- Vegetation/Shade
- Exterior Shading
- Hardscaping
- Heat Island



Program Elements– Side Selection and Development

Jurisdiction	Siting Elements
<p>International Code Council, ICC 700–2008 <i>National Green Building Standard</i></p> <ul style="list-style-type: none"> • 2008 • As Asopted • As Adopted 	<p>RESIDENTIAL</p> <ul style="list-style-type: none"> • Site selection: Infill site, grayfield/brownfield site • Site design: Natural resources, orientation, slope disturbance, soil disturbance and erosion, stormwater management, landscape plan, wildlife habitat, existing buildings, existing and recycled materials, density • Innovative practices: Driveways and parking areas, street widths, cluster development, zoning, wetlands, mass transit
<p>International Living Building Institute <i>Living Building Challenge 2.0</i></p> <ul style="list-style-type: none"> • 2010 • As Asopted • As Adopted 	<p>RESIDENTIAL AND COMMERCIAL</p> <ul style="list-style-type: none"> • Limits to growth • Urban agriculture • Habitat exchange • Car free living
<p>U.S. Green Building Council <i>LEED 2009 for Green Building Design and Construction, LEED for Homes</i></p> <ul style="list-style-type: none"> • 2009 • As Asopted • As Adopted 	<p>RESIDENTIAL AND COMMERCIAL</p> <ul style="list-style-type: none"> • Site selection: Development density and community connectivity, brownfield redevelopment • Alternate transportation: Public transportation access, bicycle storage and changing rooms, low-emitting and fuel-efficient vehicles, parking capacity • Site development: Protect or restore habitat, maximize open space • Stormwater design • Heat Island effect: Nonroof, roof • Light pollution reduction



Program Elements– Energy Efficiency

1. Reduce ambient demands on building
2. Increase efficiency of building
 - Percent above Code – IECC or ASHRAE 90.1
 - HERS Index Rating
 - ENERGY STAR



International Standard or Program	Efficiency	Prescriptive Verification Method	Performance Verification Method	Residential or Commercial
IECC	Any percent above code can be specified	Prescriptive form	REM/ <i>Design</i> , REM/ <i>Rate</i> , and RES <i>check</i> Energy Gauge and others	Both
ENERGY STAR	15% above 2006 IECC plus checklist and performance tests	n/a	REM/ <i>Design</i> and REM/ <i>Rate</i> Performance Calculations and Home Performance Tests	Typically Residential
HERS Index	Any designated percent above 2006 IECC plus performance tests	n/a	REM/ <i>Rate</i> Performance Calculations and Home Performance Tests	Residential
ESV3	20% more efficient than the 2009 IECC	Both prescriptive and performance options are verified by the completion of four inspection checklists.		Residential
LEED for Homes	Requires a HERS of 85- 0, generally meets or exceeds 2009 IECC	For certification, must provide specified documentation to the USGBC.		Residential
LEED 2009	Minimum 10% above ASHRAE 90.1-2007	For certification, must provide specified documentation to the USGBC.		Commercial
ASHRAE 189.1	30% weighted average energy savings across all building types over Standard 90.1-2007 (9% from renewable and 21% from efficiency)	Written in code-enforceable language with both prescriptive and performance options for most measures. Intended primarily for adoption within building codes.		Commercial
ICC 700	Lowest threshold (Bronze) is at least 15% more efficient than 2006 IECC	For verification, projects must use the Green Scoring Tool, hire an accredited verifier, and undergo several inspections.		Residential



Program Elements— Energy Efficiency



Program Elements – Water Efficiency

- Indoor water use reduction through use of high efficiency plumbing fixtures, fittings, and appliances
- Increased water efficiency of equipment such as HVAC, commercial kitchen, and medical/laboratory equipment
- Outdoor water use reduction through water efficient landscaping and high efficiency irrigation systems
- Alternative water sources such as rainwater harvesting
- Water metering and automatic controls



Jurisdiction	Water Elements
<p>State of Florida <i>Florida Green Home Standard</i></p> <ul style="list-style-type: none"> • 2011 • As Adopted • Third party 	<p>RESIDENTIAL</p> <p>Point Options</p> <ul style="list-style-type: none"> • Fixtures • Graywater re-use • Rainwater harvesting • Reclaimed water re-use • Installed landscape • Installed irrigation • Additional water certification requirements
<p>City of Fort Collins, CO <i>Green Building Code</i></p> <ul style="list-style-type: none"> • 2011 • Mandatory • City 	<p>RESIDENTIAL</p> <p>Point Options</p> <ul style="list-style-type: none"> • Efficient faucets • Efficient toilets • Efficient showerheads <p>COMMERCIAL</p> <p>Point Options</p> <ul style="list-style-type: none"> • Efficient faucets • Efficient toilets • Efficient urinals • Efficient pre-rinse spray valves
<p>City of Greensburg, KS <i>Sustainable Comprehensive Master Plan</i></p> <ul style="list-style-type: none"> • 2009 • Voluntary, Mandatory • City, Third Party 	<p>RESIDENTIAL, VOLUNTARY ICC 700</p> <p>Point Options</p> <ul style="list-style-type: none"> • Rainwater harvesting • Efficient irrigation system • High efficiency fixtures and fittings • Automatic shutoff water devices <p>COMMERCIAL, MANDATORY (CITY BUILDINGS) LEED PLATINUM</p> <p>Points Options</p> <ul style="list-style-type: none"> • Municipal recycled water system • Efficient irrigation system • High Efficiency fixtures and fittings • Automatic shutoff water devices



