

Market Research Report

Opportunities for New Appliance Market Transformation Programs in the Pacific Northwest

prepared by

**Four Winds Alliance
D&R International**

report #00-057

August 2000



NORTHWEST ENERGY EFFICIENCY ALLIANCE

www.nwalliance.org

529 SW Third Avenue, Suite 600
Portland, Oregon 97204
telephone: 503.827.8416 • 800.411.0834
fax: 503.827.8437

**OPPORTUNITIES FOR NEW APPLIANCE
MARKET TRANSFORMATION
PROGRAMS IN THE PACIFIC NORTHWEST**

FINAL REPORT

**Prepared For:
The Northwest Energy Efficiency Alliance**

PREPARED BY:

**FOUR WINDS ALLIANCE
D&R INTERNATIONAL**

JULY 2000

ACKNOWLEDGEMENTS

This report was prepared by Four Winds Alliance, LLC and D&R International, Inc. under contract to the Northwest Energy Efficiency Alliance. The development of this report would not have been possible without the generous assistance of the many individuals in the appliance retailing and manufacturing, home building, public housing, remodeling and market transformation fields who were interviewed for this report.

In particular, we also wish to acknowledge the expert assistance provided by the following individuals: Tom Eckman of the Northwest Power Planning Council, Rick Kunkle of Washington State University, Tim Michel of the Electric and Gas Industries Association, Steve Nadel and Margaret Suozzo of the American Council for an Energy Efficient Economy, Charlie Stevens of the Oregon Department of Energy, and Jill Notini of the Association of Home Appliance Manufacturers (AHAM).

We would also like to thank Ben Bronfman, Heidi Hermanet, Susan Hermanet, Marci Sanders and Phil Degans of the Alliance for providing project guidance.

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

Table of Contents

Executive Summary	1
Section I – Overview of Appliance Market Trends	8
1. General Themes In The Marketplace	8
2. Manufacturing and Product Trends	15
3. Consumer Drivers for New Appliances	17
4. Retailer and Manufacturer Views on Energy Efficient Appliances	21
5. Consumer Attitudes Towards Energy Efficiency	25
Section II – Characteristics of the Appliance Markets in the Northwest	29
1. Refrigerators	30
2. Freezers	39
3. Washing Machines	45
4. Dryers	52
5. Dishwashers	58
Section III - Appliance Manufacturing and Distribution Analysis	65
1. Distribution Chain Analysis	65
2. Efficiency Potential and Emerging Technologies	80
Section IV - Activities of Other Market Transformation Stakeholders	90
1. Overview	90
2. Summary	91
3. Program Design	92
4. Communications and Outreach	99
5. Evaluation	102
6. Cooperation with other Regional or National Groups	104
Section V - Program Opportunities and Design Recommendations	109
1. General Themes for Program Design	109
2. Program Design Feedback from Market Actor Interviews	112
3. Program Opportunities and Design Recommendations	117
Appendices	
Appendix A: Interviews	130 Appendix
Appendix B: Exhibit List	171
Appendix C: Appliance Brands by Retailers and Manufacturers	173
Appendix D: Independent Retailer Comments on Appliance Programs	175

Executive Summary

Research Background and Approach

The purpose of this research was to assist the Northwest Energy Efficiency Alliance (Alliance) in determining future Market Transformation program opportunities for residential refrigerators, freezers, clothes washers, clothes dryers, and dishwashers. The market research sought to better understand the channels of distribution and current trends in appliance retailing and manufacturing in the Pacific Northwest and nationally.

The data and findings presented in this study were derived primarily from existing reports and studies and other secondary data sources. However, primary research was conducted through interviews with key market actors including manufacturers, national retailers, independent retailers, contractors, multi-family builders and property managers, public housing agencies, and regional and national Market Transformation (MT) stakeholders.

This study consists of five sections designed to provide the Alliance both a broad perspective of current appliance marketing and distribution trends and a detailed perspective of the current prospects for highly efficient product development in each appliance area studied for this report. In addition, the report includes two chapters intended to help the Alliance identify opportunities to leverage the activities of other MT groups, retailers and manufacturers to help make potential programs resonate more fully in the marketplace. The sections of this report include:

- Section I: Overview of Appliance Market Trends
- Section II: Characteristic of the Appliance Markets in the Northwest
- Section III: Appliance Manufacturing and Distribution Analysis
- Section IV: Market Transformation Program Analysis
- Section V: Program Opportunities and Design Recommendations

Key Findings

Overview of Appliance Market Trends

Interviews with key market players in the appliance manufacturing and retailing sectors, as well as research into trade industry reports reveal several shifts in consumer demand for major appliances that should have significant impacts on MT program design and prospects for success in the near future.

- On the whole, manufacturers and retailers have noted a slight, but discernable increase in public awareness of the ENERGY STAR label and in consumer demand for efficient appliances.
- However, most of the retailers and manufacturers believe that selling appliances solely or largely on environmental benefits—unless concentrated on “hot button” issues like water conservation—will be difficult in today’s marketplace.

- Marketing the economics of efficient appliances will also be increasingly difficult as appliances get more efficient with the implementation of new federal energy standards. Most consumers demand significant annual savings and short payback periods and many assume their appliances are already efficient as a result of federal appliance standards.

Perhaps the most significant trend in today's appliance marketplace has been the emergence of "value-driven" consumers who are intent on purchasing appliances which meet a variety of needs in their lives, including:

- Superior performance
- Time efficiency, including reduced dryer cycle times or synchronized washer and dryer times.
- "Smart" or enhanced feature products that either improve performance or save the consumer time.
- Larger appliances – larger washers means less loads of clothes, larger refrigerators means less shopping trips.
- High-end design and aesthetics - many consumers now look at appliances as both a functional device and a key component in home design.

The introduction of products to meet these consumer needs has meant that appliances are no longer simply commodity items, but products for which consumers will willingly pay more provided they meet the needs noted above. Since many of these products carry higher price tags and produce more profit for both manufacturers and retailers, they have emerged as the focus of much of their current product design and marketing efforts.

The most important consumer demand driver for appliances remains the replacement of existing appliances; most industry surveys and our interviews show that this accounts for approximately 70-75 percent of new purchases. Other motivators, such as the purchase of a new home, moving to a new residence, remodeling, or the purchase of the product for the first time, generally account for the remaining 25-30 percent of appliance sales. However, despite the relatively lower numbers for discretionary purchases and remodeling, it is clear that capturing the attention of these consumers has become a major priority for both retailers and manufacturers, since these consumers generally are in the market for higher-end, high value products. We believe that this is an opportunity for the Alliance in its program planning activities.

Another interesting trend in the appliance marketplace is that most of the national retailers and manufacturers have shifted away from a regional marketing and sales orientation for a variety of reasons. In addition, the current tight labor market and the emergence of new competitors such as Lowes and Home Depot has forced most retail actors to be much more selective about the level of their involvement in what they consider to be "non-core business activities," including participation in MT programs.

Virtually all of the national actors we spoke with were surprisingly strong supporters in principle of MT programs. In practical terms, however, most view the ENERGY STAR

platform and accompanying programs as the focus of their commitment to MT and to voluntary efficiency efforts in general. Many of these parties expressed strong disapproval for any efforts that could be construed as competing with or undermining the ENERGY STAR Programs. In this light, efforts by the Alliance to exert greater influence on manufacturers and retailer practices could be well served by a wider commitment to the ENERGY STAR label in the appliance areas, as well as in other products.

However, the depth of this commitment appears to be somewhat uncertain. Many of the retailers and manufacturers interviewed for this report also believed that their long-term commitment to and involvement in the ENERGY STAR and other MT programs would depend on the success of the Alliance and other national and regional MT groups to (a) achieve a higher degree of national consistency in the marketing and delivery of their programs, and, (b) incorporate a greater degree of flexibility in program delivery elements to account for differences between sales and training systems among the national retailers.

Finally, all of the key actors were supportive of efforts by the Alliance and other MT groups to use advertising and public events to raise the level of consumer awareness of efficient appliances. However, virtually all noted that they were *not* likely to devote significant time and resources to marketing efficiency and the ENERGY STAR label absent a commitment from the Alliance and other MT groups to multi-year marketing and advertising and marketing campaigns that rely upon a simple, consistent message across a broad category of efficient products.

For this reason, we would encourage the Alliance to (a) work with other MT actors to achieve the highest degree of consistency possible among marketing and advertising efforts, (b) consider expanding the organization’s embrace of ENERGY STAR to include refrigerators and dishwashers, and (c) cross market the appliance program wherever possible with other Alliance ENERGY STAR efforts on lighting and windows.

Characteristics of the Appliance Markets in the Northwest

Based on a review of the major surveys of appliance saturation rates in the Northwest and nationwide, we estimate that the approximate number of current units in service and annual sales of each appliance is as follows in the Northwest:

Appliance Stock Levels

Appliance	Units in Service	Annual Sales
Refrigerators	4.9 Million	347,000
Freezers	985,000	78,600
Clothes Washers	2.9 million	287,000
Electric Dryers	1.9 million	239,500
Dishwashers	2.2 million	240,000

Appliance ownership patterns in the Pacific Northwest appear to mirror those found in other parts of the country based on our review of national and regional appliance studies. These studies revealed the following trends in the ownership of major appliances:

- With the exception of refrigerators, ownership rates for the appliances noted above were generally much higher in single-family and manufactured housing than in multi-family homes.
- In addition, appliance ownership rates were directly proportional with household income levels for all appliances except refrigerators.
- Over thirty percent of the refrigerator stock in place in the Northwest was ten years or older in 1997. Similarly, roughly 15 percent of all homes in the Northwest contained a freezer that was more than ten years old in 1997.

Appliance Sales Growth Trends and Forecasts

In addition, sales of the appliances noted above are expected to grow rather slowly between 2000 and 2005, when compared to growth rates in the 1990s:

Appliance	Growth Rate 1991-1998	Est. Growth 1999-2005
Refrigerators	2.7%/year	1.0%/year
Freezers	2.1%/year	-1.3%/year
Clothes Washers	1.7%/year	0.6%/year
Electric Dryers	4.5%/year	0.6%/year
Dishwashers	5.4%/year	1.3%/year

Efficiency Characteristics of New Appliance Models

Finally, efficiency has been improving dramatically over the past twenty years for all the appliances studied for this report, in many cases energy use has dropped by more than 50 percent. However, the range of efficiencies among existing models varies widely between appliance types. For clothes washers and dishwashers, considerable variation exists between models on the market. However, for freezers and dryers, most of the existing models just meet or barely exceed federal standard efficiency levels, as noted in the following chart:

Appliance	Percent of Models 1-10% Above Standard	Percent of Models >20% Above Standard
Refrigerators**	75.3%	9.8%
Freezers	99.8%	0.0%
Clothes Washers	46.1%	25.7%
Electric Dryers	100.0%	0.0%
Dishwashers	55.7%	23.2%

* Measured against 1993 Standard

Appliance Manufacturing and Distribution

Residential appliances flow to the consumer through three primary routes. The two primary channels are roughly split between the national and independent retailers. The third channel, accounting for 5 to 10% of appliance sales, is through an appliance distributor or wholesaler who serve the commercial markets (builders, contractors, designers, government sales). Most manufacturers and national retailers also have commercial sales departments that serve these commercial sales customers. National retailers have relationships directly with manufacturers but approximately 85% of independent retailers purchase products through appliance buyers group.

Five large manufacturers dominate the production of appliances: GE, Whirlpool, Frigidaire, Maytag, and Amana. The market share captured by the top three producers of each product range from 78% to 93%, with the exception of freezers in which 99% of the market is captured by two producers.

The introduction of large home improvement chains such as Home Depot and Lowes into the appliance arena is projected to have a relatively large impact on the national appliance-retailing sector. There are some indications that major players, such as Circuit City, will compete by offering full-service, dedicated appliance stores more closely modeled on small, independent appliance stores. Sears, the largest national retailer selling over 35% of all major appliances, has made a significant commitment to ENERGY STAR appliances by setting a sales target of over 1 million qualified appliances in 2000. These efforts will include enhanced training for Sears's personnel in stores nationwide.

It does not appear that the Internet will play a major role in the selling of major appliances over the next few years. However, the web is being used as an increasingly important marketing device for virtually all of the national retailers and manufacturers. Currently, efficiency and/or the ENERGY STAR label is only featured on a few retailer and manufacturer websites.

Efficiency Potential

The efficiency potential for the appliances researched in this study is summarized below based on the 2001 ENERGY STAR minimum for refrigerators, clothes washers and dishwashers, and the most efficient models currently available for dryers and freezers. All of these estimates are based on the incremental savings compared to a model meeting the standard efficiency level assuming 100% of models purchased each year are at these higher efficiency levels. Promoting tiered levels of efficiency beyond ENERGY STAR where feasible will further increase savings.

Appliance	Energy Saved per unit (kWh/yr)	\$ Saved per unit @ \$0.05 kWh	Est. Max. Potential Energy Savings in Northwest (aMW/yr)
Refrigerators	52	\$2.60	2.1
Freezers	55	\$2.75	.5
Clothes Washers	628	\$31.40	10.3
Clothes Dryers	90	\$4.50	2.5
Dishwashers	125	\$6.25	1.7

Regional and National Appliance Programs

Interviews conducted with regional and national program sponsors, and environmental advocacy groups identified tremendous alignment and opportunities for leveraging efforts. All groups recognize the heightened importance of national coordination and the need for common program designs to be successful in the appliance arena. Therefore, program sponsors are exploring ways to work closer with other regions to better coordinate communications and planning with the industry.

Many of those we spoke with mentioned that manufacturers and retailers must be engaged more fully at an earlier stage of program design if these programs are to be successful. In addition, they are realizing that they must be more flexible in designing program elements that work within the industries normal operating procedures rather than the old style of trying to change the industry practices to fit the program design. While many of the MT stakeholders are engaged in trying to coordinate nationally, it is clear that no single model has emerged for soliciting this participation from retailers and manufacturers.

All program sponsors are using the ENERGY STAR qualification levels as the foundation for their appliance program efforts and some groups promote tiered levels of efficiency above the minimum ENERGY STAR-qualification levels. Consortium for Energy Efficiency's (CEE) Super Efficient Home Appliance (SEHA) levels are often used to set the higher efficiency levels. Under the broad umbrella of ENERGY STAR, several program sponsors are exploring ways to cross-market the wide array of labeled products. One way this is being done is through consumer education and advertising based on the ENERGY STAR brand. The outreach and advertising efforts might still "lead" with a specific appliance, but the larger message is still based on the benefits of energy efficient products using the label as a vehicle to build that understanding.

Program Opportunities and Design Recommendations

The long-term transformation of the appliance marketplace will occur when consumers begin to associate efficiency with quality, choice and durability, rather than just as a means of realizing some economic benefits, which are often too small or too far in the future to drive consumer demand. As manufacturers and retailers emphasized,

consumers are willing to invest in products that offer superior value and features. We believe that the Alliance has a significant opportunity to conduct consumer outreach across a variety of product categories that would help support and reinforce this message with consumers, including dishwashers, refrigerators, lighting products and windows. For these reasons, we would recommend the Alliance consider not only including dishwashers and refrigerators under their current ENERGY STAR efforts, but also “bundling” the marketing, advertising and retailer training and support efforts to include a broad range of ENERGY STAR Products.

We believe that this bundled approach would help the Alliance achieve several aims. First, it would help preserve program resources, by ensuring that consumer awareness of and demand for efficient products is reinforced by a broad and consistent marketing message. Second, since consumers are much more receptive to marketing when they are in the market for a particular product, a broader range of products would provide greater opportunities to build consumer demand for efficient products and awareness of the ENERGY STAR label. Finally, such a program would increase the Alliance’s ability to leverage the resources of manufacturers and retailers, since most would be more willing to conduct training and expend marketing and advertising dollars promoting the benefits of a wide range of products, rather than just one or two key products.

Under the “bundled” approach advocated here, the Alliance’s Programs would be built on the ENERGY STAR platform, but could also promote tiered levels of efficiency beyond ENERGY STAR where appropriate. Program elements might include:

- Advertising and Marketing
- Training and Retailer Support
- Targeted Incentives
- Continued Advocacy for the Advancement of Appliance Efficiency Levels
- Intervention Strategies Targeted at Specific Markets including the Remodeling Market and New Homes

In addition to a bundled ENERGY STAR appliance program, we recommend that the Alliance may wish to explore the benefits of a refrigerator and freezer early retirement/replacement program. The largest opportunities fall in the multi-family and low income/public housing settings as they provide potential for a large number of replacements or retirements at a single distribution point. In addition, from a policy perspective, this program concept provides the Alliance with a way to reach this often-underserved market. While this may not a Market Transformation effort, it represents the most significant savings opportunity in the refrigerator/freezer market.

Section I

Overview of Appliance Market Trends

This section is designed to provide an overview of the major themes that serve as the backdrop to the manufacturing, retailing and purchasing of appliances in 2000 and the near-term future. We believe that these themes are important enough that they should be kept in mind as the Alliance considers new appliance market transformation programs in 2000 and beyond. The section is divided into five main areas, as follows:

- 1. General Themes In The Marketplace**
- 2. Manufacturing and Product Trends**
- 3. Consumer Drivers for New Appliances**
- 4. Retailer and Manufacturer Views on Energy Efficient Appliances**
- 5. Consumer Attitudes Towards Energy Efficiency**

While some of this information was gathered through secondary sources, a significant portion was gleaned directly from interviews with manufacturers and retailers. While there were differences of opinion between various companies in the appliance distribution chain, we believe that there was broad agreement among all these actors regarding the ways in which consumers view their appliance purchase options. In addition, there was a general consensus among all these market actors about subtle, but discernable shifts in consumer awareness of and demand for energy efficiency in appliances. We found that the themes and trends laid out in this section generally apply across all of the appliance areas analyzed for this report. However, there are some differences that will be pointed out where they exist.

Detailed analysis of the demographics of the market for each appliance area is provided in Section II, and analysis of the distribution and manufacturing sectors, as well as analysis of the energy efficiency potential for each appliance, is provided in Section III.

1. General Themes in the Marketplace

Our discussions with manufacturers and research into trade industry reports revealed several broad trends in appliance manufacturing and retailing. A summary of these trends is listed below, and a discussion of the potential implications of each follows:

- A. Appliances are no longer just “commodities”.
- B. Consumer awareness of the energy and environmental impact of their appliances appears to be increasing slightly.
- C. Most retailers and manufacturers have begun to observe a slight but discernable shift in consumer awareness of the ENERGY STAR Label.
- D. As appliances become more efficient as a result of federal energy standards, the case for energy and monetary savings at the customer level will be increasingly difficult to make.
- E. The private and public sector approach the introduction of new products in dramatically different ways.

- F. Appliance marketing has become increasingly national in scope.
- G. Broad changes in the distribution chain have forced major players to begin to redefine their market niche.
- H. The Internet will change the way appliances are marketed, even if it does not emerge as a major sales channel.

A. Appliances are no longer just “commodities.”

Several manufacturers interviewed for this report identified this as the major trend in the appliance industry over the past few years. From the early 1970’s until the mid-1990’s, most appliance features and platforms did not vary greatly from year to year; the products generally performed the same function in the same way as in previous years. In this market, price, brand name, service record, and, to a lesser degree, energy use were extremely important attributes in terms of product positioning. Also, because the basic products offered by manufacturers did not vary considerably, market share was fairly constant and profit margins were extremely tight.

While price pressure remains paramount for the large majority of purchases conducted at the lower-end of most appliance markets, the high-end of the market is increasingly focused on serving the needs of what some manufacturers and retailers call the “value-driven” consumer. These consumers generally demand more styling and aesthetics in their appliance purchases, and require them to function in ways that fit with their increasingly busy lifestyles. (These appliance functions will be discussed in more detail later in this section.)

