Market Transformation and Awareness: The Best Program May Be the One Nobody's Heard Of!

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ABSTRACT

This paper summarizes two and one half years of evaluation results for the Northwest Regional Alliance's ENERGY STAR® Residential Fenestration Program. [1] Goals of this program were to 1) increase market share to 54% for high-efficiency fenestration products in the residential new construction and remodel markets by the year 2001, and 2) decrease at least two market barriers – lack of awareness and initial cost premiums – that limit sales of high-efficiency fenestration products. Results show that a focused, highly leveraged "push" (transformation of supply) strategy in markets dominated by a relatively small number of market actors "upstream" can be successfully leveraged to transform the entire "downstream" market. Most importantly, it shows that consumer awareness, although desirable, is not necessary to effect this transformation.

Introduction

Background

The Northwest Energy Efficiency Alliance's (Alliance) ENERGY STAR® Residential Fenestration Program (Program) was designed to increase the market share of residential high-efficiency windows by working in partnership with market actors, including window product manufacturers, window dealers (wholesaler/distributors and retail suppliers), the manufactured home industry, and builders. The program provided targeted high leverage incentives (information, marketing aid, and financial support) to key Northwest market actors making, selling, and installing window products. Its goals were to:

1) increase market share for high-efficiency fenestration products in both the residential new construction and remodel markets to 54% by the year 2001

2) decrease at least two market barriers – lack of awareness and initial cost premiums – that limit sales of high-efficiency fenestration products.

The core strategy was to substantially increase the number of energy-efficient windows produced by Northwest manufacturers, sold by dealers, installed by home builders, and requested by homebuyers and remodel customers. ENERGY STAR labeling, certification, and marketing were utilized to help transform the Northwest window market. The overall marketing plan was developed to reach a diverse audience with a wide variety of media approaches to increase the brand awareness and value and to positively influence the purchasing of ENERGY STAR Windows. Key messages were that ENERGY STAR

[1] ENERGY STAR ® is a trademark of the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency's (EPA) program to increase energy efficiency in a number of products including appliances, computers, windows, etc.

Windows provide more comfort, have aesthetic appeal, reduce maintenance, provide protection from fading, and are more energy efficient than standard windows.

ENERGY STAR Partners, recruited by D&R International, signed a Memorandum of Understanding (MOU) to use the ENERGY STAR logo in advertising, educational, and other promotional materials. Certain Partners, selected for their potential impact on the Northwest windows market, were provided monetary incentives and/or marketing aid to leverage transformation of the Northwest market to high-efficiency window products. While partnership efforts were initially focused on six large regional window manufacturers, partnership was expanded throughout 1999 and the first half of 2000 to include utilities, window component manufacturers, retailers, and builders. As Table 1 shows, the total number of partners increased from 33 to 55 by mid-year 2000. Much of the increase was attributable to ENERGY STAR Program efforts to add window retailers and distributor partnerships.

Table 1. ENERGY STAR Partnership Efforts: 1998 – May 2000

	1998	1999 – June 2000
Manufacturers	20	26
Retailers/Wholesalers/Distributors, etc.	13	29
Total	33	55

Scope

The evaluation addressed ENERGY STAR window awareness, consumer willingness-to-pay, barriers to market transformation, and current and anticipated future incremental costs. Longitudinal data on key market actors' perceptions and behaviors were collected over the first two years of the program using multiple sources to triangulate and assess market transformation. Interviews and surveys of key market actors (window product manufacturers, window retailers, distributors and wholesalers, single- and multi-family home builders, and new homebuyers) were integrated with manufacturer sales data. quantec's third Market Progress Evaluation Report on the ENERGY STAR® Residential Fenestration Program was delivered to the Alliance on August 1, 2000, marking the end of Phase I evaluation.

In September 2000, quantec received an extension (Phase II) to forecast future market penetration and evaluate the final results of the program through May 31, 2001. Phase II continued the interviews of manufacturers and surveys of window dealers and home builders. Surveys of remodeling contractors and an in-store survey (Mystery Shopper) of retail window product offerings were also added. Finally, in an effort to assess likely future scenarios, a Delphi forecast by national and local ENERGY STAR Program experts was developed. The main goal of this part of the study was to predict anticipated incremental costs, trends, market penetration and potential next steps/strategies to increase levels of window energy efficiency.

Methodology

Evaluation research activities were conducted over the period of 1999 through May 2001 in order to assess the Program's impacts on behaviors of market actors and to provide feedback for program improvement.

Interviews and Surveys

These included in-depth interviews of window product manufacturers; surveys of window retailers/distributors/wholesalers, home builders, window remodeling contractors, new homeowners and remodel customers; and a Delphi forecast based on a subset of selected experts from the above market actors. In addition to these approaches, a Mystery Shopper Survey of window products was implemented in four major Northwest cities. Table 2 shows the size and spread of interview and survey techniques applied over the evaluation period.

