Residential Windows in the Northwest: A Market Transformation Success

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ABSTRACT

This paper summarizes three years of program implementation and evaluation results of the Northwest Energy Efficiency 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 among all market actors and initial cost premiums – that limit sales of high-efficiency fenestration products. Results show that a highly leveraged "push" (transformation of supply) strategy in markets dominated by a relatively small number of manufacturers followed by a mid-channel "pull" strategy (from retailers) can successfully transform the entire "downstream" market. Most importantly, it shows that consumer awareness, although desirable, is not necessary to effect this transformation. The project achieved its market share target a year ahead of schedule and by the end of the program in mid-2001, market share had reached 60%. Follow-up data indicate it has continued to increase to 70% by the end of 2001, significantly above the baseline of 15% in 1997.

Background

The Northwest Energy Efficiency Alliance's (Alliance) ENERGY STAR® Residential Fenestration Program (Program) began early in 1998 and ran through June 2001. It 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 in the Northwest states of Oregon, Washington, Idaho and Montana. The program provided targeted high leverage incentives (information, marketing aid, and financial support) to key Northwest market actors making, selling, and installing window products. Financial incentives were limited to selected manufacturers. The total project budget was approximately $1.8 million. The program's goals were to:

1) increase market share for high-efficiency fenestration products (i.e. windows, patio doors and skylights) in both the residential new construction and remodel markets to 54% by the year 2001; and

[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.

2) decrease at least two market barriers – lack of awareness among all key market actors, including supply and demand side, and initial cost premiums – that limit sales of high-efficiency fenestration products.

The project was developed in 1997 and implemented beginning in early 1998 by D&R International for the Alliance. 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. Originally, the program specification was for windows with U-values of 0.30 or lower based on NFRC ratings (estimated baseline below 5%) and a market share target of 35%, but an early decision was made to move to a slightly less efficient window (U-value of 0.35 or less) to be able to take advantage of the national ENERGY STAR Program. The program strategy then utilized the national consistency of the ENERGY STAR label and related marketing to attract participants and as an easy and credible identifier for qualifying products. To maintain regional societal cost-effectiveness with the reduced efficiency level, the program market share target was increased to 54%.[2]

According to the project baseline study by Macro International, the remodeling and replacement market were estimated at 50% of total sales, with new site built and manufactured homes using the other 50%. Of the remodels and replacements, only 17% were installed by do-it-yourselfers. For new homes, about 40% of window sales went direct to builders (includes manufactured housing) 30% to distributors and 30% to retailers.

The overall marketing plan was developed to reach a diverse audience with a wide variety of media approaches and messages customized to each manufacturer to increase the brand awareness and value and to positively influence purchasing of ENERGY STAR windows. Consumers were targeted through manufacturers and retailers. Minimal direct consumer marketing was conducted by the project, both by design and due to budget constraints. Key messages for consumers were that ENERGY STAR windows provide more comfort, have aesthetic appeal, reduce maintenance, provide protection from fading, as well as being more energy efficient than standard windows.

D&R built on their credibility established from prior working relationships with manufacturers developed during the national ratings process orchestrated by the National Fenestration Ratings Council (NFRC), a broad-based non-profit organization made up of manufacturers, utilities, energy efficiency groups and government agencies. This allowed for participation in the regional chapter of the American Architectural Manufacturers Association (AAMA) and helped open doors to the decision makers. AAMA is trade association that essentially represents the manufacturers of key architectural components such as windows and doors, etc.

Key window manufacturers based in the Northwest were recruited to become ENERGY STAR partners based on their ability to manufacture qualifying product or their willingness to do so. They signed a Memorandum of Understanding (MOU) with the Alliance and EPA 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 offered monetary incentives by the Alliance for marketing and/or

[2] The baseline estimate of the 0.30 products was below 5% whereas the baseline for the 0.35 products was found to be about 15%.

marketing aid to produce, supply and promote high-efficiency window products in the Northwest market. Manufacturers submitted proposals as to how they would match the incentive funds. Six partners were selected in the first year and a total of 8 received incentives the second year. Incentive levels were customized and ranged from $20,000 to $80,000/year for a maximum of 2 years. Payments were made in two installments – one up front and the other upon demonstration of completion of marketing objectives.

