

**System Benefits Charge
New York ENERGY STAR[®] Homes Program
Logic Model Report**

Final Report

Prepared for

**The New York State
Energy Research and Development Authority**

Prepared by

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NYSERDA

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NEW YORK STATE ENERGY RESEARCH AND DEVELOPMENT AUTHORITY

SYSTEM BENEFITS CHARGE

NEW YORK ENERGY STAR® HOMES PROGRAM

LOGIC MODEL REPORT

(UPDATED FINAL December 14, 2010¹)

INTRODUCTION

This report identifies and documents key elements (inputs, market actors, barriers, goals, activities, outputs, outcomes, potential external influences and researchable issues) associated with the New York Energy Star® Homes Program this logic model addresses NYSERDA's ongoing activities as funded by the System Benefits Charge. This includes ongoing activities under the **New York Energy SmartSM** program as well as expanded activities occurring as a result of recently added Energy Efficiency Portfolio Standard funding.

This document provides:

- 1) A table showing a list of documents relating to NYSERDA's New York ENERGY STAR® Homes Program that were used to provide insight during development of this program logic model report;
- 2) A high level summary of the context of the markets within which this program operates and the other NYSERDA programs it works with to accomplish the **New York Energy SmartSM** goals, including elements associated with enhanced funding that the program receives through the Energy Efficiency Portfolio Standard (EEPS), and the context of the markets within which this program operates. Information is also presented in this section on other potentially complimentary or competing programs deployed in the New York State. Available market characterization information is also presented in this section, including a description of baseline conditions, and the portion of that potential that the program is expected to achieve;
- 3) Key program-specific elements, including the ultimate goals of the program, market barriers, targeted market actors, program activities, inputs, anticipated outputs and outcomes, and potential external influences. Information on how program activities are expected to change the behavior of market(s) actors is also presented in this section;
- 4) A program logic model diagram showing the linkages between inputs, program activities, outputs and outcomes, and identifying potential external influences;
- 5) A table listing the key outputs and outcomes, including identification of relevant measurement indicators and potential data collection approaches to guide later prioritization, and development of a monitoring and evaluation plan; and
- 6) A list of potential researchable issues for consideration within evaluation planning.

¹ This logic model updates the June 10, 2010 final version by adding natural gas funding approved by the New York State Public Service Commission *Order Approving Certain Commercial and Industrial, Residential, and Low-Income Residential Customer Energy Efficiency Programs with Modifications*. (January 4, 2010). The model also includes adjustments to natural gas efficiency funding approved subsequently pursuant to the *Order on Rehearing Denying in Part and Granting in Part Petitions for Reconsideration*, (June 21, 2010), and incorporates all final changes promulgated in the *Supplemental Revision to the SBC Operating Plan*, (September 16, 2010).

Section 1: **RELATED NYSERDA DOCUMENTS**

Table 1 identifies NYSERDA and other potentially relevant documents that were reviewed for this report:

Table 1. Relevant Documents Reviewed

NYSERDA Document Description
GDS Associates, <i>New York ENERGY STAR® Homes Program: Market Characterization and Market Assessment. Final Report</i> , February 2009.
GDS Associates, <i>New York ENERGY STAR® Labeled Homes Program Logic Model Final Report</i> , May 2005
Home Energy Rating System Providers for the New York ENERGY STAR® Labeled Homes Program, Request For Qualifications No.
Home Energy Rating System Provider, Request for Qualifications No. 1287
NYSERDA, <i>New York's System Benefits Charge Programs Evaluation and Status Report</i> , Year Ending December 31, 2009
NYSERDA Opportunities to Develop, Maintain, and Deliver Workforce & Career Training, PON 1018, July 2006
NYSERDA.ny.gov Website http://www.nyserda.ny.gov/Page-Sections/Residential/Programs/Existing-Home-Renovations.aspx
NYSERDA Quality Assurance Services RFP 1005
NYSERDA, <i>System Benefits Charge Proposed Plan for New York Energy \$martSM Programs 2006-2011</i> , (SBC March 2006 Proposed Plan), as amended March 2, 2006
NYSERDA, <i>New York Energy \$martSM Program Evaluation and Status Report</i> , May 2006
Summit Blue Consulting, <i>New York ENERGY STAR® Labeled Homes Program: Market Characterization, Market Assessment and Causality Evaluation</i> , Final Report. May 2006.
Optimal Energy, <i>Achievable Electric Energy Efficiency in New York State DRAFT</i> , November 2008.

Section 2: CONTEXT AND PROGRAM DESCRIPTION

2.1 Program Description

The New York ENERGY STAR Homes (NYESH) Program is part of NYSERDA's combined Single Family Home Performance Program being implemented to encourage energy efficiency in the single-family (including two-to-four family) existing homes and new homes construction markets. The New York ENERGY STAR Homes Program addresses the new homes market. NYSERDA also implements a Home Performance with ENERGY STAR Program, which focuses on the existing homes market in New York State and is the subject of a separate program logic model effort. Both of these programs are market-based, and offer financial assistance to all participants. A proven marketing implementation technique for a new product or service in a market is a "push – pull" strategy, which targets both the seller and the buyer to simultaneously stimulate demand and supply in the market. NYSERDA has successfully used the "push" element of this strategy to encourage builders and contractors to offer energy efficiency and support market development through recruitment, training and direct funding and incentive activities – thus pushing the program into the market. For the "pull" element of this strategy, the program and its benefits of energy efficiency are marketed directly to residential consumers in an effort to increase demand – or pull the need for energy efficient products and services.

Implementation of the New York ENERGY STAR Homes Program started in 2000, as an enhanced version of the national U.S. Environmental Protection Agency's (EPA's) ENERGY STAR® Labeled Homes program. The NYESH Program provides marketing, technical assistance and training support, and financial incentives to one- to four-family homebuilders and to Home Energy Rating System (HERS) raters. In addition, marketing and advertising efforts are used to encourage homebuilder participation and to attract home buyers and real estate professionals. Currently, in order to qualify for the NYESH Program, a home must be built by a participating builder; have a qualified ventilation system; include electrical measures (either ENERGY STAR lighting or appliances) that produce annual electricity savings of at least 500 kWh compared to standard measures; and attain a HERS score of 84 or higher (Thermal Bypass Checklist requirements must also be met). Taken together, these measures indicate the home uses approximately 30% less energy than homes built to the New York State Energy Conservation Construction Code.

