



Revising Local Home Energy Conservation Construction Codes

Keeping Long Island at the Forefront of Building Performance Science, Responding to Changes in the Energy Star Homes Program, Proposing Codes Based Upon the HERS Index.

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A Green Paper

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Executive Summary

From 2006 through 2008, ten Long Island town boards voted to adopt new, performance-based energy conservation construction codes. In February of 2010, the Sustainability Institute at Molloy College issued a [Green Paper](#) which began with the following statement describing what had been accomplished:

A campaign to require ENERGY STAR® Homes standards for new home construction has been successful in ten out of thirteen Long Island towns. This is an unusual success in a region known for very independent local governments, and not often for regional cooperation. The endeavor was notable for being a cooperative effort between the building industry, municipal officials and environmental activists, and resulted in unanimous final votes from all town boards that voted on the measure.

This current Green Paper identifies a strategy to build upon the success reported in the 2010 paper. Its purpose is to further the unprecedented level of cooperation and collaboration among environmentalists, builders, home energy raters, and municipal officials, and to provide recommendations for local codes that will keep Long Island on the forefront of advancing energy efficiency standards for home construction.

When ENERGY STAR Homes codes were adopted, it was un-

derstood that the U.S. Environmental Protection Agency (EPA) would at some time in the future revise the ENERGY STAR Homes program. In fact that is what has happened. The new ENERGY STAR Homes Version 3 is beginning implementation in 2011. This significant revision to the ENERGY STAR Homes program raises questions about whether the town codes on Long Island that incorporate by reference the ENERGY STAR Homes program requirements into their codes, will need to be amended. In preparing this analysis, the Sustainability Institute has engaged in extensive research and discussions, which have resulted in proposed changes to the local codes to decouple Energy Star Homes requirements from the codes and replace them with a requirement to achieve a Home Energy Rating System (HERS) Index of no more than 70.

As a result of efforts that began in 2005, Long Island is unique in the nation as a region where the vast majority of new homes constructed are now subject to ENERGY STAR Homes standards. The Long Island region has gone from being a laggard to a leader in building energy efficient homes.

By adopting what we have coined the **Home Energy Rating Index laws**, local municipalities on Long Island will consolidate the gains made in energy conservation and building performance, while saving homeowners money on their energy bills, reducing greenhouse gas emissions and creating green jobs.

The SUSTAINABILITY INSTITUTE AT MOLLOY COLLEGE Green Papers are non-partisan issue analyses presented with the goal of developing viable recommendations, viewed through the lens of sustainability and the "triple bottom line" of environment, economy and social equity, that can make Long Island a better, more sustainable place to live. The purpose is to identify policies that will establish Long Island as a national leader in implementing sustainable solutions. Green Papers provide facts, arguments and proposals in a manner that will encourage informed, respectful interchange among parties with varying viewpoints.

A core mission of the Sustainability Institute is to foster informed debate concerning issues of environmental sustainability, consistent with Molloy College's mission of developing ethical leadership through transformative education. Molloy is committed to academic excellence with respect for each person. To further these ends, Green Papers are intended to raise the level of public discourse through the free, respectful exchange of differing ideas. The Sustainability Institute's recommendations included in this paper are based on the research and experience of the authors, and do not necessarily represent the opinions of the administration or Board of Trustees of Molloy College.

Background: How Long Island led the nation in adopting innovative, performance-based energy codes.

The new initiative evaluated and recommended in this report—Home Energy Rating Index laws—builds upon the ENERGY STAR Homes codes that went into effect in most Long Island towns between 2007 and 2009.

The proposal to adopt local codes and make the national standard for ENERGY STAR Labeled Homes a mandatory code requirement rather than just a voluntary, incentive-driven program, was first developed in 2005 at meetings of the Clean Energy Leadership Task Force facilitated by Neal Lewis, the current executive director of the Sustainability Institute, and coauthor of this report.