The emergence of this consumer group has led many appliance manufacturers and retailers to reconsider the previous market paradigm. In this new market, it is no longer assumed to be a huge risk to introduce top-end products that command a price premium, as long as they meet some of consumers' lifestyle-oriented needs. In fact, manufacturers have considered the lack of innovative, high-end products to be a competitive disadvantage in today’s appliance markets. The fact that these products also deliver significantly higher margin per unit is a not unpleasant outcome for manufacturers and retailers facing generally flat sales trends and continued pricing pressure at the lower end of the market.

The most obvious example of this shift toward value added products are resource efficient clothes washers (RECWs); despite a significantly higher sales price than other clothes washers, RECWs have been able to dramatically increase their market share (from about one percent to six percent nationwide) by featuring attributes that resonate with consumer needs, including water savings, shorter drying times, gentleness on clothes and various other design features. In other product areas, consumers have been demanding aesthetic features, such as stainless steel doors, which can add significantly to product purchase price.

Quite understandably, manufacturers are seeking to expand on this by introducing new products and product designs in all of their appliance product lines. For instance, in the

Spring of 2000 several appliance manufacturers introduced new convection-based ovens that cut cooking time dramatically, dryers that operate on the same timing cycles with washers, and refrigerators that are designed to reduce food wastage and help focus and organize consumers' busy lives.

The most obvious implication of this for public policy programs is that manufacturers and retailers, rather than resisting the introduction of high-end or positioning these products as niche products, are now actively looking for new opportunities to introduce these products into their product development and marketing plans. As such, this considerably expands opportunities for the Alliance to market high-efficiency appliances that also feature attributes that consumers have come to desire, such as advanced technology and features, improved product construction, and enhanced functionality. We believe that this new dynamic increases the opportunities for the Alliance and other MT groups to work closely with appliance manufacturers and retailers to develop strategies for the introduction and marketing of new, innovative high efficiency appliances.

B. Consumer awareness of the energy and environmental impact of their appliances appears to be increasing slightly.

Although the trend is not dramatic, most of the manufacturers we spoke to believe that consumers are placing a higher priority on efficiency and other environmental concerns when purchasing appliances. While most retailers and manufacturers did not think the concerns constitute a major priority, virtually all indicated that they were seeing the early stages of a discernable shift in consumer attitudes towards efficiency. (We discuss this issue in more detail later in this Section.)

However, there is a significant difference in how specific issues resonate with consumers. For instance, almost all of the manufacturers and retailers involved with RECWs also indicated that water efficiency is the most powerful and immediate environmental message in the marketplace today. Conversely, many believe that it remains difficult for consumers to make the connection between energy waste and air pollution, or to convince them to alter purchasing patterns in response to these environmental risks. Finally, none of retailers or manufacturers interviewed for this study believed that environmental considerations alone would change purchasing pattern for the average consumer. The most obvious implication of this trend for program design purposes is that Alliance needs to continue to find ways to make an excellent case for water savings in resource efficient clothes washers (RECWs) and, should the Alliance choose to promote dishwashers, include information on water saving features.

However, even in the case of water savings, it is unlikely that a significant percentage of consumer demand is likely to be driven by environmental considerations alone; for this reason, we believe that the Alliance should continue to make the case for efficient appliances as part of a package of benefits these products provide, rather than relying on environmental messages alone or in the main.

C. Most retailers and manufacturers have begun to observe a discernable shift in consumer awareness of the ENERGY STAR Label

Most manufacturers and retailers indicated that they have begun to see increased levels of consumer awareness and recognition of the ENERGY STAR label, in part due to the level and quality of outreach conducted by the Alliance, other regional MT programs and the national ENERGY STAR programs. However, most of the retailers and manufacturers contacted for this report viewed the awareness building process as still in the early stages; virtually all emphasized that building this level of consumer awareness and demand would require a sustained, multi-year, highly-focused communications and outreach effort by the Alliance, other MT groups and the national program. In addition, most emphasized that the Alliance and others should seek the broadest possible product platform upon which to build their marketing efforts to include other ENERGY STAR products, including lighting products, windows, heating and cooling equipment and other products.

The retailers and manufacturers gave several reasons for this recommendation:

- Consumer receptivity toward marketing messages is heightened when they are actively in the marketplace for those products. In the case of major appliances, which are replaced every seven to fifteen years on average, most consumers are only in the marketplace every two or three years. If the Alliance's marketing is predicated on pushing only one or two efficiency or ENERGY STAR-qualified products, it will be much more difficult to achieve success in getting consumers to internalize the efficiency message sufficiently to allow markets for these products to become self-sustaining.
- Creating a more consistent broader marketing platform for efficient products makes it much easier for many manufacturers and retailers to devote more resources to marketing of these efficient or ENERGY STAR-qualified products.
- Finally, including more products in the Alliance's portfolio using specifications common to other MT group's efforts would increase movement toward a national platform for efficiency, thereby increasing the desire of some manufacturers and retailers to produce and aggressively promote high-efficiency products.

We believe that it would benefit the Alliance to consider expansion of its current ENERGY STAR efforts to include dishwashers and refrigerators (though not electric dryers and freezers, for reasons we will explain later). In addition, we recommend that the Alliance consider using the ENERGY STAR label in general as a marketing and outreach tool to help make the case for efficiency in appliances and other consumer products.

We also believe that the Alliance should make it a priority to work actively with other MT groups at the regional or national level to develop more consistent marketing and outreach themes for efficient and/or ENERGY STAR-labeled products. We believe that these strategy meetings should also work closely with interested national and regional

manufacturers and retailers to ensure that the marketing and outreach strategies are coordinated with these groups to the maximum extent possible.

D. As appliances become more efficient, the case for energy and monetary savings will be increasingly difficult to make

As we will discuss in Section II, federal standards and advances in appliance manufacturing practices and materials have succeeded in dramatically reducing the energy intensity of appliances. This has produced huge benefits for the environment. However, the remaining, technically feasible energy savings in some appliance areas may not produce significant enough monetary savings to justify purchase of the product by the typical consumer. For instance, a refrigerator that is ten percent better than the 2001 Federal standard will only reduce the average household's energy use by approximately 45 kilowatt-hours per year--or roughly \$2-3 per year at Northwest electricity rates.

Most retailers and manufacturers told us that they believe consumers' investment horizon for appliances only extends 12-24 months, meaning that that the average consumer almost completely discounts savings that occur beyond two years after purchase. Potential energy savings levels for freezers and electric dryers produce similar results. Clearly, selling some efficient appliances on the basis of the savings from efficiency is going to be difficult in the coming years.

Another related marketing challenge facing the Alliance and other MT groups is that some retailers and manufacturers indicated that many consumers believe that their appliances are "already as efficient as they can be" as a result of the implementation of federal efficiency standards, and are thus highly skeptical of claims that some appliances can help them save energy and money.

While these issues pose challenges for program design, we believe that effective marketing of efficient products will require the Alliance to emphasize the combination of benefits, including monetary savings, environmental benefits, and the complimentary benefits mentioned earlier—to include water savings, better construction, or meeting consumers' lifestyle needs.

We also believe that the lower energy and monetary savings for individual appliances provides another rationale for "bundling" appliances to demonstrate the overall merits of efficiency in consumers' minds. This would have several benefits: first, it would enable the Alliance to raise the issue of the overall savings levels that can be achieved through the purchase of efficient appliances across the board; second, it make it easier for the Alliance to discuss the complimentary attributes of efficient appliances (such as better construction, better performance, etc.). Finally, as mentioned above, it would allow the Alliance to tie the campaign into larger themes already adopted by other program areas and market actors.

E. The private and public sector approach the introduction of new products in dramatically different ways

Most of the interviews conducted and materials consulted for this program revealed that manufacturers and retailers largely introduce products from the “top down” by targeting more affluent, image conscious consumers first, then seeking to expand the product features and attributes to broader market segments as they can increase economies of scale and feature lower price differentials. Conversely, public benefit programs by necessity and the need for equity, more often approach product introductions from a “bottom-up” perspective, i.e., by emphasizing program design elements that will get the product before as many consumers, across a broad income and demographic spectrum, as quickly as possible. While both of these efforts are understandable and necessary, they can lead to difficulties when the public and private sector attempt to leverage the others’ efforts to increase the visibility of efficiency.

It was clear from our discussions with manufacturers and retailers that they believe that many of the high-efficiency appliances need to continue to build market share if they are to achieve a price point that is within the reach of the average consumer (one retailing executive estimated that price is still a primary driver for 80-90 percent of his customers). For that reason, we believe that it will be important for the Alliance to continue to conduct the consumer outreach aimed at promoting products at a reasonable efficiency level (whether designated by the ENERGY STAR label or not), while continuing to promote the introduction of super-efficient appliances through targeted incentives, including rebates and/or tax credits.

We also believe that the Alliance can incorporate program strategies that focus on promoting efficient appliances to higher-end consumers and meeting the needs of moderate-income consumers as well. As we will discuss in Section V, we believe that a combination of targeted incentives in multi-family and public housing, combined with an broad-based, long-term consumer outreach campaign will allow the Alliance to work effectively with both the private sector, as represented by the retailers and manufacturers, and public sector, as represented public and low-income housing.

F. Appliance marketing has become increasingly national in scope

Most of the national retailers and appliance manufacturers we interviewed for this report indicated that they are relying less on regional advertising campaigns and more on national advertising and marketing as a means of simplify their message and increasing the appeal of their products to broad audiences. While they retain their ability to react to various publicity and outreach events at a local and regional level, their ability to change or reflect energy efficiency or ENERGY STAR messages in their national advertising is constrained somewhat by what they believe to be a lack of unity across all the programs nationwide.

The obvious implication is that regionally-based program designs and outreach campaigns will have a harder time capturing the attention of major national retailers and

manufacturers and leveraging their resources for product promotion. For this reason, we believe that it will be important for the various MT groups from across the country to work together to achieve more uniformity in the types (but not necessarily the look) of outreach and support efforts they conduct around energy efficiency. Absent such cooperation, we believe the current interest demonstrated by national manufacturers and retailers in promoting the efficient products will wane considerably over time.

As we noted, a key focus of these efforts should be to work with other MT groups to develop common approaches and messages for use in marketing and outreach. However, we also believe that it is imperative that these groups should provide manufacturers and retailers the adequate notice of the timing, location and scope of advertising and marketing efforts if these organizations are to be able to effectively feature energy efficiency and the ENERGY STAR label and their messages in national advertising. Based on our conversations with retailers and manufacturers, most require three to six months notice to effectively plan and execute marketing and advertising campaigns.

G. Broad changes in the distribution chain have forced major players to begin to redefine their market niche

Entrances of “big box” stores such as Lowes and Home Depot into the appliance market place have forced other actors to refine and focus on market niches. For instance, Circuit City is testing concepts in Florida in which they would open stores focused solely on appliances. Should this direction continue, Circuit City’s operations would essentially become far more like a “national independent”, offering their clientele more specialized service and information that other competitors may not. Whatever the result of these efforts, it is clear that several distinct types of retailers are emerging on the national market, each with different sales and marketing strategy.

However, discussions with national retailers made it clear that many do not see the current program training and marketing materials used by MT programs as a benefit to them, given their unique staffing and training requirements and limitations. For example, a big box home improvement store like Lowes or Home Depot may require more self-explanatory materials that reflect the shopping experience and levels of interaction between sales personnel and customers in those venues. Conversely, local, independent retailers believe their unique market advantage is their ability and willingness to spend more time with consumers to explore the features of various products according to the consumers' individual needs.

We believe that MT programs must be able to design and produce a variety of materials that meet all these needs if retailers across the full range of the industry if these actors are to become more involved in training, advertising and marketing of efficiency programs. The critical first step may be for the Alliance to begin discussions with each of the key retail actors in the market chain to discuss which program design and marketing materials work in the context of their particular operations.

H. The Internet will change the way appliances are marketed, even if it does not emerge as a major sales channel

Virtually every major player in the national retailer and manufacturing portion of this industry has made the Internet a part of their product marketing and positioning strategy. However, most industry observers do not believe that a large portion of appliance sales will ever be made over the Internet. Conversely, almost all industry observers agree that Internet will serve a huge role helping consumers gather information about appliance features and benefits, value-added benefits, such as energy and water efficiency and ease of use issues.

Despite the growing place of the Internet in manufacturer and retailers' sales and marketing strategies, and what retailers and manufacturers claim is the growing importance of ENERGY STAR and the regional efficiency programs, it is difficult to find specific information on either on most of the national actors' websites. We believe that this is an issue that needs to be addressed quickly.

While we believe that it will be important to work with national retailers and manufacturers to build energy efficiency and ENERGY STAR messages into their websites, we also believe that it would be difficult for most of these actors to respond quickly and accurately to input from a variety of regional or local programs. It may be useful work with the national and regional programs to develop a single, coordinated method for working with the retailers and manufacturers to (a) build efficiency and ENERGY STAR content into these websites, and (b) establish a mechanism for linking consumers to relevant local programs

2. Manufacturing and Product Trends

As noted earlier, the past few years has witnessed the emergence of a new type of appliance consumer, one more focused on the purchase of a high-value, rather than low-cost product. Not surprisingly, manufacturers have turned their attention to building products that meet consumers' rising expectations. This has been reflected in the accelerated pace of innovation and new product development and introduction over the past decade.

We believe that public policy programs will be most successful when they can work with manufacturers to build more efficient products that also improve their ability to meet a host of consumer demands. For this reason, it would be useful to discuss what manufactures and retailers see as the main product drivers in today's market:

- A. Superior Performance***
- B. Time Efficiency***
- C. Flexibility***
- D. Larger Appliances***
- E. High-End Appliances***

A. Superior Performance

Consumers are now much more critical of how well their appliances perform. In the past, consumers assumed that appliances performed their basic, intended function, but in general they did not expect or demand considerably more from their appliances. This has changed dramatically. Consumers have become intolerant of poor or mediocre performance. One manufacturer related this shift to the increased pace of our lifestyles. For example, people are too busy to wash a load of dishes twice due to poor appliance performance. They want the appliances to perform well and to do it quickly so they can focus on the more important demands of their lives.

B. Time Efficiency

As mentioned above, consumers are extremely busy and therefore impatient. Where applicable, manufacturers are focusing on ways to increase appliance time efficiency. For example, Whirlpool is releasing a new dryer that has a reduced cycle time to match the time it takes to wash a load of clothes. Although cooking appliances are not covered in this report, several manufacturers mentioned time efficiency as a major trend in cooking appliances. In addition to reduced cycle times, ease of use and maintenance are also key aspects of appliance time efficiency.

C. Flexibility

The increased focus on appliance flexibility is closely tied to superior performance and timesaving expectations. Consumers are demanding more flexibility in appliance features as a means to enhancing performance and saving time. For example, Whirlpool is introducing a new clothes washer that essentially eliminates pre-treatment of clothes by spraying a concentrated solution on clothes as they spin before wash agitation begins. In addition, this washer features a triple dispenser system that allows consumers to load detergent, bleach and fabric softener into the dispensers at the beginning of the cycle. The washer then dilutes each additive and releases it at the right moment in the cycle. These features eliminate the need for consumers to spend time pre-treating the clothes and adding various solutions throughout the cycle.

Manufacturers report that one way they will continue to expand appliance flexibility is through “smart appliance” features. While they were reluctant to discuss specifics of future smart appliance features, they acknowledged this to be an important aspect of product development. Current smart appliance features range from the new sensor equipped dishwashers that adjust water and energy needs to the load size and soil levels of dishes. Futuristic features include such innovations as web access on the refrigerator door or remotely controlled appliances. When questioned on the future of smart appliance features, manufacturers noted that the emphasis would be on saving consumers’ time and enhancing performance, not on gimmicks.

D. Larger Appliances

The increased demand for larger appliances seems to be driven by the need to save time. Larger refrigerators mean less frequent shopping, larger washers, dryers and dishwashers mean less frequent washing, and the addition of freezers even further reduces shopping frequency. However, manufacturers noted that consumers are often limited by space restrictions, especially with built in appliances such as dishwashers.

E. High-End Appliances

Manufacturers and retailers noted a trend toward high-end appliances. More consumers are style and design conscious in the appliances they choose. Appliances are becoming a key feature in the home design instead of simply a functional piece of equipment. This is especially true during a remodel when consumers are buying a suite of appliances to match the new décor. One retailer commented that consumers are willing to pay several hundred dollars more solely for a design feature such as stainless steel.

The trend towards high-end appliances is also related to the increased emphasis on performance. Consumers perceive high-end appliances to be superior in their performance and reliability, all resulting in time savings. With higher value placed on performance and time, more consumers are able to justify the incremental investment in a high-end appliance. As manufacturers and retailers emphasized, consumers are willing to pay more for something they value. The key is to understand what consumers' value and then communicate the product features in a manner that resonates with their values and needs.

3. Consumer Drivers for New Appliances

Despite some fairly significant changes in the way consumers shop and the products they are demanding, the motivation for shopping for an appliance has *not* changed dramatically over the past few years. By far the most important issue driving consumers is the replacement of existing appliances; most industry surveys and our interviews show that this accounts for approximately 70-75 percent of new purchases. Other motivators, such as the purchase of a new home, moving to a new residence, remodeling, or the purchase of the product for the first time, generally account for the remaining 25-30 percent of appliance sales.

However, as we will discuss below, some of these other demand drivers, while motivating fewer appliance sales, play a huge role in manufacturers' and retailers' design and marketing plans. We will discuss each of the key motivators in turn.

- A. Replacement of Existing Appliances**
- B. New Construction Market**
- C. Moving**
- D. Discretionary Purchases**
- E. Remodeling**

A. Replacement of Existing Appliances

By far the largest driver of sales for existing appliances is replacement of existing appliances due to malfunction or impending breakdown. Various consumer surveys have been taken to measure the percent of total sales driven by replacement or malfunctions, and virtually all indicate that replacement accounts for approximately 70 percent of total appliance sales¹. This varies little across the appliance categories investigated for this report.

The average turnover rate for existing appliances varies widely, as do these estimates among industry observers. The following chart summarizes these estimates by appliance:

Appliance	Turnover Rate Estimates	Source (1997)
Refrigerator	13 years	AHAM
Clothes Washers	9 years	AHAM
Clothes Dryers	8 years	AHAM
Dishwashers	9 years	AHAM
Freezers	11 years	AHAM

B. New Construction Market

In general, most new single-family homes and manufactured homes built in the U.S. currently come equipped with (or have dedicated space for) a refrigerator, dishwasher, clothes washer and dryer. However, few homes come equipped with freezers. In most states, (including those in the Northwest), refrigerator and laundry purchases for single-family and manufactured homes are made by the buyer. Dishwashers, on the other hand, are typically built into the unit and purchase decisions tend to be made by the builder.

Unit numbers for new multi-family housing tend to be a much smaller share of the market, largely due to the small numbers of multi-family units built each year and the generally lower saturation rates for dishwashers, clothes washers, and dryers in multi-family settings (see Section II for more details on saturation rates)

¹ Hagler Bailly Consulting, "Residential Market Effects Study: Refrigerator and Compact Florescent Lights," PG&E Study #3302, April 1998. The range of figures accounts for slightly different results between California consumers and those in the U.S. as a whole. California residents were more likely to report that they were purchasing a replacement. Pacific Energy Associates, "A Second WashWise Market Progress Evaluation Report," Prepared for the Northwest Energy Efficiency Alliance (Report #E98-012), July 1998, p 13

C. Moving

Approximately, 7 percent of appliance shoppers in the surveys reviewed for this study reported that they were in the market for a new appliance as a result of a move in which their new residence lacked one of the major appliances. This figure is reasonably consistent among surveys conducted by Pacific Energy Associates in the Northwest and in California by Hagler-Bailly.

