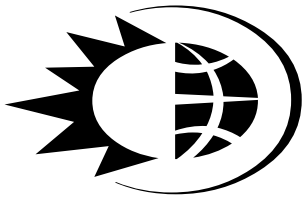

NORTHWEST ENERGY EFFICIENCY ALLIANCE

Market Progress Evaluation Report

ENERGY STAR Windows Program, No. 3 (3/00)

Prepared by:

quantec

Report # 00-046

March 2000

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Market Progress Evaluation Report for the ENERGY STAR® Windows Program

Prepared for:
Northwest Energy Efficiency Alliance

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March 2000

Table of Contents

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The views and opinions of the authors do not necessarily reflect those of the Alliance, its board, members, or staff.

Executive Summary

Program Description

This is the second Market Progress Evaluation Report on the Northwest Energy Efficiency Alliance's (Alliance) ENERGY STAR® Residential Windows Program (Program). The Program tries to increase market share of residential high-efficiency windows by working in partnership with market actors including window product manufacturers, wholesaler/distributors, retail suppliers, the manufactured home industry, and builders.

The Program uses ENERGY STAR labeling, certification, and marketing to aid in transforming the Northwest window market.[1] ENERGY STAR Partners sign a Memorandum of Understanding (MOU) to use the ENERGY STAR logo in advertising, educational, and other promotional materials. Under the MOU, selected Partners are given monetary incentives and/or marketing aid to leverage transformation of the Northwest market to high efficiency window products.[2]

Goals and objectives of the Program are to:

- Increase market share for high-efficiency fenestration products in both the residential new construction and remodel markets to 54% after the year 2001.
- Decrease at least two market barriers – lack of awareness and initial cost premiums – that limit sales of high-efficiency fenestration products.

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[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] ENERGY STAR windows and doors have a U factor ≤ 0.35 while ENERGY STAR skylights have a U factor of ≤ 0.45.

Summary of Research Activities for the Second Report

Research activities conducted for the second Market Progress Evaluation Report (Report) include:

- In-depth interviews with 49 retailers/wholesalers
- In-depth interviews with 19 regional manufactured home builders
- Review of key assumptions underlying estimations of Program effects

Summary of Key Findings and Highlights

Product Market Share

Overall Northwest market share for energy-efficient windows was estimated at 10%-15% in 1997. By the end of 1998, ENERGY STAR windows were estimated to comprise 41%-44% of Northwest residential window sales. Research conducted for this report confirms these estimates, with retailers and wholesalers/distributors reporting that an estimated 40% of windows sold in the Northwest were ENERGY STAR-compliant in 1998. The most recent sales data from window manufactures indicates that ENERGY STAR windows made up 44% of their window sales for the first half of 1999. Participating window manufacturers project some 955,000 units of ENERGY STAR sales in 1999. Given these numbers, it is not improbable to estimate a total ENERGY STAR market in the range of 59% by 2000, exceeding the Alliance's market transformation goal of 54% a year ahead of schedule.[3]

Market Drivers

The first and second Market Progress Evaluation Report identified the following as potential market drivers in the transformation of the Northwest windows market:

- Windows manufacturers' partnerships and participation in the Program (as well as other national and regional energy efficiency market transformation efforts)

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[3] This assumes that the remaining windows manufacturers (most of whom are now ENERGY STAR Partners) would have the same ENERGY STAR penetration as reported by ENERGY STAR Partners in 1998.

- Cumulative effects of building code and uniform national standards (e.g. the NFRC 100) improvements across the region (and expectations that this trend will continue)[4]
- Increased awareness of and concern about energy efficiency in general (but not ENERGY STAR windows) by consumers
- The naturally competitive nature of the fenestration industry
- Material and technology breakthroughs and service trends (e.g., more after-sale service) in windows manufacturing and related drops in the costs to produce energy-efficient windows
- A trend by manufacturers to position energy-efficient products in all or most of their product lines (with "energy efficient" being defined as anything with $U \leq 0.45$)
- This Second Market Progress Evaluation Report finds that retailers and wholesalers/distributors report that ENERGY STAR level energy-efficient windows are now available regionally across most brands. Retailer and wholesaler/distributor surveys indicate that ENERGY STAR level windows comprised 40% of 1998 window sales.[5] However, manufactured home builders report little awareness of the Program, despite half of builders reporting that they provide ENERGY STAR–compliant windows.[6] Finally, the first six months of 1999 sales data from window manufacturers reporting shows an increase in ENERGY STAR penetration to 44%.

Market Barriers: Lack of Awareness and Initial Cost

Retailers and wholesalers/distributors customers include professional home builders, professional remodelers, and "Do-It-Yourselfers." Manufactured home builders obtain window products from distributors and/or manufacturers. Both retailers/wholesalers/distributors and manufactured home builders appear to have no trouble finding ENERGY

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4 Oregon, Washington, Idaho and California all reference NFRC in their building codes. In 1994, the NFRC rating system was adopted for use in the Model Energy Code by the Council of American Building Officials.

5 When weighted by number of windows sold, 39.6% of windows sold by retailers and wholesalers/distributors were ENERGY STAR–compliant.

6 High-efficiency windows are usually offered by manufactured home builders as an upgrade, although at least one manufacturer offered them as standard in one product line.

STAR level window products. Both groups believe that consumers continue to appear to be aware of and value energy efficiency in general but remain largely unaware of high-efficiency window benefits.

Manufactured home builders appear to lag significantly in their levels of awareness of ENERGY STAR. Despite their lack of knowledge of the Program, about half of manufactured home builders report that they offer high-efficiency windows in some product lines, either as a "standard" offering or as an "upgrade."

By comparison, retailers and wholesalers/distributors are generally aware of ENERGY STAR windows. They rate price and quality as the most important factors in marketing windows and indicate that these factors are much more important than energy efficiency. However, when asked about market barriers, they ranked lack of information on the part of the consumers and builders as the highest barrier and price second. Window manufacturers, the manufactured home industry, and builders rank first cost as a substantial barrier to increasing market share of ENERGY STAR windows.

Following are specific findings concerning the level of ENERGY STAR awareness and market barriers perceived by retailers and wholesalers/distributors and manufactured home builders.

Perceptions of Manufactured Home Builders

- The manufactured home industry is driven by competitive pressure and consumer demand to keep home prices down. Vertical integration and the associated 'flux' in this industry are expected to worsen price pressures in the immediate future. June/July 1999 survey results indicate that this situation is not helped by the manufactured home builders' lack of awareness of ENERGY STAR – 11 of 18 regional manufactured home builders indicated that they knew nothing about ENERGY STAR (7) or did not know enough to make a decision about participating in ENERGY STAR (4). In the survey, only one representative of a manufactured home builder identified itself as an ENERGY STAR Partner. This lack of awareness on the part of manufactured home builders is judged to be primarily the result of a policy decision made early in the history of the Program to avoid potential competition issues with the Super Good Cents Program (SGC). Now that this issue has been resolved, ENERGY STAR implementers have begun to systematically contact manufactured home builders, presenting ENERGY STAR and developing

partnerships with individual manufactured home builders in the Northwest.

- Despite significant lack of awareness of ENERGY STAR, more than half of manufactured home builders were offering ENERGY STAR efficiency level windows, indicating the availability and recognition of the value to consumers of high-efficiency windows. The availability of high efficiency windows found in manufactured housing may be due, in large part, to the influences of the SGC manufactured home market transformation program as well as advances in window technologies.[7]

Perceptions of Retailers and Wholesalers/Distributors

- Sixty-seven percent of retailers and wholesalers/distributors reported that they are familiar with ENERGY STAR windows. This still left one-third of the contacted retailers unfamiliar with ENERGY STAR windows.
- According to prior and current manufacturer sales data and our research, the penetration rate of ENERGY STAR windows ranges from 40% to 44%. The responses of retailers and wholesalers/ distributors confirm the lower end of this range, with ENERGY STAR windows comprising 40% of 1998 sales.
- Respondents rank price (84%) first and quality (55%) second in importance, with energy efficiency (20%) a distant third in terms of customers' decision-making. However, more than half (51%) of retailers and wholesalers/distributors believe customers have a high demand for high-efficiency windows.
- Retailers and wholesalers/distributors say the key barrier to marketing ENERGY STAR windows is consumers' lack of information, which is rated more important than price.[8]
- Retailers and wholesaler/distributors believe that they get more marketing and promotional support for non-ENERGY STAR than

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7 The SGC market transformation efforts, along with advances in framing and warm-edge spacer technologies, have decreased the gap between standard practice and ENERGY STAR. Telephone discussion with Bob Davis, Ecotope, December 16, 1999.

8 Split incentives also exist because retailers and wholesalers/distributors reap no energy bill reductions from energy efficient windows. Retailers and wholesalers/distributors also have a wide mix of customers, including homebuilders, manufactured home builders, professional remodelers, retail homeowners, and, in the case of distributors, manufactured home builders. This may limit their ability to analyze the trade-offs among meeting the needs of various customers.

for ENERGY STAR products, both from manufacturers and the Program. Retailers and wholesalers/distributors do not appear to actively associate the ENERGY STAR windows (or ENERGY STAR qualifying products) they sell with ENERGY STAR. Although 79% of those who had heard of ENERGY STAR said that they carried ENERGY STAR windows, 55% stated that ENERGY STAR was providing labeling, and only 9% said that ENERGY STAR provided advertising.

Windows Manufacturer Sales Data through June 1999

- Window sales data show that ENERGY STAR windows now comprise 40% of window sales in the first quarter of 1999 and 44% of residential window sales in second quarter of 1999, for a total 42% penetration for the first half of 1999, up from an estimated 41% in 1998.[9]

Conclusions

Current research indicates a 1998 energy-efficient window market share in the Northwest in the range of 40%-44%. Window retailers and wholesalers/distributors report that ENERGY STAR windows make up 40% of windows sold in 1998, corroborating the lower bound estimate of 40%. Window manufacturer sales data for the first half of 1999 show a 40% penetration for ENERGY STAR in the Northwest while second quarter figures indicate an increase to 44%. Despite this, the surveys of retailers and wholesalers/distributors, as well as manufactured home builders, continue to reveal that they lack awareness and knowledge of the marketing value of ENERGY STAR. They also do not believe that consumers are aware of or understand the benefits of ENERGY STAR although they value high-efficiency windows. With few exceptions, neither retailers/wholesalers/distributors nor manufactured home builders are aggressively marketing ENERGY STAR windows. Furthermore, they believe that the initially higher cost of high-efficiency windows is a barrier to marketing high-efficiency windows.

[9] Reported by window manufacturers with some 80% of the Northwest market. Market estimate for overall 1998 is revised to 41% from 42% based on actual numbers of windows reported for fourth quarter 1998.

Market Drivers

In our last report, we stated that market transformation in the Northwest appears to be driven primarily by manufacturers rapidly changing the energy efficiency of their product lines. The availability of high-efficiency windows in manufacturer product lines is now demonstrated in the marketplace as evinced by results of our surveys of retailers/ wholesalers/distributors and manufactured home builders.

Market Barriers

Specific market barriers identified in our first Market Progress Evaluation Report included:

- A distinct lack of awareness and information about Energy Star exists among new homebuyers and remodelers although homebuyers and remodel customers were interested in the features and benefits of energy-efficient window products.
- Builders also had a fairly low awareness of ENERGY STAR, although custom homebuilders tended to value energy-efficient products. Builders tended to believe that energy-efficient windows cost more and that customers had little interest in them compared to other home features.
- Windows manufacturers reported that first costs of energy-efficient windows are a barrier to builders and that builders make decisions on energy efficiency for different reasons, mainly first cost, than do consumers, who tend to take long-term energy savings more into account. They also believe that lack of awareness and information, particularly on the part of builders and consumers, is a major market barrier resulting in a lack of customer demand for energy-efficient windows.
- End use consumers, builders, the manufactured home industry, retail suppliers, and wholesaler/distributors were all considered customers by manufacturers, and each, in turn, was seen to influence downstream window purchasers. Although understood by some actors, information concerning the benefits of energy-efficient window products is not being effectively transmitted among key actors (e.g., builders to new homebuyers).

The second Market Progress Evaluation Report adds the following findings to the emerging picture of the Northwest windows market:

- Retailer and wholesaler/distributors also identify lack of awareness of ENERGY STAR windows on the part of window purchasers as the major barrier, more so than price, to selling ENERGY STAR windows. They perceive that more marketing and sales support is provided for non-ENERGY STAR than for ENERGY STAR products.
- Retailer awareness of ENERGY STAR windows is high (67%) but not yet universal.
- Manufactured home builders remain mostly unaware of ENERGY STAR, although more than half say they offer high efficiency windows, either as standard in some production lines, or as upgrades. They remain driven by price. They are willing to provide ENERGY STAR-compliant windows but unwilling to "push" higher-cost home features upon their customers, who tend to be more affected by increases in home price than other homebuyers.

Based on these results, levels of awareness and information about ENERGY STAR level windows must be increased in order to effect an "across-the-board" transformation of the market.

