

# Understanding the Green Programs

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We Help You Build a Better *Green* Home



# AGENDA

1. What is Green Building?
2. National Programs
3. Benefits of Programs
4. Steps to Compliance
5. Comparison: Energy Star, LEED for Homes, NAHB: ANSI/ICC NGBS
6. Training for Builders & Designers

# What is Green Building?

DESIGN DECISIONS  
+  
IMPLEMENTATION



LONG  
LASTING  
POSITIVE  
RESULTS

# What is Green Building?

## LESS IS MORE:

All buildings have a negative environmental impact

GOAL = Minimize Impact

SMALLER BUILDINGS use Less:

Materials

Initial Energy

Long-Term Energy & Water

Maintenance Resources



# What is Green Building?

## CONTROL

Site Choices

Materials

Building Design

Size

Landscape Design

Occupant Training



## ACHIEVE

Energy Efficient

Water Efficient

Healthy & Safe

Comfortable

Durable

Resource Efficient

# Regional Green Building Programs

- 80-100 existing green building programs nationally
- Builders are & have been sampling a variety of local and regional green certifications for a decade or more



# National Green Building Programs

Two approaches to green certification:



# The Core: Energy Efficiency



- Energy Star Homes: since 1995
- Joint Development of US EPA & DOE
- Can be utilized alone or in conjunction with a full green building program



- Developed by National Association of Home Builders Research Center.
- Development of program included limited oversight by NAHB of regional & local HBA implementation and evaluation with two public comment periods.
- Released for use in early 2008.
- Formed the basis for the ANSI reviewed, National Green Building Standard (ICC 700-2008).





- Developed by the U.S. Green Building Council (USGBC)
- LEED (Leadership in Energy and Environmental Design) is a voluntary, consensus-based national rating system for developing high-performance, sustainable buildings.
- “The key elements of USGBC's consensus process include a balanced and transparent committee structure, technical advisory groups that ensure scientific consistency and rigor, opportunities for stakeholder comment and review, member ballot of new rating systems, and a fair and open appeals process.”
- Pilot – 2005, Fully-chartered program – 2008.

# Benefits of Programs

- Structured & Comprehensive Approach
- Minimize Shortcuts, Last Minute Changes, and Forgotten Details
- Third Party Verification = Consumer Confidence
- Marketable Certification

# Steps to Compliance

1. Design and Decide Measures
2. Build
3. Verify (3<sup>rd</sup> Party)
4. Certify

# Comparison of Programs

1. Applicability to Housing Types
2. Delivery Models
3. Design/Decision Process
4. Verification Methods
5. Certification
6. Categories of Measures
7. Prerequisites and Credits

# Applicability



Single Family  
Gut Rehab  
*Renovation*  
Multi-Family Low  
Rise  
*Multi-Family Mid-rise*

Yes	Yes	Yes
Yes	Yes	Yes
Yes	<b>No</b>	<b>No</b>
Yes	Yes	Yes
Yes	Yes	<b>Pilot</b>

# Delivery Models



1. Builder Hires Provider during design
2. Provider is involved from design through certification
3. Provider's Green Rater verifies measures & documents
4. Provider acts as QA
5. Independent body issues certification, (not USGBC or Provider)



1. Builder determines project goals and measures independently
2. Builder hires Verifier when home is under construction
3. Verifier provides results to NAHB Research Center
4. NAHB Research Center issues certification and serves as QA.

# Design/Decision Process



Provider MUST participate in “Preliminary Rating” with project team:

- Explain Mandatory Measures
- Help team understand measures and verification methods
- Develop initial project checklist



for Homes

## LEED for Homes Simplified Project Checklist

Builder Name:
Project Team Leader (if different):
Home Address ( Street/City/State):

### Project Description:

Building type: *Single detached*  
# of bedrooms: *0*

Project type: *Custom*  
Floor area: *0*

### Adjusted Certification Thresholds

Certified: *45.0* Gold: *75.0*  
Silver: *60.0* Platinum: *90.0*

Project Point Total		Final Credit Category Total Points					
Prelim: <i>0 + 0 maybe pts</i>	Final: <i>0</i>	ID: <i>0</i>	SS: <i>0</i>	EA: <i>0</i>	EQ: <i>0</i>		
Certification Level		LL: <i>0</i>	WE: <i>0</i>	MR: <i>0</i>	AE: <i>0</i>		
Prelim: <i>Not Certified</i>	Final: <i>Not Certified</i>	Min. Point Thresholds Not Met for Prelim. OR Final Rating					