D. Discretionary Purchases

Surveys have shown that approximately 7-10 percent of major appliance surveys are motivated not by need (i.e., appliance breakdown or lack of an appliance), but by a desire for more features or a larger or newer appliance. In many instances, remodeling activity in the home triggers the discretionary purchase, as consumers look to upgrade their total kitchen package.

In general, discretionary purchases, though not a huge part of the marketplace, receive a great deal of attention from manufacturers and retailers. The key reason are consumer demographics in the remodeling market—most major kitchen remodels are made by consumers with a considerable amount of discretionary income who are also looking to substantially upgrade the look, feel and quality of their surroundings. In sum, manufacturers and retailers consider remodelers as trendsetter consumers who are willing to spend more to get the qualities they desire. As a result, both manufacturers and retailers spend a good time and effort trying to anticipate and meet the demand for new product attributes and features on the part of consumers in this niche market.

For this reason, we will spend some time analyzing the overall remodeling market in the U.S.

E. Remodeling

Single Family Homes

In general, remodeling activity in the single-family market has been accelerating rapidly over the past several years in the U.S. The Joint Center for Housing Studies at Harvard University reported that approximately 6.1% of all U.S. households in 1995 performed some sort of remodeling work on their kitchens. In addition, the Bureau of the Census reported that the total amount spent on kitchen remodeling in owner-occupied spaces jumped from \$2.194 billion in 1993 to nearly \$3.520 billion in 1998, an increase of over 60 percent in six years.² The Home Improvement Research Institute estimates that home improvement product sales jumped by 9.5 percent in 1999 and will jump by

² U.S. Bureau of the Census, Report C-50, Table S-1 “Expenditures to Owner-Occupied Properties by Type of Job, 1993 to 1998. Includes expenditures under the “kitchen remodeling “ and “kitchen and bathroom remodeling categories.”

another 4.5 percent in 2000. Sales are expected to grow by approximately four percent per year through 2004.³

One of the most revealing figures in the Bureau of the Census C-50 survey is the breakdown of expenditures by income of the homeowners. For instance, in 1998, over \$62 billion was spent on home improvements in the U.S. Of this total, over 37 percent was spent by households with annual incomes of \$75,000 or greater, a figure that rises to almost 70 percent of total expenditures when households with incomes greater than \$50,000 are included.⁴

The survey found that nearly 60 percent of all affluent homeowners replaced their dishwasher and refrigerator during the remodel, and that 60 percent listed “wanted to upgrade my appliances” as a motivator in their decision to upgrade. Another 37 percent listed “wanted a more efficient kitchen” as a motivator in their decision making process

As noted above, activities by homeowners in the higher income brackets drive a great deal of activity in the appliance marketplace. First, these consumers exert, in the words of one trade magazine, “an enormous impact” on the national kitchen market. These audiences also look for high value and functionality in their appliance purchases. In addition, these markets quite often represent the entry point for new, high value and higher first cost appliances in the marketplace.⁵

Multi-Family Homes

Although remodeling in multi-family units was far lower in terms of dollar per unit than in single-family homes, kitchen upgrades and appliances remain an important part of strategies to retain tenants in these facilities. A 1995 U.S. Census Bureau survey found that 44.5 percent of owners of multi-family complexes with less than five units and nearly 60% of owners/managers of facilities with 50 or more units reported that they upgraded their facilities as a technique to reduce tenant turnover. The same survey found the following results in terms of the types of upgrades made to the units within five years of the survey:

Activity	All Multi-Family Units in U.S.	< Five Units	5-49 Units	>50 Units
Replacement of Kitchen Facilities	48.1%	46.9%	54.6%	45.3%
Some/All Kitchen Appliances Replaced	43.9%	45.2%	38.7%	37.2%

³ Home Improvement Research Institute, “E-Commerce Sales Strong, But Home Improvement is Even Stronger” Press Release,

⁴ Bureau of the Census, Report C-50, Table S-3.

⁵ Kitchen and Bath Design News, “Purchasing Power: affluent homeowner survey,” February 2000

Many of these activities are highly sensitive to apartment vacancy rates; however, the figures do appear to demonstrate that kitchen remodeling and appliance replacement does factor as a tenant retention strategy among multi-family property owners nationwide.

However, most of the upgrades in multi-family units do not appear to capture the same level of manufacturer and retailer attention, as do single-family upgrades. The main reason seems to be that the types of appliances purchased in multi-family upgrade projects are more geared toward functionality than styling, aesthetics, or top of the line features.

4. Retailer and Manufacturer Views on Energy Efficient Appliances

As noted, we conducted surveys with a variety of market actors to gain a better understanding of the response of their organization and their customers to energy efficiency, the ENERGY STAR Labeling efforts, and efficiency program delivery mechanisms. We will present an overview of their responses.

The surveys conducted with retailers and manufacturers for this report, asked (among other things) a series of questions regarding consumer reactions to energy efficient appliances. The questions fell into several broad categories:

- A. Consumer Awareness of Efficiency***
- B. Attitudes Towards Efficient Appliances***
- C. Reasons Consumers Purchase Efficient Appliances***
- D. Reasons Consumers Forego Purchases of Efficient Appliances***

In addition, this section summarizes the relevant findings from a recent study conducted in California on public awareness and attitudes toward energy efficiency.

A. Consumer Awareness of Efficiency

The general consensus among all respondents was that consumer awareness of energy efficiency has generally been improving over the past five years. Of all the actors surveyed, none indicated a belief that consumer awareness had decreased; similarly, none indicated a strong surge in awareness or interest, with the possible exception of clothes washers, for reasons we will explain below.

Many of the survey participants indicated that they believed energy efficiency is now a mainstream concept that most Americans understand and accept. In general, most of the survey participants believed that efficiency considerations were more likely to be raised by consumers when discussing clothes washers and refrigerators. Conversely, almost no one indicated that efficiency was a consumer concern when it came to the purchase of electric dryers.

B. Attitudes Toward Efficient Appliances

Issues of product quality were not raised. However, several of the participants raised interesting points with regard to consumers and energy savings: first, many people are aware that federal efficiency standards govern appliance design and manufacturing, and therefore they assume that the appliance in question is either as efficient as it can be, or that any gains would be small. This, in some instances, lessened consumer interest in efficiency and the promotional programs on the market.

C. Reasons Consumers Purchase Efficient Appliances

When asked why consumers do invest in efficient products, manufacturers and retailers gave the following answers:

Economic/Savings Considerations

This, for the whole appliance area, was a double-edged sword. Most retailers and manufacturers believed that energy savings resonated far less with consumers than did other issues, such as water savings in the case of RECWs. In fact, many of the retailers and manufacturers indicated that water was the most compelling story they had to tell.

The retailers and manufacturers also stated their belief that consumers will not readily invest in products that the payback is not sufficiently large and immediate. When asked to define sufficiently large, most mentioned \$50-100 per year. However, most correctly ascertained that the savings levels in most appliance areas were likely to be far smaller for the average consumer.

Finally, almost all voiced the concern that if the simple payback on an incremental investment in an energy efficient appliance were more than one-two years, most consumers would forego the investment altogether.

Environmental Considerations

Most of the survey participants gave environmental considerations lower ratings than economic value to consumers. Most expressed the belief that consumers generally understood the connection between energy waste and environmental degradation and generally did care about the environment. However, it was also clear that few retailers or manufacturers believed that consumers would be generally inclined to spend the extra money to purchase a high-efficiency appliance solely on the grounds that it would help the environment.

Again, as we noted before, many of the retailers and manufacturers expressed their belief that many consumers did react to concerns about water waste and its effect on their local environment. As several noted, many consumers live in areas in which water is becoming scarce or the source of a number of environmental concerns. Second, it was also pointed out that washers have good “water visuals,” since consumers can

instinctively understand the amount of water it takes to fill up the tub of a standard v-axis washer. Many survey respondents urged the Alliance and other groups to continue to make the case for water conservation as forcefully as possible with consumers.

Better Technology

We asked if consumers were attracted to efficiency by the fact that, in general, efficient appliances featured superior construction over less efficient products. A few respondents questioned the basis of the question, but most indicated that consumers were drawn first and foremost to the better construction of some appliances, and found the efficiency benefits to be a nice addition to the value provided by the appliance.

Advanced Technologies

Similarly, we asked if consumers were motivated to purchase energy efficient appliances by the fact that they were getting the latest or most advanced technologies. The general response from manufacturers and retailers is that this feature or benefit resonated with only a small portion of their market—generally males between 35 and 55. However, for this small group, the technology aspects were quite important.

Presence of Rebates

Finally, we surveyed participants about how strongly consumers responded to rebates. Surprisingly, since virtually all were strong believers in rebates—the response was mixed. Most felt that where rebates were of sufficient value, they were a huge driver of demand for these products. When pressed for what was considered “significant,” most manufacturers and retailers mentioned a range of \$50-100 per unit, with the upper end being considered necessary for higher price items such as refrigerators. Conversely, if rebates were only for nominal amounts—under \$50 dollars—most participants felt that they were not likely to drive many sales and be given only to those already committed to purchasing a high-efficiency appliance. As one participant said, “if you’re not going to put the rebates at an amount that changes consumer buying patterns, you’re better off spending the money elsewhere.”

D. Reasons Consumers Forego Purchases of Efficient Appliances

We also gathered retailer and manufacturer attitudes on why consumers chose not to invest in high-efficiency appliances.

Higher Purchase Price

For most respondents, this was a major reason why the majority of their consumers did not invest in energy efficient appliances. There was little variation in the responses, which tended to fall in the 7-9 range on a scale of 10 (strong reason).

Lack of Confidence in Savings Estimates

In general, most manufacturers and retailers did not believe that consumers believe the savings estimates that are typically used with appliances. In general, most respondents believed that consumers were confident they would save money with efficient appliances; the only question was whether the savings were either large enough or immediate enough to matter to consumers; most believed that current savings levels were not sufficient to drive consumer demand. (see discussion of this issue, above). Finally, a few respondents cautioned against making “lifetime” claims of savings for appliances, citing Federal Trade Commission restrictions on such claims for products with uncertain useful lives.

Lack of Rebates

Most retailers and manufacturers felt that a lack of rebates was a potential problem for most of the retailers and manufacturers. The general view was that, in the absence of effective and sustained outreach and advertising efforts, rebates are the single most effective method of focusing consumer attention on efficient appliances. In some instances, manufacturers and retailers indicated that they believed most consumers had come to expect rebates for efficient appliances; for the most part, however, they felt the lack of rebates would make it more difficult to focus consumer attention on high-efficiency products.

Unfamiliar Technologies

Retailers and manufacturers were asked if they believed that the use of relatively unfamiliar technologies to improve appliance efficiency—such as the h-axis washer—served as a barrier to consumer purchase of the product. While many of the retailers and manufacturers indicated that the technology was a barrier early on in the product introduction cycle, most believed that these barriers had been overcome and that consumers were willing and, in some instances eager to embrace new appliance technologies.

Lack of Model or Feature Choices

A past problem with appliance efficiency programs has been the limitations on the choice of models or features on efficient appliances. Most of the manufacturers and retailers we spoke with indicated that this was not a problem at this juncture, since over 20 percent of refrigerator models and nearly 50 percent of dishwasher products currently meet ENERGY STAR guidelines. Some retailers and manufacturers mentioned that ENERGY STAR -compliant clothes washers actually offer more consumer choice and features than competing models, making the sales proposition much easier in the retail setting.

5. Consumer Attitudes Towards Energy Efficiency

A baseline statewide study was conducted by Hagler Bailly on behalf of all California utilities in 1999 to help lay the groundwork for analyzing and tracking awareness and attitudes toward residential energy efficiency products and services. The study included focus groups and telephone surveys in California and nationally.

A. Key findings⁶

- **Awareness is low** – Few consumers have adequate awareness/knowledge of the range of specific actions they can take to save energy at home. Moreover, consumers often do not have awareness/knowledge of what distinguishes one product from another in terms of energy efficiency. They lack awareness of the likely cost of energy efficient products (relative to standard efficiency alternatives) as well as the energy savings potential. They also lack awareness of how to take action – where to go, where to look, etc.
- **Attitudes are favorable** – While energy efficiency is not a top-of-mind purchase consideration for most consumers, the general public does exhibit relatively positive attitudes toward the general idea of saving energy and making energy efficient purchase decisions. However, lack of awareness/knowledge of how to go about saving energy or making an energy efficient purchase decision limits the extent to which favorable attitudes alone can influence behavior.
- **Attitudes are diverse** – Consumers have many views of the energy situation, its role in decisions, and reasons for either attending to energy efficiency or ignoring it when they make decisions. Communications designed to change these general beliefs will face a patchwork market in which many different philosophies about energy efficiency exist and the fact that there are many reasons for both attending to energy efficiency and ignoring it.
- **Behavior is not necessarily predictable** – Favorable attitudes toward energy efficiency in general does not necessarily correlate with intentions to purchase specific energy efficient products or take particular energy efficient actions. As a result, changing behavior will be problematic due to the many different potential influences on behavior (preferences for other product attributes like brand or features, financial concerns such as price, service delivery issues such as when the product can be delivered, and the influence of other decision-makers like other members of the household).

B. Findings Relevant to Appliances⁷

Consumers proactively mentioned both refrigerators and clothes washers when asked an unaided question about what types of energy efficiency improvements might help lower

⁶ Key findings copied directly from CBEE Baseline Study on Public Awareness and Attitudes Toward Energy Efficiency, PHB Hagler Bailly, June 1999

⁷ Findings in this section pulled from CBEE Baseline Study on Public Awareness and Attitudes Toward Energy Efficiency, PHB Hagler Bailly, June 1999

energy bills. About 7% in California and 2% nationally suggested refrigerators and 4% in California and 3% nationally suggested clothes washers. In addition, 3% of consumers nationally and in California mentioned removal or unplugging of second refrigerator or freezer as a way to save energy.

The survey included a variety of questions on 17 specific energy efficiency improvements, including refrigerators, clothes washers and removal of second refrigerators or freezers. Listed below are some of the key findings from these questions:

Overall awareness of product as a way to save energy (aided):

- Refrigerators - 68% in California and 57% in U.S.
- High efficiency, front loading clothes washer - 45% both in California and the U.S.
- Removal of 2nd refrigerator or freezer - 60% in California and 57% in U.S.

Awareness of price (percent reporting reasonable price differential):

- Clothes Washers \$200-500 – 12% in California and 15% in U.S.
- Refrigerators \$100-200 – 20% in California and 22% in U.S.

Awareness of Energy Savings (percent reporting reasonable energy savings potential):

- Clothes Washers \$50-100 – 48% in California and 40% in U.S.
- Refrigerator \$25-50 – 51% in California and 41% in U.S.

Energy Efficiency as a Preferred Product Attribute (percent of respondents mentioning energy efficiency as a preferred product attributes):

- Clothes Washer – 12% in California and U.S.
- Refrigerator – 22% in California and 15% in U.S.

Energy Efficiency ranked as the most important product attribute:

- Clothes Washers – 4% in California and U.S.
- Refrigerators – 11% in California and 5% in U.S.

Comparison of Product Attribute Preferences:

	Brand	Price	Features	Energy Efficiency	Warranty	Other	Don't Know
Washers	21%	10%	81%	12%	8%	3%	5%
Refrigerators	9%	11%	92%	22%	5%	1%	2%

What types of information would be helpful when making a purchase decision:

	Clothes Washers	Refrigerator
Energy, cost savings benefits	47%	44%
Pricing Information	32%	28%
Features, technical data, equipment comparisons	24%	25%
Contacts for retailers, suppliers	8%	8%
Other benefits (including environmental, comfort)	6%	14%
Testimonials, case studies	10%	6%
Other (misc.)	10%	5%
Don't know	14%	18%

Overall, the findings in this study mirror the comments from manufacturers and retailers on consumer attitudes about energy efficiency. The findings support the responses received from manufacturers and retailers who believe that consumers place higher value on the efficiency of washers and refrigerators than other appliances. One might wonder if the history of refrigerator and washer program promotion in California might have influenced this awareness, however, the comparison with the U.S. in general is surprising. While awareness levels for refrigerators as an energy efficiency measure were higher in California (68% compared to 57% nationally), clothes washer awareness was 45% both in California and nationally and removal of 2nd refrigerators or freezers was marginally different, 60% in California compared to 57% nationally.

Summary of Relevant Findings from the Alliance's Energy Efficiency Focus Groups conducted by Norris Consulting in 1999:

A series of focus groups were conducted in the Pacific Northwest for the Alliance in 1999, which included both residential and commercial customers. The focus group discussions did not include appliances, but focused on new homes and buildings or remodeling of existing homes or buildings. While the results are not specific to appliances, they do provide additional insight into consumer attitudes about energy efficiency. The key findings are listed below.⁸

- Energy efficiency is not a top-of-mind consideration for most homebuyers and business professionals. It is more of a background consideration and needs to be prompted before it becomes part of the discussion.

⁸ Key findings copied from the NEEA Energy Efficiency Focus Groups report by Norris Consulting dated August 1999

- Energy efficiency is typically equated to sacrifice. Both homebuyers and business professionals believe that they have to spend money upfront to create an energy efficient environment in their home or office and that they can only recoup the costs if they stay in the space long enough.
- Energy efficiency is important in the Northwest because people tend to be more environmentally conscious than in other areas of the country. However, the low energy costs in the Northwest minimize the impact of energy efficiency. Consumers believe that there is no shortage of energy in the Northwest and that the regions' hydroelectric power is virtually unlimited.
- Most homebuyers have a fairly good understanding of what energy efficiency is. They generally understand what things in a home setting impact energy efficiency. However, it has different meanings to different people and some consumers have a hard time grasping the idea of energy efficiency.
- Energy Efficiency is a relatively intangible concept that cannot be seen, only felt. Hence, homebuyers and remodelers ask that energy efficiency be better defined. They want it to be broken down into an understandable list of things that relate to energy efficiency.

The study authors concluded that homebuyers and remodelers are most likely to respond to energy efficiency promotional message that focus on cost savings and the environment. Relating energy efficiency to comfort and health is a stretch for most consumers. While each of the studies summarized in this section report slightly different conclusions on the level of consumer knowledge and awareness of energy efficiency, it is clear that there is much work to be done in this area.

Section II

Characteristics of the Appliance Markets in the Northwest

This section will present data on the size of the appliance market in the U.S. and Pacific Northwest, as well as trends in disposition and efficiency of the stock. The data to be presented for each appliance type include:

- A. *Current Market Size and Stock, by Region***
- B. *Sales and Sales Trends in the U.S. since 1991***
- C. *Total 1998 Northwest Sales, Broken Down by State***
- D. *Sales Forecasts Through 2005***
- E. *Market Share of ENERGY STAR-qualified Appliances in Each State and the U.S. for 1998 (where applicable)***
- F. *Efficiency Trends & Distributions for 1998 Models***
- G. *Trends in Existing Stock and Ownership Patterns***

We believe the data presented in this section will give the Alliance a reasonably complete snapshot of the overall size of the markets for each appliance in the Northwest, as well as some insight on the demographics of appliance purchasers in each category. We hope this information will be useful as the Alliance considers various program designs and responses in each specific product category.