2.2 Market Assessment

The most recent full Market Characterization and Market Assessment and Causality Evaluation (MCA) report for the New York ENERGY STAR Homes Program was completed in 2009. All data in this section, unless otherwise noted is based on information presented in this MCA report and reflects program activities and data through the end of 2007.

2.2.1 Description of Baseline Condition

The state of New York, including the regions served by the **New York Energy \$martSM** program, has a large residential population and most of the housing stock is older and less energy efficient than current building standards dictate.² The residential market consists of two submarkets: new construction and existing homes. According to the latest available US Census data, there are more than 3.4 million one- to four-family, owner occupied homes in the state of New York (excluding Nassau and Suffolk counties),

² GDS Associates, Inc, *Program Theory and Logic Model Activities for the New York Energy \$martSM Single Family Home Performance Program Logic Model Report*, Prepared for NYSERDA, March 2007.

representing slightly more than 55% of the state's total residential home market.³ The growth rate of the residential new construction market is directly affected by economic and market conditions in New York. In the **New York Energy SmartSM** territory, new construction for one- and two-family homes dropped from 21,000 in 2002 to less than 13,000 in 2007.⁴ During 2002 to 2007, while the average square footage of a new home construction project held relatively constant, the average value per project increased each year.⁵ In addition, despite the downturn in the real estate market across the country, 2007 was the most active year for NYSERDA's NYESH Program since its inception, when it achieved 2,454 completed new home construction projects, the greatest number of new homes constructed through the program in one year.

Buildings Already Served – Market Share

According to the NYSERDA NYESH Program database, as of the end of 2009, 15,434 new homes have been completed since program inception, including:⁶

- 14,547 Certified ENERGY STAR “Labeled” Homes
- 669 “Model” Homes
- 218 ENERGY STAR “Display” Homes
- Excluded from the numbers above are 350 Assisted NYESH projects. In addition, over \$3 million were distributed through 2,465 incentives to participating builders, including 45 upgrades, 717 plan reviews and initial ratings, and 1,703 uses of co-op advertising
- Despite the recent slowdown nationwide and in New York's new construction housing market, as noted above, NYSERDA's NYESH Program has had impressive construction activity – achieving a market penetration of 13.7% in 2006 and 19.9% in 2007. The NYESH Program had a 2008 market penetration rate of 21% of all single family homes and 16% of all 1-4 family homes built in the **New York Energy SmartSM** territory. At its current production rate, a market penetration rate of 30% is predicted in 2009 for one-family homes and 25% for one-to-four family homes built in the **New York Energy SmartSM** territory.

Through December 31, 2009, the NYESH Program's 15,784 total projects have achieved 27.3 GWh of annual electricity savings and 800,191 MMBtu of annual natural gas, oil, and propane savings.⁷ From July 1, 2006 through December 2009, 8,010 New York ENERGY STAR Homes (market rate and

³ US Census Data, 2006.

⁴ McGraw Hill Construction Dodge New, Addition and Alteration Database. Current Dodge data include data for 2002 to 2007. Information for 2001 is no longer available. The current Dodge data also groups housing stock into one-family, two-family, and multifamily (three + units – including large apartment buildings). Previously, data were presented as one-family and two-to-four family and included 2001 data. Given these differences in data availability and categorization, indicators, such as market penetration, cannot be directly compared to those presented in the 2006 New York ENERGY STAR® Labeled Homes Market Characterization, Market Assessment and Causality Evaluation Report. Thus, the MCA team has re-calculated indicators, such as market penetration, for this more recent effort using the new data categories.

⁵ Value is measured as “market price” (as reported directly in the McGraw Hill Construction Dodge Database) and has not been adjusted for inflation.

⁶ NYSERDA Database summary through December 31, 2009. Various levels of NYESH criteria, based on HERS Score are as follows; Tier 1 (HERS score between 84 and 86.9), Tier 2 (HERS score of 87 to 88.9) and Tier 3 (HERS score 89+). Description and participation levels listed by these categories are reported in the NYSERDA Database. Labeled/Model/Display homes have equipment criteria in addition to HERS Score criteria, and participants could qualify in any one of the three tiers.

⁷ New York's System Benefits Charge Programs Evaluation and Status Report Year Ending December 31, 2009, Report to the Public Service Commission, Final Report March 2010, p. 4-6 and 4-8.

assisted) had been built, 52% of the original target of 15,259 established for the timeframe from July 1, 2006 through June 30, 2011.⁸

Awareness

In the MCA survey assessing the 2006-2007 period, participating homeowners stated that their familiarity with energy efficiency measures and equipment had increased “significantly” (31%) or “somewhat” (42%) – 73% collectively. More than half of participating builders stated that their familiarity with energy efficiency measures had “increased significantly”. Awareness of NYESH among non-participating homeowners has been constant, with roughly 53% indicating awareness in 2006-2007 period.

Availability of ENERGY STAR Homes and NYESH Builders

Approximately half (49%) of participating homeowners and 28% of non-participating homeowners that were aware of NYESH stated that it was not hard to find an ENERGY STAR home. Similarly, less than 30% of the non-participating homeowners, that were aware of NYESH, believed that such homes were available. Eighty percent of participating homeowners responded that it was fairly or very easy to find an ENERGY STAR home builder. This indicates that participating builders are relatively well distributed and available in areas where qualified contractors (trained and capable of building NYESH homes) are being sought.

Cost and Pricing

Participating and non-participating homeowners and builders were asked how much more a NYESH costs to build when compared against the cost of a similar standard-built home. Homeowner estimates were higher than builder estimates, ranging from over \$19,500 for participating homeowners to more than \$24,700 for non-participating homeowners, compared with \$7,200 and \$17,700 for participating and non-participating builders, respectively. As a comparative, according to a recent ENERGY STAR Homes Incremental Cost study,⁹ the incremental cost of a single-family ENERGY STAR Home ranges from \$2,936 to \$9,286 depending on the level of efficiency (and resulting HERS score) the home was being built to.

