Should We Stop Trying to Update to the Latest Model Building Energy Code?

Pioneering Net Zero / Positive Practices

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Photo Credit: Sam Oberter
Mayoral Call for Leadership

- Demonstration Program
- Green Community Forum

Launch March 2011

**LEADERSHIP**

Mayor Menino’s E+ Green Building Program has challenged leading architects, builders, and developers to work together to construct high performance, green, urban homes and to demonstrate the feasibility of regenerative buildings in Boston. Five key objectives guide the program and selection process:

- **FEASIBILITY**
  Demonstrates the performance, construction, and financial potential for locally built energy positive, deep green, urban buildings with on-site renewable energy resources.

- **FUTURE PROTOTYPES**
  Construct high performance, green buildings using “on-the-shelf” products and materials, and replicable strategies that can serve as models for future practice.

- **HOUSING OPPORTUNITIES**
  Provide new housing opportunities affordable to a range of income earners in sustainable neighborhoods that are connected to nearby transit, work, and amenities.

- **AWARENESS**
  Raise public and professional awareness of the importance and potential for high performance, residential, green buildings and design and construction practices.

- **URBAN DESIGN**
  Reinvigorate Boston neighborhoods with new development that is both expressive of its high performance, green building features and is respectful of its context.

“E+ Green Buildings produce more energy than they use on an annual basis, giving energy back to the grid and saving homeowners money.”

- Thomas M. Menino, Mayor
  City of Boston
**E+ Green Buildings**

Net Energy Positive

- **Highly Efficient Envelops**
- **Simple / Small Systems**

= **HERS 30 to 40**

- **Solar PV to Net Positive**

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**ENERGY POSITIVE**

Home Energy Rating System (HERS)

The E+ Green Building program requires buildings that generate more energy than they use annually as indicated by a HERS Index of less than zero.

Developed by Residential Energy Services Network, the HERS models building energy performance. A comparable home, the HERS Reference Home, which is built to the specifications of the 2006 International Energy Conservation Code, scores a HERS Index of 100. A Net Zero Energy home scores a HERS Index of 0 and an E+ Green Home scores a negative HERS Index.

Each 1-point decrease in the HERS Index corresponds to a 1% reduction in energy consumption compared to the HERS Reference Home. An Energy Star home must have a HERS Index of 85, or lower, and is 15% more energy efficient than the HERS Reference Home.

The HERS Index system has been developed by Residential Energy Services Network (RESNET). Text courtesy of RESNET. [www.resnet.us](http://www.resnet.us)
E+ Green Buildings

Deep Green

- Site & Location
- Resource Efficient & Sensitive
- Human Health & Wellbeing
- Community & City
- Beautiful & Replicable

BEYOND PLATINUM
Green Building Leadership in Energy & Environmental Design (LEED)

The E+ Green Building Program requires buildings that are environmentally positive and exceeding LEED for Homes Platinum, the highest certification level.

LEED® is the US Green Building Council’s internationally-recognized green building certification system that provides building owners and operators with a framework for identifying and implementing practical and measurable green building design, construction, operations, and maintenance solutions. LEED for Homes scales credit requirements to the size of the building and both measures and verifies practice in eight key sustainability and environmental impact categories.

- **Sustainable Sites**
  - Encourages building on previously undeveloped land, reuses or minimizes the building’s impact on ecosystems, encourages responsible acquisition, and develops land in ways that help maintain the land’s ecological function.

- **Indoor Environmental Quality**
  - Promotes strategies that improve indoor air quality and make the building more comfortable and healthy for occupants.

- **Water Efficiency**
  - Encourages the use of water-saving fixtures, fittings, and features that reduce water consumption in the building.

- **Locations & Linkages**
  - Encourages buildings to be located near public transportation and other amenities, providing convenient access to the urban environment.

- **Energy & Atmosphere**
  - Promotes energy savings and reduces energy consumption through the use of efficient designs, systems, and technologies.

- **Awareness & Education**
  - Encourages the provision of educational resources and tools to help building owners and occupants understand and capitalize on the building’s green features.

- **Materials & Resources**
  - Promotes the use of sustainable materials and resources, including recycled and locally sourced materials.

- **Innovation in Design**
  - Encourages designs that incorporate innovative strategies and approaches to improve the building’s performance beyond what is required by other LEED credits or to address green building considerations that are not specifically addressed elsewhere in the LEED rating system.

The LEED® Rating systems have been created by the US Green Building Council. Symbols and text courtesy of the USGBC. For more information on LEED, please visit: www.usgbc.org
E+ Green Buildings

RFP for Three City Sites

- Efficient Location
- Urban Infill
- Previously Developed Land
- Walk to Public Transit
- Walk to Neighborhood Assets

LOCATION

Building new homes in compact neighborhoods that are connected to nearby transit service and local amenities reduces transportation-related energy use, pollution, and saves homeowners money. Redeveloping vacant parcels saves land, reduces sprawl, revitalizes existing neighborhoods, and promotes sustainable communities.

