Using Residential Sector-Level Logic Models to Improve the Design, Implementation, and Evaluation of Energy Efficiency Programs

Scott Albert, GDS Associates, Inc.
Lori Megdal, Megdal & Associates
Victoria S. Engel, New York State Energy Research and Development Authority

ABSTRACT

Logic models are being used more regularly to aid the design, implementation and evaluation of individual energy efficiency programs. Little attention, however, has been focused to date on looking across programs at the sector level. Significant insights, program design/delivery efficiencies, and results assessment benefits can be gained through development and use of logic models at the sector level.

This paper provides details on the methods, results and challenges/lessons learned from a recently developed residential sector-level logic model. Through diagrams and text, this document is helping program-specific and sector-level managers to identify common activities among programs and to make explicit their linkages to anticipate sector-level outputs, short-term, intermediate and long-term outcomes. In addition, potential interactions (synergistic opportunities) between programs, market barriers and external influences were discussed and documented. Finally, an extensive list of measurement indicators and potential researchable issues was developed to track progress toward key sector-level goals and to help assess the validity of some of the higher priority logical links.

Details regarding the methods used to identify and roll-up activities from over ten separate residential programs, targeting different market actors and areas, will be presented. The resulting logic diagram and sample measurement indicators will be shown along with a summary of the challenges and lessons learned from this project. In addition, this paper describes how such sector-level logics can help to improve the design, implementation and evaluation of residential energy efficiency programs.

Overview of NYSERDA's Residential Programs

The New York State Research and Development Authority's (NYSERDA) **New York Energy $mart**[SM] Program is currently in its eighth year of operation and consists of over 30 separate initiatives, and multiple sub-components, working in four major program areas as follows: (1) Commercial and Industrial Energy Efficiency; (2) Residential Energy Affordability Program (REAP); (3) Low-Income Energy Affordability; and (4) Research and Development (R&D - including renewable and combined heat and power). This paper focuses on the residential sector as served by REAP and describes the methods used, results from and lessons learned through development of a sector-level logic model for NYSERDA's residential programs. In addition, this paper describes how the logic model is being used to help improve the design, implementation and targeted evaluation of NYSERDA's collective residential program activities.

Over the past seven years, NYSERDA has been designing and strategically implementing a number of residential programs to help promote energy efficiency, a cleaner environment and, for the low-income sector, reduce the energy cost burden for citizens across the state. These programs have evolved over time to improve their ability to achieve a number of desired program-specific market transformation and overarching public policy goals. Table 1 provides a listing and brief description of the nine initiatives that make up NYSERDA's current portfolio of residential energy affordability programs.[1] Approximately $171 million of budget has been allocated over this current eight year period for implementation of these Residential programs. $164 million has been spent through December 2005.