The concept was further debated at meetings of the Long Island Association’s (LIA) Environment/Energy Subcommittee, chaired by Harry Davitian, which helped to identify concerns of the Long Island builders, and lead to the proposal eventually gaining the support of the Long Island Builders Institute (LIBI). As a result, LIBI became one of the first home builders industry groups in the country to support higher efficiency standards. The LIA board of directors formally endorsed the policy, and has directly encouraged all towns to adopt the standard. *Newsday* printed a number of editorials urging towns to adopt the measure. There was broad support from environmental groups such as the Sierra Club and the Group for the East End.

Beginning in 2006, the towns of Babylon and Brookhaven adopted the codes, with the sponsorship of Brookhaven Town Councilwoman Connie Kepert and then-Supervisor Brian Foley and Babylon Town Supervisor Steve Bellone. The new code has been adopted by 10 of 13 Long Island towns and has been in effect in all 10 towns since early 2009 (see Chart A for the list of towns and implementation dates). After much discussion by

the Sustainable Southampton Committee, the town of Southampton adopted a tiered approach, requiring greater efficiency for larger homes. Southampton now has one of the most stringent energy construction codes in the nation. Despite the momentum of the efforts, three small East End towns have failed to adopt the new code standards, and a small number of the villages on Long Island, including Southampton Village in 2010, have acted on the measure.

The Long Island Power Authority (LIPA) supported towns that adopted the new codes with grants of \$25,000 to prepare their building departments to implement the changes. LIPA and LIBI partnered to develop training programs for builders and home energy raters to help prepare them for the new mandates.

Chart A: Long Island towns that adopted mandatory ENERGY STAR codes and their effective dates:

Town	Effective Date
Babylon	April 2007
Brookhaven	April 2007
Riverhead	April 2008
Hempstead	August 2008
Oyster Bay	August 2008
Smithtown	October 2008
Southampton	October 2008
Huntington	January 2009
North Hempstead	January 2009
Islip	February 2009

Towns that have NOT adopted mandatory ENERGY STAR Standards: East Hampton, Shelter Island, Southold



Front row: Brookhaven Town Council members Kathleen Walsh, Kevin McCarrick, Tim Mazzi and Connie Kepert, Brookhaven Supervisor Brian Foley, Neal Lewis, and Babylon Supervisor Steve Bellone visit a model ENERGY STAR Home in August 2006, shortly after Brookhaven and Babylon passed the mandatory ENERGY STAR Homes code.

Why revisit these codes now?

The EPA is updating the requirements of their ENERGY STAR Homes program. The new requirements, called ENERGY STAR Homes Version 3 are being rolled out in 2011 and will be fully in place by the beginning of 2012. (See sidebar on page 4.) As these changes are made, town codes, which reference the ENERGY STAR Homes program by name and specific requirements of the program at that time it was adopted, can be seen as inconsistent. The current wording of town codes leaves open to interpretation whether a new home must meet the standards of ENERGY STAR Homes at the time the code was adopted, or the most current standards of the program. This necessitates an update to these codes, and also presents an opportunity to re-evaluate how they are structured. Other developments to consider in addition to ENERGY STAR Homes program changes are New York State's adoption of a new Energy Conservation Construction Code in 2010, and the likelihood that the New York State Energy Research and Development Authority (NY-SERDA) will soon be changing from using the HERS "Score" to the HERS "Index" as most U.S. states have already done.

ENERGY STAR Homes V. 3 is somewhat more complex and comprehensive than the program that was in place when town ENERGY STAR Homes codes were adopted. HERS rating targets are individual to specific homes. There are more checklists to complete. Some of the requirements of these checklists are not directly related to energy conservation. Larger homes are required to meet a greater efficiency standard. The new program will generally set a higher standard for home performance.

These changes are consistent with the EPA's overall strategy of periodically revising specifications for the ENERGY STAR program, not only for homes but for appliances and electronics. The goal is to promote market transformation. This is done by giving recognition to products that meet higher standards of performance and energy efficiency than industry average. ENERGY STAR products may cost more, but the difference must be recoverable in energy savings within a reasonable time period.

