

ENERGY STAR® Labeled Windows: Establishing an Effective Market Transformation Program

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ABSTRACT

KeySpan Energy Delivery (“the Company” or “KeySpan”) began offering a residential ENERGY STAR Windows rebate program in 1998, establishing itself as one of the first and only utilities in the northeast to offer this type of market transformation program. Since its inception, the program has experienced considerable customer adoption in KeySpan’s Massachusetts’s service territory, compiling over 2,800 participants in its four-year history.

The following paper will provide an overview of KeySpan’s ENERGY STAR Windows program discussing its initial development, marketing tools and initiatives used, participant energy savings achieved via the results of a participant bill history analysis, and ENERGY STAR window awareness in KeySpan’s Massachusetts natural gas service territory. One of the main objectives of this paper is to expose any areas of KeySpan’s windows program that need to be improved or adjusted to provide valid information for program cost effectiveness studies and bill analysis. Equally important is the emphasis on increasing consumer awareness of the value of ENERGY STAR windows and increasing knowledge and use of these windows in the builder community.

Company Background

KeySpan provides natural gas service to more than 2.5 million customers in the New York City boroughs of Brooklyn, Queens and Staten Island, in Nassau and Suffolk Counties on Long Island, and in Massachusetts and New Hampshire. KeySpan serves 840,000 customers in the state of Massachusetts.

History of Energy Efficiency Programs

KeySpan has been providing energy efficiency programs for its customers in Massachusetts since the early 1980’s, via its acquisition of Eastern Enterprises (which owned Boston Gas, Colonial Gas, and Essex Gas). The company currently does not offer natural gas energy efficiency programs in any of its service territory outside of Massachusetts.

Noted as a market leader and innovator in the field of energy efficiency, KeySpan:

- Has provided energy efficiency services to over 300,000 customers, including over 17,000 low income and over 5,500 multifamily and commercial customers.

During the past decade the Company has invested over \$90,000,000 to support energy efficiency programs.

- Filed the first five-year market transformation plan of any utility, gas or electric, in the state of Massachusetts (1997).
- Was the first Massachusetts utility, gas or electric, to base its performance on the success in moving the marketplace to higher efficiency levels through its energy efficiency programs.
- Launched over 20 new initiatives in the past five years
- Was the first New England utility, gas or electric, to join and support the Efficient Windows Collaborative, helping to promote energy efficient window products.

In 2002, KeySpan entered into an agreement with its regional Non-Utility Parties (NUPs) for a new five-year Demand-Side Management (DSM) and Market Transformation Plan for years 2002 to 2007, with an operating budget of \$12,000,000 per program year.

ENERGY STAR Windows and the KeySpan Initiative

KeySpan's residential ENERGY STAR Windows program began in 1998 as a demonstration program with two residential/multifamily demonstration projects, an elderly-housing complex and a single-family residence. In addition to the demonstration projects, the Company co-sponsored five educational seminars at the 1998 Glass Show at the Hynes Convention Center in September 1998. The Glass Show presented an opportunity for window dealers and manufacturers to learn about the windows demonstration program offered by the Company and about the benefits of high efficiency windows. Also during the year, meetings were held with local window distributors to explain the window demonstration program and the national ENERGY STAR windows program.

In 1999, the KeySpan ENERGY STAR Windows program evolved from a demonstration program to the residential rebate and marketing program that is in place today. The program is available to residential heating customers and is applicable for single family and multi-family residences in the new construction market as well as the replacement window market.

The windows program began as an initiative based on the National ENERGY STAR Windows program launched in March of 1998. The national program was developed from a voluntary partnership between the Department of Energy (DOE) and window and glass manufacturers. By taking input from windows and glass manufacturers, along with utilities, designers, government representatives and public interest groups, target performance levels were calculated for windows, doors and skylights that would require products that have the ENERGY STAR designation to meet performance criteria for thermal transmittance (U factor) and solar heat gain coefficient (SHGC¹) for three regions of the country depicted in Table 1. KeySpan's Massachusetts service territory falls within both the northern and central climate region zone of the ENERGY STAR rating system for windows.

¹ Solar Heat Gain Coefficient = fraction of incident solar radiation admitted through a window.