Table 1. New York Energy $mart[SM] Residential Sector Programs

Program Name	Program Description and 8 Year Budget
1) ENERGY STAR® Products & ENERGY STAR® Marketing Programs	These two programs work in tandem to increase awareness, understanding, stocking, promotion, and sales of ENERGY STAR® products - $61.3M total 8 yrs ($14.8M implement, $18.6M incentives, $27.9M marketing)
1a) Keep Cool Program (renamed "Stay Cool!" in 2004)	This program encouraged the replacement of old, working air conditioners with ENERGY STAR®-labeled room air conditioners and through the wall (TTW) units. Turned-in units were permanently removed from service and demanufactured and recycled. This program was coupled with a multi-media marketing campaign encouraging consumers to follow three specific energy tips during the summer months: (1) buy ENERGY STAR® products; (2) shift appliance use to non-peak periods; and (3) use timers or programmable thermostats on air conditioners. Due to the success of the bounty program, the bounty was reduced in 2003 and eliminated in 2004. The marketing component has continued and in 2004, the program was renamed Stay Cool! - $32.8M total 8 yrs ($5M implement, $14M incentives, $4.9M recycling, $8.9M marketing)
2) New York ENERGY STAR® Labeled Homes (NYESLH) Program	This program is an enhanced version of the EPA's ENERGY STAR® Labeled Homes Program, providing technical assistance and financial incentives to 1-4 family home builders and Home Energy Rating System (HERS) raters. The program encourages the adoption of energy -efficient design features and the selection and installation of more energy-efficient equipment in new construction and substantial renovation projects - $12.4M total 8 yrs ($5.9M implementation and $6.5M incentives. Marketing is in the ENERGY STAR® Marketing budget)
3) Home Performance with ENERGY STAR® (HPwES) Program	This program is designed to enhance the capacity for delivering energy efficiency services to existing 1-4 family residences. Energy efficiency improvements supported by the program include a comprehensive home assessment that examines the need for improvements; building shell measures; electric measures, such as refrigerators and lighting fixtures; heating and cooling measures, such as boilers and central air conditioning; and renewable energy technologies, such as photovoltaics - $25M total 8 yrs ($8.9M implementation, $9.7M incentives, $4.4M financing, $2M Small Homes Loan Fund. Marketing included in the ENERGY STAR® Marketing budget)
4) ENERGY STAR® Products Bulk Purchase Program	This program provided purchase assistance for early replacement of inefficient appliances through education, bulk procurement, and incentives in order to influence market transformation in the multifamily sector - 8 yr budget included in ENERGY STAR® Products & Marketing program. (This program was completed in 2003.)
5) Residential Comprehensive Energy Management (CEM) Program	This program promotes the acquisition and installation of sophisticated energy management and advanced metering systems. This program helps position residential customers to take advantage of retail competition, while enabling program implementers access to customers' energy-use data - $15.2M total 8 yrs ($2.4M implement, $11.4M MF incentive, $1.4M SF incentives)
6) Residential Technical Assistance Program (ResTech)	This program improves the operation of multifamily housing by identifying and encouraging the implementation of cost-effective energy efficiency measures that also enhance health, safety and comfort. Activities supported include: feasibility studies, computer-assisted building modeling, energy efficiency technical training, and commissioning - $1.3M total 8 yrs
7) Energy Smart Students Program	This program provides curriculum materials, training and professional development for teachers on the scientific concepts of energy and provides objective information about energy sources, their use and impact on the environment,the economy and society - $728,000 total.
8) **New York Energy $mart[SM]** Communities Program	This program was developed to complement the Department of Energy (DOE) Rebuild America program. Energy $mart Communities targets regional needs by bringing together organizations and agencies that contribute to local "model"projects demonstrating how energy efficiency and energy resource approaches can be used to create economic, social and environmental benefits. To transfer success of these model projects to the rest of the region, this program provides information and support at the local level to individuals and organizations interested in energy efficiency and **New York Energy $mart[SM]**.- $3.9M total 8 yrs

[1] This list of programs excludes NYSERDA's Low-Income sector initiatives which have been addressed through a separate sector-level logic report.

Program Name	Program Description and 8 Year Budget
9) Residential Special Promotions Program	This program seeks to increase the availability, promotion, and sale of energy-efficient products and services by implementing promotions in markets not currently addressed through other marketing activities. This program is designed to influence the behavior of up-stream and mid-stream market participants as well as residential customers - Budget included within ENERGY STAR® Products and Marketing Programs

Sector-Level Logic Model Development Methodology

In developing NYSERDA's residential sector-level logic model, six key tasks were undertaken: (1) program-specific details review, (2) common elements identification, (3) common elements summary feedback meeting, (4) draft activities summary and logic diagram development and review, (5) revised logic model and outputs/outcomes/indicators table development, and (6) review of similar programs elsewhere and their evaluation results. A brief summary of each of these tasks is presented below:

First, each of the programs noted in Table 1 were reviewed to identify specific market actors and barriers (including potential catalysts), program activities designed to overcome key barriers, and associated anticipated outputs, outcomes and potential external influences. Once this information was compiled for each program, efforts were made to identify market barriers and activities, etc. common across all programs. A meeting was then held with program managers and appropriate program staff to make sure that no important elements were overlooked or under or over emphasized in this sector-level summarization process.

Following feedback and input obtained during the common elements review meeting, a draft sector-level activities summary and logic diagram was developed and distributed for thorough review. Based on results from this detailed review process, a revised logic model was created along with a table showing, for each anticipated sector-level output and outcome, appropriate measurement indicators and testable hypotheses that program implementation staff and evaluation assistance contractors might use or consider to help assess the residential sector programs' combined effectiveness and progress toward key sector-level goals.

As a final task in the sector-level logic development process, a review of similar programs elsewhere and their evaluation results was conducted to help NYSERDA identify other potential barriers, market actors, delivery approaches, and results for consideration.