In 2006-2007, NYESH homes continued to be slightly larger on average than non-ENERGY STAR homes. However, according to respondents, they cost 22% less per average square foot than a standard home. It is important to note that the accuracy of homeowner self-reported responses appear questionable since these results run in contrast to that of 2004-2005, when it was reported by homeowners that NYESH homes cost an average of 3.3% more per square foot.

Perceived Value

Participating (2006-2007) homeowners generally felt that ENERGY STAR Homes have lower energy bills (nearly 90%), are worth more (more than 85%), and that the ENERGY STAR label indicates additional quality (over 80%). In 2006-2007, both participating (92%) and non-participating (83%) builders said they perceived the ENERGY STAR label to be a strong selling point for new home purchasers.

⁸ New York’s System Benefits Charge Programs Evaluation and Status Report Year Ending December 31, 2009, p. 4-12.

⁹ *How Much More Does It Cost to Build an ENERGY STAR® Home? Incremental Cost Estimation Process*, ACEEE 2008 ENERGY STAR Homes Incremental Cost Study, 2008 paper prepared by Betty M. Tolkin, Nexus Market Research, Inc., William Blake, National Grid, Stephen Bonanno, NSTAR Electric and Gas, Dorothy Conant, Independent Consultant, Thomas Mauldin, Nexus Market Research, Inc., Lynn Hoefgen, Nexus Market Research, Inc. Although this range provides an interesting second set of data points for consideration of incremental cost, it is based on information compiled on homes built elsewhere in the country.

2.2.2 Expected Savings and Statewide Technical Potential

As shown in the Table 2 and Table 3 below, by the year 2015, the NYESH Program is estimated to save approximately 11.2% of the achievable electric potential energy savings estimated within New York’s residential sector, specific to new construction and retail products. These numbers come from Optimal Energy’s assessment of technical potential savings in New York for 2009-2015 and the SBC plan detailing expected program savings.¹⁰ In January 2010, the New York State Public Service Commission approved an additional \$18.2 million in Energy Efficiency Portfolio Standard (EEPS) natural gas funding for the NYESH Program.¹¹ Targeted savings specified for the natural gas funds for 2010 through 2015 are shown in Table 3.¹² By the year 2012, a total of 428,767 MMBtu is expected to be saved, representing approximately 50% of the achievable natural gas potential energy savings estimated within New York’s residential new construction sector.¹³

Table 2. Achievable Potential Savings and NY ENERGY STAR Homes Program Expected Savings Totals

Sector	Annual Cumulative Energy Savings	Annual Cumulative Summer Peak Demand Savings
Achievable Potential Savings, 2009-2015		
Residential – New Construction	<u>38 GWh</u>	<u>12 MW</u>
Residential – Retail Products	<u>3,675 GWh</u>	<u>500 MW</u>
Residential – Low Income	<u>351 GWh</u>	<u>180 MW</u>
Total	<u>4,064 GWh</u>	<u>692 MW</u>
ENERGY STAR Homes Program Expected Savings, 2009-2015		
Program	Annual Cumulative Energy Savings	Percentage of Achievable Potential
ENERGY STAR Homes (GWh)	455.16	11.2%
ENERGY STAR Homes (1000 MMBtu)	429	50 ^a %

^a Percentage of Achievable Potential by 2012

Sources: Optimal Energy, *Achievable Electric Energy Efficiency in New York State DRAFT November 2008*.

Optimal Energy, *Natural Gas Energy Efficiency Resource Development Potential In New York*, October 31, 2006.

NYSERDA, *Supplemental Revision to SBC Operating Plan*, September 16, 2010.

¹⁰ Optimal Energy, *Achievable Electric Energy Efficiency in New York State DRAFT November 2008*.

¹¹ State of New York, Public Service Commission, *Order Approving Certain Commercial and Industrial Residential, and Low-Income Residential Customer Energy Efficiency Programs With Modifications. Issued and Effective January 4, 2010*. Total funding includes administration, outreach and marketing, evaluation, and cost recovery fee.

¹² NYSERDA, *Supplemental Revision to SBC Operating Plan*, September 16, 2010.

¹³ Optimal Energy, *Natural Gas Energy Efficiency Resource Development Potential In New York*, October 31, 2006.

Table 3. Cumulative Year by Year Annual Energy Savings (GWh and MMBtu)

	2009	2010	2011	2012	2013	2014	2015
Electric (GWh)							
Achievable Potential Total Residential Sector- New Construction, Retail Products, and Low Income (GWh)	481	1,123	1,932	2,474	3,027	3,624	4,064
NYESH, SBC (GWh)	40.60	49.51	57.38	65.23	73.1	366.78	455.16
Gas (MMBtu)							
Achievable Potential Total Residential New Construction (1000 MMBtu)	352	530	731	859	1,000	1,154	1,320
NYESH EEPS Gas (1000 MMBtu)	0	157	429	429			

Sources: Optimal Energy, *Achievable Electric Energy Efficiency in New York State DRAFT November 2008*.

Optimal Energy, *Natural Gas Energy Efficiency Resource Development Potential In New York*, October 31, 2006.

NYSERDA, *Supplemental Revision to SBC Operating Plan*, September 16, 2010.

2.3 Other Relevant NY Utility and New York Area Programs

In addition to New York ENERGY STAR Homes Program, there are a number of other potentially relevant programs being implemented in New York, including other utility and New York area programs. These programs are included in Section 3.5- Program Inputs and Potential External Influences of this report and are identified in Table 4– Market Barriers, Table 7 – Program Inputs, Table 8- Potential External Influences, and the program logic diagram (**Error! Reference source not found.**) as factors with the potential to impact (help or hinder) achievements of NYSERDA’s New York ENERGY STAR Homes Program goals. These programs mostly offer incentives for various high efficiency and ENERGY STAR labeled residential products in existing homes. However, these programs have some relevance in the new homes market as well, since both new and existing homes are eligible for most utility rebate programs. Information in this section comes from the DSIRE website.¹⁴

2.3.1 Central Hudson Gas and Electric Corporation – Home Energy Savings Central Program

The Home Energy Savings Central Program offers customers rebates of between \$25 and \$1000 on energy efficient equipment and measures. This is for residential electric customers who upgrade their heating, cooling or ventilation systems with specific types of energy efficient equipment. The electric Home Energy Savings Central rebates began on May 18, 2009. These rebates include eligible efficient central air conditioners, central air-source heat pumps, electric heat pump water heaters, furnace blower fans, ENERGY STAR programmable thermostats and duct and air sealing (with blower door and duct blaster testing). Rebates for the following types of natural gas equipment are available as well: natural gas furnaces, natural gas boilers, boiler reset controls, steam boilers, indirect water heaters, programmable thermostats, and duct and air sealing.