Recommendations

- **Continue to build customer demand for ENERGY STAR products at every level**. Demand can be built in various ways, by more stringent codes or by increasing the awareness at the end-use level, resulting in customers requesting ENERGY STAR products from retailers and wholesalers/distributors and manufactured home builders.
- **Continue and expand efforts to provide extended marketing and training support within specific groups of market actors**. In this case, the key is recognizing the importance of communication of ENERGY STAR benefits to and between specific market actors. Retailers/wholesalers/distributors and manufactured home builders must clearly understand the benefits of ENERGY STAR to them so that they can communicate its benefits to their customers. This level of the distribution chain is unique in that, for example, retailers/wholesalers/distributors deal with a number of different types of customers, each of whom have a unique perspective and set of incentives, e.g., homebuilders, professional remodelers, and homeowners. Emphasis of the marketing advantages of high-efficiency

windows to each type of customer is key in raising the level of awareness of ENERGY STAR.

- **Research on the high level of consumer interest in window energy efficiency should continue to be communicated to Northwest market actors such as retailers and wholesalers/distributors and manufactured homebuilders**.
- **Continue to target additional market actors as necessary in order to educate them about the advantages of using ENERGY STAR window products**. These include model home sales agents, builders, manufactured home dealers, retail outlets, remodel contractors, and real estate agents. The emphasis on selection of targeting strategies and market actors should be on the greatest leverage of program dollars.
- **Finally, we recommend that the assumptions underlying the estimation of energy savings due to the Program be revisited.** We recommend updating the assumptions used to forecast housing starts, fuel mix, and cost information on ENERGY STAR windows for both new and remodel homes. We also recommend that data be included on non-electric energy savings and non-energy benefits (as applicable).

I. Introduction

The primary end target of the Northwest Energy Efficiency Alliance's (Alliance) ENERGY STAR ® Residential Windows Program (Program) is residential new construction, including single-family, multi-family, and manufactured housing. The program also targets remodelers.

Key partners and allies include window product manufacturers, regional utilities, building code officials, builders, the manufactured home industry, retailers, wholesalers, and other government agencies. A plan was developed to reach these diverse actors with a wide variety of approaches in order to increase the brand awareness and value of ENERGY STAR windows and to positively influence purchasing decisions of ENERGY STAR windows.

Under the Program, Partners sign a Memorandum of Understanding (MOU) to use the ENERGY STAR logo in advertising, educational and other promotional materials. In return, they are given monetary incentives or marketing aid to leverage marketing of ENERGY STAR window products.[10]

The goals of the Program are to:

- **Decrease at least two market barriers** – lack of awareness and initial cost premiums – that limit sales of high-efficiency fenestration products.
- **Increase market share** for high-efficiency fenestration products in the residential new construction and remodel market to 54% after the year 2001.

This is the second step towards "mapping" the workings of the residential fenestration market. It adds findings from the Retailer and Wholesaler and Manufactured Home Builder surveys and updates the Baseline Market Assessment Report, highlighting the changes and progress toward market transformation and the program exit strategy. The final report is scheduled for February 2000. It will again update market assessments and finalize impact findings and recommendations regarding the Program.

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[10] Energy-efficient, or high efficiency, window products surpass code requirements. ENERGY STAR level window products include windows and doors with a U factor ≤ 0.35 and skylights with a U factor of ≤ 0.45.

Structure of this Report

The main body of this report is divided into seven chapters. This chapter (Chapter I) is the introduction. It summarizes Program goals, structure of the report, and describes **quantec**'s evaluation methods. Chapter II discusses market penetration of ENERGY STAR. Chapter III discusses the assumptions used in the Alliance's cost-effectiveness analysis of the Program. Chapter IV reports on the Program's activities. Chapter V presents results from the survey of retailers and wholesalers/distributors of window products. Chapter VI examines the awareness and perceptions of ENERGY STAR by manufactured home builders. Chapter VII summarizes current research findings and presents recommendations for future Program efforts.

Methodology

Three approaches were used for collecting the research and data used for this Report:

1. Assessment of sales data reports by window manufacturers for the first half of 1999
2. Surveys of retailers and wholesalers/distributors and manufactured home builders
3. Use of the Analytic Hierarchy Process (AHP) approach for assessing preferences

Window manufacturer sales data for the first half of 1999 were provided by D&R, Inc., the program implementers of ENERGY STAR.

Information on market effects was elicited directly from market actors. Two telephone surveys were conducted (Table I-2). On behalf of **quantec**, Pacific Energy Associates, Inc. (PEA) included ENERGY STAR questions in its Super Good Cents (SGC) survey of all 19 regional manufactured home builders. Telephone surveys were conducted by **quantec** with 49 retailers and wholesalers/distributors in the region. Retailers and wholesalers/ distributors surveyed represented some 18%-21% of regional window sales in the region. The survey included questions concerning retailers and wholesalers'/distributors' awareness and knowledge of ENERGY STAR as well as their perceptions of their customers' awareness and perceptions of ENERGY STAR windows and buying patterns.

The AHP approach was employed to assess retailers and wholesalers/ distributors ranking of the importance of various factors in decision-making.[11] Appendix A contains the questionnaires used for the direct elicitation and AHP portions of this study.

Table I-2
Survey Summary

Segment	Completed Surveys	Notes
Retailers and Wholesalers	49	A mix of ENERGY STAR participants and nonparticipants from the four states
Manufactured Home Builders	19	All regional manufactured home builders.

[11] A description of the AHP methodology is included in Chapter V.

II. Market Characterization and Assessment

This Report updates develops the market characterization for ENERGY STAR windows in the Northwest region (Idaho, Montana, Oregon, and Washington) and provides an assessment of the market potential for the Program. It examines the roles of retailers and wholesalers/distributors and manufactured home builders in affecting market transformation including their level of awareness and knowledge of ENERGY STAR and factors important in decision-making.

Market Assessment Overview

Baseline evaluations show an estimated ENERGY STAR level windows market share in the Northwest in 1997 of 10%-15%.[12] The Alliance has set the goal of increasing market share of high efficiency fenestration products at 54% of the residential new construction and remodel market. This increase in penetration is to be achieved by decreasing at least two market barriers – lack of awareness and initial cost premiums.

Market Share

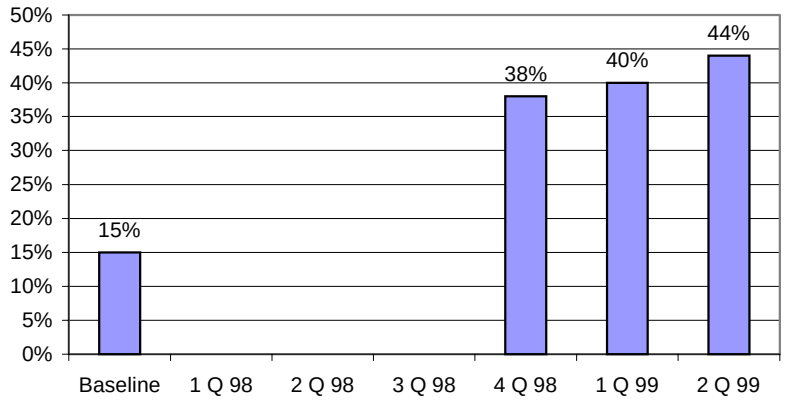
Product market share for this Report is derived from a number of sources, including:

- 1999 sales figures (January through June) for windows collected from seven major manufacturers in the Northwest through the American Architectural Manufacturers Association (AAMA), a trade association. (Estimates of market penetration will be updated throughout subsequent Reports.)
- Surveys of retailers and wholesaler/distributors in August 1999.
- ENERGY STAR questions included in PEA's current Super Good Cents Manufactured Homes evaluation being done on behalf of the Alliance.

[12] D&R International, Ltd. (D&R) and Macro International (Macro) conducted two separate evaluations (D&R Annual Report, 1998, and Macro, 1999) in order to ascertain the 1997 market share for products with a U-factor of 0.35 or lower.

The 1997 ENERGY STAR market penetration reported by Macro International, Inc., was estimated to be between 10%-15%. Our first report indicated, based on window manufacturer sales for 1998 and surveys of window manufacturers, home builders and consumers, that ENERGY STAR penetration of the Northwest market was likely to be in the range of 41%-44 %. Window manufacturers now report sales of ENERGY STAR windows have increased to 44% in the second quarter of 1999. Figure II-1 shows the available estimates of ENERGY STAR windows by reporting Northwest window manufacturers.[13]

Figure II-1
ENERGY STAR Window Sales by Northwest Manufacturers: 1997 through 2nd Quarter 1999*



* Quarterly data for the first three quarters of 1999 are not available.

Table II-1 provides a summary of the data sources collected and analyzed to date, including the retailers and wholesalers/distributors survey (Chapter V) providing support for this estimate as well as preliminary data available for 1999 market penetration estimates from window manufacturers. The current survey of regional retailers and wholesalers/ distributors confirm the reasonableness of the lower estimate for the range of market penetration, with about 40% of window sales for 1998 estimated

[13] Quarterly data is not available for quarters 1-3 of 1998, and thus is shown for the available time periods. Based on data for manufacturers with approximately 80% of the market (D&R, Northwest Energy Star Window Program, 1998 Annual Report, p. 15. Possible reasons for this large increase between 1997 and 1998 is summarized in the Executive Summary.

to be high-efficiency, or ENERGY STAR level windows (U=0.35 or below.)[14]

Table II-1
ENERGY STAR Windows Market Penetration

Sources	Probable Penetration
1998	41% - 44%
Window Manufacturers Sales Data [1]	41%
New Homes	
♦ Single-family[2]	35%
♦ Multi-family[2]	44%
♦ Manufactured [3]	19%
Remodeled Homes [4]	66%
Retailers and Wholesalers/Distributors [5]	40%
1999	
Window Manufacturer Sales Data	
♦ First Quarter	40%
♦ Second Quarter	44%
♦ January through June	42%

1 AAMA sales data provided by D&R, Inc.
2 **quantec** builder survey, January/February 1999
3 Personal communication, Bob Davis, Ecotope, May 3, 1999
4 **quantec** remodel customer survey, March 1999
5 **quantec** retailer and wholesalers/distributors survey, August 1999

Windows manufacturers receiving financial marketing support from the Program project 955,000 units of Energy Star window sales for 1999. Assuming the same total sales as in 1998 and given that most of the other regional window manufacturers are now ENERGY STAR Energy Star partners or producing ENERGY STAR qualifying product, the regional sales of ENERGY STAR could reach 59%. This level would exceed the Alliance's market transformation goal of 54% by 2000, a year ahead of schedule.[15]

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14 Retailers and wholesalers/distributors responses on market share were weighted by reported 1998 market sales to derive the penetration rate of 40%. When weighted by market sales, respondents comprised 18%-21% of total window manufacturer sales to Northwest retailers/wholesalers/distributors.

15 This also assumes that the remaining windows manufacturers (most of whom are now ENERGY STAR Partners), would have the same ENERGY STAR penetration as reported by ENERGY STAR Partners in 1998.

III. Energy Savings and Cost-Effectiveness Assumptions

The Alliance has estimated energy savings due to the ENERGY STAR program to be nearly 6.3 aMW by 2010. This estimate is based on a number of assumptions embedded in regional forecasts of housing starts, electric fuel saturation, energy savings and incremental costs. As part of the review of the ENERGY STAR Program, this report briefly examines those assumptions in the forecasts most critical to evaluating the Program's success in transforming the Northwest market.

The estimated savings are based on the following assumptions:

- Upgrading from U = 0.40 and 0.38 for stick-built and manufactured housing, respectively, to U = 0.35 windows in new electrically heated residential homes.
- New unit electrical heat saturation is estimated at 40% for single-family, 82% for multi-family, and 94% for manufactured homes.
- Energy savings weighted by climate zone and by home size by type are estimated at 353 kWh/year for new single-family and manufactured homes, and 135 kWh/year for multi-family units.
- Savings are based on square feet of fenestration per house size; single-family homes are modeled using an average of 227 square feet of fenestration, while multi-family homes are modeled based on 104, and manufactured homes are based on 183 square feet of fenestration.
- Estimated savings are modeled using the Northwest Power Planning Council's UA Optimizer.
- Incremental costs to the consumer per square foot of efficient fenestration are estimated at $0.48 for single- and multi-family stick-built and at $0.46 for manufactured homes.
- Market effects are based on increased sales of U = 0.35 windows from 10% to 54% of electrically-heated homes over three years, and sustaining penetration at 54% for ten years.
- $1,315,000 of matching funds from window manufacturers is included in the cost-benefit analysis.

- Total savings are based on new construction. Savings estimates do not include energy savings due to remodels, a major component of savings, particularly in single family stick-built housing.

Age of Data

Some of the issues raised in this report are due to "age" of data utilized by the Alliance. In particular, estimates of housing starts, fuel mix, and energy savings. Some of these forecasts have not been updated since 1995 (or earlier in the case of fuel mix), when they were used to develop the Fourth Northwest Conservation and Electric Power Plan. The following are some examples:

- Based on Ecotope's regional baseline study of new single family construction across the region now underway, electric heat saturation for single-family new construction may be much lower than that forecasted for this period by the econometric models.[16]
- PEA, based on its recent SGC research, recommends that the 94% electric saturation factor for manufactured housing now used be revised. PEA's research indicates that current electric saturation for manufactured housing is in the range of 80%.[17]

Missing Data

Estimates of program impacts do not now contain certain important data. For example, current impact estimates do not include:

1. Energy savings for windows used in remodels
2. Non-electric energy savings
3. Non-energy benefits

Our summary and recommendations are summarized in Table III-1.