Common Elements/Issues Being Addressed by the Residential Initiatives

The residential sector faces a number of barriers that inhibit the adoption of energy-efficient products and activities. These barriers fall into two general groups: (1) barriers affecting the supply-side and related infrastructure, and (2) barriers affecting demand-side and associated end-use market actors. Supply-side barriers generally involve business practices and policies that deter the delivery of energy efficiency services and the lack of availability of or commitment to energy-efficient products. Demand-side barriers in the residential sector primarily focus on the lack of awareness, education, and training regarding energy efficiency options and benefits and their priority given competing uses of funds. Table 2 lists specific barriers and the related market actors (the order of these barriers does not reflect priority).

Table 2. Residential Sector Market Barriers

Market Area	Barriers and Associated Catalysts	Market Actors
Supply side (manufacturers, developers, etc.) Market Infrastructure/ policy (builders, contractors, retailers, etc.)	• Lack of information and awareness among upstream and mid-stream market actors regarding the benefits and business opportunities for energy efficient homes, efficient equipment, renewable energy and load management products, and related services • Limited experience with efficient homes and equipment, renewable energy products, load management equipment, and energy monitoring equipment • Uncertainty about product performance and profit potential for providing energy efficiency services • Limited availability of subcontractors with training and experience necessary for efficient equipment/building techniques and optimum energy performance of efficient equipment/building techniques. • Undervaluing energy efficiency and sustainability • Contractors unwilling to learn and conduct services outside of their specific trade • Lack of available real time pricing and other load management options	• Equipment manufacturers and developers • Contractors • Builders • Retailers • Distributors • HERS providers • Multifamily property managers • Sub-contractors and building trades
Demand side (downstream actors)	• Lack of awareness, knowledge and understanding of energy efficiency, renewable energy and load management features, products and services • Information costs associated with understanding these features and associated benefits • Competing needs for capital • Lack of reliable information on energy efficient practices in existing homes • Resistance to new and/or innovative technologies • Performance uncertainties • Split incentives for rental units (building owners often do not pay the energy bills, the tenant does but has little incentive or ability to improve the property) • Lack of available real time pricing and other load management options	• Residential customers, including existing and potential new home owners • Multifamily building owners • Tenants • Teachers and students • Communities

The ultimate goal of NYSERDA's portfolio of REAP residential energy efficiency programs is to develop sustainable residential markets in a way that achieve a number of higher-level State public policy goals. To achieve this ultimate goal, the programs work to reduce supply-side barriers, promote market infrastructure development, and increase demand for energy-efficient equipment, homes, and renewable energy sources in the residential sector. NYSERDA's residential programs seek to create a sustainable market for energy efficiency and renewable products and services throughout the residential sector. A number of sector-level goals for NYSERDA's REAP are listed in Table 3 below.

Table 3. Sector-Level Goals for NYSERDA's Residential Energy Affordability Program

Supply-side and Market Infrastructure/Policy	Demand Side Activities
• Increased awareness, knowledge and willingness or ability to make available technically-proven and economically-viable residential energy efficiency, renewable energy and demand response products and services (including real time pricing/load management options) • Increased number of firms (e.g.,contractors, home builders, equipment suppliers) with experience and confidence in delivering residential energy efficiency, renewable energy and demand response products and services that produce reliable benefits • Improved energy and environmental performance of existing and new homes that incorporate green design practices, energy efficiency and alternative energy technologies and operations • Robust and sustainable market for residential energy efficiency, renewable energy and demand response products and services • More efficient residential building stock	• Projects demonstrate persistent energy savings, reduced energy costs and provide other benefits to end-users • Customers have reliable information on which to understand and base their energy-related decisions • Increased consumer awareness about the benefits of energy efficiency and alternative energy options and associated understanding/awareness of the environmental impacts of energy choices and emerging energy options • Customers have confidence in energy saving estimates and value the energy efficiency and green building features of their homes and associated purchases • Access to residential energy efficiency, renewable energy and demand response (including real time pricing/load management) products and service options is improved for all types of customers, including underserved customers

NYSERDA's residential sector programs include a number of activities that produce outputs that lead to short-, intermediate- and long-term outcomes in support of the goals noted above. There are six main types of activities:

- marketing, consumer education and public awareness;
- incentives;
- technical support;
- verification, quality assurance/quality control (QA/QC);
- partner recruitment and outreach; and
- training, education and certification.