date last updated :		last updated by :		Max Points	Project Points		
					Preliminary	Maybe	Final
<b>Innovation and Design Process (ID)</b> (No Minimum Points Required)				Max	Y/Pts	Maybe	No Y/Pts
<b>1. Integrated Project Planning</b>	1.1	Preliminary Rating	Preq	1	0	0	0
	1.2	Integrated Project Team		1	0	0	0
	1.3	Professional Credentialed with Respect to LEED for Homes		1	0	0	0
	1.4	Design Charrette		1	0	0	0
	1.5	Building Orientation for Solar Design		1	0	0	0
<b>2. Durability Management Process</b>	2.1	Durability Planning	Preq	1	0	0	0
	2.2	Durability Management	Preq	1	0	0	0
	2.3	Third-Party Durability Management Verification		3	0	0	0
<b>3. Innovative or Regional Design</b>	3.1	Innovation #1		1	0	0	0
	3.2	Innovation #2		1	0	0	0
	3.3	Innovation #3		1	0	0	0
	3.4	Innovation #4		1	0	0	0
Sub-Total for ID Category:				11	0	0	0
<b>Location and Linkages (LL)</b> (No Minimum Points Required)				OR	Max	Y/Pts	Maybe No Y/Pts
<b>1. LEED ND</b>	1	LEED for Neighborhood Development	LL2-6	10	0	0	0
<b>2. Site Selection</b>	2	Site Selection		2	0	0	0
<b>3. Preferred Locations</b>	3.1	Edge Development	LL 3.2	1	0	0	0
	3.2	Infill		2	0	0	0
	3.3	Previously Developed		1	0	0	0
<b>4. Infrastructure</b>	4	Existing Infrastructure		1	0	0	0
<b>5. Community Resources/ Transit</b>	5.1	Basic Community Resources / Transit	LL 5.2, 5.3	1	0	0	0
	5.2	Extensive Community Resources / Transit	LL 5.3	2	0	0	0
	5.3	Outstanding Community Resources / Transit		3	0	0	0
<b>6. Access to Open Space</b>	6	Access to Open Space		1	0	0	0
Sub-Total for LL Category:				10	0	0	0
<b>Sustainable Sites (SS)</b> (Minimum of 5 SS Points Required)				OR	Max	Y/Pts	Maybe No Y/Pts
<b>1. Site Stewardship</b>	1.1	Erosion Controls During Construction	Preq	1	0	0	0
	1.2	Minimize Disturbed Area of Site		1	0	0	0
<b>2. Landscaping</b>	2.1	No Invasive Plants	Preq	2	0	0	0
	2.2	Basic Landscape Design	SS 2.5	2	0	0	0
	2.3	Limit Conventional Turf	SS 2.5	3	0	0	0
	2.4	Drought Tolerant Plants	SS 2.5	2	0	0	0
	2.5	Reduce Overall Irrigation Demand by at Least 20%		6	0	0	0
<b>3. Local Heat Island Effects</b>	3	Reduce Local Heat Island Effects		1	0	0	0

# Design/Decision Process



- Builder determines measures to pursue using online “Green Scoring Tool”
- Verifier involvement is not required.

NAHB - NATIONAL GREEN BUILDING PROGRAM

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About NAHB Green Who Is Green? **Green Scoring Tool** Rating Systems Certification Education

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**Habitat Atlantic City** **Scoring Tool** | [Scoring Summary](#) | [Reports](#) | [Projects](#)

Lot Design	Resource Efficiency	Energy Efficiency	Water Efficiency	IEQ	Homeowner Education	Global Impact
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Section Page 1 of 26

### Section Score: ?

**86**

0 37 62 100  
Bronze Silver Gold

### Project Status: ?

[Lot Design](#) 15  
[Resource Efficiency](#) 64  
[Energy Efficiency](#) 86  
[Water Efficiency](#) 24  
[Indoor Environmental Quality](#) 53  
[Homeowner Education](#) 9  
[Global Impact](#) 11

Project Score >> 262

0 237 311 395  
Bronze Silver Gold

Don't forget your 100 additional points! ?

[Scoring Details](#)

### Quick References: ?

- [REScheck™](#)
- [IECC 2003](#)
- [ANSI/ACCA Manual J 8th Edition](#)

### Required Conditions - Energy Efficiency

Implement an integrated and comprehensive approach to energy-efficient design of building site, building envelope, and mechanical space conditioning systems

**! REQUIREMENTS** – The home must meet the three conditions listed below to be considered for certification.

The home must also achieve at least 37 Points (Bronze Level) from the optional guidelines in the Performance Path or the Prescriptive Path.

The home is equivalent to the [IECC 2003](#) or local energy code whichever is more stringent. Conformance to this threshold shall be based on plan analysis using software such as [ResCheck](#) or other as approved by green building program administrator.