2.3.2 National Grid Generation d/b/a National Grid – Residential (Electric) Energy Efficiency Rebate Programs

National Grid residential electric customers in Upstate New York are eligible for a variety of electric equipment rebates to help them save energy in their homes. Rebates are available for ENERGY STAR

¹⁴ Desire Website: <http://www.dsireusa.org/incentives/index.cfm?re=0&ee=1&spv=0&st=0&srp=1&state=NY>.

programmable thermostats, central air conditioning systems, air-source heat pumps, ECM furnace fans, electric heat pump water heaters, and duct and air sealing. Equipment must meet standards listed on the [rebate application form](#).

2.3.3 Long Island Power Authority (LIPA) – Cool Homes Program

Long Island Power Authority offers incentives for its residential customers to increase the energy efficiency of their homes through a variety of programs. The [Cool Homes Program](#) provides rebates for energy efficient central air conditioning systems and air-source heat pumps. The minimum efficiency ratings for central air conditioning systems are SEER 14.5 and EER 12 (SEER 14 and EER 12 for air-source heat pumps), which qualifies the owner for a \$250 per unit rebate. However, if the units have a SEER greater than or equal to 15 and an EER greater than or equal to 12.5, the rebate amount is increased to \$400 per unit and to \$600 per unit for systems with a minimum SEER of 16 and a minimum EER of 13. The units must be installed by a participating [Cool Homes Contractor](#).

2.3.4 Other

Two other potentially interactive efforts are worthy of mention in this section, including local town ordinances and NYSERDA's own Home Performance with ENERGY STAR Program.

Section 3: **KEY ELEMENTS SUMMARY**

Based on a review of relevant NYSERDA documents, below is a summary of some key elements of NYSERDA's New York ENERGY STAR Homes Program.

3.1 Ultimate Goals:

The ultimate goals for the NYESH Program are to:

1. Create a market-based system of supply and demand that supports the creation and sales of energy efficient new homes
2. Develop competitive new home builders in each new home market that promote, build and sell quality NYESH homes at reasonable prices.
3. Lessen the burden imposed by energy consumption and other utility-related costs with a significant emphasis on providing this benefit for low- to moderate-income residents.
4. Package energy efficiency with other types of improvements – e.g., advanced meters coupled with a real-time pricing or time-of-use electricity rate structure, distributed generation, and renewable energy – for the new homes market.
5. Reduce the residential sector's contribution to the system peak demand.

The current primary goals for NYSERDA's New York ENERGY STAR Homes Program during the third round of SBC funding include the following list; however please note these goals do not reflect approved EEPS goals:

1. Building 2,150 new homes through the NYESH program in the first SBC year resulting in savings of 1.3 GWh of electricity.
2. Building 10,750 new homes through the NYESH program by 2011 resulting in 6.5 GWh and 378,000 MMBtu of energy savings.¹⁵
3. Building 800 new low-income homes through the NYESH program in the first SBC year providing 0.48 GWh savings.
4. Building 4,000 new low-income homes from the NYESH program over by 2011 resulting in 2.4 GWh and 140,500 MMBtu of energy savings.

Goals for partner recruitment, training and certification will be established on a market-by-market basis as performance in each market is evaluated.¹⁶

Additional savings will be achieved through expanded program activities being supported through EEPS funding approved by the Commission in January, 2010.

3.2 Market Barriers and Issues the Program Attempts to Address (“the Problem”):

Markets are typically defined by the products, services, and market events that characterize the requirements of a specific group of consumers. There may be different market actors for different market events or for different products or services.

¹⁵ NYSERDA, *System Benefits Charge Proposed Plan for New York Energy \$martSM Programs 2006-2011*, (SBC March 2006 Proposed Plan), as amended March 2, 2006

¹⁶ NYSERDA, *System Benefits Charge Proposed Plan for New York Energy \$martSM Programs 2006-2011*, (SBC March 2006 Proposed Plan), as amended March 2, 2006

A wide range of barriers may be encountered for the adoption of greater efficiency, behavioral changes and the use of new energy technologies within single family buildings. These barriers can be broken down into three general categories: barriers affecting the supply side, mid-market and infrastructure barriers, and barriers affecting demand side (and associated end-use) market actors. Supply-side and mid-market and infrastructure barriers include business practices and policies that deter the development or delivery of energy efficient products and services, or indicate an insufficient availability of, or commitment to, such energy-efficient products and services. Demand-side barriers primarily revolve around new home buyers and potential new home buyers. Table 4 presents the list of market barriers for the new homes market. The barriers are labeled “S” (for supply), “M” (for mid-market and infrastructure) and “D” (for demand) and are numbered for later reference.

Table 4 lists specific barriers related to market actors (not ordered by priority) for the ENERGY STAR Homes program. Note –Table 4 is meant to be a comprehensive list of market barriers that could potentially impact achievement of key ENERGY STAR Homes program goals. Each of these potential barriers would need to be tested and evaluated in order to determine to what extent they specifically impact the ENERGY STAR Homes market.