The greater complexity of ENERGY STAR Homes V. 3 and especially its non-energy conservation related requirements argue for decoupling town codes from the program. New York State law preempts local governments from adopting building construction codes different from the State Code, unless those local codes are based on special circumstances and are approved by the *New York State Fire Prevention and Building Code Council*. There is a specific provision in the law that allows local governments with zoning power to adopt **energy conservation construction codes** that are **more stringent** than the State Code. (NY State Energy Law §11-109.) Certain requirements of ENERGY STAR Homes V. 3, such as the water management checklist, that are not directly related to energy conservation do not fit under this provision. Therefore local municipalities cannot adopt ENERGY STAR Homes V. 3 as it stands.

ENERGY STAR Homes codes addressed a specific market failure.

In 2005 when ENERGY STAR Homes codes were first proposed, incentives and the market advantages of the ENERGY STAR brand were not sufficient to promote the construction of energy efficient homes on Long Island. A different approach was

Recommendation:

The ten Long Island towns that have adopted ENERGY STAR Homes codes should amend their codes to **decouple** them from the ENERGY STAR Homes program.

All Long Island municipalities with zoning powers should adopt **Home Energy Rating Index laws**.

Home Energy Rating Index laws should require all new homes to be rated by an independent, Residential Energy Services Network (RESNET) certified HERS Rater, following the protocol set out by RESNET, including all required reviews and diagnostic tests, including combustion safety tests. The HERS Rater must attest that the home was rated 70 or lower on the HERS index, and passed all combustion safety tests, prior to issuance of a Certificate of Occupancy.

needed. Although codes are not typically used to force market transformation in this manner, this approach was seen as a way to deal with a failure of the market to provide consumers with a meaningful choice of energy efficient homes.

When ENERGY STAR Homes codes were first proposed for Long Island towns, the program was well established, and in other areas of the country, ENERGY STAR labelled homes were achieving significant market penetration. However, relatively few ENERGY STAR homes had been built on Long Island (75 homes from 2002 through 2005). Due to the overheated housing market on Long Island, the incentives to builders offered by LIPA's ENERGY STAR Homes program and the market value of distinguishing a new home with an ENERGY STAR label were not sufficient to entice builders to take on the modest additional costs and submit to performance tests required to gain an ENERGY STAR label on the homes they were building. As a result, most home buyers on Long Island were not being provided the choice of buying more efficient homes. Mandating a higher performance standard and third-party verification was advanced as a means of correcting this failure of the market on Long Island.

Appropriate mandates support incentives

In the six years since Long Island towns began the process of adopting codes to require the improved performance and third-party verification standards of the ENERGY STAR program, market transformation has been achieved. All new single family homes in the ten largest towns are meeting the required standards, and all major home builders on Long Island have the capability to construct ENERGY STAR Homes. Often they are going beyond the minimum mandated requirements. As was reported in the Green Paper *Long Island Towns Successfully Strengthen Residential Energy Codes* (February 2010) 36% of ENERGY STAR homes built from 2007 to 2009 met the requirements for the "second tier" of LIPA's incentives, by achieving an even higher percentage of energy savings than required by the new codes.

This can be explained by noting that while LIPA does not provide an incentive for homes built to standards mandated by town codes, they do provide incentives for homes that exceed those standards and meet the requirements for higher tiers of their program. Because the town codes required all new homes to be rated and achieve a HERS score of 84 or better, many

builders judged that incurring increased cost and effort to reach the second tier was worthwhile to capture the incentive.

The significant percentage of homes already being built that are more efficient than the minimum code requirement, and the fact that the New York State Energy Conservation Code will require more energy efficiency than the prior state code argue that revising town codes now presents the opportunity to modestly advance the energy performance requirements of the codes. By mandating that new homes achieve a **70 or lower on the HERS Index** (equivalent to 86 on the HERS Score that was previously used) town codes will continue to improve energy efficiency standards in a manner that the home building industry has already demonstrated is feasible. A rating of 70 on the HERS Index represents a home that is 30% more efficient than a similar home built to the 2006 International Energy Code. A required HERS Index of 70 will be somewhat less stringent than the ENERGY STAR Homes V. 3 requirements for many homes, and since town codes will not include other requirements of the program, builders will be eligible to capture incentives from LIPA if they voluntarily participate in the program.