A Note on Methodology

Much of the data presented in this section relies on the results of the Department of Energy's 1997 Residential Energy Consumption Survey (RECS). This nationwide survey of consumers is the most recent comprehensive survey available. However, as noted below, it did not present findings aggregated at the state level, but rather at the regional (e.g. West) and sub-regional (e.g., Pacific and Mountain regions) levels. In most cases, we relied on appliance saturation data at the sub-regional level as a proxy for saturation levels for each state served by the Alliance.

However, since California is part of RECS Pacific sub-region, the possibility that the overall saturation levels in the Northwest might be skewed by results from California needs to be considered. In most cases, we relied on the results from Pacific Gas & Electric's 1998 Residential Energy Survey Report to determine if appliance saturation levels were significantly different in California from the results reported by RECS.

We also attempted to correlate our results by consulting the "Home Appliance Saturation and Length of First Ownership Study," conducted by NFO Research for the Association of Home Appliance Manufacturers (AHAM) in 1996. However, as NFO noted in the introduction, the survey methodology relied on mail-in questionnaires, and responses were fairly heavily weighted toward older owners of single-family homes. As we note later in this section, the appliance ownership rates are much higher for both single-family residences and higher income households (assuming some statistical correlation between age and income); for this reason, we believe that the saturation levels found in the NFO

report may overestimate the true appliance saturation levels found in the Northwest. In fact, the results found by NFO were very similar to appliance saturation levels found by RECS for single-family and higher income households, there by strengthening our cautions about the data in the NFO survey. For this reasons, we relied largely on the results of the RECS survey are noted in the text for each appliance area.

In addition, national estimates of product saturation levels broken down by housing stock and income levels, as well as the features and ages of stock for various appliances are included. Again, our review of the data and our interviews with retailers and manufacturers provided no compelling evidence that the types and characteristics of appliances in the Northwest deviate significantly from those found in the U.S. as a whole. For that reason, we believe that the result from national surveys provide a relatively good proxy for the characteristics of the Northwest as a whole.

1. Estimates of Refrigerator Stock in Place in the Northwest, By State

A. Current Market Size and Stock

The refrigerator market is distinctive from most other appliances in that it has achieved virtually full saturation in the U.S. RECS estimates that 99.9 percent of American households contain one refrigerator, with another 15 percent owning at least one more. In all, the survey estimated that there were approximately 117.5 million refrigerators in service in the U.S in 1997.

RECS estimates reveal little difference between ownership patterns in the Northwest and those in the rest of the country. For instance, RECS reports that 99.7 percent of homes in the Mountain and Pacific sub-regions of the country contained at least one refrigerator, versus 99.8 percent in the U.S. as a whole.⁹ In addition, RECS reported that 15.2 percent of U.S. households contained a second refrigerator. The figures for the Pacific and Mountain sub-regions were 15.8 and 13.4 percent, respectively. The following chart provides a snapshot of the refrigerator penetration levels in the Pacific Northwest in 1997.

Exhibit 2-1. Refrigeration Penetration Levels in the U.S. and Northwest

Feature	National	Pacific Region	Mountain Region
Total Penetration (%)	99.8	99.7	99.7
- Households with one unit (%)	84.7	83.8	86.3
- Households with two or more units (%)	15.2	15.8	13.4

⁹ RECS defines the Pacific Region to include the states of Washington, Oregon, California, Alaska and Hawaii. The Mountain sub region include the states of Montana and Idaho.

These findings are similar to those found in PG&E's Residential Energy Survey Report, which found that 82.6 and 18.4 percent of households owned one refrigerator and two or more refrigerators, respectively.¹⁰

Northwest Refrigerator Stock

Of the total U.S. stock of 117.5 million refrigerators, we estimate that approximately 4.9 million of these were in service in the Pacific Northwest in 1998. This estimate was derived using the RECS refrigerator saturation figures shown above and applying them to 1998 U.S. Census Bureau estimates of Northwest households. These estimates are shown in the chart below:

Exhibit 2-2. Estimation of Total Refrigerator Stock in the Pacific Northwest

State	Households	% One Unit	# of Units	% Two Units	# of Units	Total Units By State
Washington	2,211,000	99.7	2,204,367	15.8	349,338	2,553,705
Oregon	1,286,000	99.7	1,282,142	15.8	203,188	1,485,330
Montana	346,000	99.7	344,962	13.4	46,364	391,326
Idaho	448,000	99.7	446,656	13.4	60,032	506,688
Totals	4,291,000		4,278,127		658,922	4,937,049

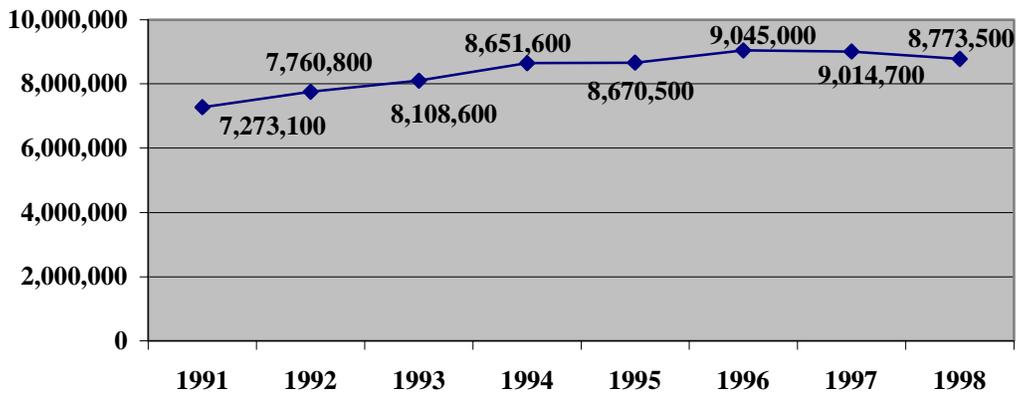
Using these estimates, the refrigerator stock in the Pacific Northwest would be approximately 4.2 percent of the total U.S. stock, only slightly higher than the regions' share of the total U.S. population (4.1 percent).

B. Sales and Sales Trends in the U.S. since 1991

Nationally, annual sales of refrigerators increased from approximately 7 million units in 1991 to over 8.7 million units in 1998. However, as the table below demonstrates, the market since 1994 has been relatively flat, moving in a range between 8.6 million units and 9.0 million units per year.

¹⁰ Residential Energy Survey Report, Pacific Gas and Electric Company, 1997

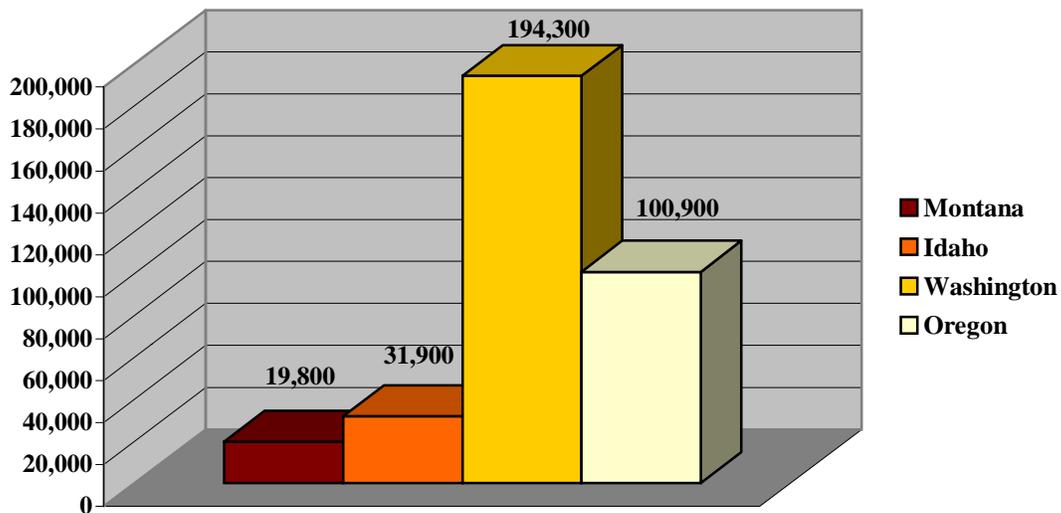
Exhibit 2-3: U.S. Refrigerator Sales (1991-1998)



C. Total 1998 Northwest Refrigerator Sales by State

1998 sales of new refrigerators in the Northwest were approximately 348,000 units. These sales figures were approximately 4 percent of national sales, again roughly paralleling the Northwest region’s share of total U.S. population. As reported by AHAM, sales by state in the Northwest for 1998 broke down as follows:

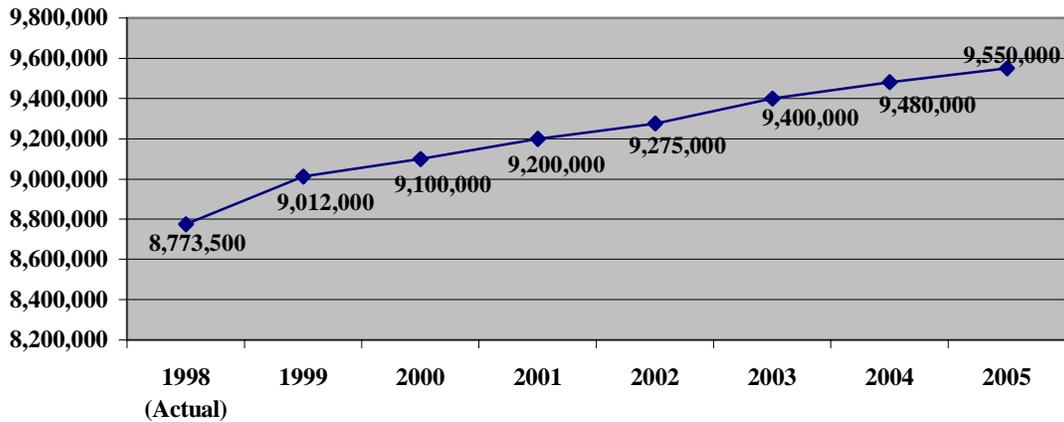
Exhibit 2-4: Northwest Refrigerator Sales by State (1998)



D. Sales Forecasts Through 2005

AHAM projects that refrigerator sales nationwide will increase by almost nine percent between 1998 and 2005. This growth will be fairly steady—between one and two percent per year—during the forecast period.

Exhibit 2-5: Estimated Refrigerator Sales in U.S. (1999-2005)



Thus, if the AHAM forecast of refrigerator sales on the national level is correct, the sales in the Northwest would be approximately 391,000 units per year in 2005.

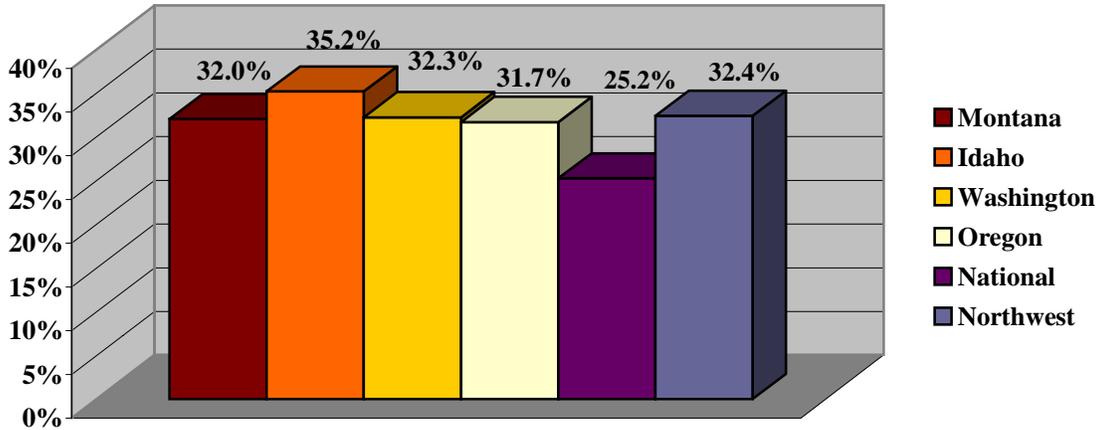
E. Market Share of ENERGY STAR Refrigerators in Each State and the U.S.

Despite the lack of a formal incentive of advertising programs for high-efficiency and/or ENERGY STAR-qualified refrigerators, the market share for ENERGY STAR models in the Northwest in 1999 exceeded the national average by a considerable margin (32.4 percent for the Northwest, versus 25.2 percent nationwide). In fact, the market share for qualified refrigerators in the Northwest was higher than most other regions that conducted formal programs for ENERGY STAR refrigerators. For instance, 1999 sales in California and the Northeast were approximately 24.3 and 25.2 percent, respectively. Sales in Wisconsin and New York both were approximately 24 percent in 1999 as well.¹¹

Finally, as the chart below demonstrates, sales were fairly equitably distributed among the four states that comprise the Alliance; market share in Montana (32 percent) was roughly equal to the market share in Washington (32.4 percent).

¹¹ Source: D&R International, ENERGY STAR Appliances: 1998 Sales Report, pp. 13-15.

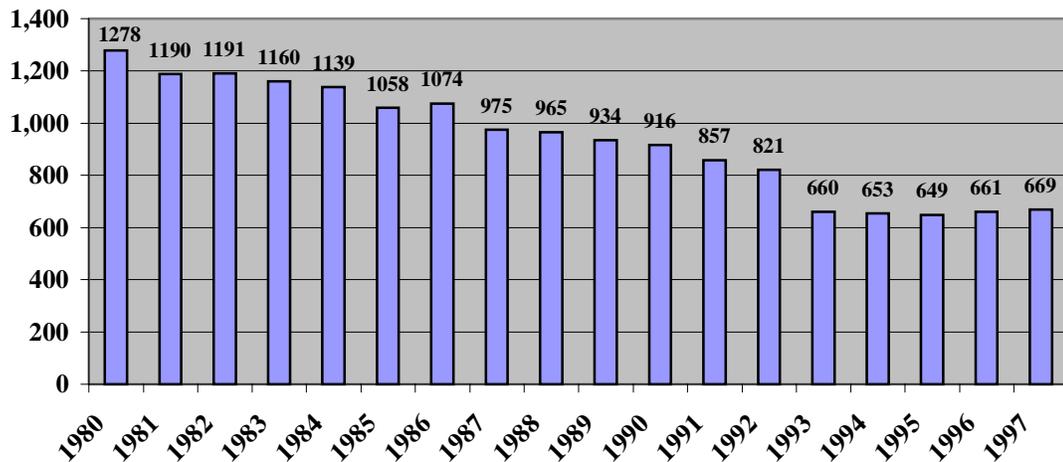
Exhibit 2-6: 1999 Market Share of ENERGY STAR Refrigerators in the U.S. and Pacific Northwest



F. Efficiency Trends and Distributions for 1998 Models

Refrigerator energy use per unit has improved markedly over the past twenty years. But as the chart below reveals, the average energy use masks significant differences in per unit energy by vintage of refrigerator. For instance, whereas refrigerators in 1980 consumed almost 1,300 kilowatt-hours of electricity per year, the average model in 1996 consumed only 661 kilowatt-hours per year, a reduction of nearly 50 percent. However, as the chart also reveals, this downward trend largely stopped after the implementation of new federal efficiency standards in 1993, and in fact have begun to rise again, perhaps due to Americans’ preferences for larger refrigerators (discussed below).

Exhibit 2-7: Refrigerator Energy Use Trends from 1980-1997 (Kilowatt-Hours per Year)



As we discuss in the next section, the average energy use of new refrigerators will decline dramatically after the implementation of new standards in July 2001, which establish a limit for average refrigerator consumption of no more than 487 kilowatt-hours per year.

However, trend lines do mask overall consumption levels of the existing refrigerator stock. Despite significant energy use reductions in new refrigerators, RECS estimates that 1997 average refrigerator electricity use was still over 1,140 kilowatt-hours of electricity each year, a result of the significant number of older refrigerators still in use in the United States.¹² In the Pacific Northwest, this would translate into approximately 5.6 billion kilowatt-hours of electricity use per year. On a household level, the average expenditure would be approximately \$60 dollars per year at \$.05/kilowatt-hour.

As discussed in further detail below, refrigerators built and purchased before the implementation of the 1993 standard represented over 60 percent of the stock nationwide and in the Pacific Northwest. In addition, refrigerators over ten years old—which consume approximately 1,000 kwh/year and up—still constitute over 30 percent of the total stock in the Northwest region.

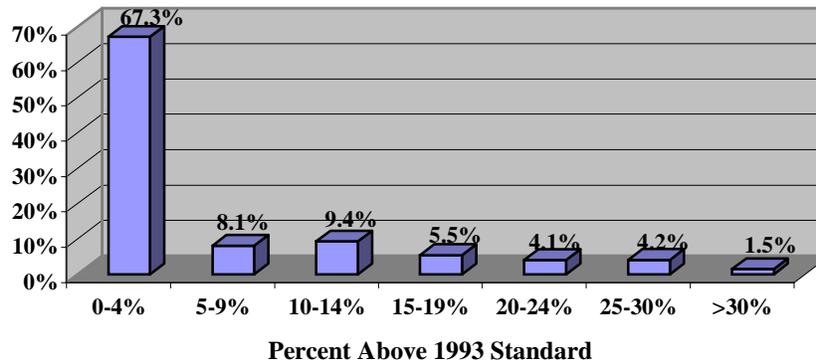
Refrigerator Efficiency Distribution in 1998

Refrigerator efficiency distribution patterns show that, for the most part, the bulk of the models in the U.S. currently do not exceed the federal standard levels by a large margin. For instance, over 75 percent of the models on the market in 1998 were within ten percent of the federal standard levels, versus roughly 10 percent of models that exceeded standards by 20 percent or more¹³. This distribution may reflect the general bifurcation of the appliance market into two camps—the bulk of shoppers who are extremely price driven, and the much smaller segment of the market that is more “value” driven and likely to spend more money initially to receive the amenities and features they have come to expect in their appliances.

¹² U.S. Department of Energy, “A Look at Residential Energy Consumption in 1997, Table 3-1

¹³ Source: D&R International Product Database, using efficiency submissions by appliance manufacturers to the Federal Trade Commission

*Exhibit 2-8: Distribution of Efficiency
Among 1998 Refrigerator Models*



G. Trends in Existing Stock and Ownership Patterns

Despite the relatively flat sales numbers in the refrigerator market between 1994 and 1998, Americans' preferences shifted discernibly between 1993 and 1997, as revealed in RECS. The more notable trends included the following:

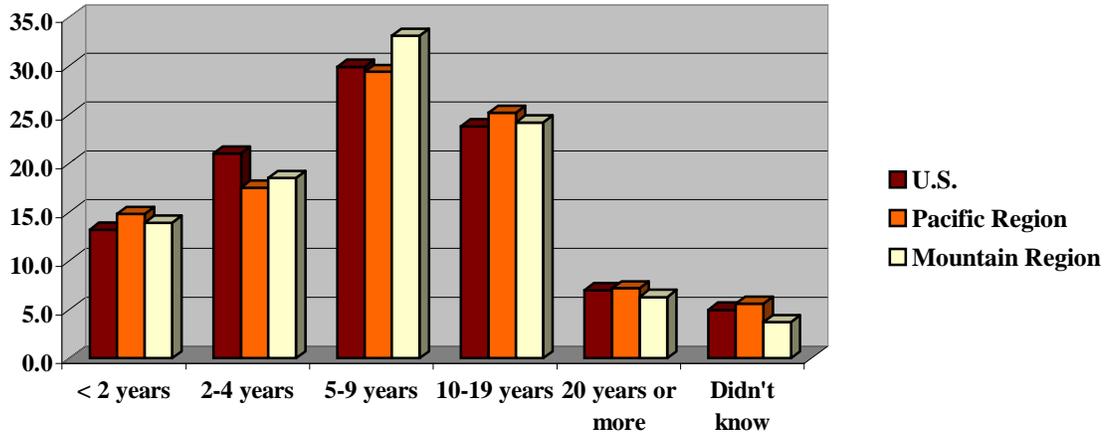
- A larger percentage of U.S. households owned refrigerators that were four years old or less (34 percent in 1997, versus only 29.1 percent in 1993).
- Similarly, the percentage of refrigerators that was ten years old or less declined slightly between 1993 and 1997, despite remaining a high portion of overall stock. The 1997 RECS survey estimates that 30 percent of the existing stock was over 10 years old, versus 34 percent of refrigerators in 1993.
- Americans increasingly prefer larger refrigerators. In 1997, over 46% of all U.S. refrigerators has a capacity of 19 c.f or greater, versus only 35% in 1993. This trend is especially pronounced in the single-family home market.