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[16] Preliminary estimates based on building permits across the region analyzed by Ecotope indicate that new single-family electric saturation may ultimately be closer to 15%-20% rather than the forecasted penetration of electric of 39% for 1998.

[17] PEA, Draft Report, 2nd Market Progress Report, September 28, 1999, p. 28.

Table III-1
ENERGY STAR:
Critical Energy savings and Cost Effectiveness Assumptions

Issue/Assumption	Recommendation
Housing start forecasts *	Update forecasts by housing segment: single-family, multi-family, and manufactured
Fuel Mix forecasts**	Update fuel mix estimates (electric, gas and other) by new and existing housing segments (single-family, multi-family, and manufactured).
Energy savings	Consider a regional effort to research and/or collect data on square footage of home, square footage of fenestration, standard practice U value, incremental ES square footage, and incremental costs.
Remodel homes energy savings and benefits/costs	Include specific energy and cost/benefit data for remodel homes in program calculations. This may be done based on engineering models of "typical" homes.
Non-electric benefits	Include non-electric benefits in calculation of program energy savings and cost effectiveness calculations. (e.g., gas particularly), and non-energy benefits (if applicable)

* Now based on historical data through 1995 used in the 1998 Northwest Power Plan Medium forecast - 1998 Northwest Power Plan

** Now based on 1992 PNW Residential Survey, Primary Space Heating System and Equipment

Many of these assumptions have not been updated for some time due to the need to review and compile findings from various research efforts or the necessity of large-scale data collection.

Overall, altering the above assumptions may be expected to increase or decrease savings for particular housing segments. However, it is reasonable to assume that including energy savings due to energy efficient window remodels, estimated to make up approximately half of residential window sales, will more than outweigh other effects, resulting in higher energy savings and a more cost-effective regional market transformation venture.

IV. Program Characterization

quantec has reviewed all available Program status reports for this second Market Progress Evaluation Report. We have also had many contacts with D&R, Inc, the Program implementers for the purposes of obtaining clarification and information on the Program.

Overview

The Program's objective is to make the choice of purchasing energy-efficient windows an easy and informed decision for Northwest consumers by using the marketing potential of ENERGY STAR labeling and by offering marketing incentives and promotional assistance.[18] Targets are new residential construction, multi-family, remodel, and manufactured housing. Homebuyers and homeowners are also targeted as key decision-makers.

Key partners and allies include window product manufacturers, regional utilities, retailers and wholesalers/distributors, builders, the manufactured housing industry, building code agencies, and other government agencies, including DOE, EPA, SEOs, and the NFRC. Industry Partners sign a Memorandum of Understanding (MOU) to use the ENERGY STAR logo in advertising, educational, and other promotional materials. In return, they label qualified ENERGY STAR products and educate staff on the advantages and selling points of energy-efficient products.[19]

In January 1999, in addition to promotional materials, training, and sales support, the Program began to offer monetary incentives to selected window manufacturers in order to leverage information and marketing of ENERGY STAR windows. The Program continues to build these relationships as well as reach out to other market actors (builders, glass

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[18] The window target is aligned with the U.S. DOE/EPA Northern Tier ENERGY STAR standard. All ENERGY STAR Window products must be rated and certified by the National Fenestration Rating Council (NFRC) and be labeled for both U–Factor and Solar Heat Gain Coefficient (SHGC). One recommended window product designation is made for each of three climate regions: Northern ($U \leq 0{,}35$, no applicable SHGC), Central (($U \leq 0.40$, $SHGC \leq 0.55$), and Southern ($U \leq 0.75$, $SHGC \leq 0.40$).

[19] Includes Oregon, Washington, Montana, and Idaho. Skylights must have a U-factor ≤ 0.45 for the Northern region, $U = \leq 0.45$ and $SHGC \leq 0.55$ for the Central region, and a $U \leq 0.75$ and $SHGC \leq 0.40$ for the Southern region.

manufacturers, etc.) in order to build and leverage the ENERGY STAR Program.

Intervention Strategies

The Program itself focuses on developing industry partnerships. The Program was designed to leverage co-op advertising with key partners and allies. The overall Strategic Marketing Plan was developed to reach a diverse audience with a wide variety of media approaches in order to increase the brand awareness and value of ENERGY STAR Windows and positively influence the purchasing of ENERGY STAR Windows. Key messages were that ENERGY STAR Windows provide more comfort, have aesthetic appeal, reduce maintenance, provide protection from fading due to sun, and are more energy efficient than standard windows. Marketing was first tested in the target cities of Boise, Spokane, Seattle, Portland, and Eugene.

Materials developed by D&R to market ENERGY STAR windows include fact sheets, press releases, brochures, newsletters, trade show exhibits, print media advertisements, special "give-a-ways," sales team training kits, point-of-purchase materials, and builder sales kits.

Media and promotional campaigns have included trade shows, the Street of Dreams, the Parade of Homes, monthly trade association meetings, industry conferences, golf tournaments, and special events such as promotional banners at events such as "Waterfront Concerts" and a Seattle Mariners baseball game to recognize achievements of leading ENERGY STAR partners.

Review of the 1998 ENERGY STAR Windows Program

The first year of the Program focused on building an image for the Program in the Northwest, particularly in the market sectors that ultimately serve the consumer: utilities, window manufacturers, the building industry, and window retailers. At the beginning of 1998, the Northwest Project was still a separate regional effort. In February 1998, the Alliance supported the decision to move to the federal ENERGY STAR performance level. By spring 1998, the Northwest ENERGY STAR Windows program was rolled out. Throughout the remainder of the year, meetings with builders, window manufacturers, and attendance at trade shows in the region continued. A retailer "kit" was developed, premised on a boxed point-of-sale set of materials ready for use of the retailer in the store. By December, the ENERGY STAR Windows program was working with the window industry to find alternative technologies to make high-

efficiency window products without argon gas by using stainless steel spacers, spectrally selective low e coatings, and better frame design. The end result is of the new approach is lessened production time and decreased costs for high-efficiency windows.

By the end of 1998, a new marketing direction was developed, shifting emphasis toward marketing incentives and aid to regional window manufacturer Partners. The hope is that the strategy will actively engage industry partners to achieve higher margin sales to retailers through value-added marketing assistance, and simple messages to consumers. The strategy envisioned that retailers in turn would order more ENERGY STAR Window products, thus increasing production by manufacturers of high-efficiency windows, completing the cycle.

1999 ENERGY STAR Windows Program to Date

During 1999, the ENERGY STAR staff continued to meet with window manufacturers, retailers and wholesalers/distributors, manufactured home builders, and builders to present marketing strategy, seek cooperation, and provide marketing aid to the six partner window manufacturers that represent an estimated 80% of the Pacific Northwest sales. Program marketing materials were distributed to partners and their affiliated window distributors and retailers. Retailer training was held throughout the region.

Examples of ENERGY STAR Windows promotional and informational efforts and products in 1999 included:

- Meetings with builder associations and selected builders
- Media and public relations plans for the single-family, multi-family, and remodel sectors
- Press releases to the media
- Literature to be used in Home Shows and advertising venues
- A newsletter for program partners
- Presentations at sites of window manufacturers (7) and selected retailers and home builders
- Promotional slides to be shown in movie theatres throughout Montana and Idaho
- Booths at Home Shows (Boise, Spokane, Eugene, Portland, Seattle, Missoula)

- Distribution of more than 600 point-of-sale kits to window manufacturers and retailers
- Support to window manufacturers to train retail account sales personnel at key accounts

Targeted markets included single- and multi-family developers and builders, as well selected regional independent manufactured home manufacturers in order to encourage use of ENERGY STAR windows in Super Good Cents homes.

An MOU was signed with a large window distributor and was under discussion for coverage of eastern Washington and northern Idaho. Meetings began again with manufactured home builders, and specific promotional campaigns included television ads to be co-sponsored by partners and a Seattle Mariners baseball game promotion for retailers. Co-op ads were developed with Parr Lumber and Best Built Windows.

ENERGY STAR met with utilities (Idaho Power, PGE, Seattle Power, Montana Power, EWEB, etc.) and other potential program partners and continued outreach to market actors.

By the second quarter of 1999, the six window manufacturer partners and three other window glass and window distributors had made matching contributions to ENERGY STAR of more than $760,000.[20]

The remainder of this second Market Progress Evaluation Report includes survey findings for manufactured home builders and retailers and wholesaler/distributors. It describes the barriers to the downstream flow of energy efficiency and specifies which barriers are the most critical to market actors.

Table IV-1 presents a summary of market barriers and intervention strategies identified for retailers and wholesalers/distributors and manufactured home builders.

[20] Gary Curtis, D&R, Inc., October 1, 1999.

Table IV-1
Market Barriers and Intervention Strategies

Market Actor	Market Barriers	Intervention Strategies
Retailers/Wholesalers/ Distributors	• **Lack of Information** • **First Cost** • **Split Incentives** • **Bounded Rationality**	• Signing MOUs to promote marketing of ES Windows • Marketing promotions • Dissemination of information though design and provision of brochures, advertising, articles, media spots, point-of-sale kit, etc • Providing training materials for retail staff
Manufactured Home Builders	• **First Cost** • **Lack of Awareness** • **Lack of Information** • **Split Incentives** (Incur the first cost of windows but homeowners earn the savings)	• Signing MOUs with incentives to promote marketing and reduce cost of ES Windows • Marketing promotions • Ongoing promotion and attendance at home builder shows • Trade association advertising and public relations contacts • Dissemination of information though design and provision of brochures, advertising, articles, media spots, point-of-sale kit, etc

V. Retailers and Wholesaler/ Distributors Survey

For clarity, it is useful to understand the distinction between retailers, wholesalers, and distributors. Retailers sell products in relatively small quantities to consumers. Wholesalers sell products in large bulk or quantity, usually at a lower price than a retailer. Distributors market and supply goods from manufacturers usually (but not always) under contract to retailers or large bulk purchasers.

Retailers and wholesalers/distributors of fenestration products are important actors in the distribution chain. Their behaviors affect the perceptions and demand of builders and consumers down the distribution chain as well as manufacturer perceptions and product lines higher up in the distribution chain. The Northwest ENERGY STAR Windows Program has developed a "Partner" strategy designed to enhance the awareness and information of these market actors regarding high efficiency windows. ENERGY STAR Partners sign a Memorandum of Understanding (MOU) to abide by ENERGY STAR guidelines, and in turn, receive marketing and promotional aid. In order to better understand the perceptions and influence of retailers and wholesalers/distributors and the effects of the ENERGY STAR Windows Program on this influential market segment, **quantec** designed and administered a survey to approximately 50 retailers and wholesalers/distributors in August 1999.

Methodology

The retailer/wholesaler survey was designed to collect the opinions of ENERGY STAR Partners and non-partners, as well as different size of companies in terms of window sales of retailers and wholesalers/ distributors across the region. The survey instrument was developed to address a number of questions, including:

- How important is high-efficiency fenestration to customers (e.g., professional homebuilders, professional remodelers, and retail consumers)?[21]

[21] Perceptions of manufactured home builders who obtain their windows primarily from distributors or manufacturers are dealt with in Chapter IX.

- Are retailers and wholesalers/distributors informed and aware of the benefits of ENERGY STAR window products?
- Where do retailers and wholesalers/distributors obtain information on fenestration products?
- What is the current reported penetration rate of ENERGY STAR level fenestration products?
- Is the market penetration rate of ENERGY STAR level window products increasing?

Sample Design

The sample for the retailer/wholesaler survey was collected from two sources:

- A list of ENERGY STAR Partners provided by D&R, Inc.
- The state telephone yellow pages for listings under "Windows"

Quotas were developed using a proportional approach for the number of window retailers/wholesalers in Idaho, Montana, Oregon, and Washington (Table V-1).[22] **quantec** attempted to complete interviews with the ENERGY STAR partners before contacting the yellow pages sample. In addition, company listings were screened to select those selling window products for installation in new homes or residential remodeling.

Efforts were made to include companies focusing on both sales mostly to builders and contractors and companies with mostly retail sales. In addition, efforts were made to include a wide size range of respondents to better reflect the population of actual fenestration product retailers and wholesalers/distributors in the region.[23,24]

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[22] Yellow page listings were obtained from GTE.net Superpages. Each listing provides the name, address, and phone number of the retailer/wholesaler/distributor. Idaho had 122 listings, Montana 118, Oregon 282, and Washington 382. Additional sample size was selected based on the ratio of total "Windows" listings for each state. (For example, Idaho's total weighting was therefore 122/(122+118+282+382) = 13%. 13% * 50 = 7 for a quota. This approach resulted in a higher selection of retailers and wholesalers than "pure" distributors, e.g., those who sell to professional or very large customers, but not to retail customers. However, since almost all respondents indicated they bought window products directly from manufacturers, this was not judged a significant issue.