Table 1. ENERGY STAR Windows Program – Climate Region Qualifications

Region	Item	Specification	
		U-Factor	SHGC
Northern	Windows & Doors	≤ 0.35	Any
	Skylights	≤ 0.45	Any
Central	Windows & Doors	≤ 0.40	≤ 0.55
	Skylights	≤ 0.45	≤ 0.55
Southern	Windows & Doors	≤ 0.75	≤ 0.40
	Skylights	≤ 0.75	≤ 0.40

Today, ENERGY STAR windows are available to consumers manufactured with common frame materials (fiberglass, vinyl or wood) and are available in a variety of glazing systems and configurations (with low-E/argon, double glazed, low-E coating/spectrally selective low-E coating, and argon gas fill). The installation of ENERGY STAR windows is estimated to save the average consumer up to 15 percent on their energy bills per year (ENERGY STAR 2002). Additional benefits include reduced sun damage and fading of furnishings, draperies and carpeting, resistance to condensation and reduced drafts.

DOE issued a proposal in August 2001 that would eliminate the three climate region-specific qualification criteria in favor of a single national specification for each product type (windows, doors and skylights). However, due to concerns from stakeholders, DOE is conducting a thorough review of the analysis and process for establishing ENERGY STAR criteria. When this review is complete DOE will determine a final course of action.

KeySpan Program Logic Model

The purpose of KeySpan’s ENERGY STAR Windows program is to increase the penetration of high efficiency windows in the Company’s residential sector. Throughout KeySpan’s DSM program history, the Company has taken the opportunity to promote new and underutilized energy efficiency technologies, and the Company saw this opportunity in 1998 with the introduction of ENERGY STAR labeled windows. In addition, KeySpan is looking to offer its customer base a way to effectively reduce their monthly energy consumption. With replacement window installations being a common home improvement measure, a market opportunity for ENERGY STAR windows in KeySpan’s residential service territory appears to exist. KeySpan’s window program is also designed to support participation in additional Company DSM program offerings such as its high efficiency heating and water heating equipment programs, ENERGY STAR Programmable thermostat, ENERGY STAR Homes program, home audit program, and low income program. By promoting and rebating the purchase of ENERGY STAR windows to the Company’s customer base, KeySpan is addressing all major building energy systems.

Incentive Based Program

While the majority of ENERGY STAR windows programs across the U.S. are primarily market awareness campaigns, KeySpan offers a rebate incentive to further encourage customer adoption. According to industry experts from the Efficient Window

Collaborative and Quantec, LLC, the incremental cost for ENERGY STAR windows ranges from one to three dollars per square foot of window area (Quantec 2002). KeySpan perceives this incremental cost to be a substantial barrier to customer adoption, thus the Company has established a rebate offer of one dollar per square foot of window area, up to a maximum of \$500, which covers approximately 33 percent to 100 percent of the incremental cost of a consumer choosing to install ENERGY STAR labeled windows. This ratio falls in line with the Company's incentive levels for other DSM rebate programs (i.e. ENERGY STAR programmable thermostats, high efficiency heating equipment, etc.). Based on research of other gas and electric utility DSM programs, KeySpan is one of the first utilities in the northeast and in the U.S. to offer a rebate program to its customers for the purchase of ENERGY STAR labeled windows.

Historical program data shows the majority of rebates fall in the \$250 or less range. However, the \$500 rebate maximum has been critical in the new construction market as an incentive for builders to outfit new homes with ENERGY STAR labeled windows. According to retailers surveyed in Massachusetts, builders are especially first-price sensitive, and may need incentives in order to install ENERGY STAR labeled windows (Quantec 2002). Builders will quote, "try to beat the system" and "will do anything to make a buck" and will not install ENERGY STAR® labeled windows unless they are retaining some type of benefit. Table 2 displays the rebate distribution of past program participants (through April 30, 2002).