These activities range across the spectrum from demand-oriented (e.g., marketing and consumer education) through market infrastructure (e.g., technical support and verification activities) to supply-oriented (e.g., partner recruitment and training). Identification of the common set of activities at the sector level was derived from program-specific logic models developed for many of the residential sector programs. More specific information on each activity can be found in NYSERDA's individual residential program descriptions and logic models presented in NYSERDA's May 2005 **New York Energy $mart**[SM] Program Evaluation and Status Report. Table 4 lists activities along with their designated targets on the demand-supply continuum.

Table 4. Residential Sector: Activities

<table>
<tr><th colspan="2">Marketing, Consumer Education and Public Awareness</th></tr>
<tr><th colspan="2">Demand-Side Activities</th></tr>
<tr><td colspan="2">• Collateral marketing materials and advertising to inform end-users of opportunities (coordinated with other organizations and leveraged awareness activities), including Point Of Purchase (POP) materials, videos and brochures (Energy Tips, etc.), radio, TV and paid print ads - leveraged funding and co-advertising, as part of broad NYSERDA marketing activities (within and across program areas, sectors and portfolios)
• Promotional opportunities, home shows, local events, special promotions and community education with significant co-funding through USDOE Rebuild America
• Website enhancements and information/promotion on website (on-line marketing), screen website visitors through a series of questions and encourage them to take action, toll-free hot line/call center
• Contact via project contractors and on-going NYSERDA REAP management/support staff, Cross marketing through other programs
• Provide educational support and conduct awareness activities for tenants and building owners to increase consumer demand
• Provide information and tools to K-12 teachers to help them educate students about energy efficiency and conservation and to help educators, energy managers and consumers use energy wisely</td></tr>
<tr><th colspan="2">Incentive Activities</th></tr>
<tr><th>Demand-Side Activities</th><th>Market Infrastructure Activities</th></tr>
<tr><td>• Incentives to building owners to install meters and direct load control equipment
• Financing options and incentive for self-financing (ENERGY STAR® financing, Loan Fund, HFI and Low-Income option)
• Periodic special product incentives</td><td>• Product-specific targeted incentives (market share-based – lighting, washers, heat pump water heaters)
• Incentives to builders – to reimburse them for expenses they have paid up front
• Co-operative advertising incentives
• Training and certification incentives</td></tr>
</table>

Technical Support	
Demand-Side Activities	**Market Infrastructure Activities**
• Provide one-on-one assistance to building owners, matching them with financial and technical assistance available through NYSERDA and other agencies • Conduct feasibility studies • Support distribution of technical education material through state-wide TV, radio and print media (Steve Thomas), PR, consumer hotline, printed materials mailed and contractor follow-up, home shows, State fair, website • High School HPw/ENERGY STAR® Pilot • Provide lighting and appliance assessments for multifamily buildings and associated measure installation suggestions	• Product evaluation and specifications development • Comprehensive marketing, outreach and education to address contractor uncertainty regarding sufficient demand for whole-house services • Contract with qualified firms to provide energy-related and environmental technical assistance to multifamily housing facilities and organizations, provide energy efficiency technical training • Support computer-assisted building modeling, provide commissioning support • Provide one-on-one assistance to building owners, matching them with financial and technical assistance available through NYSERDA and other agencies • Develop technical education material
Verification, QA/QC and Other	
Demand-Side Activities	**Market Infrastructure Activities**
• QA/QC for sample of new homes in each target market to document and confirm performance • Follow-up QC support to consumers and related consumer protection	• Delisting and decertification process for builders, contractors and HERS raters whose work does not meet program standards • Survey of builders and homebuyers • Cost-effectiveness screening, written work scopes, certificates of completion, post-completion QC inspections, Appliance recycling and early retirement support • Identification of turn-in facilities, contracts with entities to pick up and demanufacture
Partner Recruitment & Outreach	
Market Infrastructure Activities	**Supply-Side Activities**
• Builder recruitment • Retailer recruitment • HERS rater recruitment, encourage contractor partnerships and contractors to obtain BPI accreditation • Work with New York State Public Service Commission to develop a market infrastructure to support advanced metering and RTF tariff	• Work with manufacturers and coordinate with regional and national efforts to ensure consistency and market advancement
Training, Education and Certification	
Market Infrastructure Activities	**Supply-Side Activities**
• Builder training • Retailer training, provision of educational materials and training on the benefits of ENERGY STAR® products, educate retailers in the operation of the programs, provide sales tools and POP materials and information on qualifying equipment and knowledge to help them sell, inform of financing options • HERS rater recruitment and training, encourage contractor partnerships and contractors to obtain BPI accreditation, provide classroom training on a market basis, offer continuing education credits for those occupations that require it • Influence certification criteria when appropriate, align programs with existing processes (BPI, codes training), TECA initiative, in collaboration with manufacturers, professional trade associations and distributors, vocational schools pilot • Host video-based training materials, participation agreements and other materials on website to improve program delivery and management, allow for reporting of performance data on line • Support contractors in modifying their businesses to incorporate whole-house approach and related elements, provide field support to contractors on Home Check software, etc.	• Work with manufacturers and coordinate with regional and national efforts to increase manufacturer knowledge and involvement