“Often, when your goal is driving real change in the marketplace, it’s best to show – not just tell...E+ is another example of Boston’s leadership under Mayor Menino.”

- Rick Fedrizzi, President, CEO, and Founding Chair of the U.S. Green Building Council
Winner
156 Highland Street
Highland Park

Sage Builders / Transformations
Winner
64 Catherine Street
Wood Bourne, JP

GFC Development
Utile Inc.
Winner
61 Marcella Avenue
Highland Park

Urbanica
ISA / Interface Studio Architects
E+ Green Buildings

Marcella St, Roxbury
Completed Fall 2013

Photo Credit: Sam Oberter
E+ Green Buildings

LEED H Platinum

LEED FOR HOMES - FINAL 100.5/136

Innovation & Design Process (ID) 8/11
Location and Linkages (LL) 10/10
Sustainable Sites (SS) 16.5/22
Water Efficiency (WE) 5/15

Materials and Resources (MR) 11/16
Awareness and Education (AE) 1/3
Indoor Air Quality (EQ) 14/21
Energy and Atmosphere (EA) 35/38

MARCELLA STREET
E+ Green Buildings

Building & System Use: 30.5 MMBtu
Solar PV Production: 37.5
Net Energy Positive: - 7.1 MMBTU
E+ Green Buildings

Proven Practice

Annual Production + 8,140 kWh

Performance Monitoring

Welcome to the City of Boston's E+ Green Building Program. Over the course of a year an energy positive building (i.e. E+) will produce more electricity than it consumes. This is achieved through innovative design, a well-constructed building envelope, and use of high-efficiency windows and heating/cooling systems. Rooftop solar panels and solar thermal water heaters provide electricity and hot water for building occupants.

Marcella Street

A four-unit multifamily townhouse building totalling 7,900 square feet. Predicted annual electricity production of 44,400 kWh, consumption of 36,900 kWh, net electricity production of 12,600 kWh.

Photo credit Sam Oberter.

Embue

Sensing & Control in Every Room
**E+ Green Communities**

**Building on E+ GB Program**
- Two City Owned Parcels
- Community Charrette and Planning Meetings
- E+ GB Goals PLUS
  - Neighborhood Sustainability
  - Place-making and Site Planning
  - Building and Community Sustainability
- RFP Seeking Leading Teams

[Map Image: Aerial view with marked parcels and street names]
E+ Green Communities

RFP Response

studio garchitects
E+ Green Communities

Architect / Developer: SEBASTIAN MARISCAL STUDIO

44 Units / 21% Net Positive

Selected Developer
Sebastian Mariscal
E+ Green Communities

RFP Response

Architect / Developer: SEBASTIAN MARISCAL STUDIO
E+ Green Communities

RFP Response

Architect / Developer: SEBASTIAN MARISCAL STUDIO
E+ Green Buildings – Residential Market Impact

Private E+ / Net Zero Energy Projects
Dorr Street Residences, Roxbury (completed)
Urbanica Development / Merge Architects
E+ Green Buildings – Institutional Market Impact

Private E+ / Net Zero Energy Projects

Artists for Humanity Addition, Boston
AfH Boston / BEHNISCH Architekten
E+ Green Buildings – Public Leadership

Public / Net Zero Energy

Cronin Field Headquarters, Westborough (completed)
Massachusetts Division of Fisheries & Wildlife / Architerra
Development Recommendation:
Four RFPs, Two Small, Two Medium
Parcel Group – Building / Units
A – Small – 2 Family / 2 - 3 Units
B – Medium – Row / 13 - 16 Units
C – Small – 3 Family / 2 - 4 Units
D – Medium – Muliti / 12 - 20 Units
TOTAL 40+ UNITS
Zero Carbon

**Carbon Free Boston** study

- Collaboration with the Boston Green Ribbon Commission (GRC) and the BU Institute for Sustainable Energy (ISE).
- Quantify most effective strategies to reduce energy, buildings, transportation, and waste GHG emissions.

**Carbon Neutral Boston 2050**

Mayor Martin J. Walsh

**Carbon Neutral Cities Alliance**

- Collaboration of cities committed to achieving aggressive long-term carbon reduction goals with USDN, INC, and C40.
- Boston and Cambridge – “road mapping” policy, planning, new & existing buildings, time of renovation / sale upgrades.
Given the rapid normalization of high performance building practices how do we keep pace with change?

Given the urgency of the situation can we afford a business as usual progress?

*The tipping point is that magic moment when an idea… crosses a threshold, tips, and spreads like wildfire.*

*Malcolm Gladwell, “The Tipping Point”*

Carbon Free Boston 2050; let’s go Net-Positive!