Table 2. Completed Interviews and Surveys

Approach	Evaluation*			Total
	1999	2000	2001	
In-depth telephone Interviews				
Window Product Manufacturers	11	16	10	37
Telephone Surveys				
Dealers	49	49	50	148
Home Builders	68	70	74	212
Manufactured Home Builders		19		19
New Homeowners	239	271		510
Home Remodel Customers	93	92		185
Window Cost Survey				
Window Retailers			20	20
Delphi Forecast				
Window Experts			23	23
Retail Surveys				
Store's Window Products			12	12

* Evaluation data was collected in the spring following the program year (e.g., the 1998 program was evaluated in spring 1999).

The Delphi Method

The Delphi method is a qualitative method of forecasting that utilizes successive polls of experts over time. Each expert is individually polled for his or her forecast. Experts whose forecasts lie outside the middle of the distribution are then asked to provide the reasons why their judgement was appreciably higher or lower, thus adding information to the forecasting process. This information is then provided anonymously to the whole group. The process is repeated until the forecasts appreciably converge and stabilize.[2]

Twenty-five experts agreed to participate in the Delphi panel; 23 finished the complete panel process. Experts were chosen for their knowledge of the energy-efficient window market based on their roles in manufacturing, sales, building, or national /regional efficiency programs. Each was individually polled via e-mail (or fax if necessary) for their forecasts. Those experts whose forecasts deviated significantly from the average were then asked to provide the reasons why they had responded as they had, thus adding information to the forecasting process. The results were then summarized and provided

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[2] Note that the hoped-for trend towards central tendency based on inclusion of additional information may or may not be also linked to a directional shift of the entire distribution. The Delphi method produces fair to very good short, intermediate, and long range forecasts. Thomas W. Knowles, Management Science: Building and Using Models, Stuart School of Business Administration, Illinois Institute of Technology, 1989, pp. 651-653.

to the whole group again. In this case, it was necessary to poll the Delphi panel only two times before results substantially converged and/or stabilized on most major indices. Forecasts were developed for market penetration and incremental costs. Participants were also probed for their predictions of future energy efficiency goals and program strategies.

Other Analytical Techniques

Data analysis included use of the Analytical Hierarchy Process (AHP) as well as frequencies, cross-tabulations, and other graphical representations. AHP employs pairwise comparisons to mathematically estimate the relative importance of specific criteria. The technique was incorporated in interview and survey instruments to quantify and rank the perceived relative importance of the different market barriers by different market actors. Its uses in this evaluation included development of weights on importance of new home marketing attributes (location, cost, energy efficiency, style, floor plan, and square footage), and market barriers to use of energy efficient windows in homes (e.g., lack of information, split incentives, bounded rationality, and availability of measures). Differences between AHP average weights over time for various market actors (manufacturers, dealers, builders and remodelers) aided us to assess the success of the market transformation effort.

Results

Product Market Share

The ENERGY STAR Fenestration Program's first goal was to increase market share for high-efficiency fenestration products in the residential new construction and remodel market to 54% by 2001. Figure 1 shows the rise in market penetration of the ENERGY STAR windows market share in the Northwest from 1997 through the end of 2000. Actual market shares were estimated based on manufacturer-reported energy efficient residential window sales for approximately 80% of the Northwest market. The sales data show that the program met this goal more than a year ahead of schedule. Market share rapidly increased during the course of the program from a 10%-15%[3] baseline in 1997, to 41% in 1998, 48% in 1999, and 56% in 2000. Furthermore, the first quarter of sales data for 2001 showed a 60% market share.

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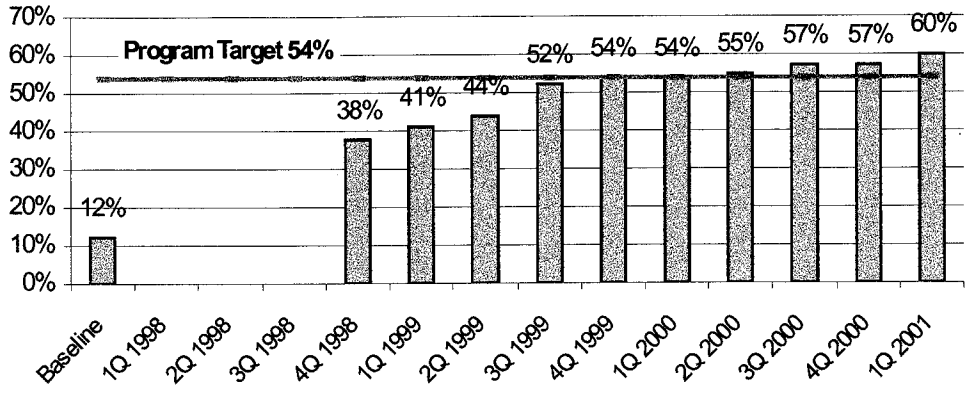
3 Baselines numbers were developed by D&R International, and Macro International, Inc.

