If We Build It, Will They Come? Building Infrastructure and Creating Demand for Energy Efficiency in New York

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ABSTRACT

Achieving greater building energy efficiency through market transformation requires the creation of a demand for high performance buildings and development of a capability to meet that demand. The leverage points to meet this objective vary within the marketplace. In commercial buildings, architects and engineers are in a position to influence the energy efficiency of projects they design. In residential buildings, the builder and homebuyer are key. Transforming design and construction practices is more likely to occur if there is increased demand from users, with a concurrent stimulus to deviate from tried and true practices. Over the past four years, the New York State Energy Research and Development Authority (NYSERDA) has successfully invested over $100 million in the construction marketplace to achieve short and long term changes in energy efficiency. These activities include reducing risks through technical and financial assistance, influencing professional and consumer markets, delivering a comprehensive and persistent marketing message, developing an infrastructure of trained building contractors, providing localized project advocacy and teaming with industry partners.

This paper outlines key goals in transforming the residential and commercial building markets, which center around the concurrent objectives of increasing demand and providing capabilities to meet that demand. Some of the successful strategies discussed include the commercial New Construction Program, extensive brand identification with Energy Star, a private sector funded Home Energy Ratings System (HERS), development of local homebuilder allies, and creation of a statewide support network to advocate for program participants. Also presented are lessons learned and NYSERDA's strategies in response.

Background

New York's public benefits program was established in January 1998, under an initial three-year plan approved by the New York State Public Service Commission (PSC) funded through a non-bypassable systems benefit charge (SBC). In January 2001, this program was extended for an additional five-year period beginning through June 30, 2006 and program funding was increased to $150 million annually, of which the New York State Energy Research and Development Authority (NYSERDA) administers approximately $139 million.[1] NYSERDA's public benefits program is offered under the service mark name of **New York Energy $mart[sm]**. The key goals of the **New York Energy $mart[sm]** program are

[1] New York State Public Service Commission. *In the Matter of Competitive Opportunities Regarding Electric Service.*, Opinion No. 98-3. Opinion and Order Concerning Systems Benefits Charge Issues. Issued and effective January 30, 1998. Cases 94-E-092 *et al.*

to promote competitive markets for energy efficiency services, to provide direct benefits to eligible electricity ratepayers and to mitigate the State's peak electricity needs. [2]

Many of the **New York Energy $mart[sm]** Programs are aimed at reducing energy consumption in the two predominate building sectors in New York- residential and commercial. NYSERDA's strategy to intervene in the marketplace is twofold: to provide direct encouragement to building owners and operators (increase demand) and to create an ongoing support network to sustain these actions over the long-term (build infrastructure). **New York Energy $mart[sm]** programs such as the New Construction Program and the Energy Star Homes program focus on building support within the marketplace to extend impacts beyond one-time transactions. In most cases, where end user incentives are offered by programs, these same programs have a mid-market infrastructure development component so that the efficiency gains go beyond the individual facility.

Commercial Building Infrastructure

Prior to developing the New Construction Program, NYSERDA conducted a baseline survey of Architecture and Engineering firms in summer 2000, with the intent of assessing current practice and barriers to energy efficient design. Key findings indicated that each firm was responsible for 39 design projects per year, at roughly 65% renovations and 35% new construction. From a designer's perspective, the most significant barriers were lack of information on new technologies, lack of information on energy savings, operational and maintenance issues and resistance from building owners. From a building owner's perspective, the designers responded that higher first costs were the most significant barrier. Of the respondents, 86% said they did not use energy modeling to compare alternative energy features in designs.

Based upon this assessment of the barriers to increased rates of energy efficient building design and construction, the NYSERDA New Construction Program was structured to 1) provide incentives to building owners to cover a substantial portion (70%) of the incremental cost of high-efficiency equipment and 2) to provide cost-shared technical assistance to design and construction teams for the evaluation of energy efficiency improvements on projects. The technical assistance is intended to build an infrastructure to increase the transferability of efficiency behavior and actions to future construction jobs completed by the design and construction team. The financial incentives reduce risks and increase the experience and confidence that the design and construction teams gain from participating in these types of projects.