Check here if you claim compliance

Energy Star - Will Qualify

[Guidelines Reference 3.1.1](#)  
[How To Verify Intent](#)  
[How To Implement Resources](#)

Size space heating and cooling system/equipment according to building heating and cooling loads calculated using [ANSI/ACCA Manual J 8th Edition](#) or equivalent. [Computerized software recognized by ACCA](#) as being in compliance with Manual J 8th Edition may be used.

Internet | Protected Mode: C  
ASSOCIATES

# Verification Methods



## GREEN RATER

(Accredited by Provider)

1. Visual Inspection & Testing
2. Accountability Forms
3. Backup Documents -  
*Submitted by fax/email, or viewed at site*
  - Invoices
  - Letters
  - Spec Sheets
  - Drawings & Calcs
  - Photos



## VERIFIER

(Accredited by NAHB-RC)

1. Visual Inspection & Testing
2. Backup Documents -  
*All viewed at site*
  - Invoices
  - Letters
  - Spec Sheets
  - Drawings & Calcs
  - Photos

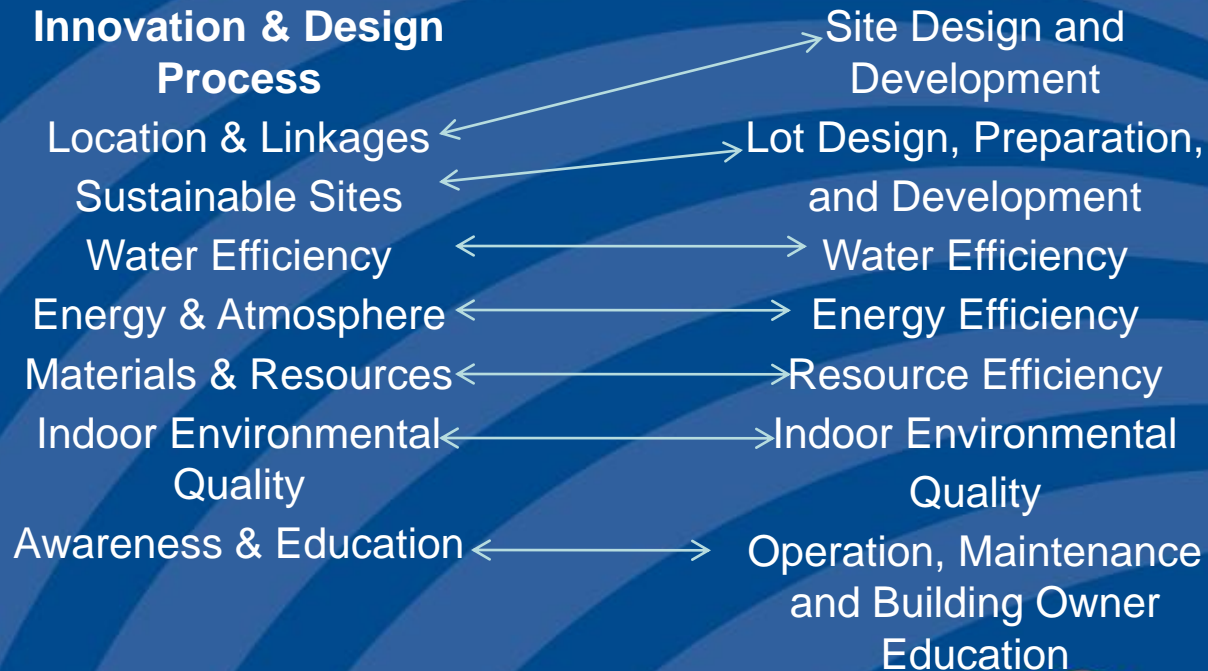
# Certification Process



1. Green Rater provides verification info to Provider
2. Provider performs QA
3. 3<sup>rd</sup> Party (not USGBC) reviews package and issues certification.