Specific outputs and outcomes anticipated for NYSERDA's Residential sector program activities are shown in the logic diagram (Figure 1) below. More information on these outputs and outcomes, and associated measurement indicators, can be found in Tables 6 and 7 immediately following the diagram. The ability of the REAP efforts to accomplish the level of outputs that will in turn cause the anticipated outcomes and its causal chain to reach the ultimate goals is dependent upon the level and quality of inputs that go into the effort. There are also external influences that can assist the development of the required outcomes or hamper them. The REAP inputs and external influences are presented in Table 5 below.

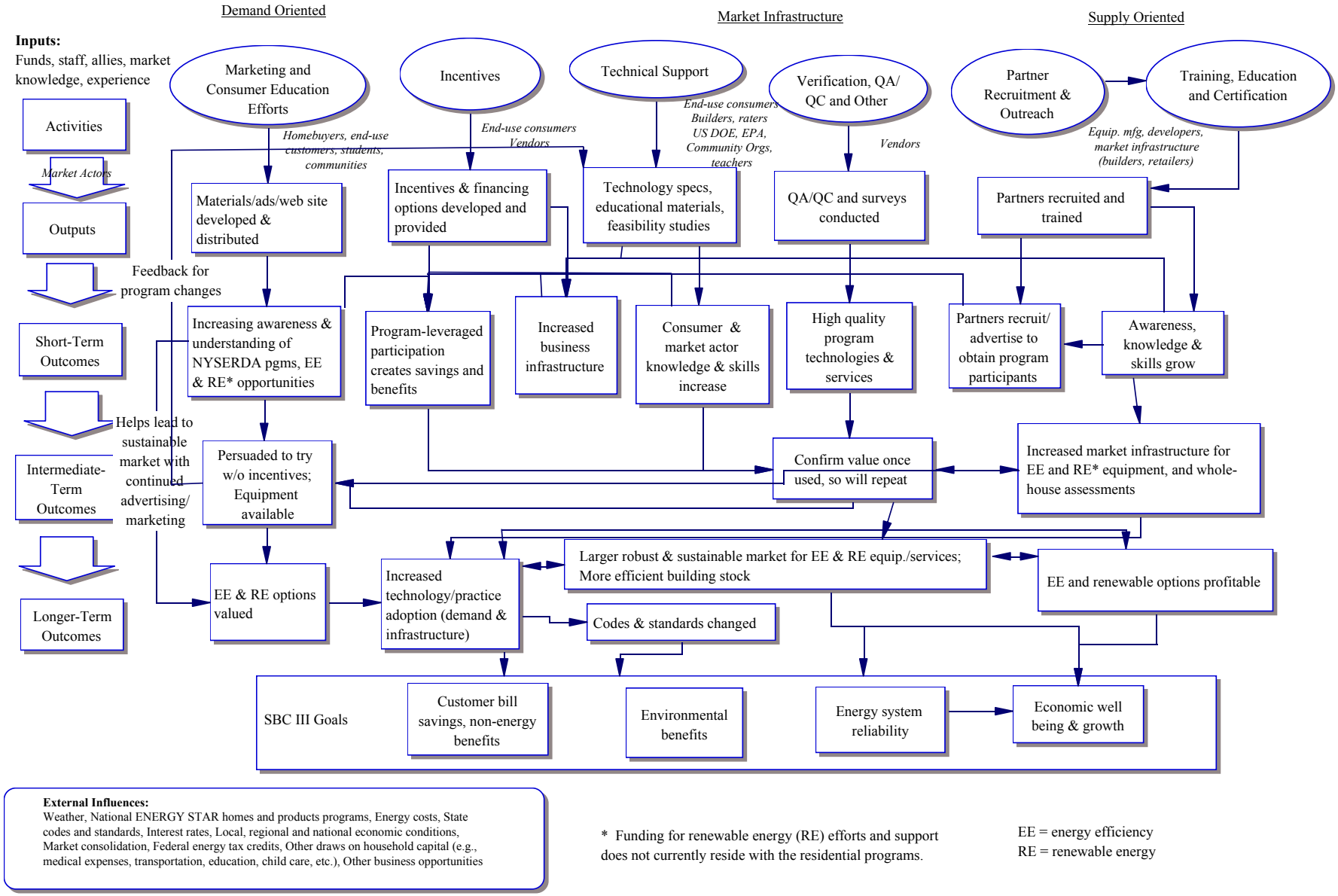
Table 5. Residential Sector Inputs and External Influences

