New York State Energy Research and Development Authority

New York Green Residential Building Program

Annual Report

September 2013

The New NY WORKS for Energy

nyserda
Energy. Innovation. Solutions.

NYSERDA's Promise to New Yorkers:

NYSERDA provides resources, expertise and objective information so New Yorkers can make confident, informed energy decisions.

Our Mission: Advance innovative energy solutions in ways that improve New York's economy and environment.

Our Vision: Serve as a catalyst—advancing energy innovation and technology, transforming New York's economy, empowering people to choose clean and efficient energy as part of their everyday lives.

Our Core Values: Objectivity, integrity, public service, partnership and innovation.

Our Portfolios

NYSERDA programs are organized into five portfolios, each representing a complementary group of offerings with common areas of energy-related focus and objectives.

Energy Efficiency and Renewable Energy Deployment

Helping New York to achieve its aggressive energy efficiency and renewable energy goals – including programs to motivate increased efficiency in energy consumption by consumers (residential, commercial, municipal, institutional, industrial, and transportation), to increase production by renewable power suppliers, to support market transformation and to provide financing.

Energy Technology Innovation and Business Development

Helping to stimulate a vibrant innovation ecosystem and a clean-energy economy in New York – including programs to support product research, development, and demonstrations; clean-energy business development; and the knowledge-based community at the Saratoga Technology + Energy Park®.

Energy Education and Workforce Development

Helping to build a generation of New Yorkers ready to lead and work in a clean energy economy – including consumer behavior, youth education, workforce development and training programs for existing and emerging technologies.

Energy and the Environment

Helping to assess and mitigate the environmental impacts of energy production and use – including environmental research and development, regional initiatives to improve environmental sustainability and West Valley Site Management.

Energy Data, Planning and Policy

Helping to ensure that policy-makers and consumers have objective and reliable information to make informed energy decisions – including State Energy Planning; policy analysis to support the Regional Greenhouse Gas Initiative, and other energy initiatives; emergency preparedness; and a range of energy data reporting, including *Patterns and Trends*.

New York Green Residential Building Program

Annual Report

August 31, 2013

Prepared by:

New York State Energy Research and Development Authority

Albany, NY

Daniel Farrell
Associate Project Manager

September 1, 2013

Table of Contents

Executive Summary

On September 29, 2008, Public Authorities Law (PAL) 1872 established a green residential building grant program. PAL 1872 directs the New York State Energy Research and Development Authority (NYSERDA) to establish a green residential building grant program to serve residential buildings with up to 11 dwelling units[1] for buildings receiving a Certificate of Occupancy for the timeframe January 1, 2010 through October 31, 2013. NYSERDA initiated a rulemaking process in accordance with the law to establish Program regulations, requirements, and procedures. Final regulations were published in the State Register on September 22, 2010.

NYSERDA announced the New York Green Residential Building Program on September 23, 2010. New York is the second state in the country[2] to have a program that provides direct incentives to building owners[3] for certified green buildings. The program website provides all information (such as Program Guidelines and forms) needed for owner participation.

To receive Program incentives, qualifying residential buildings must be certified to meet or exceed the second level (Silver) of either Leadership in Energy and Environmental Design (LEED™) for Homes or LEED for New Construction, or the National Green Building Standard™ (NGBS). Additional Program-specific energy efficiency performance and occupant health and safety requirements must also be met. "Green" building refers to those buildings that are designed and built to deliver improved environmental performance in site preparation, water efficiency, energy efficiency, building materials selection, and indoor environmental quality, relative to buildings using typical construction practices.

With a current total budget allocation of $4.07 million, the Program has been an important addition to NYSERDA's suite of residential building energy efficiency programs. To date, NYSERDA has received 463 incentive applications, and 408 are approved for payment. Program incentives totaling $2,094,925 has been paid to qualifying building owners. Reserved funds total $1,671,347. Of the 463 buildings represented, 453 are newly constructed and 10 are substantial renovations.

NYSERDA issues this report to the Governor, Temporary President of the Senate, and Speaker of the Assembly, pursuant to *Section 5. Reporting* of PAL 1872. This report provides information on Program activities from August 1, 2012 through July 31, 2013, as well as Program-to-date totals.