1. Verifier emails inspection reports to NAHB Research Center
2. NAHB Research Center issues certification.

# Categories



# Points & Levels



Level	Points
Certified	45
Silver	60
Gold	75
Platinum	90
Total Possible	136
Total Measures	~ 86-105
Home Size Adjust	-10 to +30



Level	Points
Bronze	222
Silver	406
Gold	558
Emerald	697
Total Possible	1270+
Total Measures	~ 237-259
Home Size Credit	0 to 15

# Prerequisites and Category Minimums



Credit category	Prerequisites (mandatory) measures	Minimum point requirements	Maximum points available
Innovation & Design Process (ID)	3	0	11
Location & Linkages (LL)	0	0	10
Sustainable Sites (SS)	2	5	22
Water Efficiency (WE)	0	3	15
Energy & Atmosphere (EA)	2	0	38
Materials & Resources (MR)	3	2	16
Indoor Environmental Quality (EQ)	7	6	21
Awareness & Education (AE)	1	0	3
<b>Total</b>	<b>18</b>	<b>16</b>	<b>136</b>

# Prerequisites and Category Minimums

Category	Prereqs	Bronze	Silver	Gold	Emerald	~ Max Avail.
Lot Design, Preparation, and Development	0	39	66	93	119	226
Water Efficiency	0	45	79	113	146	200
Resource Efficiency	5	30	60	100	120	259
Energy Efficiency	16	14	26	41	60	355
Indoor Environmental Quality	12	36	65	100	140	307
Operation, Maintenance and Building Owner Education	1	8	10	11	12	29
Additional Points from any category		50	100	100	100	



# Mandatory Measures: Innovation/Design



Conduct <b><u>Preliminary Rating</u></b>	--
Prepare <b><u>Durability Plan</u></b> (builder defines, verifies measures)	--
<p><b><u>Durability Measures:</u></b></p> <ul style="list-style-type: none"> <li>•Water Resistant Flooring (Kitch/Bath/Laundry/Entry)</li> <li>•No paper-faced walls around tubs</li> <li>•Drain/Pan for washers, water heaters, and condensing dryers</li> </ul>	<p><b><u>Durability Measures:</u></b></p> <ul style="list-style-type: none"> <li>•Ext. Drain Tile – Fin. Bsmt.</li> <li>•Water Resistive Barrier</li> <li>•1:20 Slope from House</li> <li>•Ice Barrier per IRC/IBC</li> <li>•No carpet adjacent to toilets</li> <li>•Dryer vented to outdoors</li> <li>•No paper-faced backer behind tile</li> <li>•Vapor retarder under slabs</li> <li>•Damp proof below grade walls</li> <li>•R6 on ducts in uncond. space</li> </ul> <p>Points awarded for various other measures</p>

# Mandatory Measures: Energy



Meet Energy Star Homes performance requirements, including:

- HERS Index 85 or less
- HVAC Sizing per ACCA Manual J
- EPA Thermal Bypass Checklist
- Duct Leakage 6cfm25 per 100sqft or less
- Energy Star HVAC, Windows, Lights, or Appliances
- Sealed ductwork

Size HVAC per ACCA Manual J Sealed Ductwork  
No Panned Supplies  
Air Sealing including majority of items on EPA Thermal Bypass Checklist  
Energy Star qualified windows  
 Points awarded for various other measures

--

IECC 2003 Compliant  
 per REScheck  
 Or equivalent

3<sup>rd</sup> Party Review of Compliance

Proper Refrigerant Charge

Points awarded

# Energy Star vs. REScheck



REScheck™

- Compares to 2004 IECC for rating
- Includes:
  1. Envelope: insulation/windows/etc.
  2. Mechanical Equipment: HVAC/DHW
  3. Infiltration
  4. Duct Leakage
  5. Lights and Appliances
  6. Solar

- Compares to any energy code (2003 IECC for NAHB/ICC)
- Includes:
  1. Envelope: insulation/windows/etc.
  2. Mechanical Equipment: HVAC/DHW

It is possible (though not common) for a home to pass Energy Star (barely) but NOT pass REScheck for IECC 2003.

# Mid-Rise Energy

## Energy Analysis per ASHRAE 90.1 Standard

90.1 analysis builds two buildings- baseline and proposed

- LEED for Homes Midrise requires 14% increase in efficiency
- Energy Star Pilot requires 20% increase in efficiency

### *Common Energy Efficiency Measures for Mid-Rise*

#### Lighting

- ✓ Bi-level using motion sensors
- ✓ Careful attention to wattage density

#### Hot Water Conservation

- ✓ Showerheads, faucet aerators

#### High Efficiency Gas Furnaces or Boilers

#### Split AC systems

#### Air sealing

# Mandatory Measures: Site



<u>Erosion Controls</u> during construction	-- Points awarded for various measures
No <u>Invasive Plants</u>	--

# Mandatory Measures: Materials/Resources



<b><u>Framing Waste Factor</u></b> <10%	--
<b><u>Tropical Hardwoods</u></b> (if used) must be FSC certified	--
Identify <b><u>Waste Diversion</u></b> options and document rate of diversion	-- Points awarded for Waste Management Plan
--	<b><u>Floor/Roof/Wall Sheathing:</u></b> PS1 for OSB PS1/PS2 for Plywood