Table 4. Commercial, Industrial and Institutional Sector Market Barriers and Actors

Market Area	Barriers	Market Actors
Supply Side	S1 – Perceptions of a lack of demand for energy efficiency and new energy technologies	Manufacturers
	S2 – Lack of repair parts for efficient equipment and new energy technologies	Distributors
	S3 – Lack of standards for advanced meters and common connectivity environment preventing broad market development of advanced metering and real time pricing products	Suppliers
	S4 – Lack of real time prices for electricity	Utilities Regulators Developers and Builders

Table 5. Commercial, Industrial and Institutional Sector Market Barriers and Actors (continued)

Market Area	Barriers	Market Actors
Market Infrastructure and Policy	M1 – Builders do not regard energy efficiency as a value-added measure M2 – Lack of builder awareness concerning ENERGY STAR Homes and their benefits M3 – Builders lack information on how to build ESTAR Homes M4 – Builders lack experience building New York ENERGY STAR Homes and doing so affordably M5 – Builders lack knowledge and experience in selling ENERGY STAR Homes and doing so profitably M6 – Geographically dispersed supply of qualified HERS raters are not available to builders to certify ENERGY STAR Homes M7 – Lack of demand for HERS raters by builders suggests this is not a profitable occupation M8 – Lack of high efficiency equipment and parts for repair M9 – Lack of trained technicians to fix and maintain the equipment M10 – Reduced builder confidence in the ENERGY STAR label due to the media’s coverage of a recent GAO report regarding undeserving products being given the ENERGY STAR label	Builders HERS providers HERS Raters Contractors
Demand Side	D1 – Lack of awareness of ESTAR Homes and their benefits D2 – Lack of consumer information on energy efficiency in new construction D3 – Lack of consumer awareness of ENERGY STAR lighting and appliances and their benefits D4 – Lack of consumer awareness of need, and how to obtain, healthy indoor air quality in a new home D5 – Energy efficiency is not a priority for home buyers D6 – Additional costs associated with buying a NYESH D7 – Lack of availability of New York ENERGY STAR Homes D8 – Reduced consumer confidence in ENERGY STAR label due to the media’s coverage of a recent GAO report regarding undeserving products being given the ENERGY STAR label	New home and potential new home buyers

3.3 Targeted Market Actors:

The New York ENERGY STAR Homes Program is performance-based and targets home builders, HERS raters, and home buyers in the **New York Energy \$martSM** area.¹⁷ Other targeted market actors include contractors, real estate agents and new energy technology suppliers.

3.4 Program Implementation Approach (“Activities”):

Activities within NYSERDA’s NYESH Program have been designed to work strategically with demand-side and mid-market and infrastructure market actors and with supply-side market actors (particularly in the area of advanced meters) to help address key barriers.

¹⁷ New York ENERGY STAR Labeled Homes Program: MCAC, page 1-2.

Table 6 lists these NYESH activities, grouped along the supply-demand continuum. The logic model in Section 4: below is diagrammed from left to right to match this continuum.

Table 6. Activities of the New York ENERGY STAR Homes Program

Consumer Outreach Activities and Cooperative Advertising Activities (Demand-Side)
Provide cooperative advertising incentives Support outreach efforts including participation in home shows, local events, public relations, and grass root efforts Provide a toll-free call center and database to handle and track customer inquiries
Builder Incentives and Additional Incentives for Low-Income Households (Mid-Market and Infrastructure and Demand-Side)
Pay incentives to builders who construct the ENERGY STAR Homes Require builders to pay up-front for the raters' services and then reimburse builders through the program Encourage contractors and homeowners to take advantage of federal energy efficiency tax credits Provide additional \$500 incentives to low-income owners
Recruiting and Training Activities (Supply-Side and Mid-Market and Infrastructure)
Recruit builders Recruit and train raters Provide incentives for Home Energy Rating System (HERS) rater training
Quality Assurance and Quality Control (QA and QC) Activities of Raters, Builders and Program Homes (Supply-Side and Mid-Market and Infrastructure)
Conduct QA and QC checks of builder performance and HERS ratings (includes sampling ENERGY STAR Homes in each target market) Implement a de-listing and de-certification process for builders, contractors, and HERS raters whose work does not meet program standards

3.5 Program Inputs and Potential External Influences

The ability of the ENERGY STAR Homes Program to accomplish the outputs and outcomes likely to result in the program reaching its ultimate goals is dependent on the level, quality and effectiveness of inputs that go into these efforts. There are also external influences that can help or hinder the development of anticipated outcomes. Key inputs and potential external influences are presented in Table 7 and Table 8.

Specific outputs and outcomes anticipated for the ENERGY STAR Homes Program activities are shown in the logic diagram in Section 4: below. More information on these outputs and outcomes, and associated measurement indicators can be found in Table 9 and Table 10 immediately following the diagram (see Section 5:).

Table 7. Key Inputs for the ENERGY STAR Homes Program

Program Inputs
<p>SBC funding and EEPS gas funding</p> <p>Staff resources and experience implementing earlier rounds of the SBC-funded programs</p> <ul style="list-style-type: none"> • NYSERDA’s credibility and relationship with key stakeholders and policy makers • Existing awareness of NYSERDA among market actors <p>Expertise of raters, trade allies, and contractors</p>