Program Elements – Material Conservation and Waste Avoidance





Program Elements – Material Conservation and Waste Avoidance

Table 4.6 – LEED New Construction Pollution Prevention Points (Commercial)

Credit #	Credit Name	Possible Points
Prereq 1	Storage and Collection of Recyclables	
Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
Credit 2	Construction Waste Management	1 to 2
	50% Recycled or Salvaged	1
	75% Recycled or Salvaged	1
Credit 3	Materials Reuse	1 to 2
	Points Possible	8

Source: LEED for New Construction 2009,
<http://www.usgbc.org/DisplayPage.aspx?CMSPageID=222>

Program Elements– Indoor Environmental Quality

- Ventilation Rates, Filtration, Outdoor Air Delivery, and Tobacco Smoke Controls
- Thermal Comfort of occupants, regulating both temperature and humidity
- Materials specification
- Acoustical controls
- Daylighting
- Isolation of building from pollutants in soil

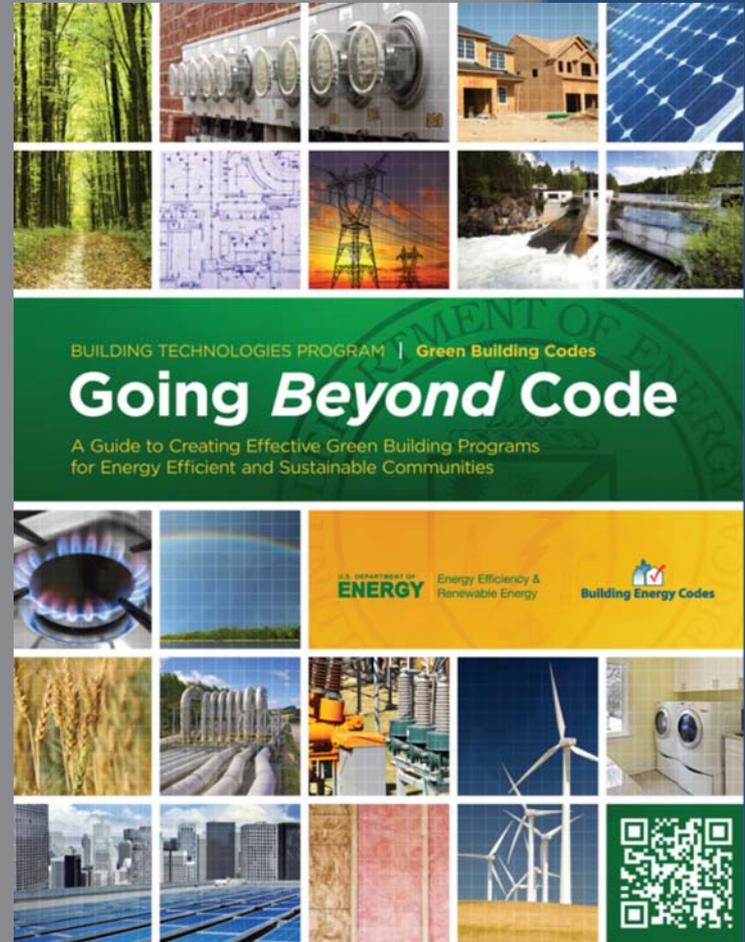
Jurisdiction	Indoor Environmental Quality Elements
<p>EPA Indoor airPLUS 2009</p> <ul style="list-style-type: none"> • As Adopted • Third Party 	<p>RESIDENTIAL</p> <p>Moisture control Radon control Pest management HVAC</p> <ul style="list-style-type: none"> • Minimize condensation problems • Dilute and exhaust pollutants • Remove airborne particulates <p>Combustion Venting Building Materials (reduce source pollutants)</p>
<p>ANSI/ASHRAE/USGBC/IES Standard 189.1 – 2009 <i>Standard for the Design of High-Performance Green Buildings</i></p> <ul style="list-style-type: none"> • 2009 • As Adopted • As Adopted 	<p>COMMERCIAL</p> <p>Indoor air quality:</p> <ul style="list-style-type: none"> • Minimum ventilation rates • Outdoor air delivery monitoring • Filtration and air cleaner requirements • Environmental tobacco smoke • Building entrances <p>Thermal environmental conditions for human occupancy Acoustical sound:</p> <ul style="list-style-type: none"> • Exterior sound • Interior sound • Outdoor-indoor transmission class and sound transmission class <p>Daylighting by toplighting:</p> <ul style="list-style-type: none"> • Minimum daylight zone by toplighting • Skylight characteristics <p>Daylighting by sidelighting:</p> <ul style="list-style-type: none"> • Minimum effective aperture • Office space shading <p>Daylighting simulation Isolation of the building from pollutants in soil Materials:</p> <ul style="list-style-type: none"> • Adhesives and sealants • Paints and coatings • Floor covering materials • Composite wood, wood structural panel and agrifiber products • Office furniture systems and seating • Ceiling and wall systems