As noted before, in general the RECS survey revealed that existing refrigerator stock characteristics in the Northwest were quite similar to those found among consumers nationwide. We will discuss some of the most relevant characteristics of refrigerator stock patters for program design in this section.

Refrigerator Age

The chart below shows the average age of refrigerators broken down nationally and by RECS sub-regions. It reveals that, despite some minor differences, refrigerator ages at the regional levels were similar to those found nationally. It also shows that over 60 percent of all refrigerators in place in the Pacific and Mountain sub-regions were purchased before the advent of new refrigerator standards in 1993. Similarly, over 30 percent of the refrigerators in each region were more than 10 years old. The patterns for the Pacific Region were very similar to those found by PG&E for its service territory.

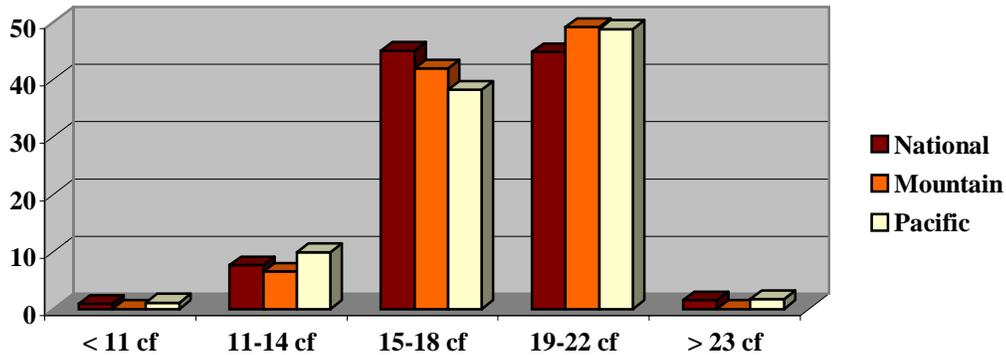
**Exhibit 2-9: Age of Refrigerator by Region
(Percent of Total Stock)**



Refrigerator Size

However, the RECS data revealed a slight deviation in the average size of refrigerators in the Pacific and Mountain sub-regions when compared to national averages. Specifically, the percentage of houses with large (e.g. >19 c.f. refrigerators) was slightly higher in the Pacific (50.5 percent) and Mountain (49.1 percent) than the national average (46.3 percent). The size ranges by region are shown in the chart below:

**Exhibit 2-10: Refrigerator Size by Region
(Percent of Total Stock)**



Thus, despite some minor differences, the general refrigerator trends and buying patterns in the Northwest appear to be quite similar to those observed nationwide. This lack of a distinct “Northwest consumer” was echoed by virtually all of the national appliance manufacturers and retailers surveyed for this report. Thus, we find that most of the trends observed nationwide can and should be applied to the Northwest market.

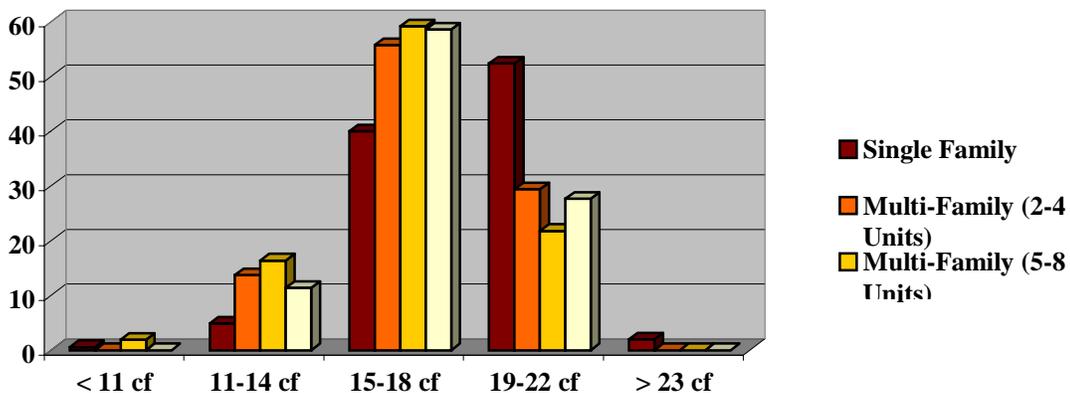
Differences in Refrigerator Purchases Among Classes of Consumers

The broad trends in refrigerator purchase patterns mask some important differences among consumer types and present a somewhat incomplete picture of the refrigerator market. As one might expect, buying trends and habits differed markedly between consumers depending on a variety of factors, most notably housing stock. We will examine these in detail below.

Size

As noted above, refrigerator size has generally increased over the past decade. However, these increases have generally been concentrated in single-family housing market. For instance, over 50 percent of the single family homes surveyed for RECS owned a refrigerator with a capacity of greater than 19 cubic feet, versus less than thirty percent for multi-family units the percentage of refrigerators with capacities above 19 c.f., as shown in Exhibit 2-11, below:

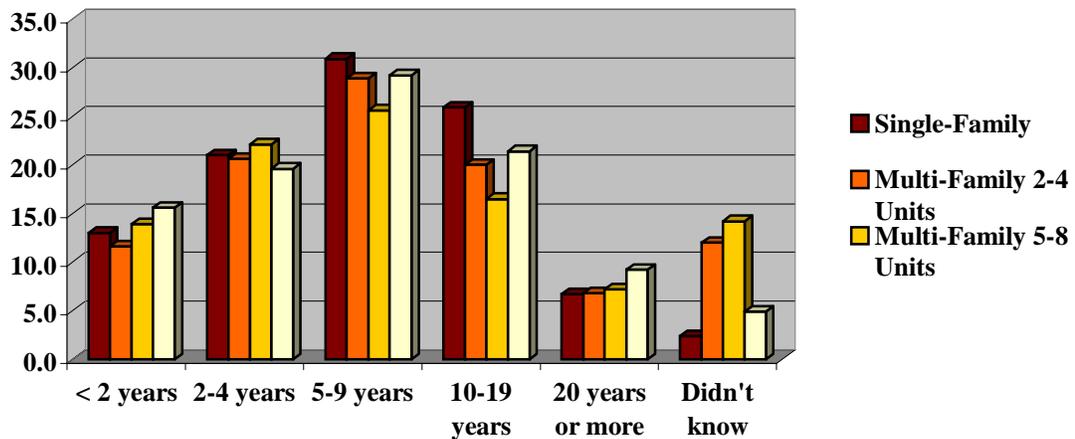
Exhibit 2-11: Refrigerator Size by Housing Type



Age

One surprising fact that emerged from the 1997 RECS survey is that there does not appear to be a major difference between the ages of refrigerators in the different types of housing stock. The RECS data showed that refrigerators in single-family homes tended to be either slightly newer or slightly older than those found in multi-family housing stock. In fact, while over 60 percent of refrigerators in single-family and manufactured housing was over five years old. Refrigerators in manufactured housing stock tended to demonstrate the same patterns as single-family homes, as shown in the following chart:

**Exhibit 2-12: Refrigerator Age by Housing Type
(Percent of Housing Stock)**



Second Refrigerators

Finally, as expected, the large majority of the second refrigerators nationally were concentrated in single-family homes. The RECS survey showed that almost 20 percent of single-family homes contained a second refrigerator, versus less than five percent in multi-family and manufactured housing stock. Slightly higher second refrigerator penetration levels were found in a 1997 Pacific Gas and Electric Company study, which found that 22.8 percent of single-family homes had two or more refrigerators, compared to 2 percent of multi-family housing with five units or more. However, the PG&E study also found that 16 percent of manufactured housing units had a second refrigerator.¹⁴

2. Freezers

A. *Current Market Size and Stock, by Region*

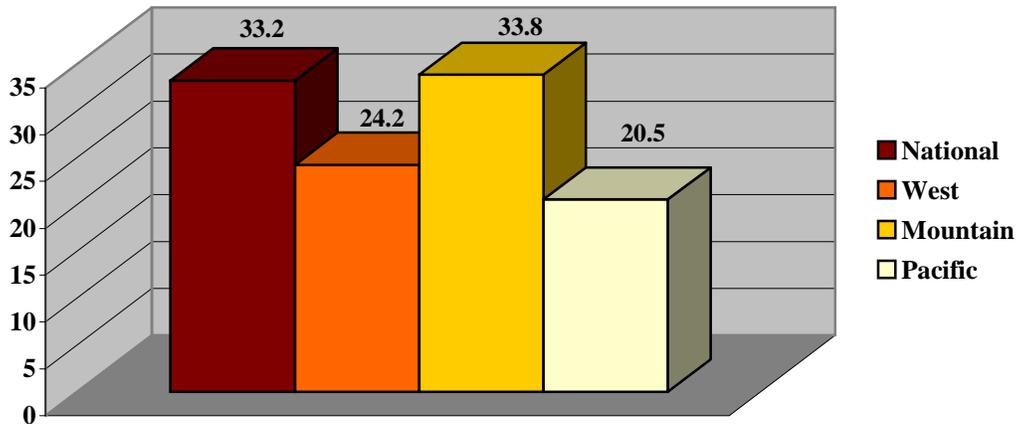
RECS estimates that the current market penetration of freezers nationwide in 1997 was approximately 33.2 percent. This figure showed a slight decrease from the 1993 RECS saturation level of 34.1 percent. However, RECS also reveals that the saturation levels in the Western part of the U.S. tend to be considerably lower (24.2 percent) than those in other parts of the country

For the Pacific sub-region (which includes Washington and Oregon), saturation levels were just over 20 percent. This figure is almost ten percentage points lower than freezer saturation levels found in the PG&E survey, which found that roughly 29 percent of households had a least one freezer.

The RECS Mountain sub-region, which contains Idaho and Montana, had an overall saturation level of 33.8 percent, slightly higher than national averages.

¹⁴ Pacific Gas and Electric Company, Residential Energy Survey Report, 1997, Page C-25

**Exhibit 2-13: Freezer Penetration by Region
(Percent of Households)**



Using the RECS freezer saturation estimates and 1998 U.S. Census Bureau estimates of total households by state in the Northwest, we estimate the total stock of freezers in the Pacific Northwest to be approximately one million units. The chart below shows the derivation of this estimate, with an approximation of total units for each state in the Northwest.

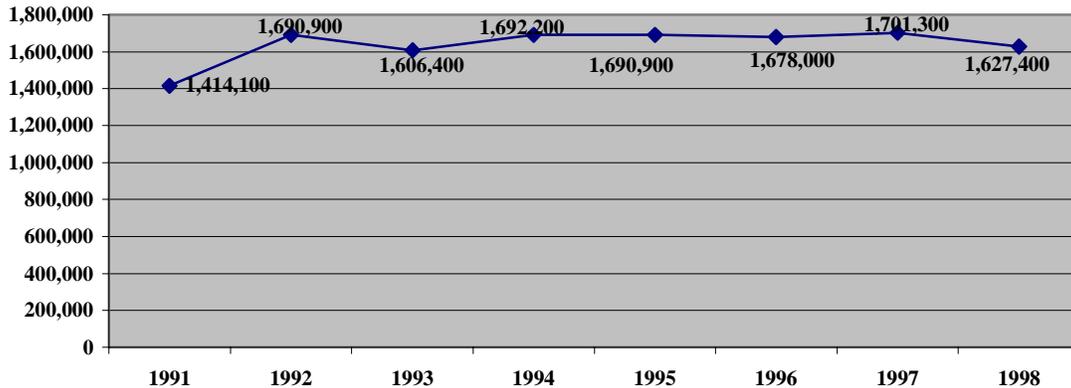
Exhibit 2-14: Estimated Freezer Unit Numbers by State (1998)

State	Households	Saturation Levels	Total Units By State
Washington	2,211,000	20.5	453,255
Oregon	1,286,000	20.5	263,630
Montana	346,000	33.8	116,948
Idaho	448,000	33.8	151,424
NW Totals	4,291,000		985,257

B. Sales and Sales Trends in the U.S. Since 1991

AHAM reports that 1998 sales of freezers in the U.S. were approximately 1.6 million units. As the chart below clearly demonstrates, overall growth in the freezer market has been virtually non-existent since 1992, after a 19 percent increase between 1991 and 1992. However, AHAM projections for 1999 indicate that freezer sales increased by almost 20 percent, to 1.83 million units. Most of the industry and retailer sources we spoke to believed that the increase in sales was due mainly to public fear of Y2K disruptions. Industry forecasts show that sales through 2005 are actually expected to drop by about 10 percent.

Exhibit 2-15: U.S. Freezer Sales (1991-1998)

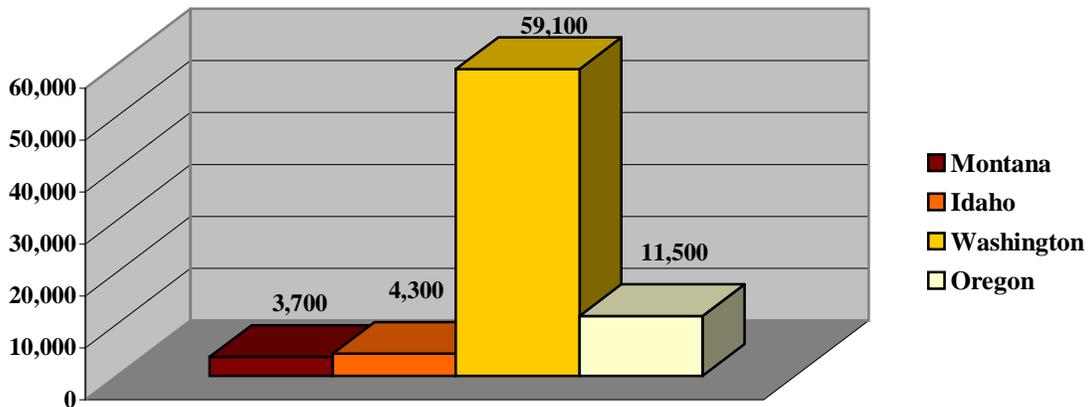


The sales pattern shown in the chart above illuminates an interesting fact about freezers; specifically that sales tend to run counter-cyclical to economic patterns. During recessions, sales increase as people look to stock up on sales items (as demonstrated by the upturn in sales during the last U.S. recession in 1992). Conversely, during good economic times, consumers place a lower premium on these factors and thus purchase fewer units.

C. Total 1998 Northwest Sales, Broken Down by State

AHAM estimates that 1998 freezer sales in the Pacific Northwest totaled approximately 78,600 units. On a state-by-state basis, AHAM reports these sales broke down as shown on the following graph:

Exhibit 2-16: 1998 Freezer Sales by State



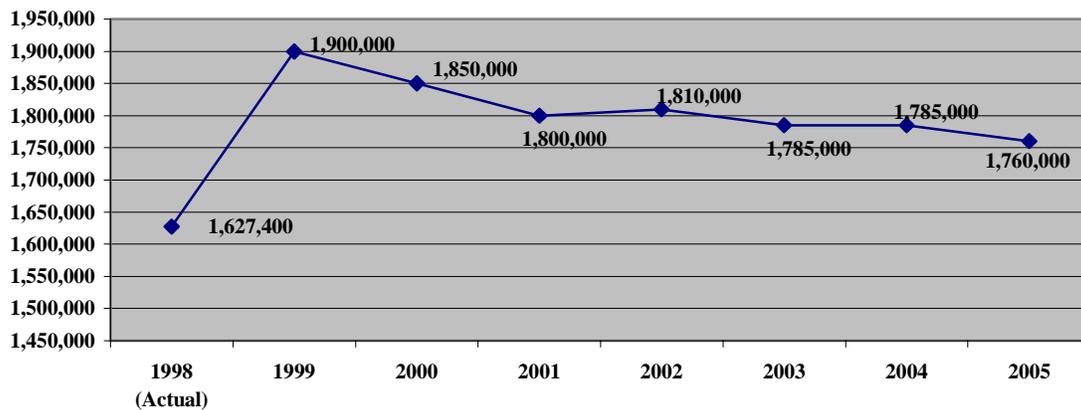
However, some caution should be exercised in interpreting this data, since they appear to indicate that Washington accounted for 75 percent of regional freezer sales in the Northwest. AHAM reports shipments as they are made to distribution centers, rather than retail outlets. Thus, the figures reported here are probably accurate for the Northwest as a whole, but give a somewhat misleading picture for sales at the state level.

The sales figures for the Northwest states as a whole in 1998 did deviate slightly from expected patterns based on state population figures. The Northwest, which accounts for 4.1 percent of the U.S. population, accounted for approximately 4.8 percent of all freezer sales.

D. Sales Forecasts Through 2005

As noted earlier, projected U.S. freezer sales for 1999 are expected to be quite strong, rising by nearly 17 percent.¹⁵ From 2000 to 2005, freezer sales are actually expected to decline by almost 8 percent from 1999 to 2005. Overall, freezer sales in the Northwest are forecast to be approximately 85,000 units in 2005, a slight increase from estimated 1998 sales of 78,000 units.

Exhibit 2-17: Freezer Sales Forecasts (1999-2005)



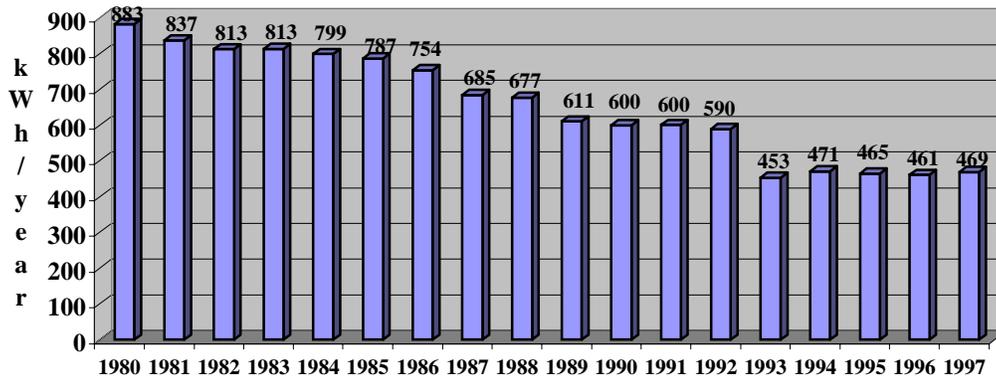
E. Efficiency Trends and Distributions for 1998 Models

The Lawrence Berkeley National Laboratories estimate that, on average, freezer energy use per unit nationwide was approximately 1,025 kilowatt-hours per year. Using the total estimated stock for the Northwest, this would indicate that total freezer energy use is approximately 1 billion kilowatt hours per year.

Freezers demonstrate the same sorts of energy intensity reductions as were found in refrigerators, in large part because the two appliances are built with similar technologies and are on the same national standards setting timeline. As shown in the chart below, the electricity use per year for the freezers dropped from approximately 870 kilowatt hours per year in 1980 to around 470 kilowatt hours per year in 1997. However, the general pattern of efficiency improvements has stalled since the last round of efficiency standards were implemented in 1993.