Table 8. Potential External Influences for the ENERGY STAR Homes Program

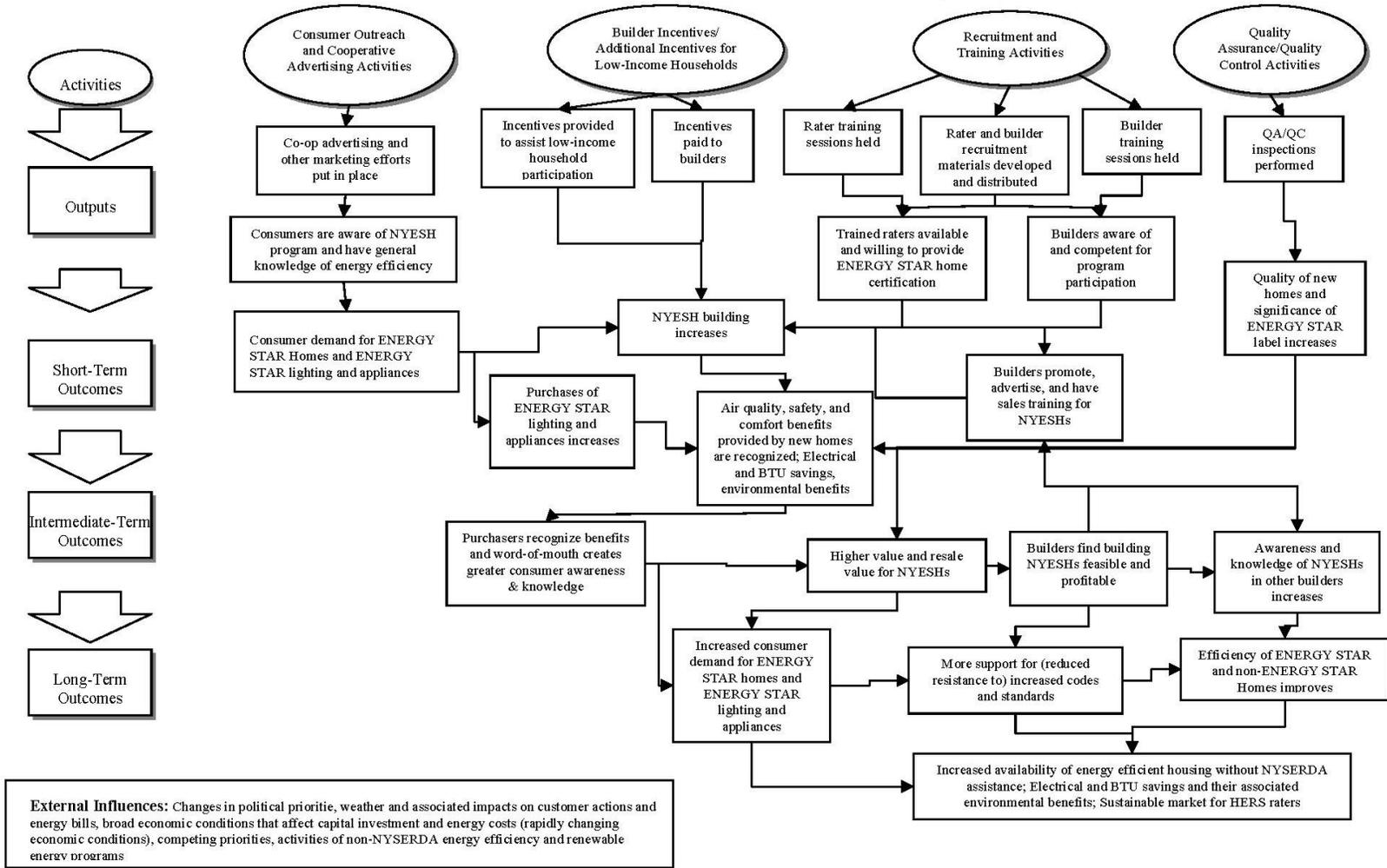
External Influences and Other Factors
<p>Changes in political priorities</p> <ul style="list-style-type: none"> • Federal energy policies including energy related tax credits, the American Recovery and Reinvestment Act, etc. • Perceptions of energy and global climate change issues • Codes and standards <p>Weather and associated impacts on customer actions and energy bills</p> <p>Broad economic conditions that affect capital investment and energy costs (rapidly changing economic conditions)</p> <ul style="list-style-type: none"> • Energy prices and regulation (changes in fuel and energy prices) • Perceptions of the value of “green” buildings and ENERGY STAR • Activities of public and institutional purchasers and projects • Low interest rates (favor home improvement industry in general) • The recession and its associated impacts on New York and the country’s economic well-being (which can limit up-front funds available for energy efficiency enhancements and decrease the perception of the ability of consumers to make these investments) <p>Competing Priorities</p> <ul style="list-style-type: none"> • Other draws on household capital (e.g. medical expenses, transportation, education, child care etc.) <p>Activities of non-NYSERDA energy efficiency and renewable energy programs</p> <ul style="list-style-type: none"> • EPA’s national ENERGY STAR homes and products programs (support national branding of the ENERGY STAR label) • The New York Energy \$martSM Communities and Education Program, which supports energy efficiency community efforts, awareness of the benefits of ENERGY STAR homes and assists in builder and contractor recruitment within a community • Programs and activities resulting from Federal stimulus (American Reinvestment and Recovery Act) funding • Utility programs in the LIPA, National Grid, and Central Hudson territories

Section 4: PROGRAM LOGIC MODEL DIAGRAM

The following page (Figure 1) contains NYSERDA's New York ENERGY STAR Homes Program logic model diagram showing the linkages between activities, outputs and outcomes, and identifying potential external influences. The logic model depicts the program as it is described in the updated SBC III plan, including EEPS fast track enhancements. The logic diagram presented here is at a slightly higher level than the tables in this report, aggregating some of the outcomes, in order to provide a logic model that is easier to read. (Evaluation research should use the more detailed tables, in addition to the diagram, in examining the anticipated linkages and performance through the various outcomes.)

Inputs: EEPS and SBC funding
 Staff resources and experience implementing SBC programs
 NYSERDA's credibility and relationships with key stakeholders and policy makers
 Existing awareness of NYSERDA among market actors
 Expertise of raters, trade allies, and contractors

Figure 1.
New York ENERGY STAR Homes
Program Logic Model Diagram
 June 2010



Section 5: OUTPUTS, OUTCOMES AND ASSOCIATED MEASUREMENT INDICATORS

It is important to distinguish between outputs and outcomes. For the purposes of this logic document, outputs are defined as the immediate results from specific program activities. These results are typically easily identified and can often be counted by reviewing program records.

Outcomes are distinguished from outputs by their less direct (and often harder to quantify) results from specific program activities. Outcomes represent anticipated impacts associated with NYSERDA’s program activities and will vary depending on the time period being assessed. On a continuum, program activities will lead to immediate outputs that, if successful, will collectively work toward achievement of anticipated short-, intermediate-, and long-term program outcomes.

The following tables list outputs (Table 9) and outcomes (Table 10), taken directly from the logic model and associated measurement indicators. For each indicator, a proposed data source or collection approach is presented. When required, the need for baseline data is also noted. Items in this table should be prioritized and subsequently considered as potential areas for investigation as part of a formal program evaluation plan.