Figure 1. Market Share of High-Efficiency Fenestration Products



Results of manufacturer interviews and surveys of window dealers, home-builders, and remodeler contractors were used to cross-check the above-reported manufacturer sales data. Results generally corroborated the sales data. Manufacturers indicated a steady pattern of annual increase in production of ENERGY STAR windows since 1997 with ENERGY STAR windows products comprising an average of 38% of their product in 1997, 42% in 1998, and 53% in 1999. Retailers/wholesalers reported that 53% of the windows they sold in 1999 were ENERGY STAR-level efficiency. Both results are actually slightly higher than that reported from manufacturers' sales data result of 48% for the same period. However, home builders estimated that only 36% of 1999 homes were built with energy-efficient windows. Forty-six percent of homebuyers reported that they had energy-efficient windows.

Awareness & Initial Cost Barriers

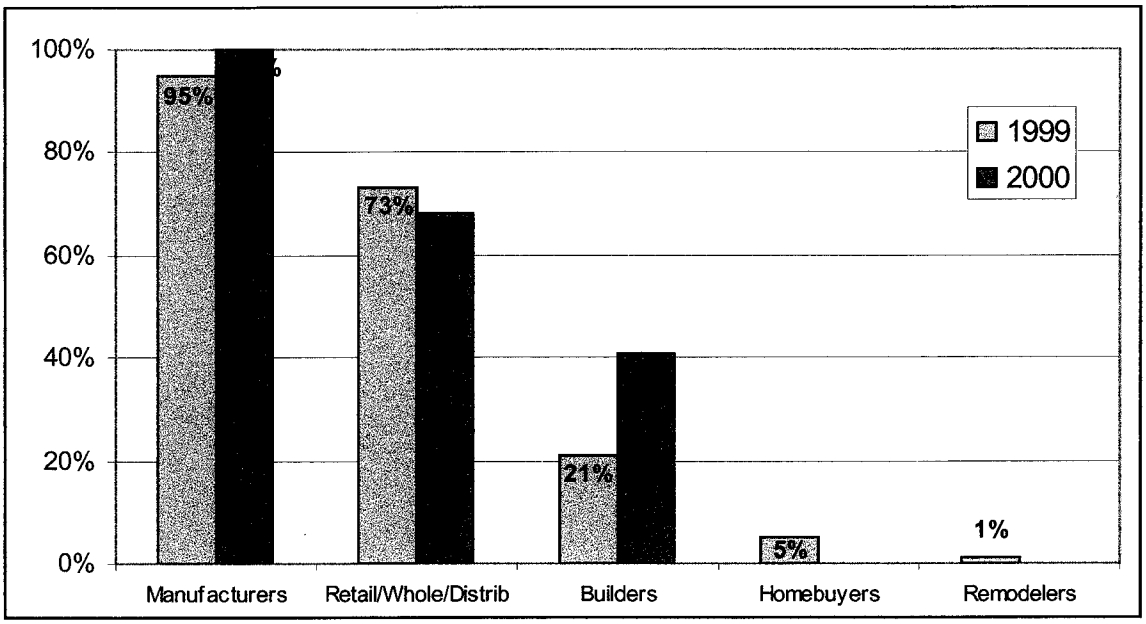
The second goal of the ENERGY STAR Fenestration Program was to increase the awareness of high-efficiency windows and decrease high-efficiency windows' initial cost premiums that limit sales in the Northwest.

Awareness. Our research indicated that, by the end of 2000, all major Northwest window product manufacturers were aware of ENERGY STAR, with many also participating in the ENERGY STAR Fenestration Program. Awareness of ENERGY STAR windows was not as high among dealers, as approximately 68% of the dealers we spoke with were aware of ENERGY STAR windows by the end of 2000. Awareness of ENERGY STAR windows among builders was substantially lower, but did increase significantly during the last year of the Program, increasing from 21% in 1999 to 41% in the 2000 Program.

New homebuyers and remodelers – last surveyed for the 1999 Program evaluation – were far less aware of ENERGY STAR: only 5% of new homebuyers and 1% of remodelers surveyed were aware of ENERGY STAR windows. Consumers, however, did express an interest in energy-efficient windows: 71% of new homebuyers said energy efficiency was "somewhat" or "extremely" important in their new home-purchasing decision, and 90% of respondents who had remodeled their homes ranked energy performance as one of the top two factors influencing their purchase of windows, far ahead of other factors.