¹⁵ “2000: Riding It Out,” HFN, January 1, 2000

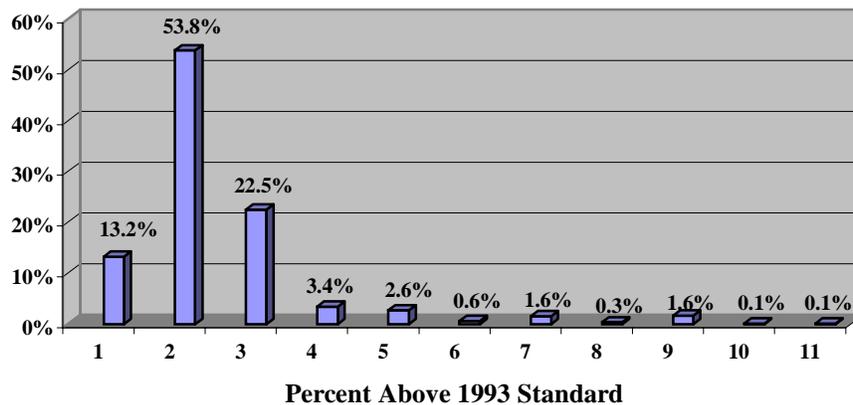
Section 2-18: Freezer Energy Use Trends (1980-1997)



Distribution of Freezer Efficiencies in 1998 Models

As the chart below demonstrates, the current stock of freezers sold in the marketplace does not offer a wide range of efficiencies. For instance, almost 90 percent of all freezer models fell in a range of one to three percent better than 1993 standard. Less than five percent of 1998 models were more than five percent more efficient than existing federal standards.

Exhibit 2-19: Freezer Efficiency Distribution - Percent of 1998 Models

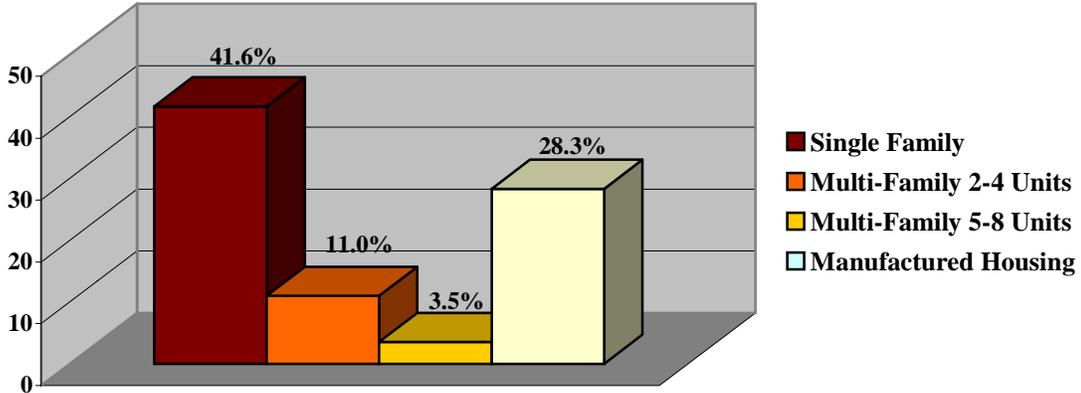


F. Trends in Existing Stock and Ownership Patterns

One of the distinguishing characteristics of the freezer market is the wide disparity between the penetration levels by housing stock. As the chart below demonstrates, while 41 percent and 28 percent of single family and manufactured homes contained a freezer, respectively, only ten percent or less of multi-family units contained freezers. In fact, the disparity in ownership patterns actually widened since 1993; while penetration levels in single family homes held relatively steady from 1993-1997, penetration levels in multi-

family housing of 5-8 units declining by roughly half, from 6.8 percent to approximately 3.4 percent over the same period.

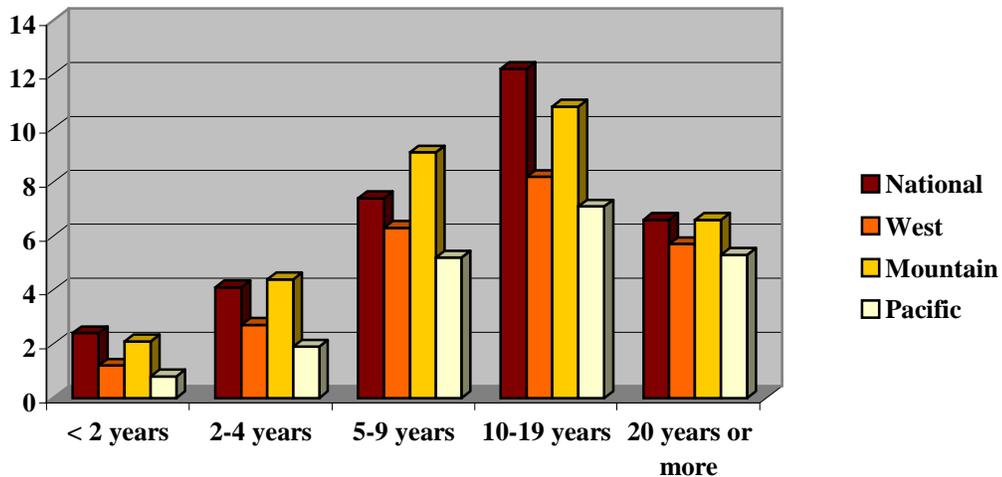
Exhibit 2-20: Freezer Penetration by Housing Type - 1997
(Percent of U.S. Housing Stock)



Age of Freezer Stock

Another characteristic of the freezer market is the overall age of freezers: in general, the stock is relatively old. As the chart below demonstrates, 13.7 percent of homes in the Pacific sub-region (Washington and Oregon) and 16.5 percent of homes in the Mountain sub-region (Montana and Idaho) have freezers that are ten years or older. Conversely, only 5.2 percent of homes in the Pacific sub-region and 6.5 percent of the Mountain sub-region have freezers that are less than five years old.

Exhibit 2-21: Freezer Age by Region - 1997
(Percent of Households)

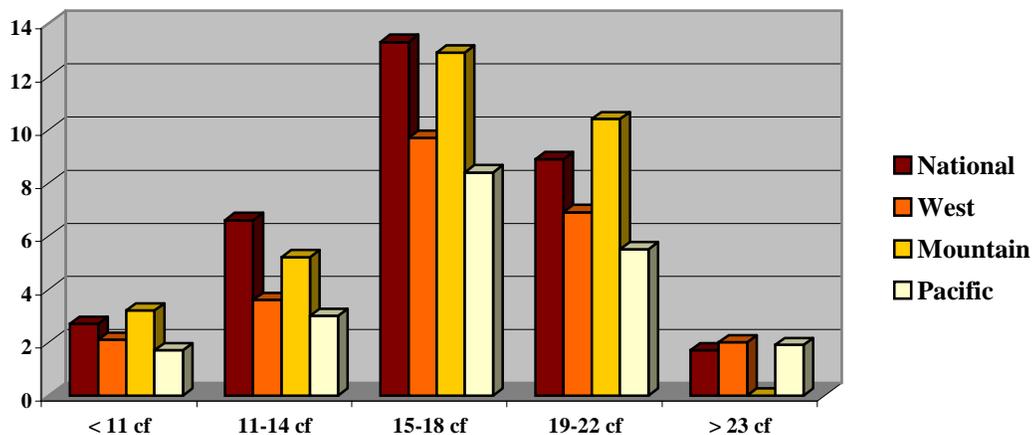


Freezer Size

The general trend in freezer size nationally has been toward purchases of mid-sized models. For instance, the percent of households with small (less than 14 cubic foot) freezers declined from 9.8 to 9.3 percent from 1993 to 1997. Similarly, the share of large freezers nationally declined from 12.2 percent of households in 1993 to 10.6 of households in 1997. The only growth area in terms of freezer penetration between 1993 and 1997 was in the mid-sized models (15-18 cubic feet), which increased from 12.6 of all homes in 1993 to 13.3 percent in 1997.

In the Pacific Northwest, there is considerable variation in the size of freezers in the different states. As the chart below demonstrates, while 10.4% of the households in the Mountain sub-region own a freezer larger than 19 cubic feet, only about 7.5 percent of households in the Pacific sub-region do.

Exhibit 2-22: Freezer Size by Region - 1997
(Percent of Households)

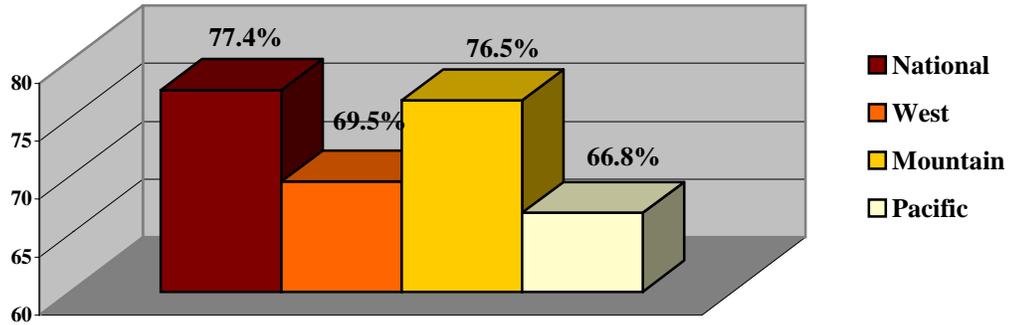


3. Clothes Washers

A. Current Market Size and Stock, by Region

RECS estimates that the current market penetration of washers nationwide in 1997 was approximately 77.4 percent. This figure showed only a slight rise from the 1993 RECS saturation level of 77.1 percent. However, RECS also reveals some wide discrepancies between regions of the country, mostly due to the greater concentration of multi-family housing in certain areas of the country. For the Pacific Northwest region, the saturation levels varied considerably, ranging from 66.8 percent in the Pacific sub-region (which includes Washington and Oregon) to 76.5 percent in the Mountain sub-region, which contains Idaho and Montana.

**Exhibit 2-23: Washer Penetration by Region
(% of All Homes)**



Using the RECS washer saturation estimates and 1998 U.S. Census Bureau estimates of total households by state in the Northwest, we estimate the total stock of washers in the Pacific Northwest to be approximately 2.9 million units. The chart below shows the derivation of this estimate, with an approximation of total units for each state in the Northwest.

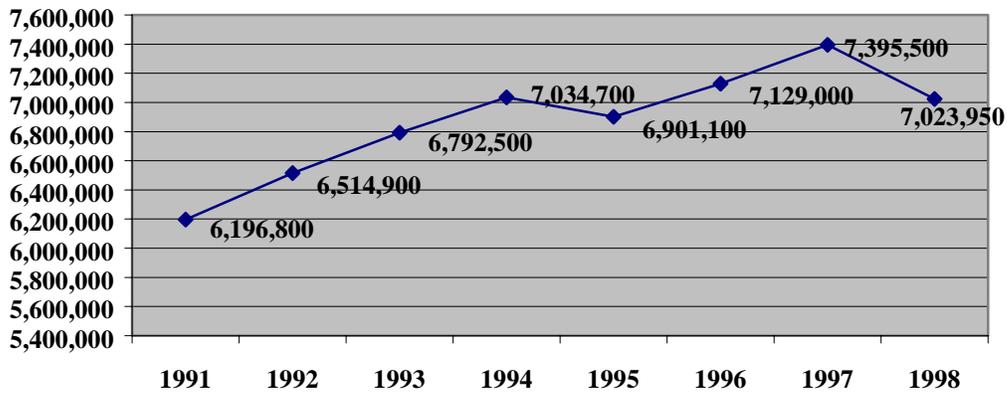
Exhibit 2-24: Estimate of Total Washer Units by State

State	Households	Saturation Levels	Total Units By State
Washington	2,211,000	66.8	1,476,948
Oregon	1,286,000	66.8	859,048
Montana	346,000	76.5	264,690
Idaho	448,000	76.5	342,720
NW Totals	4,291,000		2,943,406

B. Sales and Sales Trends in the U.S. Since 1991

AHAM reports that 1998 sales of washers in the U.S. were approximately 7 million units. As the chart below shows, overall growth in the market has been approximately 13 percent since 1991, but that growth is somewhat uneven between years, ranging from a high of a five percent increase between 1991 and 1992 to a decrease of 3.8 percent between 1997 and 1998.

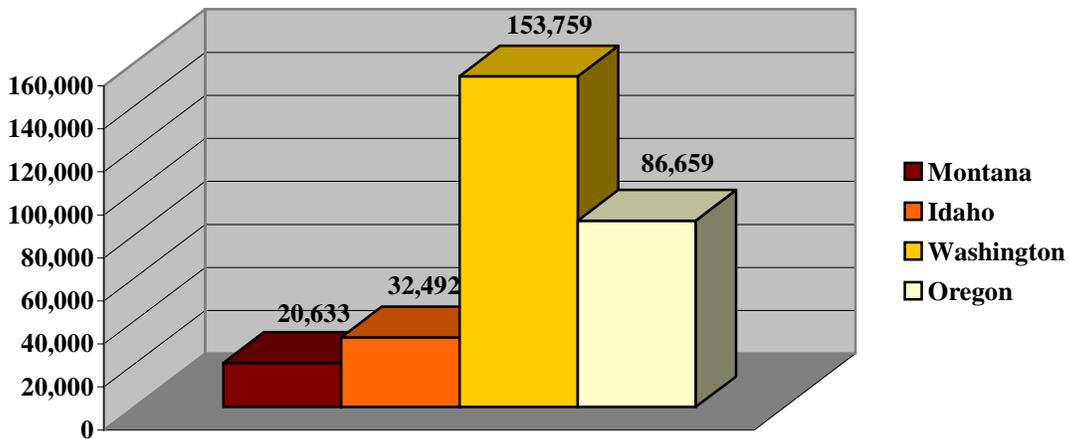
Exhibit 2-25: U.S. Clothes Washer Sales 1991-1998



C. Total 1998 Northwest Sales, Broken Down by State

In the Pacific Northwest, total washer sales in 1998 were approximately 287,000 units, as estimated by AHAM. On a state-by-state basis, this broke down as follows:

Exhibit 2-26: Northwest Clothes Washer Sales by State (1998)

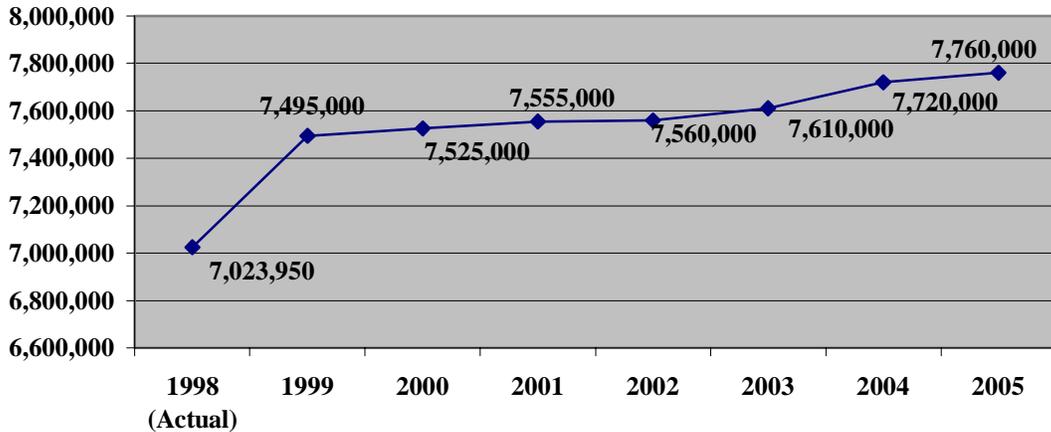


Sales figures for the Northwest states in 1998 did not deviate significantly from expected patterns based on state population figures. For instance, Washington, which has approximately 2.12 percent of the total U.S. population, accounted for 2.19 percent of total washer sales. Similarly, Montana, which accounts for approximately .325 percent of U.S. population, accounted for approximately .295 percent of total U.S. sales.

Sales of clothes washers nationally is expected to rise ten percent between 1998 and 2005, from 7.0 million units to just under 7.7 units annually. However, almost 7 percent of the total growth was projected to occur between 1998 and 1999 (final 1999 sales

figures have not yet been published by AHAM). For the remainder of the forecast period, growth is expected to be only 3.5 percent, or slightly less than 0.6 percent annually. If market share trends for the Northwest remain constant during this period, this would place annual sales in the region in 2005 at approximately 318,000 units per year.

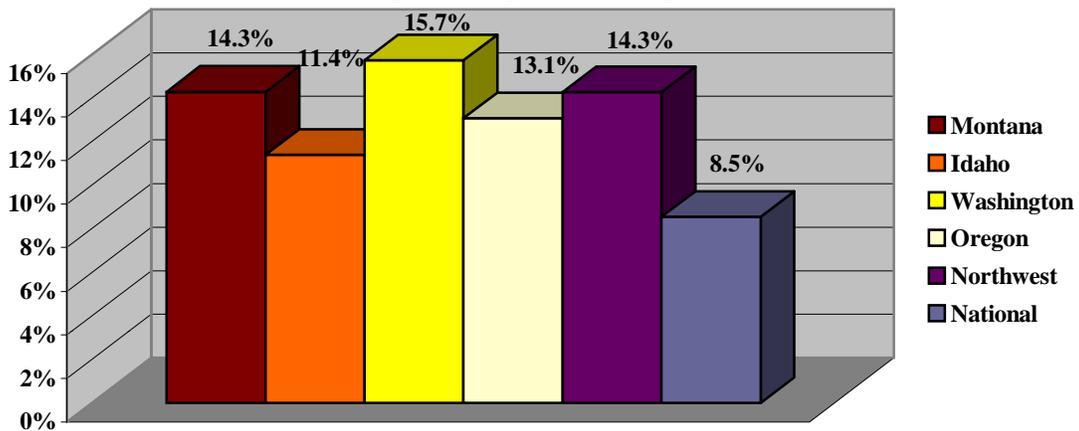
Exhibit 2-27: Forecasted U.S. Clothes Washer Sales (1999-2005)



E. Market Share of ENERGY STAR® -Qualified Appliances in Each State and the U.S. for 1998

Reported sales of ENERGY STAR-qualified clothes washers at or above the ENERGY STAR level were as follows in 1999:

Exhibit 2-28: 1999 Energy Star Washer Sales by Region (Percent of Total Sales)



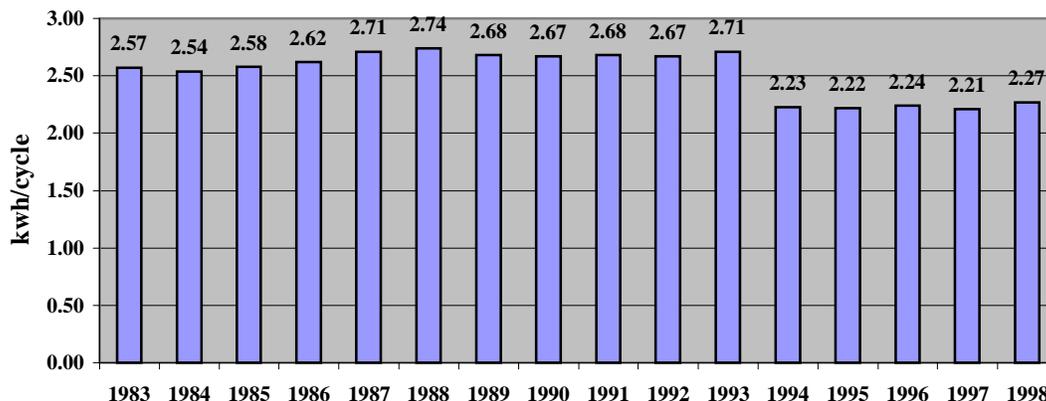
As the chart shows, sales of higher-efficiency washers in the Northwest were roughly twice the national average (15.7 percent versus 8.5 percent nationally). In addition, the market share of ENERGY STAR-qualified models in the Northwest area were also equal

to or somewhat higher than in other regions and states that offered financial incentives and/or sponsored promotional campaigns for high-efficiency washers. For instance, regional sales figures in the Northeast for 1999 showed that ENERGY STAR washer sales were 15.7 percent of total sales, while California figures estimated that ENERGY STAR models achieved an 11 percent market share in 1999. Sales from Wisconsin and New York for the same period were 10.3 and 7.9 percent, respectively.¹⁶

F. Efficiency Trends and Distributions for 1998 Models

As shown in the chart below, the energy intensity of clothes washers has dropped over the past decade, but, unlike refrigerators and freezers, the change has been relatively small as a percentage of overall energy use. As shown in the chart below, the electricity use per load for the average clothes washer moved between a low of 2.54 kilowatt hours/load in 1984 to a low of 2.27 kwh/load in 1998.