[1] A dwelling unit is defined in Program Regulations (21 NYCRR, Part 508) as "a single, independent unit for providing living, sleeping, eating, cooking, and sanitation facilities, for one or more persons to perform life activities," consistent with the definition in the Building Code of New York State.

[2] Delaware's "Green for Green Program," initiated in May 2010, is the first.

[3] The "owner" is defined in the Program regulations as the individual or entity that owns the building on the date the Certificate of Occupancy is issued for newly constructed buildings, or the date the Certification of Completion is issued for substantially renovated buildings.

Table 1 – Program Incentive Applications Received and Incentives Paid (Program to date, through July 31, 2013)

Incentive Applications Received	Applications Approved	Applications Pending	Applications Denied or Withdrawn	Incentives Paid
463	407	38	18	$2,094,925

Program Budget Summary

NYSERDA has allocated $4.068 million in funds to the Program[4]. All expenditures and commitments are summarized in Table 2. The Program will close on October 31, 2013, as specified in the enabling legislation. It is not anticipated that additional funds will be allocated to the Program. It is anticipated that all committed funds will be spent by October 31, 2013.

Table 2 – Green Residential Building Program Budget Summary (as of July 31, 2013)

Budget Item	Commitments *	Expenditures	Totals
Incentives	1,671,347	2,094,925	3,766,272
Regulatory Filing Costs		143,450	143,450
Marketing		18,323	18,323
Database Development		30,091	30,091
Quality Assurance Contractor	38,040	71,967	110,007
Totals	**$1,709,387**	**$2,358,756**	**$4,068,143**

*– Commitments are those funds that have been obligated under a Contract/Purchase Order within NYSERDA's accounting system but have not been spent (invoiced).

[4] $3,468,031 million in Regional Greenhouse Gas Initiative (RGGI) funds have been allocated to the Program to date. $600,112 in State Energy Program (SEP) grant funds were allocated to the Program, and spent on incentives.

1 Program Activity (August 1, 2012 – July 31, 2013)

Program incentive application activity has nearly doubled in this program year., Significant Program milestones and activity for the current reporting year include:

- Ongoing from August 1, 2012 through July 31, 2013
    - 210 incentive applications were received and paid during the reporting period; 108 incentive applications were received and paid in the previous reporting year. Program-to-date incentive[5] application activity through July 31, 2013, is summarized in Table 1.
    - 31 site inspections on buildings that applied for Program incentives were completed by NYSERDA's Quality Assurance contractor during this reporting year. All of the building passed the inspections, and no corrective action reports were issued. These inspections confirm that participating Technicians are accurately documenting the measures installed and performing high-quality building diagnostic testing on the inspected buildings.
- October 2012
    - On October 31, NYSERDA issued a Program Announcement stating that an additional $450,000 in Program funding was available to be reserved. By the end of the business day, Incentive Reservation Forms had been received claiming all of the funds, and NYSERDA closed the program to new reservations. Overall, the incentive reservation process NYSERDA implemented in 2011-2012 for budget management purposes has been effective in ensuring that the program did not become over-subscribed.
- April 2013
    - NYSERDA extended the Participation Agreements for the 19 Technicians approved in 2012 through October 31, 2013, the anticipated Program close date. All were in good standing with the Program, so NYSERDA deemed it unnecessary for them to resubmit 2013 Signature Forms.

The rate of denied or withdrawn applications is about four percent of the total submitted, which indicates that participants clearly understand what is required for program compliance. The projects participating in the Program to date continue to be predominantly single-family homes or attached townhouses, however several small multifamily buildings have now received incentives through the Program. Additional small multifamily buildings are in the Program pipeline and are due for completion sometime in the second half of 2013. However, because of the building size limitation (11 dwellings units) NYSERDA anticipated the Program will not significantly penetrate the multifamily housing market. There continues to be good participation in the program by affordable housing developers. The Program has not reached the mixed-use building market, which typically include ground-floor retail below residential dwelling units.

[5] A table showing available Program incentive levels is provided in Appendix A.

1.1 Green Building Certifications

For the 407 buildings that have applications submitted and approved or pending for Program incentives, 138 received LEED for Homes (LEED-H) certification and 269 are certified to the National Green Building Standard (NGBS) through the Home Innovation Lab's National Green Building Program. This demonstrates that there is interest in both systems, however NGBS certifications now significantly outpace LEED-H certifications in the Program.