Table 9. NYESH Program Outputs, Associated Indicators and Potential Data Sources

Outputs (<1 year)	Indicators	Data Sources and Potential Collection Approaches
Outputs from Consumer Outreach and Cooperative Advertising Activities		
Ads placed through Co-op advertising incentives	Incentives paid on co-op advertising by region Numbers and expenditures on co-op advertising, content ratings of participating builders’ advertising Number of ads and impressions	Review of program database, related files and documents Content analysis on co-op advertising
Other marketing activities	Number and types of other marketing activities implemented	Review of program database, related files and documents Content analysis on marketing activities
Builder Incentives and Additional Incentives for Low-Income Households		
Builder incentives paid	Incentives paid by region, by firm size and home type and size (market and low-income)	Review of program database, related files and documents
Incentives provided to assist low-income household participation	Number and dollar amount of incentives to low-income households by region	Review of program database, related files and documents
Outputs from Recruitment and Training Activities		
Rater and builder recruitment materials developed and distributed	Number and type of recruitment and marketing materials distributed	Program records
Rater Training sessions Held	Number of HERS raters recruited and trained Geographic distribution of trained raters across the state	Review of program database, related files and documents Records of northeastern HERS rating training organizations (e.g., Northeast HERS Alliance (NEHERS))

New York ENERGY STAR Homes Program Logic

Outputs (<1 year)	Indicators	Data Sources and Potential Collection Approaches
		Information and records from Residential Energy Network (RESNET)
Builder Training sessions held	Number of builders recruited and trained Geographic distribution of trained builders across the state	Review of program database, related files and documents Interviews with trainees who became program partners and those who did not become active
Outputs from Quality Assurance and Quality Control Activities of Raters, Builders & Program Homes		
QA and QC inspections performed	Number and results of QA and QC inspections (market and low-income)	Review of program database, related files and documents

Table 10. NYESH Program Outcomes, Associated Indicators and Potential Data Sources

Outcomes	Indicators	Data Sources and Potential Collection Approaches
Short-Term (1-3 years)		
Trained raters able and willing to provide rating services	Numbers of active HERS raters, reimbursements paid for training, effectiveness of HERS training sessions, quality of HERS raters	Review of program database, related files and documents Review of end-of-class surveys in cooperation with HERS rater training organizations Interviews with trainees who became program partners and those who did not become active
Builders aware of and competent for program participation	Number of builders recruited and trained Geographic distribution of trained builders across the state Numbers of participating builders, depth of participation (% of these builders' businesses), number of builder trainings, number of builders trained on building NYESHs (All measured separately for market and low-income) Builder awareness of NYESH across the new home markets Effectiveness of builder training	Review of program database, related files and documents Survey of program builders Survey of all builders, by new home market QA and QC results on NYESH Interviews with QA consultants and program staff
Consumers are aware of NYESH program and have general knowledge of energy efficiency	Awareness of NYESHs among new home shoppers Consumer understands what the ENERGY STAR label signifies and recognizes its benefits	Consumer survey of new home shoppers – given anticipated difficulties to identify a sufficient survey pool of “new home shoppers”, consider surveying “new home purchasers” instead
NYESH building increases	Number of NYESHs built	Review and verification of program database
Quality of new homes and significance of ENERGY STAR label increases	QC values on NYESHs Quality comparison of NYESHs versus non-program homes	Program QC and QA records On-site visits QC evaluation verification (some may need to occur during building process) Evaluation QC comparison between NYESHs and non-program homes via on-site inspections (some may need to occur during building process)
Air quality, safety, and comfort benefits provided by new homes are recognized	M&V on indoor air quality Comparison of indoor air quality for NYESHs and non-participating homes Homeowners' perceptions of air quality, safety and comfort	Site visits to test indoor air quality of program and non-program homes New homeowner survey (could be participants only or comparison

Outcomes	Indicators	Data Sources and Potential Collection Approaches
		between participants and non-program home occupants)
Electrical and BTU savings, environmental benefits	Impact estimates for kW, kWh, and BTUs for NYESHs homes and corresponding environmental benefits Safety and comfort – perception of NYESH homeowners and comparison with non-ES new home owners	Impact evaluation for NYESH-it will be critical to establish baseline values for kW, kWh, BTU savings and associated environmental benefits New home owner surveys
Builders promote, advertise, and have sales training for NYESHs	Proportion of builders (in percent) that promote, advertise and have sales training for NYESHs Estimated spending (\$ per builder and total) dedicated to these activities Perception by builders of value of ENERGY STAR label and the components of cost to build, sell, and profit from being a NYESH builder Number of NYESHs sold Market share of NYESHs Number and circulation of new home advertisements promoting ENERGY STAR homes Number of employees trained by builders on ENERGY STAR and dollars spent on training Builder’s perceptions on appropriate level of investment in the NYESHs market and the return on that investment.	Survey of residential builders National ENERGY STAR records or survey of builders Advertising content analysis In-depth surveys and record gathering with builders
Consumer demand for ENERGY STAR homes and ENERGY STAR lighting and appliances increases	Consumer perceived value of NYESHs, ENERGY STAR lighting, and appliances Consumer intent to purchase ENERGY STAR homes and ENERGY STAR lighting and appliances ENERGY STAR is an important search criteria for consumers seeking new homes, appliances and lighting equipment	Consumer surveys Purchaser intercept surveys
Purchases of ENERGY STAR lighting and appliances increases	Purchasers of NYESHs that also purchase ENERGY STAR lighting due to the program Purchasers of NYESHs that also purchase ENERGY STAR appliances due to the program Purchases of ENERGY STAR lighting and appliances due to the program’s advertising ENERGY STAR lighting and appliances in NYESHs, number by type compared to previously and non-NYESHs	Consumer surveys (large screening surveys for purchasers may be necessary) then follow-up and secondary surveys for program attribution Market surveys