[23] **quantec** was unable to contact two "big box" retailers for this report – Home Depot, and Homebase – but will continue to attempt to contact these major retailers for the final Market Progress Evaluation Report.

[24] Results of this survey approach are indicative rather than representative of the total

As shown in Table V-1, **quantec** conducted a total of 49 interviews with retailers and wholesalers of fenestration products. The survey instrument was a mixture of open- and closed-ended questions, and is included in Appendix A. In the case of the ENERGY STAR Partners, **quantec** spoke with the company contact (normally a manager). The survey tried to obtain as much information as possible at the corporate, or in some cases, regional or multi-store level from each respondent. However, in a number of cases, the respondent's knowledge was limited to the specific site in question. For these respondents, **quantec** normally spoke with the owner or senior manager.

Table V-1
Retailer/Wholesaler Quotas

	ID	MT	OR	WA	Total
Quota	7	6	16	21	50
Completed	8	6	15	20	49*
Refused	- - -	- - -	- - -	- - -	19**

* Respondents included 3 self-identified distributors
** Includes three partial interviews terminated due to time constraints.

Company Characteristics

Retailers and wholesalers/distributors of window products in the Northwest exhibit a complex pattern of types, sizes, and buying and selling behaviors. Table V-2 summarizes a profile of retailer/wholesaler company characteristics based on the interview responses.

quantec completed interviews with ten of the 14 ENERGY STAR Partners. Altogether, ENERGY STAR Partners represented 20% of the 49 survey respondents (Table V-2). Partners tended to be larger in terms of window sales an expected outcome based on the Program's expressed strategy of partnering with larger, more influential retailers and wholesaler/distributors.

When asked to describe their companies, 44% of the 46 companies responding to the question described their market as "Sales to Professionals." The remaining 14 companies indicated their sales could best be described as Retail and Home Improvement.

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population of Northwest regional retailers and wholesalers/distributors.

Many of the respondents indicated that they sold fenestration products in more than one state. The most common sales locations mentioned by respondents were Washington (53%) followed by Oregon (39%), Idaho (27%), and Montana (12%). Many respondent companies were located in towns or metropolitan areas located near state boundaries, and thus served regional or area markets in adjoining states.

The majority of the survey respondents (86%) offered both sales and installation of window products. Fewer than half of the respondents (42%) indicated that they sold to builders who construct 20 or more homes a year. In addition, almost all respondents (98%) report purchasing window products directly from the manufacturer rather than from distributors. It is not untypical for a very large retailer to purchase windows from several manufacturers directly. It also is not unusual for manufacturers to sell directly to some retail stores, to large builders and perhaps even smaller builders based on long-existing relationships.[25]

[25] Discussion with Jim Russell of D&R, Inc., October 1, 1999.

Table V-2
Retailer/Wholesaler Characteristics*

	Frequency	Percent
ENERGY STAR Partner		
Yes	10	20%
No	39	80%
Location of Sales**		
Idaho	13	27%
Montana	6	12%
Oregon	19	39%
Washington	26	53%
Services Offered		
Sales and Installation	42	86%
Sales Only	7	14%
Sales to Builders who Build 20+ Homes a Year		
None	27	59%
1% to 50%	16	35%
Over 50%	3	7%
Source for Window Purchases		
Direct from Manufacturer	48	98%
From Wholesaler/distributor	1	2%

* Respondents' 1998 window sales represent 18%-21% of window sales to retailers/wholesalers/distributors reported by Northwest window manufacturers for the same time period.

** Percents sum to greater than 100% because respondents could and often did report sales in more than one state as a function of markets spilling over state boundaries.

Respondents' reported sales for 1998 represent some 18%-21% of sales by Northwest window manufacturers to retailers/wholesalers/ distributors for the same time period.[26] The wide array of types of retailers and wholesaler/distributors also led to a wide range of annual window sales volume by respondents. As shown in Table V-3, 27 respondents (or 77% of those with sales data) had sales of less than $500,000 in 1998. These same respondents, however, make up only 15% of total sales reported by the sample group. On the other hand, those five companies reporting over

[26] Based on $30,415,948 in sales reported by respondents divided by the percentage of estimated 1998 window sales made by Northwest window manufacturers to retailers and wholesalers/distributors. (The denominator is based on multiplying numbers of Northwest manufacturer windows by D&R, Inc.'s estimate of $125-$144 per window times the estimated 60% of windows sold through retailers/wholesalers/ distributors, etc. by window manufacturers (60%*1,907,670).

$1,000,000 in sales for 1998 comprised 76% of total reported window sales, further illustrating the dispersal of sales. Two respondents alone represented approximately 57% of all sales.[27]

Table V-3
Size of Company by 1998 Window Product Sales

	Number of Respondents*	Percent of Respondents	Percent of Sales
Less than $100,000	12	34.3%	1.8%
$100,000 to $499,999	15	42.9%	13.1%
$500,000 to $999,999	3	8.6%	8.8%
$1,000,000 to $2,999,999	3	8.6%	19.7%
Over $3,000,000	2	5.7%	56.6%
Total	35*	100.0%	100.0%

* 35 of 49 respondents provided sales data

Examined by a different approach, the lowest quintile, or 20% of respondents, reported sales representing only 1% of total window sales. Window sales for the highest quintile of respondents, on the other hand, represented 83% of total window sales (Table V-4).

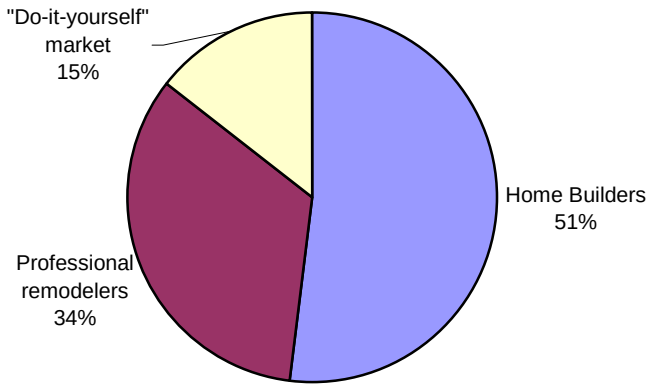
Table V-4
Size of Company by 1998 Window Product Sales (Quintiles)

Quintile	1998 Window Sales ($)	Percent of Sales	Total Sales
First	$50,000 or less	1%	$177,872
Second	$50,001 to $150,000	2%	$605,000
Third	$150,001 to $275,000	5%	$1,452,936
Fourth	$275,001 to $800,000	10%	$3,052,340
Fifth	$800,001 or more	83%	$25,127,800
All (n = 35)		100%	$30,415,948

[27] One of these was a major distributor, and the other was a major building supply company with stores throughout the region.

ENERGY STAR Partners, although representing only 20% of the sample, represented 58% of total window sales. Figure V-1 displays the breakdown of the reported sales.[28]

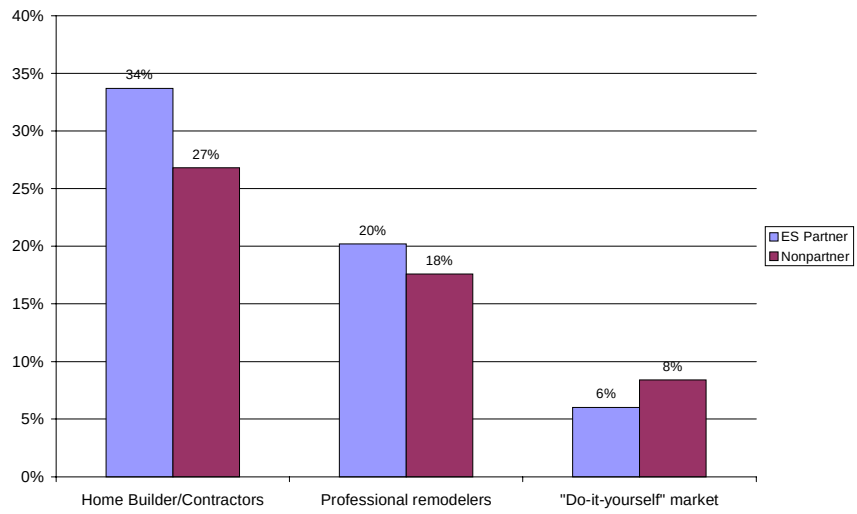
Figure V-1
Window Sales to Home Builders, Remodeler Contractors, and Retail Customers



Sales by ENERGY STAR Partners indicated that these companies made more sales to professional home builders (34%) and remodelers (20%), but slightly less retail sales (6%) than non-partners (27%, 18%, and 8%, respectively) (Figure V-2).

[28] Respondents were unable to categorize sale type by a specific customer segment for some 46% of sales. Comments indicated that these were considered "walk-ins off the street" and thus could be homebuilders, remodeler contractors or "do-it-yourself" retail customers.

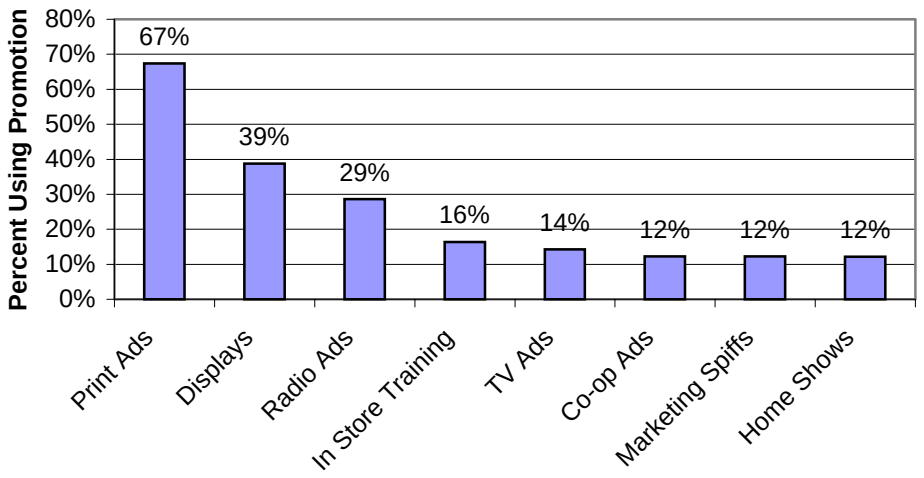
Figure V-2
Window Sales by ENERGY STAR Partnership



How do retailers and wholesalers/distributors prefer to promote window products?

Retailers and wholesalers/distributors strongly favored print ads (67%), particularly telephone yellow pages, as their first choice for promotional techniques to reach potential customers (Figure V-3). In-store displays (39%) and radio ads (29%) were second and third rated in popularity. In-store training (16%), TV ads (14%), and then co-operative advertising, marketing spiffs, and home shows (all at 12%) were other techniques.

Figure V-3
Preferred Ways of Promoting Window Products



What are top selling window brands?

As shown in Table V-5, the most popular brands in terms of sales/stocking in the Northwest were Milgard (sold by 51.1% of the respondents) and Insulate (46.7% of the respondents). Summing up responses by respondents, these brands, along with Best Built (22.2%) and Summit (17.8%), make up the largest percentage of sales as well. Table V-5 shows the percent of respondents, their average percent of sales/stock, and their average percent of sales/stock weighted by 1998 window sales.[29] However, when brands are weighted by 1998 window sales, two other brands – notably Weathervane and Marvin, emerge as leaders. These two brands were sold by only one respondent. Eighty-four percent of respondents (41 of 49) sold multiple window brands.

[29] It must also be noted that when the average percent of sales/stock windows are examined without the two largest companies, Insulate (26.7%), Marvin (24.1%), and Milgard (16.7%), appear to be by far the leading brands in terms of frequency of sales/stocking decisions by the remaining 33 companies.