The history of ENERGY STAR Homes demonstrates that mandates and incentives can work together most effectively when the “gap” between mandatory requirements and the voluntary standards to receive incentives are not too great. When the cost of hiring a HERS rater and the training of workers to meet higher baseline standards are considered “sunk costs,” inherent in the construction of any new home, the marginal cost of improving a home to meet a somewhat higher standard becomes less of a “reach” for a builder. This makes the incentive more attractive.

This experience points to the possibility of decoupling town codes from the ENERGY STAR Homes program while still maintaining requirements for high energy performance, and third-party verification and **combustion safety testing** by an independent, certified HERS rater. This would maintain the energy saving and safety benefits realized by the ENERGY STAR Homes codes, while removing the more complex requirements of ENERGY STAR Homes Version 3, and avoiding legal challenges due to the requirements of ENERGY STAR Homes V. 3 that are not directly related to energy conservation. Decoupling will also avoid the necessity of revisiting codes as the ENERGY STAR Homes program is revised in the future. It should be noted that ENERGY STAR Homes Version 4 is already in development.



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ENERGY STAR Labeled Homes

The ENERGY STAR Labeled Homes program was established in 1995 by the federal government as an outgrowth of its labeling program for individual appliances. (See energystar.gov.) The program sets stringent specifications designed to save at least 20% of energy consumed for heating, cooling, and water heating as compared with an equivalent home built to state code requirements. Since 2002, LIPA has offered rebates to participating builders.

Integral to the ENERGY STAR Labeled Homes program is the Home Energy Rating System (HERS). HERS raters review plans, visit the site during construction to visually verify that insulation and air sealing measures are properly installed, and perform tests on the ducts and home after construction is completed to measure duct tightness and air infiltration rates. The data from this review is entered in software that compares the energy efficiency of the home to a reference home of the same size and layout built to meet minimum code requirements.

ENERGY STAR Version 3 makes a number of changes to the program which are being introduced in 2011 and will be fully in force by January 1, 2012.

ENERGY STAR V. 3 no longer has a single HERS rating target for all homes in a particular climate zone. A specific target is determined for each house, based on a theoretical reference house of the same size and layout, built to ENERGY STAR's prescriptive standards.

To qualify under Version 3, a home must meet the requirements of four checklists:

1. Thermal Enclosure System Rater Checklist
2. HVAC System Quality Installation Contractor Checklist
3. HVAC System Quality Installation Rater Checklist
4. Water Management System Builder Checklist (or Indoor airPLUS Verification Checklist)

Homes larger than a benchmark house of 1000 square feet for a one bedroom house, plus 600 square feet for each additional bedroom must achieve a better HERS Index. The required improvement is based on a Size Adjustment Factor, determined by how much larger the house is.

On-site renewable energy generation is no longer credited for meeting the basic HERS target. Renewables are only allowed to offset the Size Adjustment Factor

HERS Index vs. HERS Score

The Residential Energy Services Network (RESNET) developed the **HERS Index** in 2006 to replace the **HERS Score**. The two numbers are arrived at using the same review and diagnostic testing, however the Index is a more direct and intuitive number to explain.

A home built to the 2006 International Energy Code receives a HERS Index of 100 (it uses 100% as much the energy as the “reference house”); a home that uses no net energy would be rated zero on the Index (0 energy use). Each percent of reduction in energy use translates directly to lowering the Index rating of a home by one. Like golf, a lower number is better.

The HERS Score sets the reference house at 80 and a house that used no energy as 100. A reduction in energy use by 5% translates to raising the score by 1. Therefore a Score of 84 is equivalent to an Index of 80, and a 87 Score equals a 65 Index.