

TO: Joyce Paul

CC: Jeanne Herb, Mike Winka, Kenny Esser, Mary Sheehy

FROM: Judy Shaw, Ph.D., Rutgers Center for Green Building, Project Manager

RE: Interim Green Building Guidance

DATE: November 25, 2009 [**REVISED: November 30, and December 17, 2009**]

In August 2007, the New Jersey Legislature directed the Commissioner of the Department of Community Affairs to publish a green building manual to provide a baseline for the construction of buildings that "significantly reduce or eliminate the negative impact of buildings on the environment and their occupants (C.52:27D-130.6)." It is currently being developed through a partnership between the DCA, DEP, HMFA, BPU, and the Governor's office (collectively, the Client) and designed by the Rutgers Center for Green Building (RCGB) at the Bloustein School of Planning and Public Policy.

The New Jersey Green Building Manual will be a resource for local governments, building owners and developers who wish to apply for State grants that reward or require consistency with green building standards. It will provide green building guidance for residential and commercial buildings in five broad areas:

- Sustainable site planning
- Safeguarding water and water efficiency
- Energy efficiency and renewable energy
- Conservation of materials and resources
- Indoor environmental quality

The Green Building Manual will be completed in September 2010.

Meanwhile, the Client has requested interim green building guidance such as could be utilized by the state agencies in meeting the objectives of the New Jersey Energy Master Plan and the Global Warming Response Act. In July 2009, an interim green building guidance task force was formed as an outgrowth of the Green Building Summit – the latter being a group originally convened by NJ AIA (March 27, 2009) and subsequently by DEP and DCA (July 10, 2009). A number of important "ground rules" were established at the July 10 meeting as to what the interim guidance might entail. Specifically, it was agreed that the interim guidance would refer both to the LEED (Leadership in Energy and Environmental Design) green building rating system of the US Green Building Council and to the National Green Building Standard, known as ICC-700, which was approved in January 2009 as an American National Standard. The task force was asked to "draw a line" of equivalency between LEED and ICC-700, being most specifically equivalent in the area of energy performance. RCGB agreed to facilitate this group.

The task force met on July 24, 2009 in New Brunswick and made initial recommendations in a memo dated August 12, 2009 to Jeanne Herb. Since then, RCGB has produced a few iterations of this guidance document. The most recent, given here, also takes into consideration a need of NJ EDA - through the Local Finance Board- to provide green building guidance for adoption as part of an incentive grant application procedure for the Economic Redevelopment and Growth Grant program. Legislation (S2299) required the standards for those incentives be based on the green building manual. In lieu of the completed report, interim guidance was provided.

The guidance, below, is intended to serve these multiple purposes. There are several green building programs and terms that are referred to throughout the guidance document. For reference purposes, a brief definition of them is given here.

LEED is an internationally recognized green building certification system developed by the U.S. Green Building Council (USGBC) providing 3rd-party verification that a building or community was designed and built using strategies aimed at improving performance across a variety of metrics: energy savings, water efficiency, CO₂ emissions reduction, improved indoor environmental quality, and stewardship of resources and sensitivity to their impacts. On April 27, 2009, USGBC launched LEED v3. LEED Rating Systems – which streamlined LEED rating systems into 3 overarching categories: Green Building Design & Construction, Green Interior Design & Construction and Green Building Operations & Maintenance. Underlying these categories are more specific rating systems (e.g., New Construction, Core & Shell, Schools, etc) which may be drawn upon depending on the project scope. In addition, there are LEED rating systems for residential construction (LEED for Homes) and neighborhood development (LEED ND), which are referenced in this document. Certification levels include: certified, silver, gold and platinum. (usgbc.org)

The **ICC-700-2008 National Green Building Standard**, approved by the American National Standards Institute (ANSI) on January 29, 2009, establishes practices for the design and construction of green residential buildings, building sites, subdivisions and renovations thereof. It provides criteria for rating the environmental impact of design and construction practices to achieve conformance with specified performance levels of green residential buildings. The National Green Building Standard also provides in-depth guidance for green remodeling and a basis for scoring green remodeling projects. There are bronze, silver, gold and emerald performance levels that can be attained within this program. Submissions are 3rd party certified by verifiers who are accredited by NAHB research center (see: www.nahbgreen.org).