Table V-5
Top Window Brands (Sales and Stock)

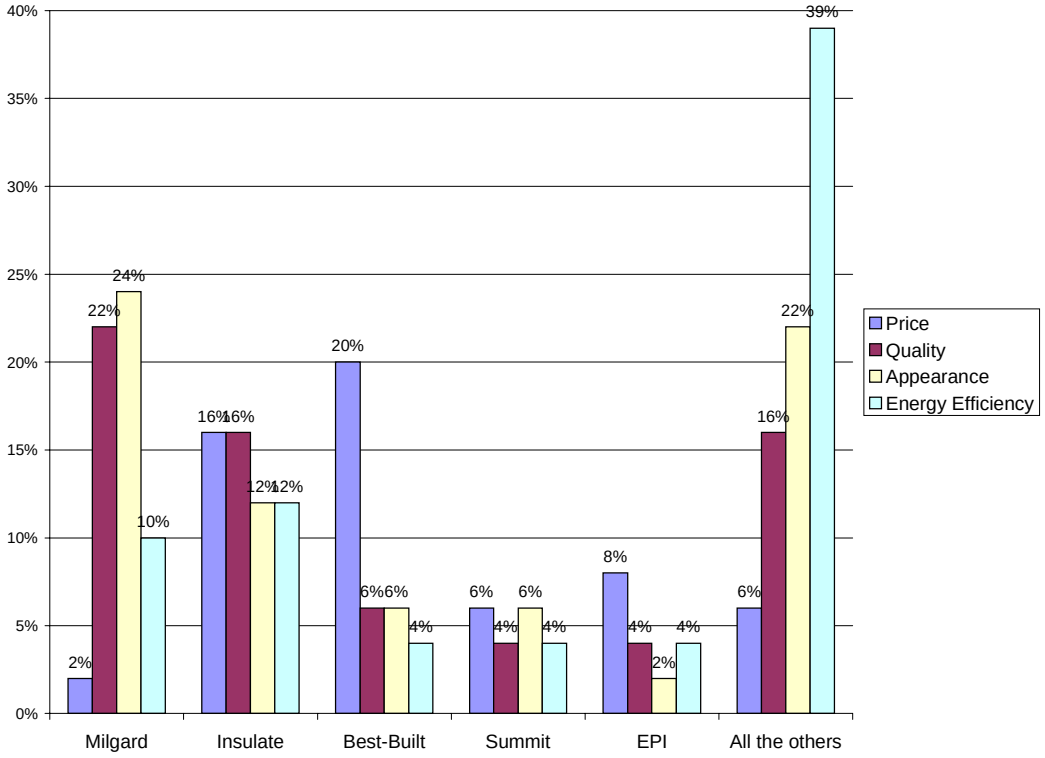
Percent Respondents Selling Brand Name (Percent) (n=45)*	Average Percent of Sales/Stock	
	Unweighted (n=45)**	Weighted by Window Sales (n=35)***
Milgard (51.1%)	15.5%	12.9%
Insulate (46.7%)	19.7%	23.2%
Best Built (22.2%)	10.6%	6.9%
Summit (17.8%)	7.6%	0.7%
Alpine, LBL, EPI (13.3% each)	3.0%	0.3- 3.0%
Amsco, Western, Merser (6.7% each)	1.6%	0.1-0.9%
Aluma-Glass, Crystalite, CDI, Pozzi (4.4% each)	5.9%	0.1-0.7% except Pozzi (5.3%)
Anderson, McVay, Wilco, Mirmax, Marvin, Viking, Winter Seal, Weathervane, Peach Tree, Starline, Traco, Pella, Moneray, Loewen, Lumitech, Metal Industries, Norca, Northwest Aluminum, Calason (2.2% each)	< 2.5% each	< 0.9% except Marvin (9.6%) and Weathervane (22.9%)

* Miscellaneous/unassigned = 11.1%
** Miscellaneous/unassigned = 1.5%
*** Miscellaneous/unassigned = 8.0%

Retailers and wholesalers/distributors also identified different features associated with the different brands of windows. For example, while respondents believed Milgard could be sold on quality (22%) or appearance (24%), only 2% of respondents believed Milgard was the best window to sell based on price. Best Built windows, on the other hand, were far more likely to be sold on price (20%) than on quality (6%) or appearance (6%).

In terms of energy efficiency, many respondents (39%) felt that there was no difference between the brands.

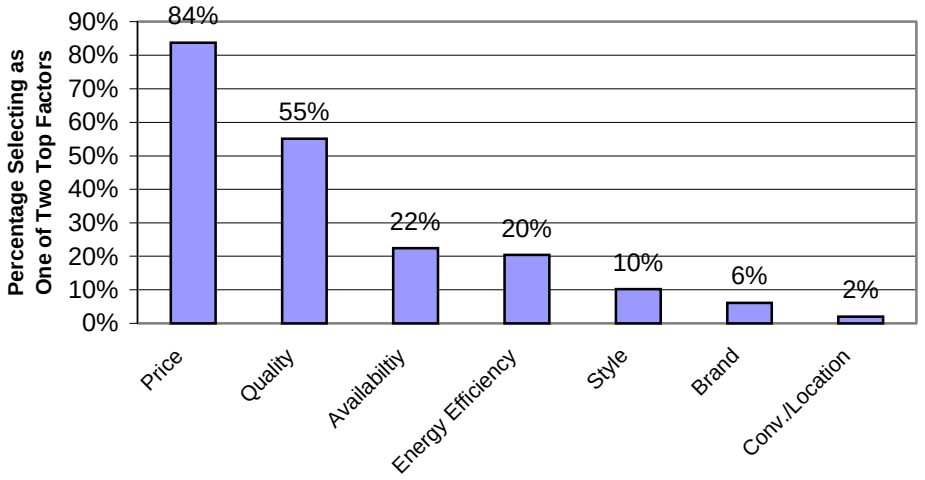
Figure V-4
Brand of Window Sold Based on Features



Retailer Perceptions of Customer Interest in Efficient Fenestration

Retailer/wholesalers felt that price (84%), far more than any other factor, influenced customer decisions to purchase window products (Figure V-5). They believed that quality (55%) was also very important, and that availability of products when needed (22%), and energy efficiency (20%) were also somewhat important. Style, brand, convenience/location were judged relatively unimportant comparatively by respondents (10%, 6%, and 2%, respectively).

Figure V-5
Factors Influencing Customers' Decisions to Buy Window Products



More than half of retailers and wholesalers/distributors (51%) believed that their customers had a high demand for high-efficiency windows (Table V-6). The ten ENERGY STAR partners, who are already promoting high efficiency windows, reported a higher customer demand than non-partners; they reported an average customer demand of 3.7 (with 1 being very low demand and 5 being very high demand) compared to 3.3 for the other respondents.

Table V-6
Current Customer Demand for High Efficiency Windows

Ranking of Customer Demand	All Respondents	ES Partner (n=10)	Not Partner (n=39)
Low Demand (1 or 2)	22%	10%	26%
Neutral Demand (3)	27%	30%	26%
High Demand (4 or 5)	51%	60%	49%
Average Ranking	3.4	3.7	3.3

Respondents that reported a low or neutral customer demand (22%) in high efficiency windows generally felt that customers cannot tell the difference between the efficiency in windows, and will normally adhere to code limits only. On the other hand, respondents that reported a strong customer demand for in ENERGY STAR level efficiency windows believed

that customers were becoming better educated, and more demanding, about energy efficiency in windows.

The retailers and wholesalers/distributors were also generally positive about the benefits, affordability, and availability of high efficiency windows (Table V-7). Ninety-two percent of respondents confirmed that high-efficiency windows provide a good value to customers, while only about a third of the respondents felt that the benefits are either hard to explain to customers (33%) or that the windows are too expensive from the customers' point of view (31%). Only 6% of respondents believed that high efficiency windows are "hard to get," indicating that at least these respondents no longer believe that availability of high efficiency windows is a barrier in the Northwest.

ENERGY STAR Partners, with more experience with high efficiency windows, generally agreed with the other respondents. However, they showed more sensitivity to the cost of energy efficient windows compared to standard windows. Four of the ten ENERGY STAR respondents (40%) believed that the windows are too expensive, while only 28% of the non-partner respondents agreed with this statement. However, ENERGY STAR Partners also found it easier (80% versus 64% for non-partners) to explain the benefits of high efficiency windows to their customers, probably due at least in part to the information and marketing aids and incentives provided by the ENERGY STAR Program.[30]

Table V-7
Perceptions of High Efficiency Windows for Customers

	All Respondents	ES Partner (n=10)	Not Partner (n=39)
Provide a good value to the customer	92%	100%	90%
Are hard to explain to customers	33%	20%	36%
Are too expensive from customers' point of view	31%	40%	28%
Are hard to get	6%	0%	8%

[30] When asked if high efficiency windows needed to be special-ordered, 100% of respondents replied yes; however, when asked if this was a problem, all said no – they special ordered all windows for jobs, keeping only a very few in stock.

As customers of retailers and wholesalers/distributors include both builders/remodeler contractors and end-use retail customers, it is useful to cross-check their perceptions of customer interest against builders', new homebuyers', and remodel customers' directly expressed interest in energy efficient windows.[31] **quantec**'s survey of home builders indicates that builders are extremely sensitive to price and somewhat disconnected from homebuyer's actual valuation of energy efficient windows.[32, 33] More than half (54%) of new homebuyers responded that they were willing to pay the higher incremental cost of energy efficient windows when queried. Energy efficiency was the most-looked-for feature in window construction by new homeowners (59%). New homeowners also ranked saving energy and saving money from energy savings as the third and fourth most important features of energy-efficient windows – only comfort (cutting heat loss and making the home less drafty) ranked higher. Remodel customers report that only durability (91%) outweighs energy efficiency (88%) as an important factor in the purchase of replacement windows, while price, for remodel customers, was ranked much lower at 65%. **quantec**'s survey of retailers and wholesalers/distributors indicates that they, like builders, are sensitive to price and do not realize the marketing advantages of customers' high valuation of energy efficiency.

What is the level of awareness and information on ENERGY STAR?

Retailers and wholesalers/distributors of fenestration products were more aware (96%) of energy efficiency ratings for windows (U-factor) than, for example, new home builders (85%) (Table V-8).

Awareness of ENERGY STAR was also fairly high among the retailers/wholesalers 67% of all respondents (and 59% of the non-partners). However, there remains a large opportunity to be captured in that 33% of all respondents (61% of non-partners) had not heard of ENERGY STAR. By comparison, awareness of ENERGY STAR by new

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31 Remodeler contractors may be more attuned to the needs of the individual remodel customers with whom they directly contract.

32 Builders of manufactured homes also indicate price as the most important factor in marketing manufactured homes. Their perceptions affect those of distributors who provide windows to the manufactured home industry.

33 Remodeler contractors may resemble, in terms of buying patterns, the end use homeowner more than large project builders. Also, to the extent that retailers and wholesaler/distributors may respond more directly to the perceptions of builders who work with them over time on many projects as opposed to one-time retail homeowner sales, it is possible that they may be more influenced by their home builder customers.

homebuyers was nearly nonexistent (2.9%) and very low among remodel customers (16.1%) and homebuilders (20.0%).

The lack of awareness of the ENERGY STAR label among consumers is reinforced by the finding that only 16% of the respondents (only 5% of the non-partners) report that customers have asked for ENERGY STAR products (Table V-8). This finding confirms the conclusion in the first Market Progress Report that window purchasers in the Northwest are still largely unaware of ENERGY STAR.

Table V-8
Awareness and Interest in ENERGY STAR Fenestration Products

	All Respondents	ES Partner (n=10)	Not Partner (n=39)
Familiar with U-factor	96%	100%	95%
Heard of ENERGY STAR	67%	100%	59%
Carry ENERGY STAR fenestration products	53%	100%	41%
Customers have asked for ENERGY STAR	16%	60%	5%

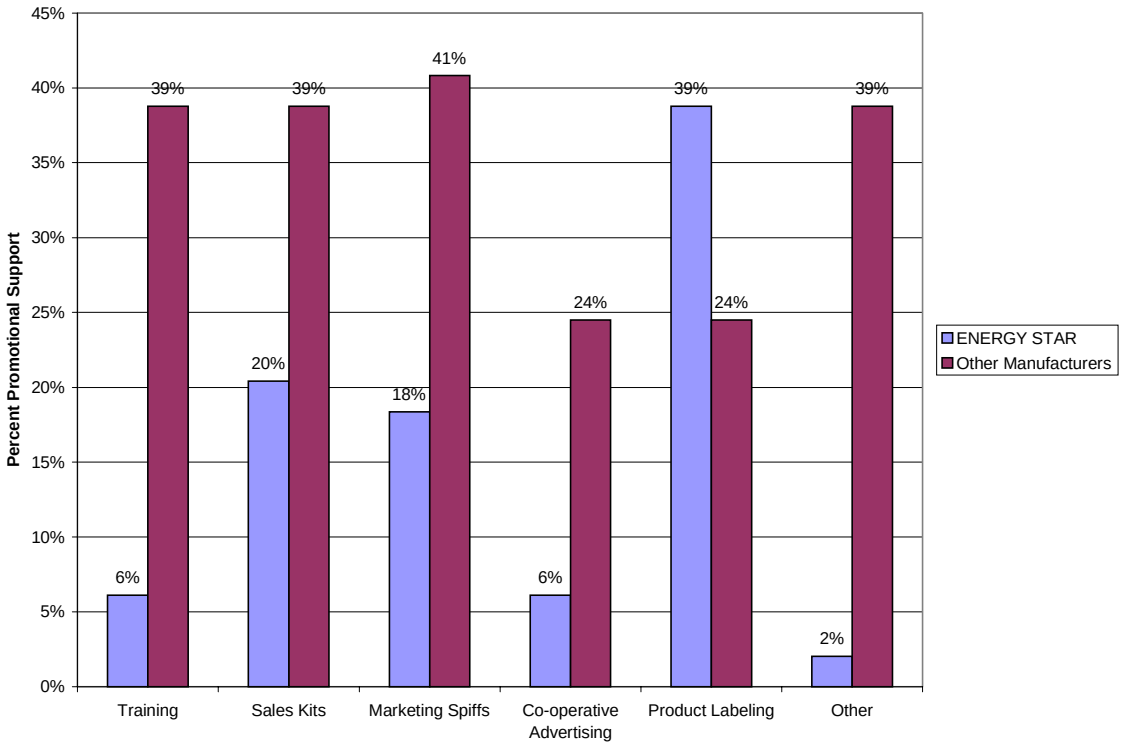
Retailers and wholesalers/distributors reported that they receive far more sales and promotional assistance from manufacturers for non-ENERGY STAR products than from the Program or manufacturers for ENERGY STAR products (Figure V-6). For nearly all measures – training for sales personnel, sales kit materials, marketing or promotional spiffs, and cooperative advertising – other products were said to have been far more likely to be associated with having assisted retailers and wholesalers/ distributors. These findings raise some questions as most window manufacturers in the Northwest are now involved to some extent with ENERGY STAR.