After almost three years of operating the Program, the following trend seems clear and borne out by the data: a higher percentage of projects achieving a "darker shade" (Gold or Platinum, higher or highest level, respectively) of green have used the LEED-H Rating System, while builders who have built to a "lighter shade" of green (Silver) are more likely to use the NGBS. NYSERDA believes that the most likely explanation is that production builders, as a cost control measure, are doing the minimum amount of upgrading needed to achieve Silver level certification and access the Program incentive. Figure 1 shows the number of projects achieving specific certification levels.

Figure 1 –Projects by Green Building Certification Level*
(Program inception through July 31, 2013)

*Platinum is the highest level achievable under LEED-H and Emerald highest under the NGBS; Silver is the lowest certification level allowed by the Program (both LEED and NGBS offer a Bronze level). The certification level achieved is determined by total points accumulated on the project; more points are obtained by implementing more green building practices, indicating a higher level of green building performance.

2 Program Situation Analysis

The residential new construction market is slowly beginning to recover in New York State. Mortgage rates remain at historically low levels. However, mortgage rates are beginning to rise, which may spur additional new home purchases as buyers move to lock in low rates.

Although building activity is picking up, energy codes are set to significantly increase in stringency with adoption of the 2012 International Energy Conservation Code (IECC) in New York, which is tentatively scheduled for May, 2014. In 2012, the U. S. Environmental Protection Agency (EPA) updated the ENERGY STAR® Homes Program to Version 3, which represents a significant increase in minimum performance level relative to the Version 2 standards that have been in effect since 2006. Other evaluation systems aimed at promoting very energy efficient residential construction, above ENERGY STAR requirements, including the U.S. Department of Energy Challenge Home, the Passive House Institute's (U.S.) Passive House certification, and Net-Zero Energy.[6] These evaluation systems are now gaining more recognition and traction in the marketplace. In summary, energy codes and systems seeking to measure "beyond code" energy efficiency performance have significantly increased their visibility in the residential marketplace in the last year or two, while green building certification has become less central to the conversation.

Although green builders remain some of the "early adopters" of the most energy efficient construction techniques, organizations developing green building evaluation systems have changed somewhat slowly in response to energy-efficiency drivers. An update of all the LEED Rating Systems, including LEED-Homes (LEED H), was only recently adopted (July 2013). The LEED-H July 2013 version now references ENERGY STAR Version 3 as the minimum performance requirement for energy efficiency. However, the new version of LEED-H has been given a delayed, "soft" launch, allowing projects to register using the old system through 2014. Until the January 1, 2015 requirement is in effect, it will still be possible to have a LEED-H certified green home that does not meet the minimum requirements of the ENERGY STAR Version 3 program.

However, green building does encompass other benefits in addition to energy efficiency. Certification systems like NGBS and LEED-H are widely recognized to be the best systems available to measure and establish relative green building performance levels. Green building also continues to enjoy good market acceptance, as consumers and builders alike recognize the overall cost savings and quality of life advantages of green construction relative to typical construction. In addition to the Program incentive, some builders cite the marketing advantages that having

[6] To qualify as net zero energy, a home must produce as much electricity as it draws from the electric grid, resulting in monthly utility bills that net to zero over a year's time. Net zero is typically accomplished with photovoltaic (PV) systems on site, where the utility buys electricity that the building owner exported to the grid.

certified green buildings provides, with respect to their competitors, during this challenging time in the new construction market. For example, for one active builder in the Program, 2013 was the best year in the company's 40-year history, and the company made a commitment to certify all of their homes green and pursue net-zero energy.

3 Energy Savings Data and Green Building Measures

Improving energy efficiency performance well beyond energy code minimum requirements should be at the core of any legitimately "green" building. The energy efficiency performance of buildings participating in the Program continues to be excellent. The average Home Energy Rating System (HERS) Index[7] achieved by buildings in the Program is 55. To put this number in context, a building achieving a HERS Index of 100 would be expected to have about the same energy usage characteristics of building meeting the 2006 International Energy Conservation Code (IECC). A HERS Index lower than 100 indicates better projected energy efficiency performance.