The New Construction Program has built up an infrastructure to foster energy efficiency in building design. NYSERDA has developed, and recently expanded, a regionally based network of technical assistance consultants and Outreach Project Coordinators (OPC's) who expedite program participation for customers. Many of the OPC's are professional engineers, and their role is to provide customer advocacy, assist customers in program participation and to handle on-site project verification of measures. Since inception of the program 31 months ago, over 700 customers have applied to

[2] New York State Energy Research and Development Authority, **New York Energy $mart[sm]** Program, Final Report on the Initial Three-Year SBC Program, January 2002

participate in the New Construction Program. An increasing number of program referrals are now coming to the OPC network from local utilities, economic development agencies, product suppliers and vendors, local government offices and other existing sources. This referral network is directing energy users to NYSERDA's currently available resources.

In addition to providing outreach services to these applicants, to date NYSERDA has provided technical assistance studies to over 245 design teams and offered capital cost incentives to over 300 building owners. The technical assistance provided through NYSERDA to design teams on a project-specific basis is building a capacity within the design community to implement energy efficiency in subsequent projects. Designers are becoming more familiar with and confident in recommending measures such as variable-air volume systems, variable speed drives and geothermal heat pumps to building owners. Many design firms are participating multiple times in the program with new customers, and have stated that they now recommend, for example, variable speed drives and occupancy sensors to all their clients.

Permanently influencing the standard practices of these firms will have a sustainable benefit. As an example, Ashokan Architecture and Planning participated in the New Construction Program for the design of a new dormitory project for Bard College in the Hudson Valley region of New York. According to Peter Reynolds, principal, "... the benefits to us in-house in approaching NYSERDA early on in our design process is to get the maximum design input possible and to best evaluate potential avenues for support. We hope this will be a significant aspect of our growth into a full-service green design firm." Reynolds further states that "...through your significant funding contribution, we were able to include a heat pump system for domestic water. This latter innovation, we hope, will set a new energy standard at Bard College"[3].

Residential Building Infrastructure

The overall goal of the residential new construction program is to implement and promote an enhanced version of the U.S. Environmental Protection Agency's ENERGY STAR® Labeled Homes Program in New York; New York's ENERGY STAR® Labeled Homes.

Strategy

New York's ENERGY STAR® Labeled Homes was strategically launched in six upstate New York markets (Albany, Rochester, Buffalo, Syracuse, Binghamton and Hudson Valley) in the late spring of 2001. Special effort was taken to ensure adequate builder participation was in place so that consumer demand did not exceed the builder's ability to service that demand. Prior to offering a residential new construction program, in the fall of 1999 NYSERDA conducted an industry stakeholders meeting, which concluded that historically the lack of consumer demand has been the downfall of previous energy efficient new construction programs in New York State.[4]

The NYSERDA program strategy relies on midstream level incentives and an extensive paid multi-media advertising campaign. The midstream level incentives aim to

[3] Letter to William Flynn, NYSERDA, March 23, 2002

[4] NEES Global, October 30,1999, Residential New Construction/ ENERGY STAR® Homes Program Summary Report for New York, Westborough, MA, NEES Global.

actually change the supply characteristics of the marketplace - from what manufacturers produce, to what suppliers sell, to the practices builders and contractors support. The extensive media campaign provides consumer education and creates consumer demand for ENERGY STAR® Labeled Homes, and recruits builders into the program. By building both a trained builder infrastructure and educating customers, NYSERDA intends to build a self-sustaining recognition of energy efficiency in the marketplace.

An additional element of this strategy includes a strong relationship with the New York State Home Builders Association (NYSBA) and its local affiliates. NYSERDA has teamed with NYSBA's Research and Education Foundation to assist with program design, supervise account management activities, monitor and coordinate builder/rater relations, recruit builders, administer training and process incentives. This teaming arrangement represents the ability to reach over 3,500 builders throughout New York State.

Implementation

The program's implementation approach is to develop and support an energy-focused new home construction industry, which uses performance-based "building science" techniques to maximize quality, consistency and effectiveness of energy use in new homes. This approach focuses on transforming the home-builder infrastructure and creating a private-sector driven Home Energy Rating System (HERS). Both builders and HERS raters are instrumental in providing consumers with quality ENERGY STAR® Labeled Homes.