# Mandatory Measures: Indoor Environmental Quality



<p><b><u>Closed Combustion or Power Exhaust</u></b> Mechanical Equipment</p>	<p><b><u>Natural Draft Appliances</u></b> installed to be code compliant and minimize spillage/backdrafting Points awarded for other measures</p>
<p><b><u>CO Monitor</u></b> On each Floor</p>	<p>-- Points awarded for installation near bedrooms</p>
<p><b><u>Doors on Fireplaces</u></b></p>	<p>-- Points awarded</p>
<p><b><u>Outdoor Air Ventilation</u></b> per ASHRAE Std. 62.2</p>	<p>-- Points awarded</p>
<p><b><u>Local Exhaust</u></b> Kitchen and Bath per ASHRAE Std. 62.2</p>	<p><b><u>Bath Exhaust</u></b> Per ASHRAE Std. 62.2 Points awarded for kitchen</p>

# Mandatory Measures: Indoor Environmental Quality



<b><u>Duct Sizing per ACCA Manual D</u></b>	-- Points awarded
<b><u>MERV 8 Filters</u></b> In Air Handlers	-- Points awarded
<b><u>Radon Resistant Construction</u></b> In EPA Zone 1	<b><u>Passive Radon System</u></b> In EPA Zone 1
<b><u>No HVAC in Garage</u></b>	<b><u>Air Sealing</u></b> between garage & home Points awarded for other measures

# Mandatory Measures: Awareness/Education



<u>Homeowner's Manual and Training</u>	<u>Homeowner's Manual</u> Points awarded for training
--	<u>Building Manager's Manual</u>

# Effort & Time Associated with Program Verification



## First Time Builder

Preliminary rating, documentation, in field inspection & testing, documentation review and certification = 15 - 40 hours +

Infield inspections & documentation review = 4-8 hours, in best case scenario. Requires very diligent builder...

## Experienced or Production Builder

Aforementioned services = 8 hours or less with sampling possible

Similar to First-Time Builder  
No sampling protocol included in program docs.

# Program Fees



- Consulting and Verification:
- Fees set by Provider/Rater



- Verification:
- Fees set by Verifier

## LEED for Homes Pricing

	SINGLE-FAMILY HOUSING		MULTI-FAMILY HOUSING		VOLUME PRICING
	REGISTRATION	CERTIFICATION	REGISTRATION	CERTIFICATION	PROJECT SPECIFIC
USGBC MEMBER	\$150	\$225	\$450	\$0.035 PER SQUARE FOOT	CONTACT PROVIDER FOR INFO
NON-MEMBER	\$225	\$300	\$600	\$0.045 PER SQUARE FOOT	

**Note:** The LEED for Homes Rating System requires completion of on-site inspections prior to certification. Additional Provider and Green Rater verification costs apply and are based on market prices. Please consult the Provider of your choice for applicable rates and fees. All fees are subject to change. Sorry, no refunds.

- Certification:
- \$200 per home (NAHB Members)
  - \$500 per home (non-members)

# Program Similarities

- Development of program consensus based and builder participation is voluntary
- Third Party verified, though slightly different process
- Program requirements typical of general green building practices
  - Address Home Size, although slightly different
  - Two energy pathways
- Paperwork and amount of time & effort to certify is roughly equivalent



# Program Differences

- Third Party Verifier
- Where certification process begins
- Eligibility of Mid Rise Multi Family (LEED H), Renovations (NGBS)
- LEED Prerequisites are point categories for NGB Guidelines
- Energy Star not required by NGBS
- NGB point categories for minimum bronze certification level are soft in terms of encouraging innovative green strategies. This is particularly true for non-Energy Star Builders.
- NGB Standard is between LEED and NGB Guidelines in rigor



# Available Training



## General:

1. Online – Introduction to LEED for Homes
2. Online – LEED for Homes Webinar Series
3. LEED for Homes Technical Review
  - Full Day – USGBC NJ December 2009
4. LEED for Homes Process Training
  - Half Day – contact MaGrann Associates
5. LEED AP HOMES Accreditation
  - Download candidate handbook at [www.gbci.org](http://www.gbci.org)

[www.usgbc.org](http://www.usgbc.org)



# Available Training



## General:

1. CGP – Certified Green Professional Designation
2. “Green Building for Building Professionals”  
11/02/09 – Cherry Hill, NJ  
Register online @ [nahb.org](http://nahb.org)

[www.nahbgreen.org](http://www.nahbgreen.org)

# Understanding the Green Programs

Thank you for your  
attention!

QUESTIONS?

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We Help You Build a Better *Green* Home