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 all remaining major manufacturers, window component manufacturers, retailers, and builders. As Table 1 shows, the total number of partners increased from 33 to 300 by mid-year 2001. 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 – June 2001

	1998	By June 2000	By June 2001
Window Manufacturers	6	12	13
Retailers/Wholesalers/Distributors, and component manufacturers	27	43	287
Total	33	55	300

In return for becoming Energy Star partners, D&R provided any combination of the following:

- Technical assistance on least-cost ways to meet the program specifications through adjustments to the product design or the manufacturing process.
- Creative concepts, campaign ideas and marketing materials developed collaboratively with the Partner, or other more generic materials.
- Retailer spiffs and point of purchase displays.
- Training for sales personnel.
- Trade show exhibits and displays.
- A listing on the program website. The site was promoted as an information resource and as a way for both retailers and consumers to find qualified products.
- An annual sales competition whereby the highest selling manufacturer/retailer teams were awarded al expense paid trips to a major league baseball game.

Evaluation

The project evaluation performed repeatedly over the three years by Quantec addressed ENERGY STAR window awareness among all key market actors, consumer willingness-to-pay, barriers to market transformation, current and anticipated future incremental costs, and market share. Data on key market actors' perceptions and behaviors were collected over the first two years of the program using multiple sources to triangulate (i.e. to confirm findings) 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.

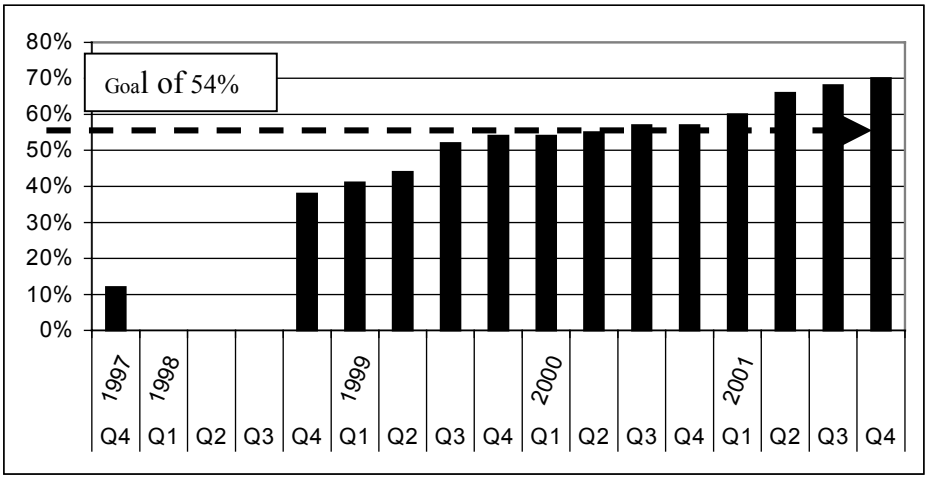
Surveys of remodeling homeowners and an in-store survey (Mystery Shopper) of retail window product offerings were also added. Finally, in an effort to assess likely future scenarios, a Delphi forecast by national and local ENERGY STAR Program experts was developed. The main goal of this part of the study was to predict anticipated incremental costs, trends, market penetration and potential next steps/strategies to increase levels of window energy efficiency beyond the end of Alliance funding.

Project Results

Product Market Share

Figure 1 shows the rise in market penetration of the ENERGY STAR windows market share in the Northwest from 1997 through the end of 2001. Actual market shares were estimated based on manufacturer-reported energy efficient residential window sales for approximately 80% of the Northwest market. Data reporting was a requirement for receipt of marketing incentives. The sales data show that the program met its market share goal more than a year ahead of schedule. Market share rapidly increased during the course of the program from a 10%-15% baseline in 1997[3], to 38% in 1998, 48% in 1999, and 56% in 2000. Furthermore, the sales data for 2001 showed a 70% market share in the last quarter of 2001.

Figure 1. Market Share of High-Efficiency Fenestration Products



Note: Baseline data in 1997 were measured through builder and retailer surveys. Data for subsequent years came from participating manufacturers and extrapolated to the whole market.