The approach to builders is to provide technical assistance and targeted financial incentives to encourage the adoption of energy-efficient design features and the selection and installation of more energy-efficient equipment. The program technical assistance is provided by a regionally based group of Account Managers (AM's). These AM's assist builders by explaining the value of ENERGY STAR® Labeled Homes, how their homes can achieve the ENERGY STAR® Label, how to sell ENERGY STAR® Labeled Homes, and the program requirements. The builder training, administered by NYSBA, is coordinated and focused on linking the ENERGY STAR® Labeled Homes program with the upcoming adoption of the International Energy Conservation Code in New York. This linkage creates a dynamic in which the changing energy code helps increase builder's attendance to training and the ENERGY STAR® message provides an easy answer to compliance.

The program has a unique approach to the HERS rating industry. Unlike most programs throughout the country, the New York program is designed to create a private sector certified HERS Rater industry in the state. The significant long- term impact is having the builder be responsible for the cost of the HERS rating, introducing a competitive dynamic to the HERS Rating process, encouraging reasonable rating costs and high quality ratings. This model provides the HERS raters with the opportunity to establish business relationships with a number of builders, expanding their customer base and thereby creating a viable business.

A significant negative short-term impact has been the lack of an adequate number of HERS raters dispersed geographically across New York and inconsistent rules, and enforcement of those rules, by the HERS Rating Providers in New York. Because this has a large short and long-term impact on the success of the program nationally, not just in New York, NYSERDA has spearheaded the development of a nationally based working group to address these rules and enforcement. This working group consists of representatives from

NYSERDA, Residential Energy Services Network, Northeast HERS Alliance, and various HERS Rating Providers.

Creating Demand In Commercial Buildings

In the commercial new construction marketplace, NYSERDA is influential through three major activities: the New Construction and Green Buildings Programs and support for State Executive Order 111. NYSERDA offers financial and technical assistance to building owners through all three programs, and has helped to stimulate demand for specialized expertise and services within the marketplace.

New Construction Program

The New Construction Program provides incentives for electric energy efficiency measures in new and substantially renovated buildings. Incentives are capped at a maximum of 70% of the incremental cost (the customer pays the remaining 30%). Demand for the program as of May 1, 2002 is at 160% of projected levels, with applications for over 700 active projects representing 66.7 million square feet of floor space.

High levels of program participation have prompted NYSERDA to review selected measures within the New Construction Program to assess whether aggressive incentives are still necessary. A good example of this is geothermal heat pumps. There are currently 34 geothermal projects in the New Construction Program, which have taken advantage of aggressive incentives available during the first phase (14 months) of the program. The availability of incentives for these systems has helped to stimulate the availability of capable well drillers in New York State, which was a significant issue only a few years ago according to several engineering firms. As a consequence of this increased demand and commensurate marketplace response, NYSERDA reduced the New Construction Program incentives for this measure in the current program offering. To date, there has been no appreciable fall-off in the number of applications for this measure. Customers now appear to routinely consider geothermal systems in commercial building applications as an alternative to a fossil fuel/electric cooling strategy.

NYSERDA's Green Buildings Program

NYSERDA is currently working with over 35 high-performance and green buildings projects across the state, and has shown that at an average cost increase of 1%, these buildings can exceed ASHRAE standards by 30% or more. Part of NYSERDA'S role is to educate building owners and interested designers on the fact that green buildings are more than just energy efficient - that they need to consider materials selection, indoor air quality and the sustainability of resources to construct and operate the building.

With NYSERDA's assistance, New York has also enacted the first Green Buildings Tax Credit to stimulate the growth of LEED™ certified buildings. Both building owners and tenants are eligible for the $25 million available in the first phase of the tax credit. Request for high-performance building guidance has stimulated an increase in the number of LEED™ certified professionals in New York and in firms specializing in conducting energy modeling and commissioning. NYSERDA has encouraged this market by providing additional

incentives for LEED™ certified buildings, offering loan funds for projects with materials that meet LEED™ or other generally accepted green standards, and by offering co-funded training. In 2000, NYSERDA estimates that there were less than 20 LEED™ certified professionals in New York; that number now exceeds 60 with additional training and certification courses planned into 2003.