In addition, 42% of homebuyers buying homes in 1999 reported that they had been given information on windows for their new home but less than half of these (44%) said that the information concerned energy efficiency.

Figure 2: Awareness Levels of ENERGY STAR Windows (1999-2000)



Much of the lack of awareness and information on ENERGY STAR windows appears to be a result of communication breakdowns between market actors. This is particularly evident in the home-building phase in which builders control many if not all window choices. Here information on ENERGY STAR windows was not successfully communicated to homebuyers.

Initial Cost. quantec developed estimates of the incremental costs for ENERGY STAR windows using a standard 5' x 3' horizontal slider window. We obtained catalogues of window manufacturer and dealer retail costs. Results indicated that the incremental cost is only about 4%-11% above standard windows.

Manufacturers estimated that the incremental cost of upgrading to an ENERGY STAR window was approximately 10%-15% above the cost of a standard window. While they felt this difference was minor, they did believe that it remained a market barrier for builders, who are still focusing on the "bottom line" and are not responsible for future utility bills, and for some consumers who are extremely price sensitive.

Builders and retailers confirmed this finding. Builders who installed fewer energy-efficient windows in homes they constructed said they did so because of the cost of energy-efficient windows, and 31% of the retailers/wholesalers/distributors reported that ENERGY STAR windows are too expensive from the customers' point of view.

The importance of cost as a market barrier, however, appears to be decreasing. The share of builders reporting costs as the primary driver fell from 84% in 2000 to 41% in 2001.

The perceived higher first cost of energy-efficient windows compared to other windows in a competitive marketplace continues to act as a barrier to higher levels of energy efficient windows, although this barrier has decreased. This barrier is evidenced throughout the extremely competitive windows market, with manufacturers, retailers/wholesalers/ distributors, and builders competing on extremely small profit margins.

Results of AHP Analysis and Delphi Techniques

The results of the AHP analysis indicated that, in the opinion of builders and resellers of windows, energy efficiency continues to become a more important factor in selection of both homes and window products. Builders ranked location, selling price, style of home, floor plan, and square footage as most important in marketing homes. While energy efficiency was still ranked last in 2001, it showed the largest increase (38%) from the previous year. When asked the relative importance of energy efficiency, appearance, quality, and price in marketing windows, retailers and wholesalers/distributors continued to rank quality first and price second. However, in 2001 energy efficiency rose to number three in the selection of home rankings, and its rank relative to that of quality and price rose substantially.

The experts participating in the Delphi study predicted a wide variance in cost trends by feature over the next five years. Approximately 80% of the experts agreed that there would be drops in the cost of certain features including double pane glass, low e hard or soft coat, argon fill, and warm edge spacer products. However, large cost increases were predicted for triple pane and advanced window frame design. Perhaps as a hedge against uncertainty, 80% of the experts also predicted a very large increase in the cost of "high efficiency materials."

Conclusions

It is oftentimes difficult, in the real world, to tease out the effects of a specific program intervention strategy, and this is particularly the case in market transformation programs. Based on our two-plus years of review of the ENERGY STAR Fenestration Program, we believe that the effort had a large effect in transforming the market for energy efficiency in the Northwest. Our study was designed to track changes within the region that were temporally and geographically related to the deployment of Program market transformation strategies. Other than the market effort, other factors may have contributed to the observed success. These include the participation of some manufacturers in the national ENERGY STAR Program, breakthroughs in materials and technologies, trends of increased efficiency in building codes, and an increase in consumers' awareness of the benefits of energy efficiency in general due to the California energy crisis.

However, by any measure, the Northwest energy-efficient windows market, gauged by changes in market penetration, was clearly transformed and this transformation occurred in the same limited geographic area and timeframe as did the Northwest ENERGY STAR Fenestration Program. The share of energy-efficient windows, based on manufacturer sales, rose from 10%-15% in 1997 to 60% in the first quarter of 2001. However, the rapid rise in market penetration was not accompanied by an even growth of awareness or increased information about energy-efficient windows by all market actors. Instead, at one end of the continuum, those most affected by the program's direct interventions (manufacturers) exhibited the highest awareness or information levels, while those farthest from direct program interventions (end consumers) exhibited little change in their awareness or information levels regarding energy-efficient windows. Despite these findings, surveys of homebuyers and remodelers indicated that they highly value energy-efficient windows when purchasing a new home or remodeling, that they are willing to pay more for efficient windows, but that they lack information about the products.

Study results show that enhanced market measure penetration can be effectively achieved through a focused, highly leveraged "push" (transformation of supply) of market transformation in markets typified by a limited number of pivotal market actors.

Acknowledgements

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