Table 2. Rebate Amount Distribution: Years 2000-2002 - Data through April 30, 2002

Rebate Amount \$	# of Rebates	% of Total Rebates	% of Rebate \$250 or Less	% of Rebate \$251 or More
1-50	353	13%	76%	
51-100	508	18%		
101-150	551	20%		
151-200	448	16%		
201-250	275	10%		
251-300	194	7%		24%
301-350	147	5%		
351-400	71	3%		
401-450	70	3%		
451-500	143	5%		
Total	2,760	100%		

Customer Education

KeySpan promotes the windows program primarily through direct-mail campaigns to customers and window manufacturers, as well as through company newsletters and bill inserts. Customers are able to receive rebate forms either through direct-mail campaigns, window contractors, or by calling KeySpan directly and making a request.

KeySpan has worked to create specialized educational pieces including a builder's brochure containing multiple rebate forms of all KeySpan residential DSM programs. This specific item was developed during the last program year and has been a popular lead source for all of the company's DSM program offerings. In addition, through

KeySpan's participation in the Efficient Windows Collaborative and the National ENERGY STAR Windows program, the Company has worked to create a fact sheet entitled "Selecting Efficient Windows for Homes in Massachusetts". This fact sheet was designed to assist consumers in the decision process by helping to familiarize them with ENERGY STAR and the National Fenestration Rating Council, ("NFRC") labels. Both labels were created as tools to help a consumer identify a high efficiency rated window. The Company also reproduced a brochure created by the Environmental Protection Agency (EPA) and DOE to educate customers on the value of purchasing high efficiency windows. This literature is consistently displayed at all KeySpan residential trade show exhibits.

According to program performance statistics, 43 percent of all window rebate leads to date have derived from KeySpan bill insert promotions, 23 percent from contractor promotions, and 14 percent from Company direct mail pieces. The remaining leads have derived from a variety of means including word-of-mouth, trade show exhibits, and newspaper ads.

An opportunity that had been overlooked in the past was obtaining program participant leads through home improvement centers and building outlets. According to the Quantec study, customers frequently inquired about KeySpan's ENERGY STAR Windows program, rather than store sales personnel informing the customer (Quantec 2002). KeySpan had hypothesized this scenario based on program lead source information.

To help change this scenario, in late 2001 the Company established an outreach program with retailers The Home Depot and Lowe's that includes training of their sales personnel regarding the rebate program and supplying their stores with rebate forms for customers that purchase ENERGY STAR labeled windows at their establishments. With the market success of these two establishments, KeySpan anticipates acquiring a greater number of windows program participants through these venues, and is closely monitoring lead activity here.

Customer Awareness and Adoption

KeySpan's ENERGY STAR Windows program began in 1998 as a demonstration program with two residential/multifamily demonstration projects and has since evolved to its current state as a service territory-wide residential rebate and education program, growing from just under 100 participants in program year one (May 1999 to April 2000), to over 1,200 in the second program year (May 2000 to April 2001), and over 1,500 in the third program year (May 2001 to April 2002). Based on these numbers, the windows program is one of the Company's most popular residential DSM programs.

Retailer estimates on penetration of ENERGY STAR windows (total sales) for the Northeast region is 44 percent and 48 percent for KeySpan's Massachusetts service territory. Out of the 40 retailers surveyed in KeySpan's Massachusetts's service territory, 55 percent are familiar with KeySpan's windows rebate program, compared to only 47 percent who are actually familiar with ENERGY STAR (Quantec 2002). Only 14 percent of those retailers familiar with the program were provided with literature from KeySpan. Retailers commented during the recent study that customers are now asking questions related to window performance that were not asked prior to the program and that

KeySpan has made the customer come in and request high efficiency, instead of retailers having to sell it to the customer. This fact has led to retailers desiring more information about program requirements and processes. Retailers that are aware and informed of the KeySpan program use it as a selling tool and have seen an increase in ENERGY STAR window sales.

Also mentioned during the study is that retailers rely heavily upon marketing material from manufacturers for in-store promotion material. Reasons why retailers do not create their own marketing material include:

- Never occurred to them
- Not worth the effort
- Not a selling point due to lack of customer awareness
- Many surveyed commented that ENERGY STAR was only for appliances and were not aware that ENERGY STAR applied to items like windows.
- Educate consumers on the need to replace windows (i.e., “if the rain is being kept out, why should a window be replaced?”)
- Retailers and wholesalers lack the knowledge required to convey the ENERGY STAR® and high efficiency message to their customers.