Executive Order 111

New York Governor George Pataki has suggested that the state lead example through implementation of Executive Order 111, which requires that all state-owned and operated facilities exceed the Energy Code requirements by 20% by the year 2010, and that the purchase of renewables and installation of green technologies reach a penetration of 10%. With over 40 million square feet of state-owned or operated floor space, compliance with the Executive Order will provide a huge stimulus to the energy efficiency marketplace as equipment is replaced or upgraded over the next eight years.

Creating Demand in Residential Buildings

Over the last several years, NYSERDA has been promoting the ENERGY STAR® label in New York with an umbrella ENERGY STAR® awareness campaign to increase name recognition and define the benefits of ENERGY STAR® labeled products and services. Based on a 2001 report,[5] prior to the campaign in 1999 there was a 34% awareness of the label in New York. In 2001, after the campaign there was a 43% awareness, representing a 27% increase.

In 2001, NYSERDA launched an extensive multi-media advertising campaign to increase awareness and sales of ENERGY STAR® Labeled Homes in New York. Ultimately, the goal of this program is to educate, influence and motivate homebuilders and buyers to construct and purchase ENERGY STAR® Labeled Homes. The marketing message supports the fact that ENERGY STAR® Labeled Homes provide better value for saving energy and money. The campaign features Steve Thomas, host of *This Old House*, as spokesperson for the program. Based on the results of the consumer focus groups conducted, Steve brings instant credibility, recognition and celebrity to the ENERGY STAR® message.[6]

The campaign is focused on "call to action" marketing, creating consumer demand and builder participation. Consumers receive information on the program by accessing a website or by calling a toll-free number. As a result of their inquiry, consumers receive an information packet, a video and most importantly, a list of participating builders in their area.

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[5] Aspen Systems Corporation, August 9, 2001 *Final Project Report New York State ENERGY STAR® Appliances and Lighting Program*, Rockville, MD, Aspen Systems Corporation.

[6] Pathfinder Research Group, June 2001 *Communications Research for NYSERDA ENERGY STAR® Labeled Homes Advertising*, Acton, MA, Pathfinder Research Group.

Providing consumers a list of participating builders serves not only to increase consumer comfort and confidence in the program but also generates qualified leads for the builder.

Results To Date

New Construction Program

New York Energy $mart[sm] Program efforts are designed to increase consumer awareness of energy-efficient equipment, products, and services, and to facilitate lasting structural change in business and consumer decision making regarding energy efficiency. Early indications show that the **New York Energy $mart[sm]** Program is beginning to have positive effects on markets by increasing supplies of and demand for energy-efficient products and services. For example, the New Construction Program is estimated to already be reaching over 10% of all the commercial construction activity within New York State, as summarized in Table 1. This rate of participation is double the expected rate of penetration at this date.

Table 1. New Construction Program Metrics (as of April, 2002)

Category	Value	Notes
Number of projects	702	active project applications
Total building square feet (Sf)	66.79 million	from program applications
Average Project size	95,412 square feet	
Months program active	31 months	Start date September 2000
Potential incentive dollars	$40,645,000/ $57,900 per project	estimated for all project applications
Annual rate of participation in terms of building Sf.	26 million Sf/year.	Total Sf/months program active x 12 months/year
Annual value of program construction activity	$3.12 billion	Assume $120/Sf cost of construction
Penetration rate of all NYS commercial construction	10-11%	1992 US Census data shows NYS annual commercial construction activity at $30.7 billion
KWH savings from projects where offer has been made	29,000,000 KWh 7.53 million sf	Data from technical assistance studies
Average KHW savings/Sf.	3.89 KWH/Sf or $.42/Sf./year	Total KWH savings/total Sf. Average cost of $.11/KWH
Estimated electric energy savings over base case	31%	Assume average electric costs of $1.20/Sf/year
Estimated overall energy cost savings	26%	Based upon 80/20 split of electric/fuel costs and total $1.50 Sf/year operating cost

A/E Surveys

NYSERDA is currently conducted a second survey targeted at participating design teams. This survey is being conducted to determine changes in their approach to energy efficiency as a result of participation in the New Construction Program, to determine if they now approach any of their other design projects differently and to assess the effectiveness of the New Construction Program. This survey is expected to provide insight into whether the program is producing a long-term market transformation in design practices as intended.