The **New Jersey ENERGY STAR Homes program** is part of the larger EPA ENERGY STAR program developed to promote energy efficient construction. It is a 3rd-party verified program that utilizes the Home Energy Rating System (HERS) Index to score energy performance. The New Jersey Home Performance with Energy Star program is similar, but for existing homes. Multiple achievement levels are possible and incentivized through the Office of Clean Energy, BPU (see: www.njcleanenergy.com).

Interim Guidance (Revised 11/24/2009)

RESIDENTIAL (single-family to 3-stories (e.g., low rise))

1. New Residential

For new residential buildings, or for gut rehabilitation, the guidance is to promote a baseline achievement of either:

- ☑ LEED for Homes version 2008 (Silver)
- or
- ☑ ICC-700-2008 National Green Building Standard (Silver)

And must meet: Certified HERS rating of 65^[1]

Note: Energy Star certification is required by LEED and the New Jersey Energy Star Home program standard would satisfy the energy efficiency component of this guidance for new residential buildings. ***NJ Energy Star incentives only apply to new residential in Smart Growth Areas (Tier 1, Tier 2 and Designated Centers). US Energy Star incentives may apply.***

2. Existing Residential

For existing residential buildings, the guidance is to promote a baseline achievement of:

- ☑ ICC- 700 (Bronze) *and* meet energy requirement ICC-700 (Silver)^[2]
- or
- For buildings constructed prior to 1980:*
 - ICC-700 Silver for the GREEN REMODEL path

Note: The certification standards of the New Jersey Home Performance with Energy Star Program could be used to satisfy the energy efficiency component of this guidance for existing residential buildings.

MULTIFAMILY (4-6 stories)

1. New Multifamily

For new multifamily buildings, or for gut rehabilitation, the guidance is to promote a baseline achievement of either:

- LEED for Homes for Midrise Buildings (Pilot) (Silver)
- or
- LEEDV3 Design and Construction (Silver)
- or
- ICC-700-2008 National Green Building Standard (Silver)

And must meet: 20% better performance than ASHRAE 90.1-2007

Note: Energy Star certification is required by LEED and the New Jersey Energy Star Home Program standard would satisfy the energy efficiency component of this guidance for new residential multifamily buildings (4-6 stories) ***NJ Energy Star incentives only apply to new residential in Smart Growth Areas (Tier 1, Tier 2 and Designated Centers). US Energy Star incentives may apply.***

2. Existing Multifamily

For Existing Multifamily, the guidance is to promote a baseline achievement of either:

- ICC-700 (Bronze) *and* meet energy requirement ICC 700 (Silver)
- or
- For buildings constructed prior to 1980:*
- ICC-700 Silver for the GREEN REMODEL path
- or
- LEED-Green Building Operation & Maintenance (GBOM) Silver (v3) certification with minimum Energy Star Portfolio Manager score of 69 (required pre-requisite for GBOM certification)[\[3\]](#)

MULTIFAMILY (+6 stories)

3. New Multifamily

For new multifamily buildings, or for gut rehabilitation, the guidance is to promote a baseline achievement of either:

- LEEDV3 Design & Construction (Silver)

or

- ICC-700-2008 National Green Building Standard (Silver)

And must meet: 20% better performance than ASHRAE 90.1-2007

4. Existing Multifamily

For Existing Multifamily, the guidance is to promote a baseline achievement of:

- LEED-Green Building Operation & Maintenance (GBOM) Silver (v3) certification with minimum Energy Star Portfolio Manager score of 69 (required pre-requisite for GBOM certification)

or

- ICC-700 (Bronze) *and* meet energy requirement ICC 700 (Silver)

or

For buildings constructed prior to 1980:

- ICC-700 Silver for the GREEN REMODEL path

COMMERCIAL

1. New Commercial

For New Commercial buildings, the guidance is to promote a baseline achievement of:

- LEEDV3 Design & Construction Silver certification, with the requirement of minimum 20% better performance than ASHRAE 90.1-2007

Note: NJ Energy Star incentives only apply to new residential in Smart Growth Areas (Tier 1, Tier 2 and Designated Centers). US Energy Star incentives may apply.