Bill History Impact Analysis

To demonstrate the energy savings benefits of KeySpan’s ENERGY STAR Windows program, a bill history analysis of past program participants was performed. Participants evaluated needed to have at least twelve months billing history before and after the processing of their window rebate application.

For the participant sample to have twelve months billing history pre and post installation, all window rebates processed after February 28, 2001 were not eligible for this study. Also, at the time of collecting participant bill history data, due to KeySpan’s customer information system, only billing history information dating back to June of 1999 was readily available, therefore, all rebates processed before June of 2000 were not eligible for evaluation. Altogether, there were nine rebate periods (months) available for evaluation (June 2000 to February 2001).

Between June 2000 and February 2001, a total of 698 window rebates were processed. To ensure that therm savings achieved by program participants were from only high efficiency windows, any program participants who participated in additional KeySpan energy efficiency rebate programs (i.e., ENERGY STAR Thermostat Program, High Efficiency Furnaces Program, High Efficiency Water Heater Program, etc.) were excluded from the analysis. Also, participants that were new construction sites, home-addition projects, etc, were also excluded. After taking these factors into consideration, the total sample size was reduced to 375 customers, representing 54 percent of all rebates processed between June 2000 and February 2001, and 19 percent of all rebates processed in the program’s history through February 2001.

After identifying the correct participants to evaluate in the bill analysis, each customer’s therm consumption data was normalized using heating degree information from the National Oceanic & Atmospheric Administration (NOAA).

Bill History Analysis – Results

Table 3. Normalized Therm Savings

Avg. Therm Savings¹	28
Therm Savings as % of Heating Bill²	2.14%
Avg. \$ Rebate	\$150.6
Therm Savings per Dollar Rebate	0.18
¹ Average therm savings of each rebate participant for all eligible rebates processed in month. ² Calculated by comparing the average therm usage between billing history year one (pre-installation) and year two (post-installation).	

Based on the bill history analysis, the average savings per customer was determined to be 28 therms per year. This represents an average reduction of 2.14 percent for each participant’s average annual energy consumption. The current value used in the Company’s benefit/cost ratio model is 109 therms saved per year (GDS 2002). The substantial difference between the bill history savings value and the benefit cost model assumption value can possibly be attributed to a number of factors.

First, there is the issue of when a participant’s high efficiency windows were installed versus when their rebate was processed and recognized. KeySpan currently only records the date in which a rebate is processed, and not the date(s) in which the customer installed high-efficiency windows. The rebate application currently in use does not require the submission of the date(s) when a participant installed their high efficiency window(s), therefore there is no source of information as to the difference between actual window installation and rebate processing date. For example, some window rebate participants, after installing high efficiency windows, may have taken several weeks (or months) before submitting their rebate application, versus some participants who submitted their application days after installation. During the Quantec study, many retailers mentioned customers returning to the store and requesting copies of window energy efficiency stickers because they were not aware of the KeySpan program until long after the windows have been installed/sold. With this uncertainty, the only reliable date that was used as a reference point for when a customer began to achieve savings for having high efficiency windows is the date the rebate is processed. Therefore, many program participants evaluated in the bill history study may have been accumulating therm savings in what was classified in the bill history study as pre-window installation consumption months rather than post-installation consumption months.

Second, there is the possibility that some or many of the high efficiency windows installed were not installed properly, further reducing the potential energy savings of having high efficiency windows. For instance, many windows may have been self-installed rather than professionally installed. Sizing and window frame alignments may have been miscalculated. Caulking and sealing preparation may be inadequate. For these reasons, participants who did not have windows installed by professionally trained installers may not obtain any energy savings benefits.

Third, our data shows that the average rebate for our sample participants is \$150, which equates to 150 square feet of glass. The assumption is that the average program participant evaluated in the bill history analysis may not have replaced all of the windows

in their residence with high efficiency models. Based on this, and lacking the information necessary to determine if this is partial or full window replacement, the window rebate application needs to be adjusted to collect pertinent data regarding the number of windows replaced versus the total number of windows in the home. Program participants may not be gaining the full benefits of having high efficiency windows, for they are still losing energy via their existing standard efficiency windows that have not been replaced. The Company realizes that replacing all of the windows in a home is a major investment on behalf of the customer, and it is not expected that the majority of program participants will do so. If this, in fact, is the case, the Company will need to adjust its benefit-cost model to reflect this.