Exhibit 2-29: Clothes Washer Energy Use Trends (1983-1998)



The relatively smaller reductions in energy use per unit are due in large part to the fact that largest clothes washer efficiency gains come from reducing water use and, by extension, water heating load. Thus, for the majority of washers using a standard (e.g. vertical axis) platform, efficiency gains are difficult to achieve, unless water requirements are reduced dramatically. As we discuss in Section III, the large increase in the number of horizontal axis technologies and a growing number of low water vertical axis models on the market should continue to reduce the energy use trends.

Another countervailing trend in the washer market that could act as a drag on energy use reductions is continuing consumer demand for larger washers. AHAM reports that between 1990 and 1998, the average washer tub size increased by over eight percent, from 2.63 cubic feet to 2.85 cubic feet. As we discuss in Section III this is a response to consumer desires for larger washers that reduce the number of loads per week, and thus total washing time, a trend that shows no sign of abating in the foreseeable future.

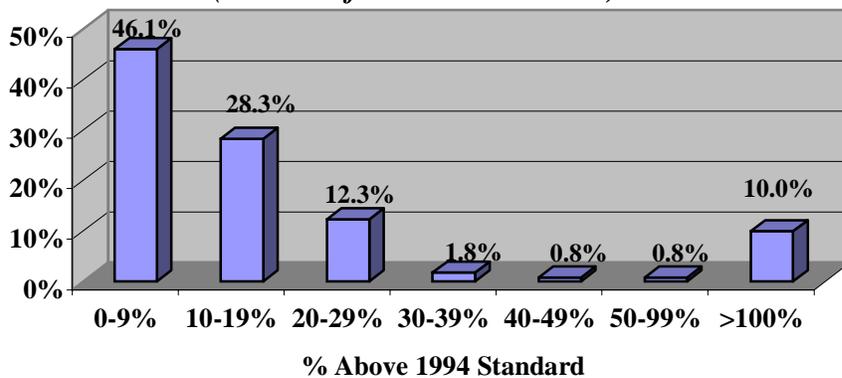
¹⁶ Source: D&R International

Washer Efficiency Distribution in 1998

More than any appliance market surveyed for this report, clothes washers demonstrate a significant spread in the efficiencies of models available on the market in 1998. As the chart below demonstrates, over 10 percent of washer models on the market in 1998 were at least 100 percent more efficient than federal standards. This number should increase somewhat with the continued introduction of RECWs by major manufacturers (see Section III for more discussion).

However, the chart also reveals the increasing bifurcation of the market into two product categories depending on efficiency. A good deal of this has to do with washer engineering—since efficiency improvements are limited without significant washer use reductions, manufacturers are forced to make significant adjustments to product platforms or operating cycles in order to push efficiencies much above 30 percent better than standard.

**Exhibit 2-30: 1998 Washer Efficiency Distribution
(Percent of Models on Market)**



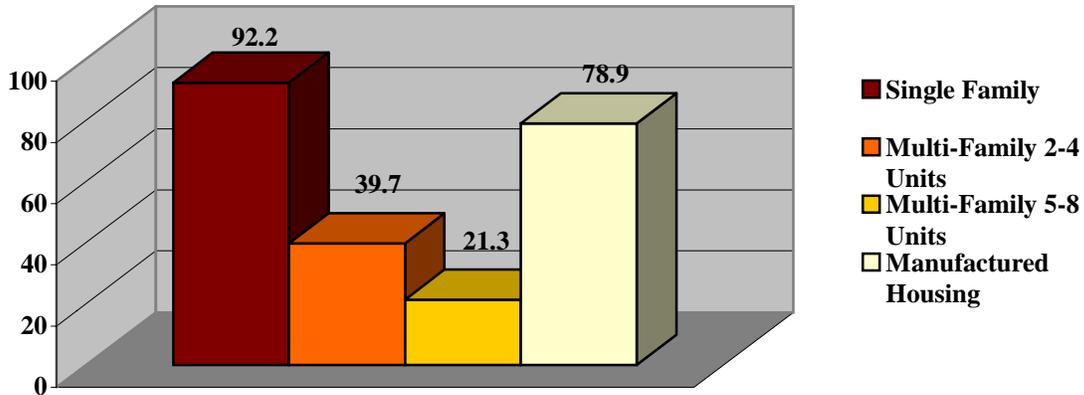
G. Trends in Existing Stock and Ownership Patterns

Washer penetration levels provided by RECS found that washer penetration levels were lower in the Pacific Sub-region than national averages (66.8 percent vs. 77.4 percent, respectively). The penetration figures for the Mountain sub-region are roughly equal to the national averages (76.5 percent vs. 77.4 percent, respectively). As we noted earlier, under the definitions used in the RECS, Washington and Oregon fall in the Pacific sub-regions, while Idaho and Montana fall in the Mountain sub-region.

Another distinguishing characteristic of the washer market is the wide disparity between penetration levels in the different housing stocks. The following chart shows the RECS results for 1997 on the national level. It shows that washer penetration levels in single-family units were over 90 percent (though they declined slightly from the 1993 levels of 93.4 percent), and multi-family penetration levels of less than forty percent, depending on the size of the complex. Manufactured housing penetration levels were surprisingly strong at 78.4 percent of total stock.

One interesting trend to note is that between 1993 and 1997 washer penetration levels in multi-family housing with 2-4 units declined significantly, from 48.4 percent in 1993 to 39.7 percent in 1997. We believe that this may be indicative of a trend in many multi-family settings away from providing washers in the units due to cost and water considerations.

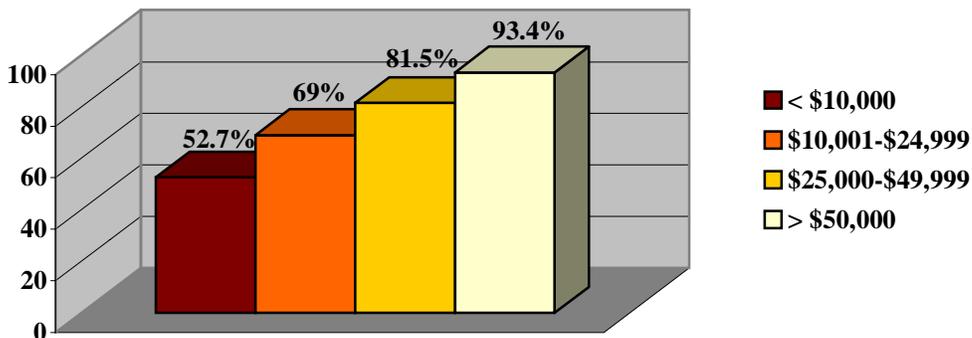
**Exhibit 2-31: Washer Penetration by Housing Type
(Percent of Housing Stock)**



Washer Penetration by Income Level

Another key feature of the washer market is the breakdown of ownership patterns by income levels. As the chart below indicates, washer ownership is directly correlated with income levels; penetration levels for households with incomes above \$50,000 are over 77 percent greater than households with incomes less than \$10,000 and 35 percent higher than households with incomes between \$10,000 and \$25,000. This disparity raises obvious equity questions with regard to public benefits programs for RECWs, an issue we discuss in more detail in Section V.

**Exhibit 2-32: Washer Penetration by Income Level
(Percent of U.S. Households, 1997)**



4. Dryers

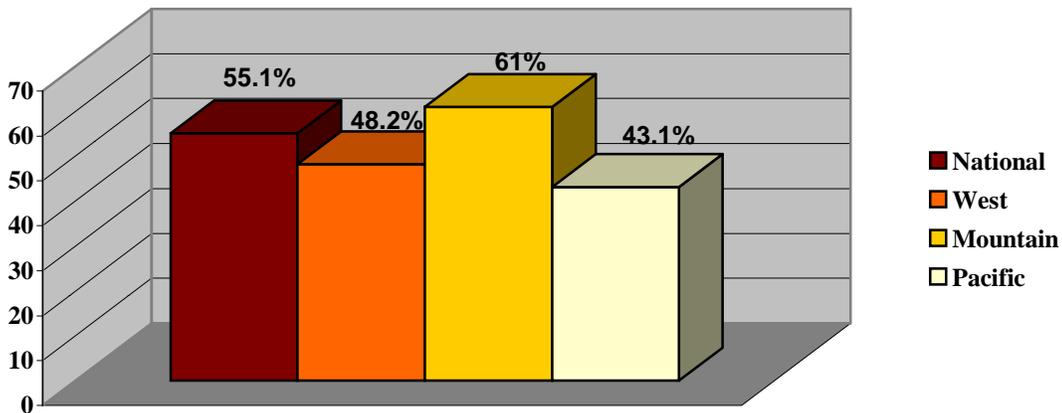
A. *Current Market Size and Stock, by Region*

RECS estimates that the current market penetration of electric dryers nationwide in 1997 was approximately 55 percent, a slight decrease from 56 percent saturation level found in the 1993 RECS survey. Total dryer penetrations (electric, gas and propane) have not increased since 1993, although the penetration of gas dryers in 1997 is slightly higher than in 1993 (15.2 percent in 1997 versus 13.9 percent in 1993).

Penetration levels for electric dryers were generally lower in the Western region of the U.S than for the nation as a whole, as shown in the graph below. Total dryer penetration levels were lower as well, (65 percent for the West versus 71 percent nationwide), but most of this was concentrated in the Pacific sub-region, where overall dryer penetrations were only 63 percent in 1997. As with clothes washers and dishwashers, we believe that this is largely a reflection of the higher density of multi-family region in that part of the country.

Electric dryer penetrations were highest in the Mountain sub-region (61 percent). Overall saturation levels were consistent with national averages; the higher electric dryer saturation levels reflect the preponderance of electric service in that region of the country.

*Exhibit 2-33: Electric Dryer Penetration by Region
(Percent of Total Households)*



Using the RECS dryer saturation estimates and 1998 U.S. Census Bureau estimates of total households by state in the Northwest, we estimate the total stock of electric dryers in the Pacific Northwest to be approximately 1.9 million units. The chart below shows the derivation of this estimate, with an approximation of total units for each state in the Northwest.

Exhibit 2-34: Estimate of Total Electric Dryer Units by State

State	Households	Saturation Levels	Total Units By State
Washington	2,211,000	41.3	913,143
Oregon	1,286,000	41.3	531,118
Montana	346,000	61.0	211,060
Idaho	448,000	61.0	273,280
NW Totals	4,291,000		1,928,601

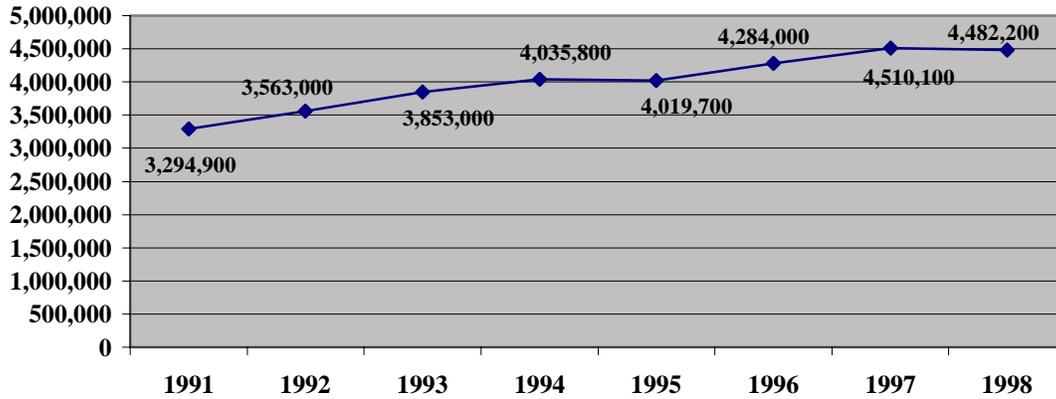
One word of caution may be in order with this estimate: this may slightly underestimate the total stock of electric dryers in Washington and Oregon. The RECS survey Pacific sub-region includes California, Oregon, Washington, Hawaii and Alaska. Since the percentage of all-electric households is generally higher in Washington and Oregon than it is in California, the saturations of electric dryers for the sub-region as a whole may not be a totally accurate reflection of the market share in Washington and Oregon. The PG&E residential survey found that 50 percent of households in their service territory has an electric dryer, slightly higher than total figures for the region as a whole.

It may be useful to consider a lower and upper range for the region. For instance, if electric dryers in Washington and Oregon were found to be consistent with national levels (55 percent), this would increase the total stock numbers in Washington and Oregon to approximately 1.21 million and 707 thousand units, respectively, and increase the overall stock in the Northwest to approximately 2.4 million units. We believe this to be the upper limit estimate for the number of electric dryers in the Northwest.

B. Sales and Sales Trends in the U.S. Since 1991

AHAM reports that national sales of electric dryers in the U.S. were approximately 4.4 million units in 1998. As the chart below shows, the electric dryer market has grown by approximately 36 percent between 1991 and 1998. As with the dishwasher market, much of this growth occurred between 1991 and 1994; growth between 1994 and 1998 was only 11 percent, about 2.5 percent per year.

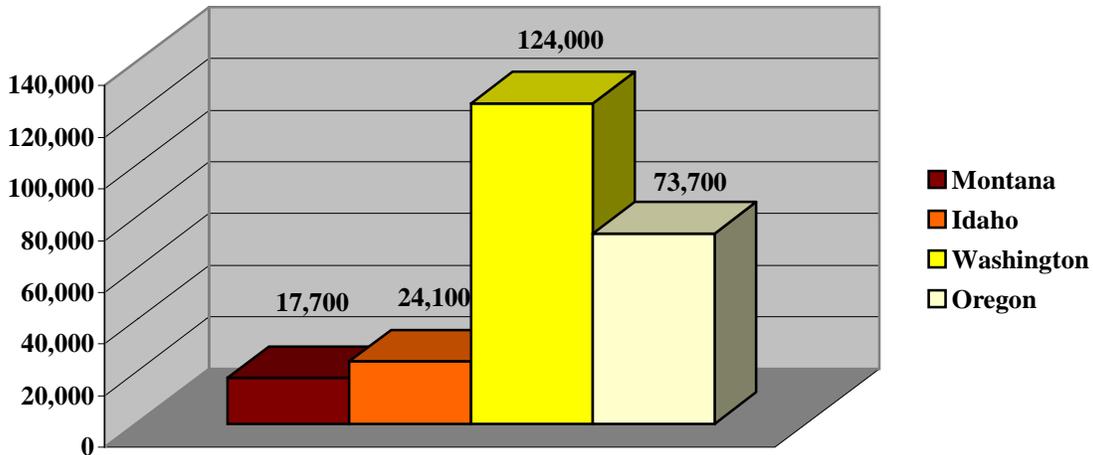
Exhibit 2-35: U.S. Electric Dryer Sales (1991-1998)



C. Total 1998 Northwest Sales, Broken Down by State

In the Pacific Northwest, the total electric dryer sales in 1998 were approximately 239,500 units, as estimated by AHAM. On a state-by-state basis, this broke down as follows:

Exhibit 2-36: Electric Dryer Sales by State (1998)



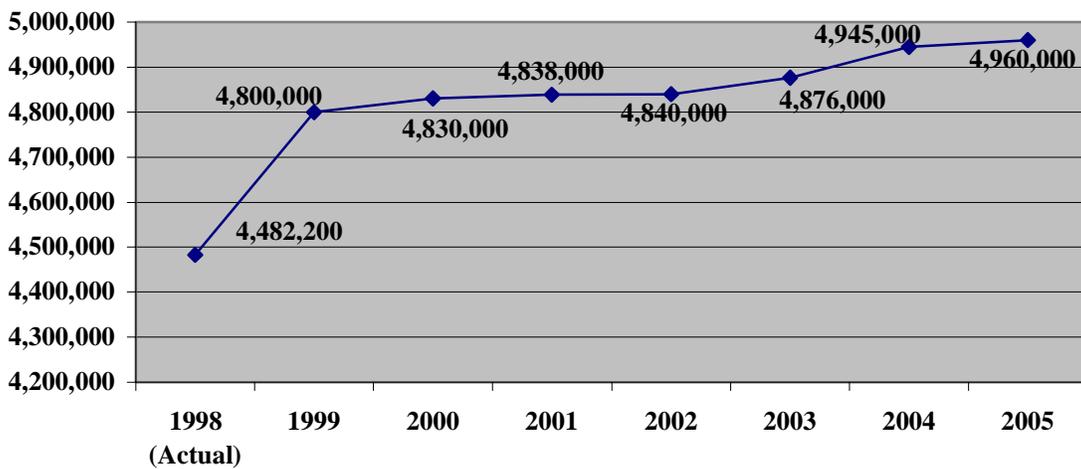
The sales figures for the Northwest states in 1998 were slightly higher than would be expected based on total population and the saturation figures provided by the 1997 RECS report. The total sales in the region accounted for approximately 5.3 percent of the national total, whereas the region represents about 4.1 percent of the total population. Further, Washington state sales as a percentage of national sales were 2.7 percent of total unit shipments, despite the fact that it has approximately 2.12 percent of the total U.S. population. Similarly, Oregon, which represents approximately 1.2 percent of U.S. population, accounted for approximately 1.6 percent of total U.S. sales. These figures

would lead us to believe that the total stock of electric dryers in each state is on the higher end of our estimates provided above.

D. Sales Forecasts Through 2005

AHAM forecasts that electric dryer sales will jump sharply—by nearly 7.1 percent—in 1999, but grow only 3 percent in total between 1999 and 2005, a growth rate of only .5 percent per year over that time frame. If these predictions are accurate, total market share of electric dryers in the Northwest would be approximately 263,000 units per year in 2005.

Exhibit 2-37: Electric Dryer Sales Forecasts (1999-2005)



E. Efficiency Trends and Distributions for 1998 Models

The 1997 RECS report estimates that, on average, clothes electric dryers in the United States consume approximately 900 kilowatt-hours per year.