2. Existing Commercial

For Existing Commercial buildings, the guidance is to promote a baseline achievement of either:

- LEED-Green Building Operation & Maintenance (GBOM) Silver (v3) certification with minimum Energy Star Portfolio Manager score of 69 (required pre-requisite for GBOM certification)

MIXED USE/NEIGHBORHOOD DEVELOPMENT

For New Mixed Use/Neighborhood Development projects, the guidance is to promote a baseline achievement of:

- LEED 2009 Neighborhood Development (Silver)
or
- Meet any combination of the LEED and ICC-700-2008 requirements above and apply to single and/or multiple buildings

[1] The HERS Index is a scoring system established by the Residential Energy Services Network (RESNET) in which a home built to the specifications of the HERS Reference Home (based on the 2006 International Energy Conservation Code) scores a HERS Index of 100, while a net zero energy home scores a HERS Index of 0. The lower a home's HERS Index, the more energy efficient it is in comparison to the HERS Reference Home. Each HERS point corresponds to 1% reduction in energy use when compared to the reference home. Therefore, HERS 65 means 35% more efficient than the reference home. HERS 65 homes use about 25% less energy for heating/cooling/water heating than IECC2009, and about 15% less when lighting and appliances are also taken into account.

[2] To achieve a bronze rating, ICC-700 requires 222 points with minimums as follows: lot design (39), resource efficiency (45), water efficiency (14), indoor environmental quality (36), building owner education (8) and energy efficiency (30). For an existing home in New Jersey to meet the recommended green building criteria, it must meet these standards with the ANSI silver energy efficiency rating minimum of 130 points. The ICC-700 Silver requirement is approximately equal to a HERS rating of 70.

[3] The Energy Star Portfolio Manager tool is an interactively tracking system to assess energy and water consumption.

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Supporting documentation is attached as follows:

Appendix 1: ICC700-2008 and LEED-Homes (v2)

Appendix 2: HERS 65/IECC 2009 Comparison

Appendix 1: ICC700-2008 and LEED-Homes (v2)

Compilation of Mandatory and Prerequisite Items: ICC ANSI 700-2008 NGBS and LEED-Homes (v2)
 [Courtesy of NAHB Research Center]

NGBS Practice Reference	Quick summary	LEED Reference	LEED H V.2
		Innovation and Design Process	1. Preliminary rating of project req'd
		Quality Management Process	2. Pre-construction durability planning required
			3. Quality Management Plan required
		Sustainable Sites	4. Minimum of 5 Sustainable Site points required
Chapter 5 Lot Design Prep, & Development	NONE	Site Stewardship	5. Erosion control during construction required
		Landscaping	6. No invasive plants permitted
		Materials & Resources	7. Minimum of 2 Materials & Resources required
			8. Framing order waste factor reduction required
			9. FSC Certification of tropical woods, if used
			10. Construction waste management planning required
Chapter 6 Resource Efficiency			
601.1 Conditioned floor area	1. Penalty for buildings larger than 4000 SF		Note: Fee differences may apply to buildings based on size of conditioned space
602.3.1 Foundation drainage	2. Only where required by code		
602.6 Finished grade	3. Six inches of positive slope. Generally required by code or is local practice		
602.9 Water-resistive barriers	4. A drainage plane behind veneer or siding. Generally good practice.		
602.10 Ice barriers	5. If ice damming is an issue or if code required, this is mandatory.		
		Energy & Atmosphere Optimize Energy Performance	11. Energy Star® with Indoor Air Package (IAP) approval required

NGBS Practice Reference	Quick summary	LEED Reference	LEED H V.2
			12. Refrigerant charge test required
			13. Room by room load calculations required
			14. Good air filter required
Chapter 7 Energy Efficiency			
701.4.1.1	6. HVAC equipment (forced air or radiant) must be sized per Manual J		
701.4.2.1 Ducts	7. Ducts have to be well sealed.		
701.4.2.2 Duct system.	8. Building cavities cannot be used as supply ducts.		
701.4.3.1 (1) and (2) Insulation	9. Most meet mfgs instructions or code and shafts must be fire-blocked.		
701.4.3.2 (1) and (2) Insulation	10. Crawl spaces, cantilevers and garages must have insulation installed properly.		
701.4.3.3 Walls (1), (2), (3), (4), and (5)	11. Windows and doors must be properly caulked, sealed, weather stripped, and installed; foundations must be sealed; skylights and architectural features must be sealed.		
701.4.3.4 (1), (2), and (3) Ceilings and attics	12. Attic accesses, and recessed lights must be insulated and/or sealed, and eave vents must be kept functional.		
701.4.4.1 Windows and doors	13. Must be Energy Star or equal based on climate zones.		
Chapter 8 Water Efficiency		Water Efficiency	15. Minimum of 3 WE points required, user options
801.6 (1) and 802.2 (1) Toilets	14. Water usage must comply, or be waterless/composting for all Gold or Emerald buildings.		
Chapter 9 Indoor Environmental quality		Environmental Quality	16. Basic combustion venting measures required
			17. No HVAC in garage required
901.2 Fireplaces and fuel-burning	15. Must comply with outside air and venting		18. Basic outdoor air ventilation required