Program Inputs
• SBC and other funding sources • Staff resources • Trade ally and contractor expertise • Market knowledge • Staff experience implementing SBC I and SBC II programs • Existing awareness of NYSERDA among market actors
External Influences and Other Factors
• Weather and associated impacts on customer actions and energy bills • The national ENERGY STAR® homes and products programs which support national branding of the ENERGY STAR® logo and label • Costs and performance of newer, more efficient technologies • Energy crises • Changes in political priorities, energy prices and regulations • Upgrades in State codes and standards • Rising energy costs and associated impacts on consumer choices, such as efforts to limit expenses • Level of interest rates, which affect the home improvement industry in general • Local, regional and national economic conditions • Market consolidation • Other draws on household capital (e.g., medical expenses, transportation, education, child care, etc.) • Other potential business opportunities for businesses in these markets • Federal tax credits of 2006 and 2007 • Other efficiency and renewable energy programs

Residential Sector Logic Diagram, Outputs, Outcomes and Indicators

The following page (Figure 1) presents key features of NYSERDA's portfolio of residential programs in the form of a sector-level logic diagram. This diagram shows the linkages between common activities, outputs and outcomes, and identifies potential external influences.

Figure 1. Residential Energy Affordability Program Sector-Level Logic Diagram



It is important to distinguish between outputs and outcomes in the program logic model and resulting measurement planning. For purposes of this paper, outputs are defined as the immediate results from specific program activities. These results are typically easy to identify and can be counted - often 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 table provides a sample of outputs (Table 6) and outcomes (Table 7) and associated measurement indicators. For each indicator, a proposed data source or collection approach is presented. Where appropriate, the need for baseline data is also noted. Items in these tables, along with researchable issues associated with the appropriateness of key assumptions, would need to be prioritized and subsequently considered as potential areas for investigation as part of a formal residential sector evaluation plan.

Table 6. Outputs, Associated Indicators, and Potential Data Sources

Outputs (< 1 year)	Indicators	Data Sources and Potential Collection Approaches
Marketing, Consumer Education & Public Awareness Activities		
Collateral materials/advertisements created and distributed or placed and events/ special promotions conducted	• Number of collateral material produced by type • Number of collateral material distributed by type and by recipient type • Educational materials provided, press releases and their advertising dollar equivalent • Call center asks customers that call in how they heard of program, call center tracking records for number of calls compared to advertisement release date • Number of events and promotions conducted	• Program databases • Program records • Program monitoring • Procedures established to collect data through call center interactions
Incentive Activities		
Incentives received by adopters	• Number and value of incentives provided by market actor and geographic area • Incentive dollars per first year kWh saved	• Program databases • Program database plus M&V study
Technical Support Activities		
Qualified contractors made available	Number and percent of contractors/builders offering efficiency and renewable products/services by market and geographic area	Program records and market survey information
Verification, Quality Control, & Other Activities		
QA/QC activities conducted and results reported	• Number of QA/QC activities conducted by project type and type of activity • Number of QA/QC reports produced	Program database
Partner Recruitment & Outreach		
Builders recruited	Number by recruited builders by type and geographic area	Program database and monitoring
Training, Education, & Certification Activities		
Certification and BPI accreditation opportunities provided, training materials developed/utilized	• Availability of certification and accreditation opportunities offered by type, frequency, and location • Number and types of training offered by geographic area • Number of training materials developed and distributed by type • Number of contractors, builders, retailers, and teachers trained	Program and market monitoring