A possible explanation is that perhaps the respondents are simply more aware of long-established promotions for non-ENERGY STAR windows. An alternative explanation supported by findings from the windows manufacturer survey is that at least some ENERGY STAR manufacturers have not yet rolled out sales and promotional support for their ENERGY STAR products – they offer the product but do not emphasize it as a ENERGY STAR product in the marketing. This is supported by responses of retailers and wholesalers/distributors who were aware of ENERGY STAR windows. When asked whether they carried ENERGY STAR windows or

whether ENERGY STAR provided advertising, 79% of retailers and wholesalers/distributors reported that they carried ENERGY STAR windows; only 9% reported that ENERGY STAR provided advertising. However, in yet again another question, 55% of those who said they had heard of ENERGY STAR reported that that ENERGY STAR was providing labeling.

These findings indicate that retailers and wholesaler/distributors need more marketing/sales promotion support from the ENERGY STAR Program and manufacturers.

Figure V-6
Sales and Promotional Assistance: ENERGY STAR (Program and Manufacturers) and Non- ENERGY STAR Manufacturers



The exception to this pattern was product labeling where respondents indicated that more labeling assistance was provided for ENERGY STAR products (39%) than for non- ENERGY STAR products (24%).

What is ENERGY STAR market penetration?

The retailers and wholesalers/distributors reported that many of the windows, doors, and skylights they sell exceed code minimum and are classified as high efficiency (ENERGY STAR level) products.

Retailers/wholesalers reported that, on average, 46.1% of the windows they sell are ENERGY STAR level efficiency (a U-factor of 0.35 or less). When this figure is weighted based on 1998 window sales, the market penetration for high efficiency windows is 39.6%. This may be compared to Macro International Inc.'s 1997 findings of 27% market penetration for ENERGY STAR.[34]

Similar analyses were conducted for glass doors and skylights. Unweighted market penetration was 42.4% for ENERGY STAR glass patio doors and 35.6% for ENERGY STAR skylights. These results do not concur with those found by the baseline study (21% and 78% respectively for doors and skylights). It appears that the baseline study and this study asked the efficiency rating questions in a different format (e.g., this study had three categories – code minimum, ENERGY STAR level (U = 0.35 or 0.45 or better), or better than code but not ENERGY STAR. It also does not appear that Macro weighted its penetration rates by reported dollars of sales as did this study. By comparison, the Macro study asked if a particular brand of door or skylight was less than or greater than U = 0.35 or 0.45, respectively. Other factors that may cause different results include response rates – the Macro study had a total response rate of 16 for the door question, while this study had 39 responses. However, both studies had approximately the same number of responses (15 for Macro and 18 for this study) on the skylight question. Given the relatively small sizes of the respondent pools for each study and the heterogeneity of retailers, wholesalers/distributors, we do not believe these to be unreasonable differences.

We also believe that it is appropriate to weight the data based on 1998 sales volume. Doing so results in a market penetration for ENERGY STAR glass patio doors of 38.2% and 7.0% for skylights. The next retailer/ wholesaler/distributor survey should provide more information on penetration rates for ENERGY STAR glass patio doors and skylights.

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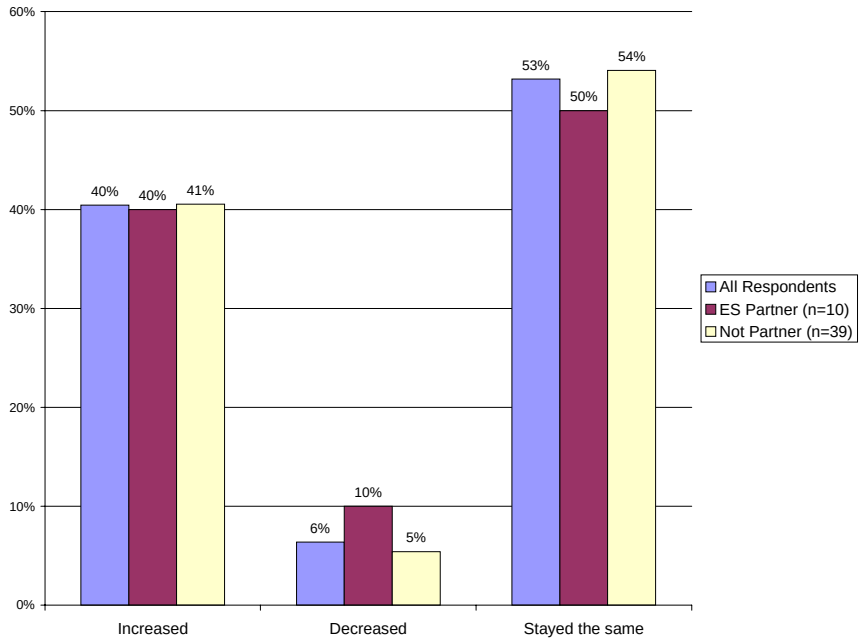
[34] Macro International Inc., Baseline Market Assessment: ENERGY STAR High Efficiency Residential Windows, January 1999, p. 23.

What are the trends in ENERGY STAR window products?

Many respondents (40%) believed sales of high efficiency fenestration products had increased since 1998 (Figure V-7). Very few – only 6% – believed that sales of ENERGY STAR efficiency level had decreased. These results were consistent among the ENERGY STAR partners and the other respondents.

When asked for the reasons for any change, the most common response was that education and an interest in energy savings was causing more customers to request high-efficiency fenestration products.

Figure V-7
Trends In Sales of High Efficiency Fenestration Products Since 1998



AHP Analysis

Methodology

Information on some of the market effects was obtained through indirect trade-off assessment. **quantec** used the Analytic Hierarchy Process (AHP) in order to quantify the relative importance of the different market barriers. The AHP is a technique that has been successfully applied for similar purposes in numerous industry applications (including a number of

utility load forecasting, rate setting, and market transformation applications).

The AHP involves three basic elements:

- Description of a complex multi-criteria problem with objective and/or subjective elements as a hierarchy
- Estimation of the relative weights for importance of various criteria (or subcriteria) on each level of the hierarchy
- Integration of the relative weights to evaluate the hierarchy with respect to the overall objective of the problem

AHP uses ratios as a measure of comparative judgments. Specifically, it uses pairwise comparisons to estimate the relative importance of specific criteria within each hierarchy level. A popular commercial software program (Expert Choice™) performs all of the computations and provides detailed reports for the generated weights of the criteria and alternatives.

The main results produced by the AHP include two sets of weights computed based on responses by each key actor:

1. Importance weights for the overall attributes (e.g., location, cost, energy efficiency, style, floor plan, and square footage)
2. Importance weights given to market barriers (i.e., lack of information, split incentives, bounded rationality, and availability of measures)

Both sets of weights were calculated for this baseline study. The same weights will be computed again in approximately one year. The difference between the average weights will indicate the success of the market transformation efforts in changing awareness and behavior and in lowering the importance of certain market barriers.

Results

Retailers and wholesalers/distributors, when asked the relative importance of energy efficiency, appearance, quality, and price in marketing windows, ranked quality first (with a mean ranking of 0.330) and price close behind it (with a mean ranking of 0.303). Appearance and energy efficiency follow in importance, with mean importance rankings of 0.187 and 0.181 respectively.

Table V-9
Descriptive Statistics for Marketability Characteristics

Descriptive Statistics	Minimum	Maximum	Mean	Standard Deviation
Energy Efficiency	0.054	0.450	0.181	0.111
Appearance	0.036	0.528	0.187	0.124
Quality	0.107	0.680	0.330	0.141
Price to purchaser	0.050	0.750	0.303	0.186

When asked why energy efficiency is not important to some companies in marketing window products, retailers and wholesalers/distributors ranked lack of information first, at a mean importance of 0.449. Price was rated as a second-greatest barrier, at 0.402. Lack of availability was not seen as a significant barrier, lagging far below other factors at 0.148.

Table V-10
Descriptive Statistics for Ratings of Market Barriers

Descriptive Statistics	Minimum	Maximum	Mean	Standard Deviation
Lack of Information	0.086	0.778	0.449	0.212
Price to purchaser	0.120	0.753	0.402	0.200
Lack of availability	0.042	0.460	0.148	0.097

When examined by size of retailer and wholesaler/distributor, those with reported window sales of above $1 million in 1998 and those with sales between $100,000 to $1 million reported that lack of information was a higher barrier (0.495 and 0.478 respectively) to marketing ENERGY STAR than price (0.387 and 0.355). Lack of availability was ranked least important at 0.119 and 0.167 respectively. Only respondents with sales below $100,000 reported that price was more important (0.492) than lack of information (0.374). They also ranked lack of availability as least important, at 0.135.

ENERGY STAR non-partners indicated lack of information as the highest barrier at a mean importance ranking of 0.438 and lack of availability as the next most important barrier – price was last by far at 0.149. ENERGY STAR Partners strongly rated lack of information as the highest barrier at 0.489, lack of availability at 0.367, and price again a distant third at a mean importance rating of 0.144.

Table V-11
Mean Importance Ratings for Market Barriers

Group	Lack of Information	Lack of Availability	Price to Purchaser
Overall	0.449	0.402	0.148
Size of 1998 Sales			
Sales above $1 million	0.495	0.387	0.119
$100,000 to $1 million	0.478	0.355	0.167
Sales below $100,000	0.374	0.492	0.135
Energy Star Involvement			
Nonpartner	0.438	0.413	0.149
Partner	0.489	0.367	0.144

Findings

The findings of the survey will be discussed in terms of market barriers, market drivers, and potential marketing channels.

Market Barriers

Retailer/wholesalers face a number of potential market barriers in their decision to support energy-efficient fenestration products, including:[35]

- **Lack of Information**

  Definition: Retailers and wholesalers/distributors say that lack of information is a bigger barrier to marketing ENERGY STAR efficiency level windows than price. They are driven by customer demand and they simply are not seeing that demand expressed in requests for high efficiency window products.

  Assessment: Retailers and wholesalers/distributors respond to what they perceive as their customers' (home builders, professional contractors, and retail homeowner customers) demands. Retailers and wholesaler/distributors emphasize the

[35] Availability was not a market barrier for retailer/wholesalers. Only 6% of the respondents stated that these products were "hard to get." This is confirmed by the results of the AHP analysis that placed lack of availability as the least important barrier to marketing energy efficient windows.

role of lack of information on energy efficient windows (a mean rating of 0.45 importance) is a higher barrier than the additional cost of energy efficient windows (a mean rating of 0.40).[36] They also find it somewhat difficult to explain the benefits of high efficiency windows to their customers, which range from home builders (and manufactured home builders) to professional remodelers and end use retail consumers (e.g., homeowners).

➔ **First Cost**

Definition: Perceptions of the importance of energy efficiency lag behind price as the predominant concern of retailers and wholesalers/distributors.

Assessment: Builders are highly sensitive to price, as are builders of manufactured homes. End use retail customers (e.g., homeowners and remodelers), however, do directly receive the benefits of energy savings. All three groups of customers have a vested interest in quality products that do not break down or invalidate warrantees.

Retailers and wholesalers/distributors clearly believe that price and quality far outstrip energy efficiency in terms of importance in marketing window products to customers. But 51% of respondents also believe that customers have a high demand for energy efficient windows, and this is confirmed by surveys of new homebuyers and remodel customers. There appears to be a partial disconnect between the perceptions of retailers and wholesalers/distributors and the expressed interest by end consumers in high efficiency window products

At the end of the interview, retailers/wholesalers were asked to describe any important trends in the windows market. Five respondents (about 10%) offered, unaided, that they see increased competition in the windows market. This provides some evidence of pressures on retailers/wholesalers to sell the lowest cost products. This was also confirmed in the respondents' belief that consumers care far more about price (84%) than any other factor, including quality (55%) and energy efficiency (20). However, the results of the AHP analysis which

[36] Lack of availability of energy efficient windows no longer appears to be a significant barrier at a mean rating of 0.15 in importance.

asks respondents to rank pairs of factors influencing the marketability of windows indicate that price and quality clustered (mean importance ratings of 0.30 and 0.33 respectively) but energy efficiency again lags behind (0.15) other factors in influencing window product marketability.

- **Split incentives**

  Definition: Compared to homeowners, who receive the energy bill reductions from the efficiency measures, retailers and wholesalers/distributors have less incentive to recognize the benefits of energy bill reductions unless those benefits emerge as a marketing tool.