Results of manufacturer interviews and surveys of window dealers, homebuilders, and remodeler contractors were used to crosscheck the above-reported manufacturer sales data. Results generally corroborated the sales data. Retailers/wholesalers also reported an increase in ENERGY STAR qualifying window sales moving from 40% in 1998 to 52% in 2000, while builders reported that 53% of the windows they sold in 1999 were ENERGY STAR-level efficiency.

[3] Baseline numbers were developed by Macro International and D&R International.

The sudden and large change from 1997 to 1998 was partially the result of a rapid technical change, specifically in the production process needed to achieve qualifying windows. D& R worked with the manufacturers to find ways to qualify without the use of argon. This included the use of automated spacer system, steel spacers and shifting from hard coat to soft coat low-e. Many of these strategies were worked out by D&R in the California program. Thus the Northwest was able to leverage the California windows effort.

Awareness & Initial Cost Barriers

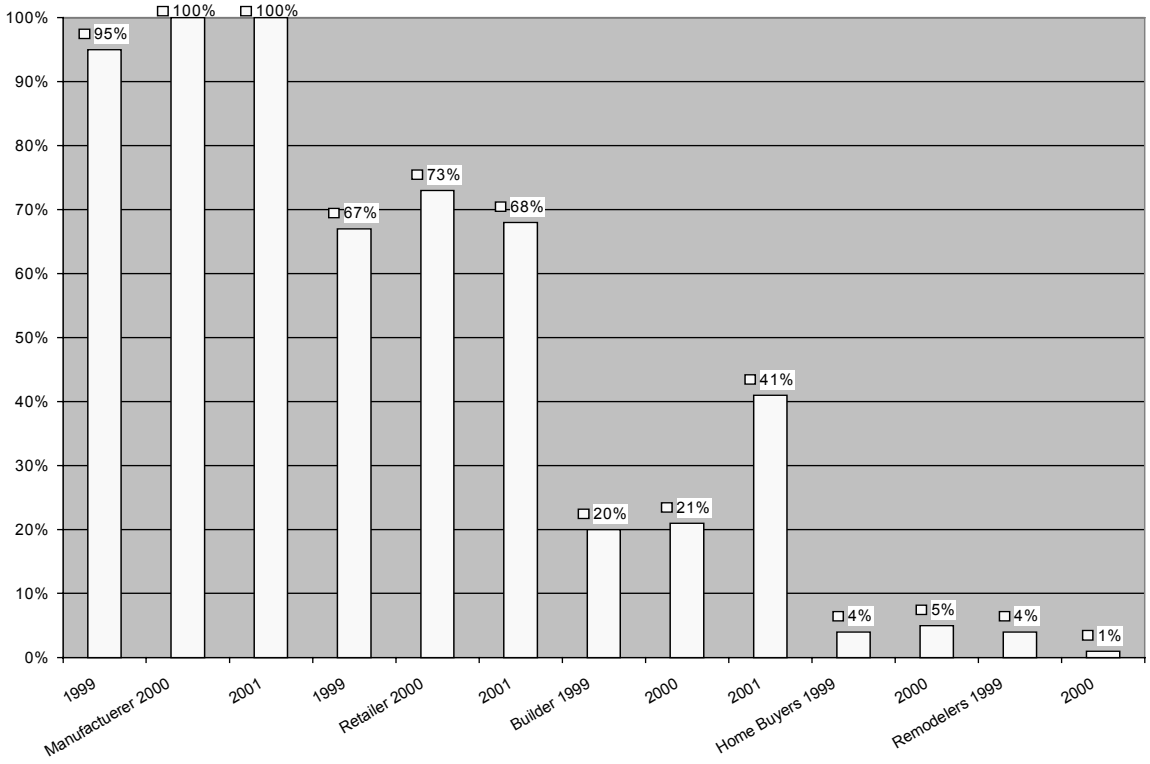
The second goal of the Northwest ENERGY STAR Fenestration Program was to increase the awareness of high-efficiency windows and decrease high-efficiency windows' initial cost premiums that limit sales in the Northwest.