Accordingly, a high percentage of projects participating in the Green Residential Building Program also participate in NYSERDA's New York Energy Star Homes (NYESH) Program or Long Island Power Authority's (LIPA) ENERGY STAR Homes program. Because savings acquired in these joint projects are critical to the NYESH program's cost-effectiveness, the projects' energy savings are attributed to the NYESH program, if the project is in System Benefits Charge (SBC) and/or Energy Efficiency Portfolio Standard (EEPS) service territory, for purposes of reporting energy savings to the Public Service Commission. Nevertheless, the Program has enhanced the effectiveness of the delivery of NYSERDA's SBC/EEPS-funded programs, and has helped to meet New York State's energy use and carbon reduction goals by saving 26,536 MMBtu of gas/propane and 1298 MWh of electricity through July 31, 2013.

Advanced green, energy-efficient building measures and techniques contributing to a building's increase in energy efficiency in the Program include:

- **High-efficiency furnaces** – Ratings of 92 percent Annual Fuel Utilization Efficiency (AFUE) or above are required in the Program; if a gas furnace is installed, 95 percent AFUE units are typical.
- **Energy (or Heat) Recovery Ventilators (ERVs)** – ERVs reduce energy usage by pre-heating incoming air using warm air being exhausted (through a heat exchanger, which separates the two air streams), as well as by providing whole-house ventilation to keep adequate fresh air coming into the building.

[7] The HERS Index is a numeric comparison of the projected annual energy use of a home being designed and built and a virtual home of exactly the same size and configuration that would meet the minimum requirements of the Residential Energy Services Network's (RESNET) Reference Home. The HERS Index is expressed on a descending scale from 100 to 0: an index of 100 for the as-built home means it equals Reference Home performance in terms of projected annual energy cost; an index of 0 means the home is projected to use no net purchased energy resources. Actual energy efficiency performance may vary, depending on weather, occupant behavior, and other factors.

- **Ground-source Heat Pumps** – Ground-source heat pumps use the ground (and its relatively constant temperature) as a heat and cold sink for purposes of space conditioning, and are several times more efficient than the most efficient gas furnaces or electric heat pumps.
- **ENERGY STAR-qualified products** - Appliances, lighting, and mechanical equipment (e.g., central air conditioners) save energy relative to standard products.
- **High-performance windows** – Windows with low U-values provide better thermal performance: the lower the U-value, the less heat transfers across the window assembly.
- **On-demand (tankless) water heaters** – Tankless water heaters heat water when needed only, rather than storing/maintaining hot water constantly, as with conventional tank equipment.
- **Advanced framing** – This technique reduces the amount of framing lumber and increase the amount of insulation in a wall or roof assembly, while providing structural integrity as required by code.
- **Spray-foam insulation** – Provides a higher R-value per inch than typical fiberglass insulation (R-value is the measure of resistance to heat transfer by conduction) and far more effectively reduces air leakage into and out of the building.
- **Alternative framing systems** – Several projects in the Program have used Insulated Concrete Forms and Structural Insulated Panels, which provide a building thermal envelope with higher R-values than typical wood-framed construction.
- **Water efficient appliances and fixtures** – Efficient dishwashers, and low-flow shower heads and faucets reduce hot water use, and thereby reduce energy use.

The median size of homes in the Program is approximately 2,165 square feet, which is below the national average new home size (approximately 2,400 square feet, according to the National Association of Home Builders). A reduction in a home's conditioned floor area may help to reduce energy use, material use, waste produced, and the size of the building's physical footprint, which are important elements of the green building design philosophy and approach.

In terms of indoor environmental and air quality, all buildings in the Program must meet the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 62.2-2007 requirements for proper mechanical ventilation. ASHRAE 62.2 guides the design of the ventilation system to provide adequate exhaust ventilation to remove stale air and pollutants from the building, and bring in adequate fresh air for occupants based on the number of bedrooms. Selection of materials such as wood products and finishes (paints and stains) with low or no levels of volatile organic compounds (VOCs), and use of hard flooring surfaces rather than carpet, are other common practices for Program buildings, which further help to improve indoor air quality and may benefit those with respiratory ailments.