Program Elements - Summary

- Site Selection and Development
- Energy Efficiency
- Water Efficiency
- Materials Conservation and Waste Avoidance
- Indoor Environmental Quality
- Operations, Maintenance and Owner Education

Benefits, Savings, and Cost Effectiveness

- Financial Benefits
- Energy
- Water
- Materials Conservation and Waste Avoidance
- Health Benefits

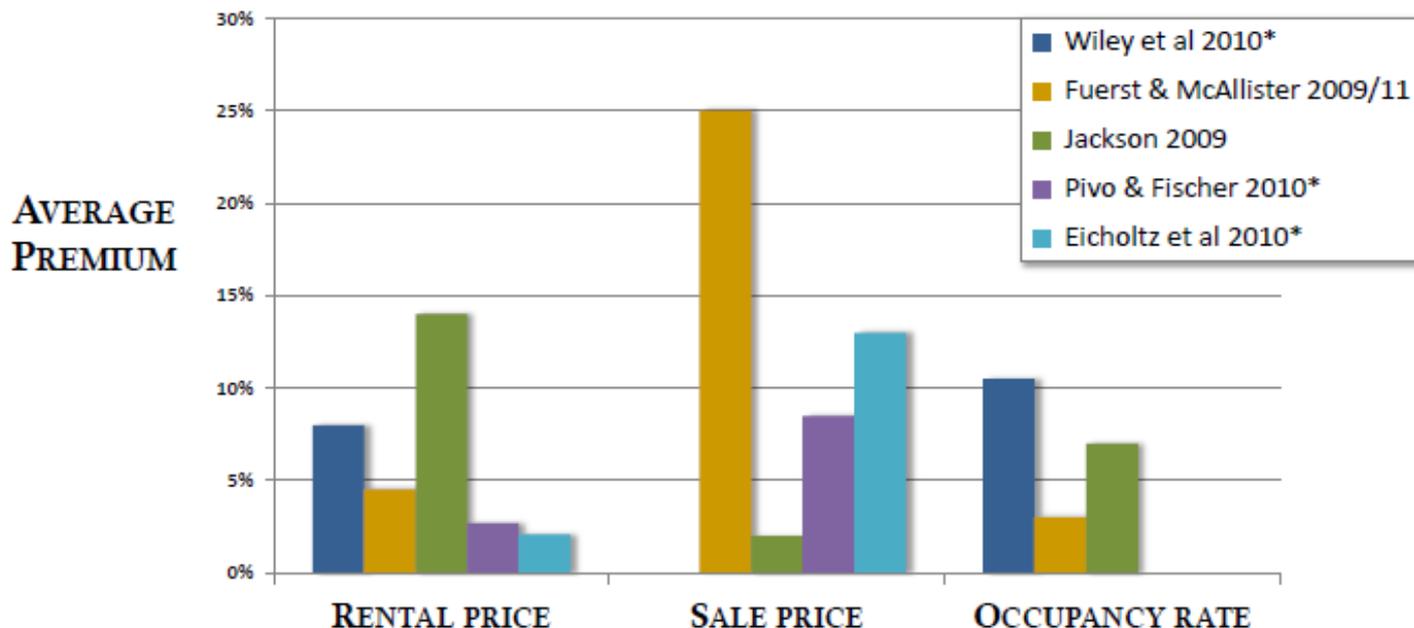


Benefits, Savings, and Cost Effectiveness

- Benefits can be significant
- Benefits can not be assumed
- Adopting agencies need to set thresholds for desired benefits

Benefits, Savings, and Cost Effectiveness

Added Value of ENERGY STAR-Labeled Commercial Buildings in the U.S. Market



© Institute for Market Transformation, 2011.

*These studies only tracked two of the listed indicators.

All studies controlled for multiple factors, including building size and location.

For more information, please contact David Leipziger at david@imt.org.



Recommendations for State and Local Officials

- Establish Goals with Measurable Objectives. Develop clear, comprehensive goals for beyond code programs, with specific, measurable objectives
- Evaluate Existing Zoning Laws and Policies.
- Convene a “Beyond Code” Task Force
- Integrate the Program Across Departments
- Provide Valuable Incentives for Participants
- Develop and Provide Education and Outreach Materials
- Conduct a Strategic Marketing and Outreach Campaign
- Develop Strategic Partnerships



Resources

- www.brittmakela.com/resources
- USGBC
- EPA
- HUD
- EnergyCodes.gov – model policies