Residential Builders

A residential building market survey was conducted by NYSERDA in early 2000[7]. The purpose of this market survey was to develop a baseline assessment of new energy efficient home building activity in the state, and assess the builder's interest in building and selling ENERGY STAR® Labeled Homes. Key findings were that: every builder expressed interest in participating in the program; most builders said they would build all their homes to the program guidelines if an incentive to cover the cost of the rating was available and if the market for the homes exists. Key barriers from the builder's perspective were difficulty in selling energy efficient homes to low/mid-market buyers, increased costs, and lack of consumer awareness.

Two surveys are being conducted in the spring of 2002. One is designed to obtain a feedback from builders on program elements and rater performance and the second is to judge consumer feedback about the program and the performance of their ENERGY STAR® Labeled Homes. As summarized in Tables 2 the New York's ENERGY STAR® Labeled Homes program, in a short period of time is reaching approximately 1% of home construction in its target markets.

Lessons Learned

Build A Continuous Message

As discussed previously, NYSERDA has made a considerable commitment to ENERGY STAR® as the label for residential program activity. Over $5 million, with approximately $2 million for new homes, has been invested to build an awareness of the ENERGY STAR® label and to modify consumer behavior. With the current increased level of awareness and understanding of ENERGY STAR®, NYSERDA is effecting the consumer decision- making process. An example: one builder in the Albany market reported that 8 out of 10 of his customers now ask for an ENERGY STAR® Labeled Home. This has meant that his company does not have to market energy efficiency as an upgrade.

[7] ICF Consulting, June 2000 *Market Assessment for ENERGY STAR® Labeled Homes in New York*, Fairfax, VA, ICF Consulting.

Table 2. New York ENERGY STAR® Labeled Homes Metrics (as of March 31, 2002)

Category	Value	Notes
Number of ENERGY STAR® Labeled Homes	96	Completed homes
Number of ENERGY STAR® Labeled Homes pending	39	Homes in process of being built
Number of Participating builders	164	
Number of builder prospects	61	
Number of Participating HERS Raters	23	Raters are either certified or have passed the certification exam
Number of HERS Raters prospects	56	Raters are prospects or in training
Months program active	12 months	
Expended incentive dollars	$371,218	For ENERGY STAR® homes, model homes, training assistance, and co-op advertising
Percent of Market Penetration	1.13%	Based on new homes starts in the 6 target markets (119 ENERGY STAR® homes out of 10,495 starts)
KWH savings from ENERGY STAR® Labeled Homes	135,552	Data from technical assistance studies based on REM/Rate
Average KHW savings/home	1412 KWH	Data from technical assistance studies based on REM/Rate
Average KW savings/home	2.1 KW	Data from technical assistance studies based on REM/Rate
Estimated energy savings over code built home	30%	Based on MEC 93

NYSERDA's New York Energy Smart branding has also helped New Yorkers identify resources for energy efficiency, to access the NYSERDA website and contact the toll-free number. References to NYSERDA from peer organizations (such as building owner to building owner) have also been a large source of new applications. NYSERDA plans to continue to exploit the advantages of the strong branding that has been established.

Develop Localized Delivery And Support

In the past two decades, energy efficiency programs had been delivered by the local utility, and supported by the infrastructure of account managers and service representatives. A key delivery component in the formation of NYSERDA's New Construction Program was the developed of localized project delivery and support through the locally-based Outreach Project Consultants (OPC). OPC's generally work in an area within two-hours drive time, and are familiar with local construction activity and the key players. This local support network been essential in screening and matching customer service needs with the services available from the New York Energy $mart[sm] program portfolio. In recognition of the value of local delivery, in late 2001 NYSERDA also opened regionally offices in New York City

and Buffalo. A key component in the New York Energy Star® Labeled Homes Program are similar regional and local program Account Managers and private HERS raters.

Manage Sticker Shock

The NYSERDA team works hard to elicit buy-in from the design team and owner, but there is some fall off when the additional cost of improvements are laid out. Clearly articulating the value of these improvements in operating costs, user comfort, maintenance, etc. during the initial discussions is important so that the owner recognizes the value when the budget figures come in. Often, many of these measures get tabled at the last minute when the budgets (invariably) come in too high. Working directly with customer design teams, NYSERDA has learned how decisions get made "in the real world" and that building construction projects continue to be driven by initial costs.