NGBS Practice Reference	Quick summary	LEED Reference	LEED H V.2
appliances	requirements.		
901.3 Garages	16. Doors to, and walls between garages must be sealed.		
901.4 Wood materials	17. Structural plywood must meet PS 1 or 2		
901.5 Carpet	18. No carpet adjacent to water closets and bathing fixtures.		
902.1.1 Spot ventilation	19. Bathrooms and clothes dryers must be vented to outdoors.		19. Basic local exhaust required
902.3 (1) Radon control	20. Buildings in EPAs radon zone 1 must have a radon system installed.		20. Radon resistant construction in high risk areas required
903.1 Tile backing materials	21. Must meet ASTM standards		
903.2.1 Capillary breaks	22. Capillary breaks and vapor retarders are required under slabs.		
902.2.(1) Crawl space walls	23. Must be damp-proofed below grade		
903.4 (2) Moisture control measures	24. Insulation must be dry before walls are enclosed.		
903.6 (1) Duct insulation	25. R-6 minimum duct insulation is required.		
Chapter 10 Operation, Maintenance, & Building Owner Education		Awareness & Education	21. Basic operations training required
1001.1 (1), (2), and (3) and 1003.1 (1), (2), and (3)	26. There are required elements for homeowner's manuals for both single and multi family buildings.		
1003.2 (1), (2), and (3)	27. Multifamily operations manuals must include these items.		
1003.3 Maintenance manual	28. A maintenance narrative is required.		
Additional NGBS mandatory items for additions and Renovations			
605.1 Disposal of hazardous wastes	A plan is required for additions and/or renovations.		
605.2 On-site recycling	All hazardous waste must be properly handled and disposed of for additions		

NGBS Practice Reference	Quick summary	LEED Reference	LEED H V.2
	and renovations.		
801.1 Indoor hot water usage	One of 4 practices must be implemented		
901.1 Natural draft heating and water heating equipment	Must not be located in conditioned spaces		
901.8 Architectural coatings	Occupied buildings being renovated must use low or no VOC products.		
901.15 Work practices	Must comply with lead-safe work practices		
902.4 HVAC system protection	Protection is mandatory for renovations/additions		
903.5.1 Plumbing	No plumbing distribution lines in exterior walls.		
904.3 (1) Dryer venting	Any unsealed combustion gas dryer vent must be replaced with a sealed vent.		

Note: LEED H prerequisite of Energy Star© equivalent to 105 or 157 NGBS points for Silver or Gold levels respectively.

Appendix 2: HERS 65/IECC 2009 Comparison

(Courtesy MaGrann Associates)

This illustrates HERS 65 vs. IECC 2009 comparison data available for ten single-family detached homes. It shows the HERS 65 homes use about 25% less energy for heating/cooling/water heating than IECC2009, and about 15% less when you take lighting and appliances into account (they are harder to reduce), suggesting HERS 65 is about the right balance.

	MaGrann ID	HERS score	% better than IECC 2009			
			Heating	Cooling	DHW ¹	Total ²
1	4731-41Vjc.blg	64	13.1%	16.9%	18.3%	10.4%
2	6532-2 Vkf.blg	64	1.0%	5.1%	29.5%	6.6%
3	6526-2 Vbs.blg	64	14.9%	18.6%	19.6%	12.2%
4	5712-164 Vbs.blg	64	23.5%	22.7%	21.2%	17.2%
5	6018-16vjc.blg ³	65	14.7%	-1.5%	9.0%	8.3%
6	5429-49vjc.blg	65	17.1%	18.8%	21.2%	13.0%
7	5429-47 Vbs.blg	65	22.1%	26.0%	21.2%	15.7%
8	5712-165 Vbs.blg	65	22.4%	24.1%	21.2%	16.2%
9	5429-44 Vbs.blg	66	17.9%	21.0%	21.2%	13.6%
10	6604-2 Vjc.blg	66	2.4%	8.9%	17.3%	2.9%

¹ DHW (Domestic Hot Water) represents energy consumption for hot water

² includes Lighting & Appliances, typically the least improvement over reference home

³ Note for 5: This building still passes IECC 2009 by cost approach