Outcomes	Indicators	Data Sources and Potential Collection Approaches
Intermediate-Term (3-5 years) Outcomes		
Builders find building NYESHs feasible and profitable	Builders perceptions on building NYESHs, concerning ease, cost, and profitability	<p>Surveys and in-depth interviews with residential builders</p> <p>Acceptance seen in the number of NYESHs built by experienced program builders beyond the 1st year of participation.</p> <p>Builder’s investment in expanding their NYESH production, training, and sales materials</p>
Awareness and knowledge of NYESHs in other builders increases	Awareness of NYESHs by non-program builders and correct knowledge about the meaning of the ENERGY STAR label, what it means for home construction, and the process for obtaining the NYESH label	Survey of non-participating residential builders
Purchasers recognize benefits and word-of-mouth creates greater consumer awareness & knowledge	<p>Behavior and “talk” from purchasers of NYESHs homes</p> <p>Consumer awareness and knowledge of NYESHs derived from secondary sources (i.e., non-primary advertising sources)</p>	<p>Follow-up survey of NYESH purchasers</p> <p>Customer survey</p>
Higher value and resale value for NYESHs	<p>Resale prices for NYESHs</p> <p>Attributes of NYESHs incorporated in valuation assessments</p>	<p>Home sales data matched against prior NYESH records and then multiple regression comparison for other home characteristics or matching study – with efforts to get actual market data instead of homeowner and builder-reported data</p> <p>Two-stage survey of property assessors and records</p>
Long-Term Outcomes (5+ years)		
Efficiency of ENERGY STAR and non-ENERGY STAR homes improves	<p>Efficiency and ventilation levels in ENERGY STAR and non-ENERGY STAR homes</p> <p>Number of NYESHs sold</p> <p>Market share of NYESHs</p> <p>Builders’ perceptions of the features needed in a new home to compete in the marketplace</p> <p>Incremental costs for improvements that lead to efficiency</p>	<p>Site visits</p> <p>Survey of new home sales materials and content analysis</p> <p>Survey of builders</p>
More support for (reduced resistance to) increased codes and standards	<p>Baseline efficiencies in new home market</p> <p>Availability of equipment and materials</p> <p>Increased attention to and compliance with code</p> <p>Changes made to increase efficiency requirements in codes and standards</p>	<p>Site visit surveys of efficiency</p> <p>Incremental cost study</p> <p>Product and material availability study</p> <p>Survey of builders</p> <p>Interviews with those involved in code changing process</p>

Outcomes	Indicators	Data Sources and Potential Collection Approaches
		Review of state energy codes and standards documents
Sustainable market for HERS raters	HERS raters available for certifying NYESHs and demand for them such that it is a profitable business for them	Surveys of builders and HERS raters
Electrical and BTU savings and their associated environmental benefits	M&V kW, kWh, and BTUs corresponding environmental benefits for NYESHs and current homes versus previous trends Safety and comfort – perception of homeowners	Impact evaluation for NYESHs - estimating the baseline is critical Energy usage per square foot for current new homes versus prior trends. New home owner surveys
Increased consumer demand for ENERGY STAR homes and ENERGY STAR lighting and appliances	Consumer perceived value of NYESHs, ENERGY STAR lighting, and appliances Consumer intent to purchase ENERGY STAR homes and ENERGY STAR lighting and appliances ENERGY STAR is an important search criteria for consumers seeking new homes, appliances and lighting equipment	Consumer surveys Purchaser intercept surveys
Increased availability of energy-efficient housing without NYSERDA assistance	Efficiency of overall building stock, ENERGY STAR and non-ENERGY STAR Availability of HERS raters and independent rater trainings Availability of energy-efficient knowledgeable contractors and trainings in the marketplace	Survey of builders Market and customer surveys

Section 6: TESTABLE HYPOTHESES (RESEARCHABLE ISSUES) FOR EVALUATION EFFORT

Based on this program logic model assessment for NYSERDA's ENERGY STAR Homes program, a number of researchable issues have been identified and are noted below. Some of these have been investigated and continue to be investigated through NYSERDA evaluation activities.

Research addressing these questions will help to validate the reasonableness of the associated theories and will help inform NYSERDA program staff of progress and potential areas for program enhancement and refinement.

Based on recognition of key underlying program hypotheses, the following issues are proposed for potential testing. These issues are grouped into short-, intermediate-, and long-term periods to represent when they are expected to become important or verifiable.

Short Term:

- Is the appropriate type and level of recruiting and training efforts being conducted through the NYESH Program such that builders and raters are aware of the program and that the desired level and mix of raters and builders are participating in the NYESH Program?
- Are the training, program support, and QA and QC elements of the program effective in having builders build NYESHs that meet the desired quality levels and that support the maintenance of the ENERGY STAR label?
- Are builder and rater recruitment and training activities successful in providing sufficient qualified market actors in each local housing market to develop the market for NYESHs and support consumer choice?
- Are the NYESHs that are being built and sold meeting the Program's and the homebuyers' expectations and the builders' and Program's claims for energy savings, air quality, safety elements, and increased comfort (compared to the average New York new home)?

Intermediate Term:

- Are participants recognizing the benefits of their NYESHs? Are they becoming active promoters of NYESHs?
- Do NYESHs have higher resale values than homes of similar size, age and location? Of similar quality but without the ENERGY STAR label?
- Are New York builders regularly including a significant number of ENERGY STAR Homes in their annual home production (without program support) because they can easily incorporate ENERGY STAR Homes into their business plans and add to their profit? Are they promoting and continuing to provide education to consumers on NYESHs?
- Are new homebuyers aware and somewhat knowledgeable about ENERGY STAR Homes, products, and lighting when they begin the home purchasing process from prior experience, prior advertising, and hearing about the benefits from friends, relatives, and colleagues? As they begin the search process, is their knowledge being reinforced and directed by the NYESH advertising provided by builders and through materials provided by builders at model homes?
- Are participating builders learning how to select plans and build NYESHs in a way that works well with their business management and practices? Are supplies of the necessary equipment, materials, and HERS raters increasing, such that building and selling

NYESHs is becoming comfortable, feasible and profitable without the need of any additional program support?

- Is the appropriate mix of builders participating in the program to maximize market transformation (i.e. increased program participation leading to adoption of energy efficient building practices outside of the program)? Would working more directly with opinion leaders, market leaders, or some other influential groups prove helpful in recruiting appropriate builders whose participation would be most effective in creating the needed market changes?
- What mechanisms would move builders at the Tier 1 level to building higher efficiency homes, so that there is increasing participation at the Tier 3 level (about 6% of completions in 2008)?

Long Term:

- Is the NYESH program contributing to strengthening energy codes and standards?
- Are consumer awareness and higher resale values leading to greater consumer demand for ENERGY STAR Homes and ENERGY STAR lighting and appliances?
- Are changing codes and awareness increasing the average efficiency of ENERGY STAR and non-ENERGY STAR Homes in New York?
- Is energy efficient housing becoming more available in New York?