An additional issue with the bill history analysis is that no control group methodology was used to analyze savings. By using a control group, factors such as changes in occupancy, behavior, or other factors between pre- and post- periods that could not be identified in the current bill history analysis.

Northeastern Regional Marketing Initiative

The development of a new regional marketing initiative to promote ENERGY STAR windows is currently being headed by NEEP. The objective of the initiative is to raise the profile of the national program and to significantly increase the market share of ENERGY STAR qualified and labeled window products in New England and Long Island. The initiative is part of a larger effort by NEEP, with the assistance of DOE, the EPA and other regional sponsors to accelerate the market penetration of ENERGY STAR windows in the Northeast. According to the Quantec study, ENERGY STAR windows currently comprise 35 percent to 48 percent of all residential window sales. NEEP proposes an accelerated market intervention strategy that would build on current program efforts as well as incorporate successful program elements from similar efforts in the Northwest and California such as the Northwest Alliance's ENERGY STAR Windows Program and would result in an ENERGY STAR window market share of 65 percent in New England and Long Island by 2005. An estimated total budget has been established at \$550,000 to \$570,000 to be funded by several electric and gas utilities. KeySpan's window program could potentially evolve into this new regional initiative.

Going Forward

To date, KeySpan's ENERGY STAR Windows program has been one of the Company's most successful market transformation programs based on program participation levels. The windows program has complemented KeySpan's entire portfolio of residential high efficiency rebate offerings, allowing the Company's residential customer base to achieve energy savings in all major areas of their dwelling. After examining the almost 3,000 windows program participants to date, it was shown that nearly 50 percent of all participants also participate in one or more additional residential rebate program offered by the Company.

Going forward, KeySpan will continue to offer the windows program with a rebate incentive. According to the Quantec study, 73 percent of new construction builders, 74 percent of remodelers, and 67 percent of homeowners in KeySpan's

Massachusetts service territory consider price to be the largest barrier to ENERGY STAR window adoption. With price being an even a bigger factor to the new construction community, the Company will consider potentially raising the current rebate cap to attract more builders/developer participants. Also, KeySpan will look to create a marketing campaign targeted strictly at the builder community. This campaign may entail promotion of the Company's ENERGY STAR window rebate incentive to builders and also training them on the benefits of ENERGY STAR windows as a marketing tool that they can use to improve their sales and profitability.

KeySpan intends to place more emphasis on promoting the windows program through retail channels. As pointed out in the Quantec study, customers frequently mention the KeySpan program to retailers with the retailer having little, if any, information about the program. KeySpan plans to increase training seminars with retailers to educate them on the windows program, as well as providing various store advertising pieces (i.e., visual displays, savings charts, product comparisons, etc.), particularly with the Company's newly established partners The Home Depot and Lowe's.

The performance of the bill history analysis brought to the forefront many items that need to be adjusted in order to more effectively measure the benefit to consumers in installing high efficiency windows. For instance, the company needs to adjust the current windows program rebate application to collect important participant variables. For example, the installation date(s) of high efficiency windows, in order to confirm when a customer began to achieve therm savings, instead of referring to a participant's rebate processing date. Requiring participants to report how many high efficiency windows were installed in their residence versus how many total windows are in their residence. As noted earlier, if a large number of windows in a home are not upgraded to high efficiency, the benefits of having any high efficiency windows may not be fully realized. Also, there is a need to find out if participants high efficiency windows were self-installed or professionally installed because improper installation could diminish or negate any energy savings from high efficiency windows. KeySpan will consider establishing a preferred contractor network of KeySpan certified window installers which customers would be required to use to install their ENERGY STAR labeled windows in order to participate in the Company's program. All of these factors will help insure that KeySpan's rebate program participants realize the full benefits of ENERGY STAR labeled windows and make it possible to undertake a more accurate bill history study.

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