4 Program Incentive Recipients

Appendix B includes the names and addresses of recipients of Program incentives, the number of buildings that an owner has successfully submitted to the Program, and total amount of incentives paid. The LEED-H or NGBS certification level(s) achieved on the buildings are also shown. In most cases, the building owner is the builder or developer, as the builder or developer is typically the owner on the date the Certificate of Occupancy is issued.

Appendix A: New York Green Residential Building Program Incentive Levels

Number of Dwelling Units in Building	Calculated Minimum Building Size (in QOSF)	Maximum Program Incentive Award for Building*
1	1367	$5,125
2	1633	$6,125
3	1900	$7,125
4	2167	$8,125
5	2367	$8,875
6	2567	$9,625
7	2767	$10,375
8	2967	$11,125
9	3167	$11,875
10	3367	$12,625
11	3567	$13,375

***** Note: If a building's qualified occupied square footage (QOSF) is below the Calculated Minimum Building Size shown in Table 1, the incentive for that building shall not exceed $3.75 per qualified occupied square foot. No building owner may receive more than $120,000 per calendar year in Program incentives.

Appendix B: Recipients of Program Incentives from August 1, 2012 through July 31, 2013.

City	Zip	Number of Buildings	Incentives Paid	Certification Level Achieved
Rochester	14604	14	$71,750	NGBS Silver
Scarsdale	10583	1	$5,125	LEED-H Silver
Wellsville	14895	1	$5,125	NGBS Gold
New York	10028	1	$5,125	LEED Gold
Schenectady	12307	1	$5,125	NGBS Silver
Port Washington	11050	1	$5,125	LEED-H Silver
Malta	12020	1	$5,125	LEED-H Gold
Rochester	14618	1	$5,125	NGBS Emerald
Hamburg	14220	7	$34,608	NGBS Silver
Rochester	14625	6	$30,750	NGBS Silver
Sagaponack	11962	2	$10,250	LEED-H Platinum
Ithaca	14850	1	$5,125	NGBS Gold
Ontario	14519	29	$148,625	NGBS Silver
Buffalo	14213	4	$19,920	NGBS Silver
Syracuse	13203	3	$15,375	LEED-H Platinum/LEED-H Silver
Rochester	14621	25	$128,125	NGBS Gold
Ithaca	14850	14	$65,130	LEED-H Gold
Gardiner	12525	1	$5,125	LEED-H Silver
Wilmington	12997	1	$5,125	LEED-H Gold
Lake Placid	12946	1	$5,125	LEED-H Platinum
Clarence	14031	9	$46,125	NGBS Silver
Blossvale	13308	1	$5,125	NGBS Emerald

Jamestown	14701	1	$5,125	NGBS Emerald
Rochester	14620	35	$179,375	NGBS Silver
Syracuse	13202	1	$5,125	LEED-H Platinum
Hilton	14468	1	$5,125	NGBS Silver
Watermill	11976	1	$5,125	LEED-H Silver
Pine Bush	12566	1	$5,125	LEED-H Silver
Tuxedo	10987	15	$76,875	NGBS Silver
Elmsford	10523	18	$92,250	LEED-H Silver
Lima	14485	1	$5,125	LEED Gold
Pittsford	14534	5	$25,565	NGBS Silver

NYSERDA, a public benefit corporation, offers objective information and analysis, innovative programs, technical expertise and funding to help New Yorkers increase energy efficiency, save money, use renewable energy, and reduce their reliance on fossil fuels. NYSERDA professionals work to protect our environment and create clean-energy jobs. NYSERDA has been developing partnerships to advance innovative energy solutions in New York since 1975.

Visit nyserda.ny.gov to learn more about NYSERDA programs and funding opportunities.

New York State Energy Research and Development Authority

17 Columbia Circle
Albany, New York 12203-6399

toll free: 1 (866) NYSERDA
local: (518) 862-1090
fax: (518) 862-1091

info@nyserda.ny.gov
nyserda.ny.gov

New York Green Residential Building Program

Annual Report
September 2013

State of New York
Andrew M. Cuomo, Governor

New York State Energy Research and Development Authority
Richard L. Kauffman, Chairman | Francis J. Murray, Jr., President and CEO

RES-GRBP-2013ar-r-1-v1
9/13