Awareness. Awareness was addressed by the marketing efforts. Figure 2 shows 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. This is not significantly different than the prior year. 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 2001 Program. It is likely that much of this increase is due to overall market awareness of ENERGY STAR in general due to appliance product marketing, and not specifically due to windows.

New homebuyers and remodelers were far less aware of ENERGY STAR: in 1999 only 5% of new homebuyers and 1% of remodelers surveyed were aware of ENERGY STAR windows. However, consumers 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. These findings reinforce the manufacturers position that ENERGY STAR would provide a valuable easy recognition mechanism to capitalize on the consumer interest in efficiency. Thus, general consumer awareness of ENERGY STAR windows is less important than a retailer being able to use the ENERGY STAR label to certify the efficiency of the product to an already interested consumer. An added retailer benefit of using ENERGY STAR was that it provided a simple message that could be easily transferred to new sales personnel in the case of turn-over.

Interestingly, 42% of homebuyers buying new homes in 2000 reported that they had <u>not</u> been given information by builders on windows for their new home. Of those that did receive information on windows, only 39% said that the information concerned energy efficiency. This is odd given the fact that over half (59%) of all new homebuyers in 1999 reported they look for energy efficient components in a window more than any other feature. For those considering remodeling in 1999, only durability ranked higher than energy performance as important factors in window purchase.

Figure 2. Awareness Levels of ENERGY STAR Windows (1999-2001)



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 by these market actors to homebuyers. Although builders had a low level of awareness and were slow to use it as a marketing tool in 1999 and 2000, awareness picked up significantly in 2001 and they appear to have begun using qualifying windows as a way to meet building code requirements.

Initial cost. The program addressed the cost issue through two strategies, through stimulating the volume of sales to allow a reduction in unit costs, and through adjustments in the product design and manufacturing process to minimize the production costs. NFRC modeling tools were used as a redesign tool to quickly come up with the lowest manufacturer cost design options that achieved a qualifying window U-value. These adjustments included some or all of the following: eliminating the use of argon which typically caused the production line to slow down; by automating spacer placement with intermittent use of use of steel "warm edge" spacers instead of continuous aluminum ones; by recessing the edges deeper into the frame; and through use of double deposition (soft coat) of low-e coatings. The recessed edge and soft coat low-e made up for any lost efficiency advantage of dropping the argon fill. Once a few manufacturers that the program worked with took these steps, competitive pressures in the industry forced others to follow. It should be noted that production is regionalized and therefore out of region plants may not have incorporated these changes, indicating a need for similar efforts in other regions.

The evaluation assessed prices in the marketplace. Quantec developed estimates of the incremental price for ENERGY STAR windows using a standard 5' x 3' horizontal slider window using catalogues of window manufacturers and dealer retail prices. Results indicated that the incremental price ranges between 4%-11% above standard windows, or roughly $0.50 to $0.75 per square foot. Manufacturers were interviewed about the incremental production costs and they provided a range of 10% - 15% or $0.66 to $1.33 per square foot. Apparently the market price is not reflecting the full cost early on, as a way to bring the new products in with less impact.

Manufacturers estimated that the incremental cost of upgrading to an ENERGY STAR window was approximately 10%-15% above the cost of a standard window or roughly $0.50 to $0.75/sf. The technical adjustments in effect kept costs within a comfort range for manufacturers. While they felt this difference was minor, they did believe that it remained a market barrier for some 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.

Ironically, price at these differences does not appear to be an issue with consumers. In 200, 81% of new homebuyers said they were willing to pay a higher price (up to $2.15 per square foot) to have energy efficient windows.

Conclusions

It is often 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. We believe that the three year effort had a large effect in transforming the market for energy efficient windows in the Northwest. Indicators of the transformation are that a significant share of the market was attained and locked in (going from 15 % to 70%) and will be propelled in the future by changes in manufacturing practices and codes, and manufacturers now producing and promoting high efficiency windows out of their own interest independent of utility rebates.