In the residential market, high budgets and first cost issues are important but often result in customers making choices between energy efficiency and ancillary items such as hot tubs, hardwood floors, decks, or kitchen cabinets upgrade. Homeowners, once educated, are beginning to incorporate the benefits of energy efficiency into their decision-making process and increase their priority.

Reduce Risks To Increase Participation

Financial incentives will remain a key component in market transformation, particularly in the early stages of an intervention strategy. For many energy users, unless there is a significant cost reduction, energy efficiency will remain unimplemented. The cost of energy efficiency remains high in mind of many customers, despite decades of work by the efficiency industry. Therefore, direct customer incentives to decrease capital costs, cost-shared technical assistance, second party review of energy efficiency proposals and energy performance contracts, and assistance in the review of financial decisions on energy efficiency will all help to reduce customer's risks in making energy efficiency improvements.

Build In Continuous Feedback

Establishing a means for simple and direct customer feedback is essential in attempts to improve service. Exit surveys, interviews, telephone follow-up, quality assurance, and control mechanisms and other simple means provide real-time information on performance. Customers are reticent to offer suggestions on improvement, and the reasons they elect not to participate must be uncovered.

Create Flexible, Responsive Programs

Each segment of the buildings market has particular needs. Flexibility in the program design phase is very important. Seasonality is critical in the residential market. Timing is critical in the new construction market. Incentives need to be focused on parts of the market that will respond, i.e., low-interest financing, equipment incentives, training and certification. Program rules and guidelines need to be developed in consideration of the inevitable special case.

Next Steps

Streamline Service Delivery

Customers currently face a number of entry portals to access NYSERDA programs, which can be a bit confusing. For a given project, there may be several "programs" that could assist that project. NYSERDA is working to streamline application processes and to use OPC's program account managers or their equivalent to take responsibility for getting all appropriate services to that customer.

Increase Stakeholders

More stakeholders are needed to increase builder participation, consumer awareness and demand, product manufacturer involvement, availability of energy-efficient products, and renewable energy resources. NYSERDA will work to include other market players, including realtors, appraisers and lenders as they are essential to long-term sustainability of the program.

Earlier Intervention

Building projects require long lead times and planning. The earlier that energy efficiency can be considered in the planning and design process, the more cost-effective and comprehensive the energy strategy. In the New Construction Program, the OPC network constantly scans for new projects by tracking school board referendums, economic development activities and by maintaining personal contact with large design-build firms. Vendors and manufacturers are also advocating for more efficient products in the preliminary specification -setting and purchasing decisions. Increased awareness of the Energy Smart Program has also prompted customers to seek out services at much earlier project phases. This is the result of over four years of intensive and successful market intervention.

In the New York ENERGY STAR® Labeled Homes program, the AM's and HERS raters are continually trying to reach builders earlier in the process to conduct plan reviews so optimum performance-based options are available.

Summary

The goal of NYSERDA's New York Energy Smart Program[sm] is to achieve market transformation in New York State through a combination of efforts to build infrastructure and to stimulate demand. While early indicators are showing success, continued aggressive and creative efforts will be necessary to reach full, lasting transformation.

References

Aspen Systems Corporation, August 9, 2001 *Final Project Report New York State ENERGY STAR® Appliances and Lighting Program*, Rockville, MD, Aspen Systems Corporation.

ICF Consulting, June 2000 *Market Assessment for ENERGY STAR® Labeled Homes in New York*, Fairfax, VA, ICF Consulting.

NEES Global, October 30,1999, *Residential New Construction/ ENERGY STAR® Homes Program Summary Report for New York*, Westborough, MA, NEES Global.

NYSERDA, GDS Associates, Megdal Associates and Oak Ridge National Laboratory, January 2002 New York Energy Smart Program, *Final Report on the Initial Three-Year SBC Program and Interim Evaluation and Status Report*, Albany, NY NYSERDA.

Pathfinder Research Group, June 2001 *Communications Research for NYSERDA ENERGY STAR® Labeled Homes Advertising*, Acton, MA, Pathfinder Research Group.

RLW Analytics, June 4, 2001 Statewide Market Assessment and Evaluation Non-Residential New Construction Program Area, Building Efficiency Assessment Quarterly Report, Sonoma, CA, RLW Analytics.