Table 7. Program Logic Model Outcomes, Associated Indicators, and Potential Data Sources

Outcomes	Indicators	Data Sources and Potential Collection Approaches
Short-Term (1-5 years)		
More skilled contractors/builders that provide a higher quality of energy-efficient and renewable products and services	Increase in measured skills and increased promotion of efficient and renewable products/services by contractors/builders	Mystery shopping that includes indicators for skills and "soft" inquiry into efficient and renewable products Surveys of contractors and builders
Intermediate-Term (5-9 years) Outcomes		
Demand for energy-efficient and renewable products and services increases due to positive word-of-mouth without requiring incentives or other program services to do so	• Number and percent of consumers stating they intend to seek energy efficient and/or renewable product and services and (2) ranking of importance of energy efficiency and/or renewables in their product and service purchasing behavior due to positive word-of-mouth by product/service type • Number and percent of consumers stating they sought energy efficiency and/or renewables in their product and service purchasing behavior by product/service type due to positive word-of-mouth	Consumer market surveys
Long-Term Outcomes (10+ years)		
More efficient residential building stock in New York and permanent demand reduction	• Tracking average efficiency, demand reduction, and renewable usage by building type • Tracking energy usage by building type (adjusting for external influences as is applicable for testing goals in light of additional technological increases)	• Building stock and penetration surveys • Energy use index (EUI) studies by building type • Consumption analyses with building/ equipment survey data

A majority of the benefits associated with these sector-level logic model efforts come from the active involvement and input of NYSERDA' program implementation staff. By collaborating with program staff to identify and review common elements across the individual residential programs and by making underlying program activity-to-outcome assumptions explicit, a broader shared understanding has been created. In addition, consensus on and understanding of the value associated with getting answers to key evaluation researchable issues can help to produce more meaningful and actionable evaluation results. This in turn opens the door for identification of program-specific modifications that can be made to improve the likely achievement of key sector level goals.

The following are two brief examples of the evaluation researchable issues identified through NYSERDA's residential sector-level logic modeling work:

- Is the contractor, builder, and retailer training offered by the programs effective in creating desired levels of knowledge about and quality in energy efficiency and renewable products, installation, and services? Does it enable contractors, builders, and retailers to create a profitable business model selling energy-efficient and renewable products and services?

- Are suppliers, vendors and mid-stream market actors finding provision of efficiency options profitable through the program? Is their support for and promotion of energy efficiency products and services increasing over time and what are the reasons for these increases?

Answers to these evaluation researchable issues can help identify what is working well and where improvements are needed to meet the sector's long-term goals. Their answers also provide important insights to better target key residential program-specific activities.

Conclusion

NYSERDA's residential sector-level logic model yields results different from the types of research findings that come from more traditional process, impact, market characterization, assessment and causality evaluations. The logic diagram itself, associated measurement indicators, and the knowledge gained and shared during the logic model development process are the major products created. This process has helped NYSERDA's program implementation and evaluation staff to explicitly document and view interactions between individual residential program activities and their anticipated outputs and outcomes. It has provided excellent insights for problem area targeting and is helping with ongoing program consolidation activities.

In addition, this sector-level logic model was used to help guide the focus of NYSERDA's field evaluations, where the logic-based measurement indicators were reviewed and prioritized with NYSERDA staff, in coordination with their other evaluation assistance contractors, to form the basis for a majority of the researchable issues used in surveys and market assessments being performed.

Finally, evaluation results are being rolled up and reported in ways that assess or validate many of the sector-level logic's approaches and anticipated outcomes (i.e., are they addressing the right problems). Findings are consistently confirming that NYSERDA's portfolio of residential programs are on the right track, working with appropriate market actors, addressing key barriers, and making progress toward many of the anticipated short and intermediate term goals. By involving program staff in the development and review of these logic models, the likelihood of buy-in, acceptance and use of these evaluation results has been greatly increased.