Several programmatic conclusions can also be drawn. First, it is clear that a cooperative partnership with manufacturers was a key to success. The supply side "push" strategy (manufacturer incentives and top-down delivery of marketing) ensured availability and access to normal marketing channels while avoiding creating expensive new ones and, combined with a subsequent mid-channel "pull" strategy (retailer demand), allowed market leaders to focus on core competencies (i.e. do what they are good at). Second, a priori consumer awareness and actual demand for ENERGY STAR labeled windows was less critical in this case than the perception among producers and retailers that energy efficiency is important to consumers and therefore ENERGY STAR will be useful as a marketing theme address consumer interest and to provide product distinction in a competitive market. This is not to say that general awareness of the Energy Star brand was not a factor. In fact, baseline awareness of the logo and name was around 30% as a result of a regional clothes washer

program. It rose to around 50% by the end of 2001. This gave retailers something to point consumers to, to leverage off.

Other factors, independent of the market transformation effort, may have contributed to the observed success. These include the participation of some of the manufacturers in the national ENERGY STAR Program, breakthroughs in materials and technologies, and a recent increase in consumers' awareness of the benefits of energy efficiency in general due to the California energy crisis. D&R had nearly simultaneously been working on a similar program for Southern California Edison and San Diego Gas and Electric.[4] Perhaps the biggest benefit to the Northwest program from these efforts was gaining Home Depot participation. However, by any measure, the Northwest energy-efficient windows market was clearly transformed and this transformation occurred in the same limited geographic area and timeframe as did the Northwest ENERGY STAR Fenestration Program.

Looking back we can identify numerous contributors to project success. These include:

- A few key leverage points simplified the process (few manufacturers, market leaders, key actors, and change agents).
- The ENERGY STAR label was critical to move the supply side because:
  - it provided a simple mechanism, that already existed and had some recognition, to identify and promote qualified product between manufacturers and retailers;
  - it provided a vehicle to rally around, to form strategies with, and a marketing hook;
  - there was broad (national) consistency and some leverage from other programs in CA; and
  - the simplicity of identity for inventorying and the simple message for sales staff helped where continual labor changes occur.
- The small increment above code in Oregon and Washington[5] (i.e. from 0.40 and 0.45 respectively to 0.35) helped keep incremental cost lower and eventually made it easier for a Washington code upgrade.
- Flexibility in allowed marketing approaches aided participation of manufacturers (i.e. providing incentive funds and general guidance instead of imposing detailed program requirements) and also allowed the industry to work within normal business channels.
- Adaptive project management and flexibility in program design allowed an early change in the qualifying efficiency threshold (from U= 0.30 to 0.35) to fit with ENERGY STAR.
- Building on an existing base of the NFRC process provided a uniform reference for all participants and opened doors for the implementing contractor because of prior working relationships.
- Change agents (i.e. key individuals within a few companies) were influential among their peers.

[4] The SCE program began ran from 1998 through 1999 and the San Diego program ran from 1998 through 2000.

[5] A recent assessment of residential construction practices conducted for the Alliance found that constructed window U-values ranged by state as follows: OR at 0.37, MT at 0.40, WA at o.46, and ID at 0.47.

In addition to the conclusions above, some key lessons were learned during implementation of this project. These include:

- Set modest goals.
- Keep the message as simple as possible.
- Small digestible incremental changes (0.40 to 0.35 not 0.40 to 0.30) have higher acceptance.
- A good base helps: (e.g. NFRC, existing technology, building codes, an experienced team.)
- Relations with market leaders (innovators and early adopters) are important to nurture.
- In a low growth market a company can only increase sales by capturing more market share.
- Supportive change agents can accelerate the transformation process.
- Markets can change quickly and unexpectedly (as companies come into, and go out of business).
- Code will follow practice.

We feel there is a high degree of transferability of this project to other projects and places because of the following:

- National manufacturer familiarity with ENERGY STAR.
- Technology advances are available nationally, but evidence suggests there is not a high level of adoption, particularly in the southern states.
- There are a lot more national ENERGY STAR partners (e.g. Home Base, Sears) to work with.
- Code changes can galvanize the market by creating a need for manufacturers and retailers to find a new mark of distinction beyond the code standard products.

Acknowledgements

This paper would not have been possible without the aid of Quantec staff, and D&R International's assistance in continually providing information for three years in the midst of trying to implement the program.

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