  Assessment: Retailers and wholesalers/distributors don't see the benefits of energy savings accrue to them. They do, however, face the competitive price pressures that result in an emphasis on cost. Thus they recognize the value of high efficiency windows to customers, yet are driven as a group by different incentives.

- **Bounded rationality**

  Definition: Retailers and wholesalers/distributors may be somewhat limited in their ability to analyze the trade-offs among the various options available to achieve energy efficiency.

  Assessment: Retailers/wholesalers seemed well educated about the trade-offs that consumers make in purchasing windows. Nearly all the respondents were aware of the U-factor rating system, and many were aware of the ENERGY STAR program. However, our study focused on managers and store owners, and these respondents are likely to be better educated regarding energy efficiency in window products than their sales forces.

Market Drivers

Retailers and wholesalers/distributors clearly understood U-value efficiency ratings, and a majority (including non-partners) were aware of ENERGY STAR. However, the Northwest retail/wholesale/ distribution market is clearly driven by window marketability, as expressed by perceptions of customers' demand. That demand is not being effectively expressed by end use customers because they are largely unaware of ENERGY STAR level efficiency windows. As of now, retailers and wholesalers/distributors believe that marketing of window products is driven by price and quality, and energy efficiency lags a distant third.

Marketing Channels

The retailer and wholesaler/distribution market consists of three classes of customers:

- Home builders (and builders of manufactured homes for certain distributors)
- Remodeler contractors
- Retail end-use consumers (e.g., homeowners)

Home builders and remodeling contractors represent end use customers to retailers and wholesaler/distributors. The question is as to whether this representation accurately reflects, at least in the case of home builders, customers' demand for high efficiency windows. **quantec**'s surveys of homeowners and remodel customers find they definitely are interested in, and value, energy-efficient windows. Professional remodel contractors may respond to the interest of remodel customers more directly because they make decisions with the remodel customer on an individual basis. However, it appears that homebuilders make decisions influenced more by general market pressure to keep prices down. This is exacerbated by their lack of awareness of energy efficient windows. (Only 20% of homebuilders are aware of ENERGY STAR.) Interviews completed for this report on builders of manufactured housing also indicate a very strong emphasis on keeping prices down for this market of end consumers.

It is clear that retailers and wholesaler/distributors believe they get more marketing and promotional support for non-ENERGY STAR than for ENERGY STAR products, both from manufacturers and the Program. Marketing efforts for retailers and wholesalers/distributors must focus on raising levels of awareness and information concerning high-efficiency windows for retailers and wholesalers/distributors and all their customer segments. A campaign of awareness and information with specific targeted strategies for customers segments must be implemented with home builders as well as end use consumers and remodelers.

Retailers and wholesale/distributors as well as their home builder (and manufactured home builder) customers must be made more aware of the marketing advantages accruing from ENERGY STAR efficiency level windows in increasing their sales to customers. End use consumers' awareness and information concerning high-efficiency windows must be raised so that they can better express their demand for energy-efficient windows. This could be accomplished through product literature, media

campaigns, and in-store displays as currently envisioned by ENERGY STAR.

VI. Manufactured Home Builders Survey

The manufactured home builder market in the Northwest is transition. Shifts in market structure and corporate influence have created a significant amount of flux. Cost and price competition is a dominant industry trend, with some 80% of market growth projected to occur in the low and low-to-middle price manufactured housing segment. Price pressures are driving the industry to more standardization and products with fewer features, an environment that does not favor increases in energy efficiency, whether in the Super Good Cents Market Venture, or in energy efficient (U=0.35) windows.

quantec, in conjunction with Pacific Energy Associates, Inc. (PEA), designed questions on ENERGY STAR for inclusion in PEA's current evaluation of the Alliance's Super Good Cents Manufactured Housing Venture. Those questions were included in PEA's July-August 1999 Super Good Cents interviews with representatives of all 19 regional manufactured housing plants.

Methodology

Manufactured home builders were asked the following questions:

- Do you participate in the ENERGY STAR Program? Why or why not?
- If yes, are ENERGY STAR windows an upgrade or standard with all homes? If an upgrade, can you get ENERGY STAR windows without Super Good Cents?
- If you use ENERGY STAR windows, what brand do you use?
- Do you market ENERGY STAR windows?
- Are ENERGY STAR windows being more actively marketed to you? If yes, by who, and how?
- Are you marketing any other ENERGY STAR products in your homes?

Sample

Interviews were conducted by PEA with plant general managers or sales managers of 19 of the manufacturers with plants in the region. Two interviews were abbreviated as one company had just permanently closed their plant and a second could not spare the time to complete the interview. The following interviews were conducted:

- **Idaho** – representatives of Champion, Fleetwood of Idaho, Guerdon, Kit Manufacturing, and Nashua
- **Oregon** – Fleetwood of Oregon, Fuqua, Oakwood (previously Golden West), American Homestar (previously Guerdon), Homebuilders NW, Liberty, Marlette, Palm Harbor, Redman, Silvercrest, and Skyline
- **Washington** – Fleetwood of Washington, Moduline (now closed), and Valley

ENERGY STAR Survey Results

At the time of the survey, most representatives of manufactured home builders in the Northwest said that they were not participating in the ENERGY STAR Program; the one exception was Palm Harbor. Interviews with the majority of manufactured home builders in the region (11 plants) said they didn't know about ENERGY STAR or didn't have enough information to make decisions about participating in the Program.

These results conflict with information from D&R, the implementers of the Program. Discussions with D&R, Inc., indicate that three are Partners (American Homestar, Silvercrest and Conser Homes) while another (Palm Harbor) is an ENERGY STAR Homes Partner that participates in the Program through its window manufacturer. D&R also indicated that Partnership discussions are underway with several more manufacturers.[37] However, PEA's interviews took place with plant general managers or sales managers, which may not have been the manufactured home builders' ENERGY STAR representatives.

Two other PEA survey respondents said they had concerns about the additional cost of ENERGY STAR windows, and one respondent stated that

[37] ENERGY STAR Partnership is defined as a manufacturer signing a Memorandum of Understanding (MOU), promising to abide by ENERGY STAR requirements and in return, receiving promotional support (posters, labels, training, etc.).

their decisions were driven by their retail customers rather than vice versa. Table VI-1 summarizes the responses on participation.

Table VI-1
ENERGY STAR Participation by Manufactured Home Builders

	N
Nonparticipants	
Don't know about it/Not enough information	11
Additional Costs/No Demand	2
Thinking about it	2
Don't know /Plant Closure	3
Total	18
Participants	
Marketing story others don't have	1
Total	1
Total Manufacturing Plants	**19**

Specific comments by representatives of manufactured home builders (18 of the 19) as to why they *were not participating* in the ENERGY STAR program are as follows:

Don't know about it or don't have enough information
(11 manufacturing plants)

- "No one talked to us about it or it hasn't been discussed" (2)
- "Didn't know about it or haven't heard of it" (7)
- "No one knows much about it. We're not active. It came up the other day, a question popped up concerning if we met the standard of U = 0.35 and at the plant we do." (1)
- "We were only "pitched" on appliances" (1)

Additional Costs/No Demand (2 manufacturing plants)

- "Not doing it due to added cost [of energy efficient windows]s."
- "Cost, value, and public demand. We respond to retailer demands, we listen to the retail side. We don't thrust things on our retailers. The retail customers need to request it."

Thinking about Participating (2 manufacturing plants)

- "[We have] been looking at it. Russell (D&R) talked to us about it. We are not actually marketing it. We use Carefree/Alpine Windows. They are in testing. Looks like the vinyl, low-e product will pass at 0.35U and be in compliance. We are not actually marketing it yet. We might use it (the stickers). It's a competitive thing that we'll use if it helps us to compete with the competition, who is using it. We don't see it as that innovative."
- "We're trying to. I'm not trying to be facetious, but it's only due to our commitment to it that we haven't abandoned it yet. We use Summit Windows, who didn't solicit [the manufactured home builder] to offer it to its customers. They are not aggressively promoting it. Doesn't this seem unusual? There are only one or two of the 16 plants in Oregon and Washington using it. We haven't given up on it yet. It has to make sense to the consumer. We need help educating [retailers/customers] on the benefits of the ENERGY STAR program. It can be a marketing tool, and give customer value from an energy- efficiency perspective and from the standpoint of how to promote [it] in the marketplace. We are using an ENERGY STAR-compliant window, but we're not promoting ENERGY STAR. We don't know how."

Other (3 manufacturing plants)

- Don't know (2)
- Plant closed (1)

When asked why it had decided to participate in the ENERGY STAR program, the one ENERGY STAR *manufactured home builder partner* made the following observation:

> *It gave us a marketing story to tell that others didn't have. It [ENERGY STAR] supplied sophisticated marketing tools. For us, it had little added cost. It's a great story that only two firms have. I think that [another manufactured home builder] is the other.*

Are ENERGY STAR windows an upgrade option or standard with all manufactured homes?

Two manufacturers responded to the question of whether ENERGY STAR windows were available as an upgrade, or were considered a "standard" item. The first, a nonparticipant, said that ENERGY STAR windows were offered as an upgrade but could not be included in the home without the

requirement that the home be Super Good Cents. Despite providing ENERGY STAR windows in its production lines, the manufacturer said that it was not "marketing" ENERGY STAR windows.[38] The second, an ENERGY STAR participant, said that ENERGY STAR was standard in two lines, which comprised 60% of its business, and was an upgrade in the third line, representing the remaining 40% of business. In the latter line, ENERGY STAR windows can be ordered without requiring other Super Good Cents measures.

Although only one manufacturer said that it participated in ENERGY STAR, nine respondents said they used ENERGY STAR level windows in at least some product lines. Energy-efficient window manufacturer brands included Phillips (3 mentions), Carefree (2 mentions), Kenro low-e, Alpine and Summit (1 mention each). The indication is that ENERGY STAR efficiency-level windows, if not ENERGY STAR participation, are becoming fairly common if not standard in the manufactured homes industry.[39]

Eighteen of the 19 manufacturers surveyed indicated that they were not "marketing" ENERGY STAR windows. Instead, the common strategy appears to ensure that energy-efficient windows are available but leave decisions on window energy efficiency to the customer. One exception was the participant manufacturer with ENERGY STAR windows as part of its standard offering in two lines and as an optional upgrade in the third product line. This manufacturer had added a logo to their highway billboard on a major interstate highway, committed to placing an ENERGY STAR logo on their website, and planned on featuring ENERGY STAR in 13 distribution areas in August 1999.

Two manufacturers out of 19 indicated that they had noticed that ENERGY STAR windows were being more actively marketed to them. In both cases, staff of D&R, Inc., the program implementer, had talked with them, offering various promotional aids. In one case, the respondent remembered receiving ENERGY STAR marketing literature emphasizing high efficiency, low-e coatings to reach the U=0.35 level of efficiency. This respondent said that the marketing effort was effective but that the manufacturing plant did not choose to participate because there was no

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38 This manufacturer estimated 70% of its manufactured homes were Super Good Cents.

39 One manufacturer said they offered vinyl and aluminum windows in response to the question of whether ENERGY STAR windows were being actively marketed to them. That response is not included, although some part of the vinyl windows might be U=0.35.

consumer demand and, thus, no marketing advantage to be pursued. His comment is as follows:

> *[ENERGY STAR] is like a brand name like Super Good Cents. The public is more aware of [Super Good Cents] than ENERGY STAR. If we are going to market these products, we'd just as soon do it under the Super Good Cents name [because] it has a brand identity.*

In the second case, the self-identified ENERGY STAR participant observed:

> *We struck an arrangement for [x] amount of marketing money if we did several marketing tasks. And we also got the windows at almost no increase in cost, less than one dollar . . . the cost difference was not significant!*

The participant found that the marketing effort was effective because the ENERGY STAR story and materials were kept simple, focusing on the message that ENERGY STAR windows were "better windows."

When asked if they were marketing any other ENERGY STAR products in their homes, all 19 manufactured home builders surveyed said no, they were not, although a couple of builders said they had marketed ENERGY STAR products in the past, or had some ENERGY STAR appliances "left on the books." Their specific comments are as follows.

> *No, our suppliers are not proactive in promoting ENERGY STAR. Is it different in site-built?*
>
> *No, just what the appliance manufacturers supply us.*
>
> *[Not now.] We did. They didn't sell. We have them on the [accounting] books and still have them.*
>
> *No. We had in the past – in fact, we still have one . . . a refrigerator. We had very few takers; [there was] little interest.*

Findings

The major finding that emerges for manufactured home builders is that 11 of the 18 non-participating manufactured home builders active in the Northwest[40] say they either don't know anything or don't know enough

[40] One manufacturer plant is closed.

about ENERGY STAR to decide whether to participate in the program. This lack of awareness is countered somewhat by nine of those respondents indicating that they offer ENERGY STAR level efficiency windows in at least some of their product lines, either as a standard offering or as an add-on "upgrade."[41]

Two of the manufacturers that were aware of the program had received communications, visits, and/or promotional marketing information (and in one case, marketing incentives). They indicated that market barriers of additional costs or lack of consumer demand had so far stopped them from participating. Two other manufacturers indicated they were considering ENERGY STAR participation but simply had not done so yet.

Market Drivers

As mentioned previously, the manufactured housing industry in the Northwest is changing. Some of these changes include the vertical integration of the industry, with a move to factory-owned retailers and combined land/home packages. However, judging from PEA's findings on Super Good Cents in manufactured homes, the industry remains largely cost driven and unwilling to pay any incremental cost for energy efficient windows unless net benefits can be shown to aid in marketing manufactured homes. (Pacific Energy Associates, p. 27.) It appears that the focus of manufactured home builders is on understanding the structural changes in their industry and keeping costs as low as possible rather than increasing efficiency levels.

Conclusions

The ENERGY STAR program must reach out vigorously to the manufactured housing builder industry to raise levels of awareness of ENERGY STAR marketing advantages and benefits to consumers. With few exceptions, most manufactured housing builders surveyed by PEA lack the essential awareness and knowledge to make decisions as to whether ENERGY STAR can benefit them in the marketplace by increasing their share of market or benefit the end consumer by decreased energy costs.

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41 Bob Davis of Ecotope estimates an ENERGY STAR manufactured home window penetration of 19% for 1998, Personal Communication, May 3, 1999. This may be compared to the 3% penetration found for manufactured homes by Macro International Inc. in 1997 in its Baseline Market Assessment: ENERGY STAR: High Efficiency Residential Windows, January 1999, p. 15.

These findings may be put into context by understanding the early stages of ENERGY STAR and its relationship to the Super Good Cents program. At the beginning of the ENERGY STAR program, there was some question as to whether introduction of the ENERGY STAR branding effort would result in potential confusion and/or attrition to the Super Good Cents branding effort. The concern was that by introducing ENERGY STAR too early, efforts to place the Super Good Cents program on a strong footing might be undermined. There was concern that the latter effort might be eroded to some degree by the raising of awareness of ENERGY STAR branding of energy-efficient windows in the industry.

The issue was resolved by the decision to wait to introduce the ENERGY STAR brand in the manufactured housing industry. The reasoning was to allow the Super Good Cents Housing Venture to better retrench in the aftermath of ending the regional MAP market transformation before ENERGY STAR entered the picture. The initial report on market progress by Pacific Energy Associates, Inc., indicates that this issue has now been substantially resolved. ENERGY STAR program staff are now beginning to contact manufactured home builders. Three have signed MOUs, while discussions on Partnership are ongoing with several more.

The next ENERGY STAR Market Progress Evaluation Report will discuss any changes in awareness and information resulting from ENERGY STAR program activities in the Northwest.

Market Barriers

- **Lack of awareness**

  Definition: Manufactured home builders appear to be largely unaware of the ENERGY STAR program, although about half mention offering energy-efficient windows, either as a standard product or as an upgrade.

  Assessment: Lack of awareness of ENERGY STAR acts as a major barrier to more manufactured home builders incorporating ENERGY STAR windows, promotion, and education to retailers and end consumers.

- **Insufficient information**

  Definition: Manufactured home builders require more information on promotional advantages and benefits of ENERGY

STAR level windows in order to increase their marketing advantages in an extremely price-conscious industry.

Assessment: Lack of information on the marketing advantages of establishing ENERGY STAR is a definite impediment to establishing it as the standard across the Northwest manufactured housing industry.

- **Split Incentives/First Cost**

  Definition: Manufactured housing builders do not receive the direct benefits of ENERGY STAR windows and are unwilling to incur the additional cost of installing energy-efficient windows if they do not perceive it as a marketing advantage.

  Assessment: To the extent that manufactured housing builders do not already incorporate energy efficient windows as a standard in their housing production lines, vigorous marketing and promotional strategies are necessary to aid in transforming the energy-efficiency of windows in the manufactured housing industry.

Market Channels

It appears that awareness and demand for ENERGY STAR products must be increased at every step of the manufactured housing distribution chain, from manufacturers, through retailers, and to buyers of manufactured homes. Manufacturers indicate that they will respond to increased customer demand for ENERGY STAR level efficient window products. They are unlikely to be willing, in an extremely cost-conscious industry, to try to develop that demand if it increases prices

Manufacturers do know, however, that higher demand will eventually lead to cost reductions via economies of scale. In the meantime, ENERGY STAR should continue its efforts to transform the market via partnerships, providing promotional aids and/or incentives, and otherwise begin ongoing dialogues concerning the strength of ENERGY STAR branding efforts.

VII. Conclusions and Recommendations

Key Findings

This report discusses the findings of surveys on ENERGY STAR awareness, knowledge, and perceptions of Northwest manufactured home builders and retailers/wholesalers/distributors. It concludes with recommendations to increase the effectiveness of ENERGY STAR. Finally, a recommendation is made to revisit the assumptions underlying calculation savings and cost-effectiveness calculations so as to develop a more accurate measurement of market transformation effects.

Awareness of ENERGY STAR and Market Share

It remains relatively early in the evaluation to assess whether market barriers of lack of awareness and/or initial cost premiums have decreased significantly. Manufacturers are extremely aware and are active in the Program, due in large part to the efforts of program implementers, as well as to the effects of other regional and national window energy efficiency transformation efforts. Consumers appear to be aware of and value energy efficiency in general but are almost completely unaware of the Program. Their lack of awareness is matched by that of manufactured home builders, who express little or no awareness (with a couple of exceptions) of ENERGY STAR. (However, half of manufactured home builders offer ENERGY STAR equivalent efficiency windows as standard in some product lines, or as upgrades.) New homebuyers are less aware than are remodel customers. Builders' level of awareness can probably be placed between consumers and retailers and wholesalers/distributors. Retailers and wholesalers/distributors are generally aware of the Program but believe that customers' lack of awareness and information is the major market barrier.

Perceptions of Manufactured Home Builders

- Eleven out of 18 manufactured home builders (1 had closed) said they didn't know about ENERGY STAR or lacked enough information to make a decision to participate in the Program.
- Only one manufactured homes builder reported being an ENERGY STAR Partner. (This contrasts to information from D&R indicating ongoing discussions with five manufactured home

builders.) That builder was excited about the program, saying that the program had given it a marketing story others didn't have and had supplied sophisticated marketing tools for little added cost. This partner also said that ENERGY STAR windows were standard in two of its production lines (60% of its business) and was an upgrade in the third line (representing the remaining 40% of business).

- Although manufactured homebuilders were almost totally unaware of ENERGY STAR, nine of the 18 reported providing ENERGY STAR equivalent typically as an upgrade. However none of the nonparticipating manufactured home builders actively marketed high-efficiency windows to customers.

Perceptions of Retailers and Wholesalers/Distributors

- Retailers and wholesalers/distributors perceive price (84%) and quality (55%) to be the most important factors in customers' decisions to purchase window products. Energy efficiency was a distant third (20%). However, over half (51%) of retailers and wholesalers/distributors believed that their customers had a high demand for high efficiency windows. Ninety-two percent of respondents confirmed that high efficiency windows provide a good value to customers, while only a third or so of respondents felt that the benefits are too hard to explain, or that the windows are too expensive.
- There is still room for increasing the awareness of ENERGY STAR windows among retailers, especially smaller ones. Approximately one-third of the retailers contacted were not aware of ENERGY STAR.
- Lack of availability of high-efficiency windows was not a significant issue. Sixty-seven percent were aware of ENERGY STAR but only 16% reported that customer have asked for ENERGY STAR products. When weighted by window sales, the market penetration for ENERGY STAR level efficiency windows reported by retailers and wholesalers/distributors was 39.6%, corroborating the estimated 41%-44% penetration rate for the Northwest market as a whole. Many believed (40%) that sales of high efficiency windows had increased since 1998. Only 6% believed such sales had decreased.
- Retailers and wholesalers/distributors identified lack of information, more than price, as the most important barrier to marketing ENERGY STAR windows.

- Retailers and wholesaler/distributors also believe they get more marketing and promotional support for non-ENERGY STAR than for ENERGY STAR products. They do not appear to actively associate the ENERGY STAR windows they sell as being ENERGY STAR products or ENERGY STAR qualifying products.

Market Drivers

The following are identified by the research as being either active or potential market drivers in the transformation of the Northwest windows market:

- Windows manufacturers' partnerships and participation in the ENERGY STAR Windows program (and other national and regional energy efficiency market transformation efforts)
- The naturally competitive nature of the fenestration industry
- Material and technology breakthroughs and service trends (e.g., more after-sale service) in windows manufacturing and related drops in the costs to produce energy efficient windows
- A trend by manufacturers to position energy-efficient products in all or most of their product lines (with "energy efficient" being defined as anything from U = 0.45 or better) coupled with general availability of ENERGY STAR level window products across the region to retailers and wholesalers/distributors and their end customers
- Cumulative effects of building codes across the region (and expectations that this trend will continue)
- Increased awareness of energy efficiency in general (but not ENERGY STAR windows) by consumers and manufactured home builders

Conclusions

Overall, 1998 sales data and manufacturers' feedback indicates that the ENERGY STAR Program is crucial in the substantial market share increase from 1997 levels to an estimated 41%-44% market share. However, in terms of the Program's goals of decreasing at least two other market barriers – lack of awareness of ENERGY STAR and cost of energy-efficient windows, additional strategies are needed, particularly in increasing consumers and builders' awareness, and persuading builders of the marketing value of ENERGY STAR windows.

Market Barriers

Specific market barriers identified in our first Market Progress Evaluation Report included:

- A distinct lack of awareness and information about Energy Star exists among new homebuyers and remodelers although homebuyers and remodel customers were interested in the features and benefits of energy-efficient window products.
- Builders also had a fairly low awareness of ENERGY STAR, although custom homebuilders tended to value energy-efficient products. Builders tended to believe that energy-efficient windows cost more and that customers had little interest in them compared to other house features.
- Windows manufacturers reported that first costs of energy-efficient windows are a barrier to builders and consumers and that builders make decisions on energy efficiency for different reasons, mainly first cost, than do consumers, who tend to take long-term energy savings more into account. They also believe that lack of awareness and information, particularly for builders and consumers, is a major market barrier resulting in a lack of customer demand for energy-efficient windows.
- End use consumers, builders, the manufactured home industry, retail suppliers, and wholesaler/distributors were all considered customers by manufacturers, and each, in turn, was seen to influence downstream window purchasers. Information concerning the benefits of energy-efficient window products, although understood by some actors, is not being effectively transmitted to other key actors, for example, by builders to new homebuyers. This is supported by the finding mentioned above regarding retailers and wholesalers/distributors not believing they are given as much marketing and promotional support for ENERGY STAR for non- ENERGY STAR windows by either the Program or manufacturers.

The second Market Progress Evaluation Report adds the following findings to the emerging picture of the Northwest windows market:

- Retailer and wholesaler/distributors also identify lack of awareness of ENERGY STAR windows as the major barrier, more so than price, to marketing ENERGY STAR windows.

- Manufactured home builders remain mostly unaware of ENERGY STAR, although more than half say they offer high efficiency windows, either as standard in some production lines, or as upgrades. They remain driven by price. They are willing to provide ENERGY STAR compliant windows but unwilling to "push" higher-cost home features upon their customers, who tend to be more affected by increases in home price than other homebuyers.

Recommendations

- **Continue to build customer demand for ENERGY STAR products at every level**. Demand can be built in various ways, by more stringent codes or by increasing the awareness at the end-use level resulting in customers requesting ENERGY STAR products from retailers and wholesalers/distributors and manufactured home builders.
- **Continue to provide extended marketing and training support within specific groups of market actors**. In this case, the key is recognizing the importance of communication of ENERGY STAR benefits to and between specific market actors. Retailers/wholesalers/distributors and manufactured home builders must be aware of ENERGY STAR and clearly understand the benefits of ENERGY STAR to them so that they can communicate its benefits to their customers. This level of the distribution chain is unique in that, for example, retailers/wholesalers/distributors deal with a number of different types of customers, each of whom have a unique perspective and set of incentives, e.g., home builders, professional remodelers, and homeowners. Emphasis of the marketing advantages of high-efficiency windows to each type of customers is key in raising the level of awareness of ENERGY STAR.
- **Consumers' interest in window energy efficiency should continue to be communicated to Northwest market actors such as retailers/wholesalers/distributors and manufactured home builders**. The ENERGY STAR Program should escalate its efforts to raise ENERGY STAR awareness particularly among manufactured home builders via incentives, information and marketing aid, so that they recognize its value as a marketing tool.

- **Continue and extend efforts to target additional market actors as necessary in order to educate them about the advantages of using ENERGY STAR window products**. These include model home sales agents, builders, manufactured home dealers, retail outlets, remodel contractors, and real estate agents. These market actors should be targeted in terms of cost-effectiveness, so the emphasis on selection of targeting strategies should be on the greatest leverage of program dollars.
- **Finally, we recommend that the assumptions underlying the estimation of energy savings due to the Program be revisited.** We recommend updating the assumptions used to forecast housing starts, fuel mix, energy savings and cost information on ENERGY STAR windows for both new and remodel homes. We also recommend that data be included on non-electric energy savings and non-energy benefits (as applicable).