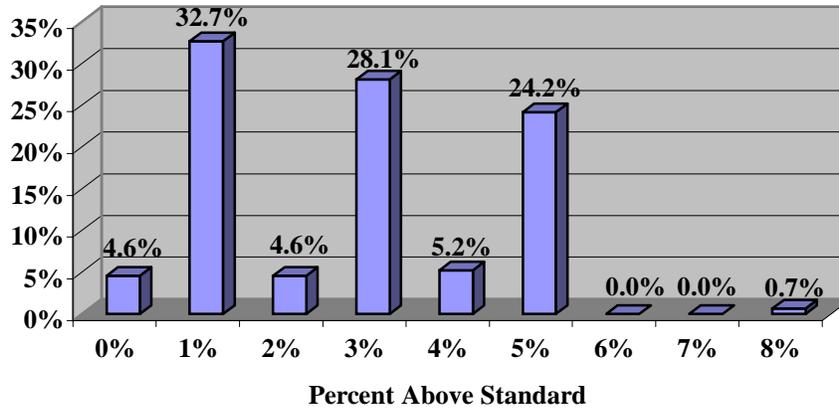
Because the government or AHAM do not collect data on dryer efficiency, we were unable to determine what the general overall trend in dryer efficiencies has been over the past five to ten years. However, most of the efficiency experts and manufacturer representatives we spoke to believe that there have been few overall gains in dryer efficiency over the past few years, with the exception of the improvement and greater availability of moisture sensors on many models. We discuss this issue in more detail in Section III.

Dryer Efficiency Distribution

Most of the experts we spoke with concerning dryers indicated that there was little difference in the overall efficiency of electric dryers currently in the market. The chart below showing the range of efficiencies available confirms these observations. It shows that virtually all of the models on the market in 1998 were within five percent of the

minimum efficiency standard. This would translate into savings of approximately 50 kilowatt hours per year for a dryer that is five percent better than the federal standard. Even the most efficient model currently on the market (ten percent better than standard) would reduce electricity consumer by about 80 kilowatt hours per year, a savings of approximately four dollars per year at the prevailing Northwest rate.

**Exhibit 2-38: Dryer Efficiency Distribution
(Percent of 1998 Models)**

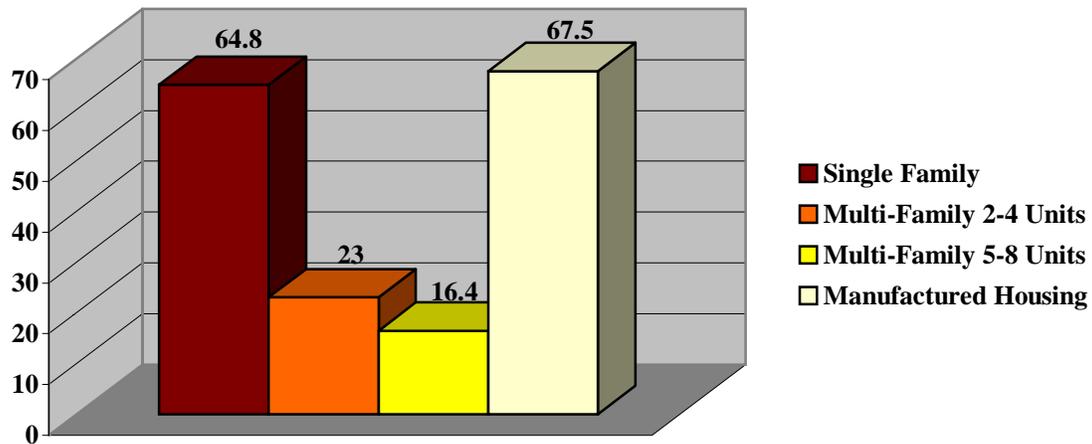


F. Trends in Existing Stock and Ownership Patterns

As with many of the other appliances covered in this report, the saturation of electric dryers varies widely in different housing stocks. The following chart shows the RECS results for 1997 on the national level. It shows that electric dryer penetration levels in single-family units were over 64.8 percent, a slight decrease from the 69 percent penetration levels found in 1993. In other settings, electric dryer penetrations were roughly the same in 1997 as in 1993, with the exception of small multi-family settings, where the penetration levels dropped to 23 percent from 28 percent between 1993 and 1997.

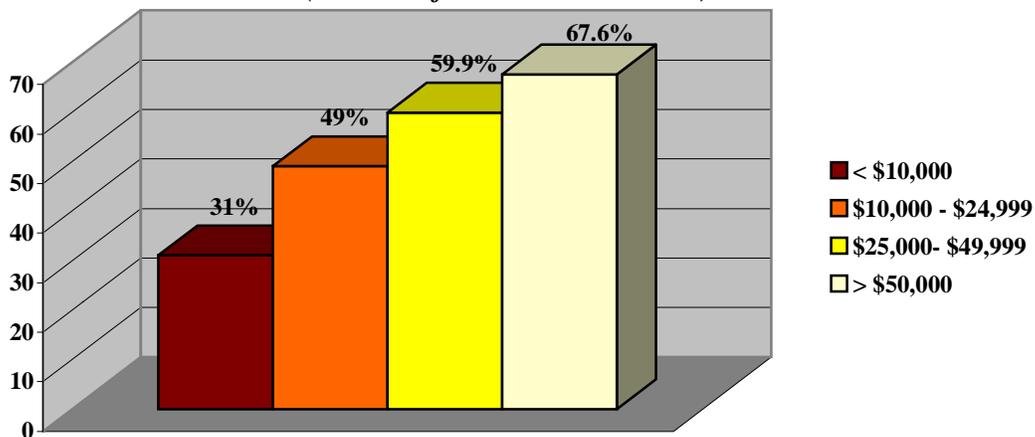
Another key distinguishing characteristic between housing types is the percent of electric dryers as a percentage of total stock. Nationally, electric dryers comprise approximately 77 percent of total dryer stock. In large multi-family and manufactured housing settings, however, electric dryers represent well over 90 percent of the stock in place.

**Exhibit 2-39: Electric Dryer Penetration by Housing Type
(Percent of U.S. Households)**



Finally, the greatest disparity in ownership patterns shows up in income level differences. As the chart below demonstrates, saturation levels for electric dryers directly correlates to household income levels nationwide:

**Exhibit 2-40: Electric Dryer Penetration by Income - 1997
(Percent of Households in U.S.)**



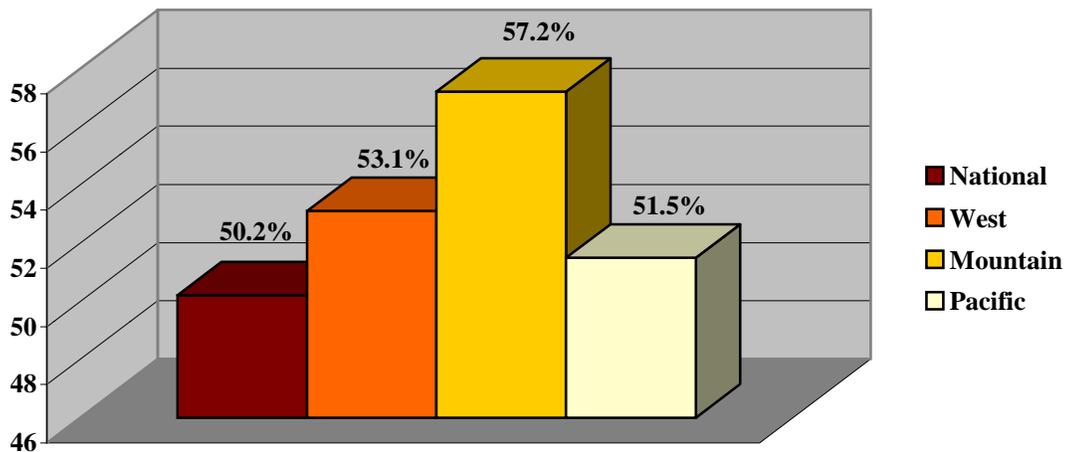
On the other hand, the percent of electric dryers (versus gas units) as a percent of installed units is inversely proportional to income. For instance, of households that have dryers, roughly 70 percent of households with incomes over \$50,000 had an electric dryer. Conversely, of households with incomes under \$10,000 that owned a dryer, over 85 percent owned electric units.

5. Dishwashers

A. *Current Market Size and Stock, by Region*

RECS estimates that the current market penetration of dishwashers nationwide in 1997 was approximately 50 percent, an increase from the 45 percent saturation level found in the 1993 RECS survey. Penetration levels were higher in the Western half of the country, as shown in the graph below. Overall penetration levels were higher in the Mountain sub region (57.2 percent) than the Pacific sub-region (51.5), but both were higher than the national penetration levels, while the Western region overall had a market penetration of 53.1 percent. The higher saturation figures in the Mountain sub-region are most likely due to the lower levels of multi-family housing stock.

*Exhibit 2-41: Dishwasher Penetration by Region
Percent of Households--1997*



Using the RECS dishwasher saturation estimates and 1998 U.S. Census Bureau estimates of total households by state in the Northwest, we estimate the total stock of dishwashers in the Pacific Northwest to be approximately 2.25 million units. The chart below shows the derivation of this estimate, with an approximation of total units for each state in the Northwest.

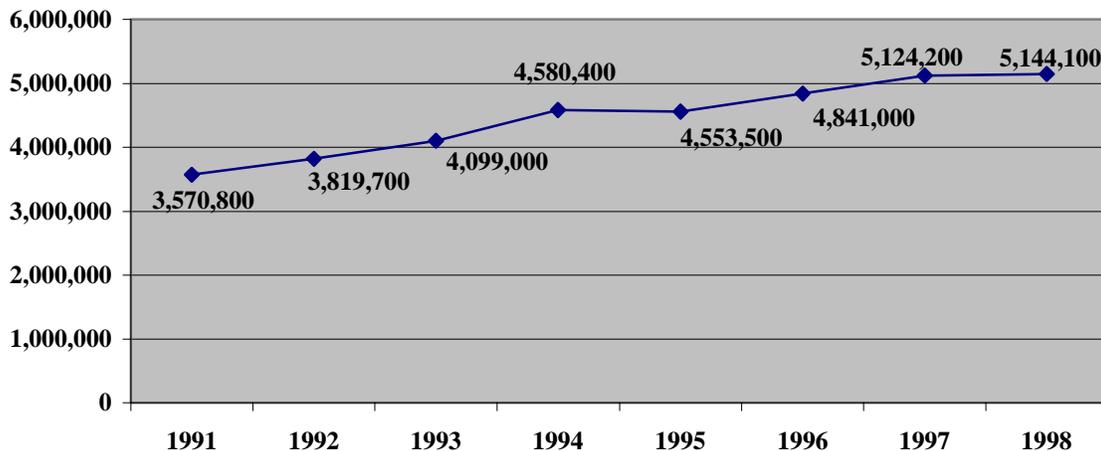
Exhibit 2-42: Dishwasher Units by State

State	Households	Saturation Levels	Total Units By State
Washington	2,211,000	51.5	1,138,665
Oregon	1,286,000	51.5	662,290
Montana	346,000	57.2	197,912
Idaho	448,000	57.2	256,256
NW Totals	4,291,000		2,255,123

B. Sales and Sales Trends in the U.S. Since 1991

AHAM reports that national sales of dishwashers in the U.S. were approximately 5.1 million units in 1998. As the chart below shows, the dishwasher market grew significantly—approximately 44 percent—between 1991 and 1998. However, the chart also shows that growth slowed considerably after 1994. Growth between 1994 and 1998 was only 12.3 percent, slightly less than 3 percent per year.

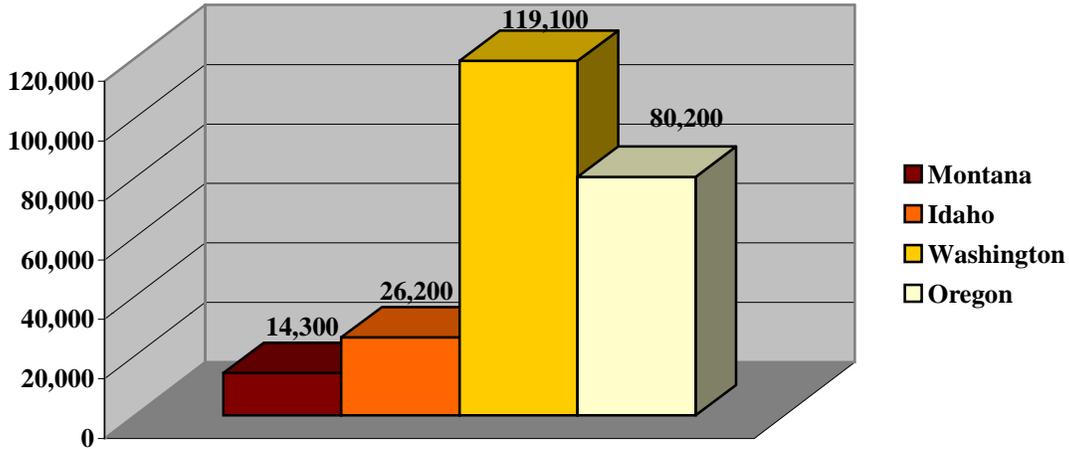
Exhibit 2-43: U.S. Dishwasher Sales (1991-1998)



C. Total 1998 Northwest Sales, Broken Down by State

In the Pacific Northwest, total 1998 dishwasher sales were approximately 240,000 units, as estimated by AHAM. On a state-by-state basis, this broke down as follows:

Exhibit 2-44: Northwest Dishwasher Sales By State (1998)

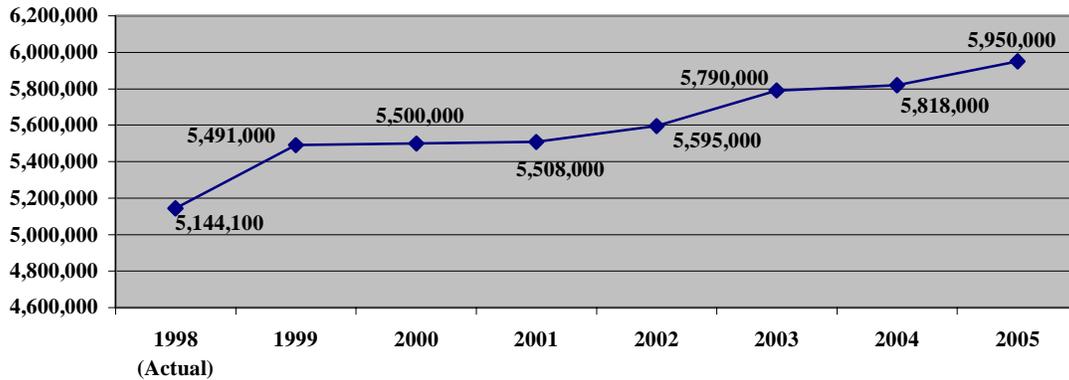


The sales figures for the Northwest states in 1998 did not deviate significantly from expected patterns based on state population figures. For instance, Washington, which has approximately 2.12 percent of the total U.S. population, accounted for 2.3 percent of total dishwasher sales. Similarly, Montana, which accounts for approximately .325 percent of U.S. population, accounted for approximately .28 percent of total U.S. sales.

D. Sales Forecasts Through 2005

AHAM projects relatively strong sales growth in the dishwasher market from 1999 to 2005, as shown in the chart below. The market as a whole is expected to grow from 5.1 million units per year in 1998 to nearly 6.0 million units per year in 2005, a 17 percent growth over that period, or approximately 2.3 percent per year. In terms of the number of units sold in the Northwest, this would be the equivalent of another 37,000 units per year over 1998 annual sales by 2005.

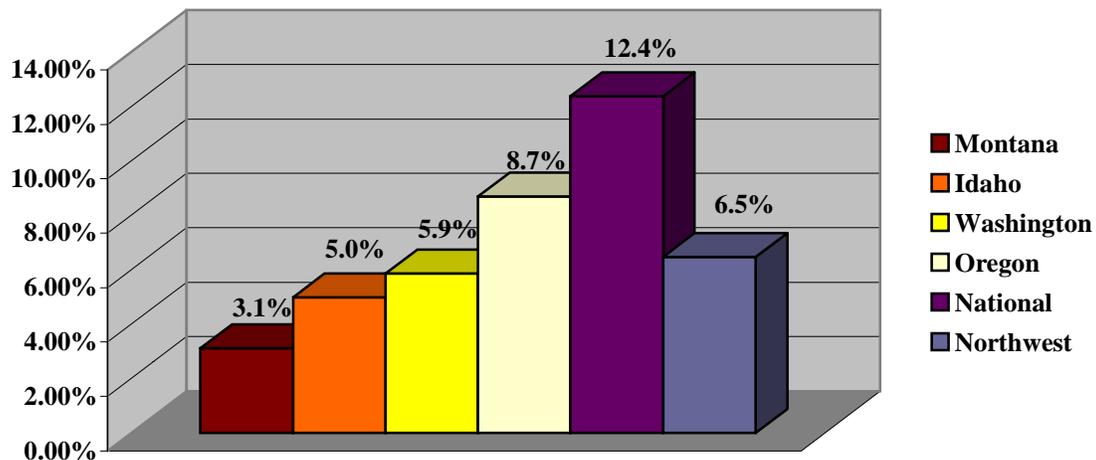
Exhibit 2-45: U.S. Dishwasher Sales Forecasts (1999-2005)



E. Market Share of ENERGY STAR® -Qualified Appliances in Each State and the U.S. for 1999

Sales of dishwashers at or above the ENERGY STAR level were as follows in 1999:

Exhibit 2-46: 1999 Energy Star Dishwasher Sales by State



As the chart shows, sales of ENERGY STAR-qualified dishwashers in the Northwest in 1999 were considerably lower than the national average (12.4 percent nationally, versus 6.5 percent in the Northwest). However, there was wide variation among the individual states in the Northwest: for example, sales in Oregon totaled almost 9 percent of total sales, versus 3.1 percent for Montana.

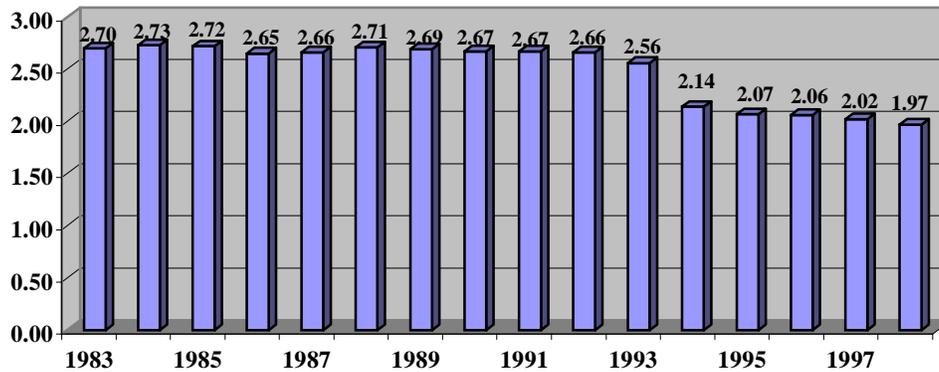
Despite these increases, the share of ENERGY STAR-qualified dishwashers in the Northwest tended to be lower than most other regions of the country, including California, New England, the Upper Midwest and the Mid-Atlantic regions. While this may be the result of a lack of a promotional campaign for dishwashers to date in the

Northwest, the sale of efficient dishwashers generally trailed regions that have not typically promoted efficient equipment, such as the Mid-Atlantic region.

F. Efficiency Trends and Distributions for 1998 Models

The 1997 RECS report estimates that, on average, dishwashers in the United States consume approximately 108 kilowatt-hours per year (excluding water heating load). As with other appliances, the energy intensity of dishwashers has dropped over the past decade, but only marginally. As shown in the chart below, the electricity use per load for the average dishwashers moved dropped by approximately 27 percent between 1993 and 1998, from 2.7 to 1.97 kilowatt hours per cycle over that time frame.

***Exhibit 2-47: Energy Use Trends in Dishwashers -1983-1998
(Kilowatt-Hours Per Cycle)***



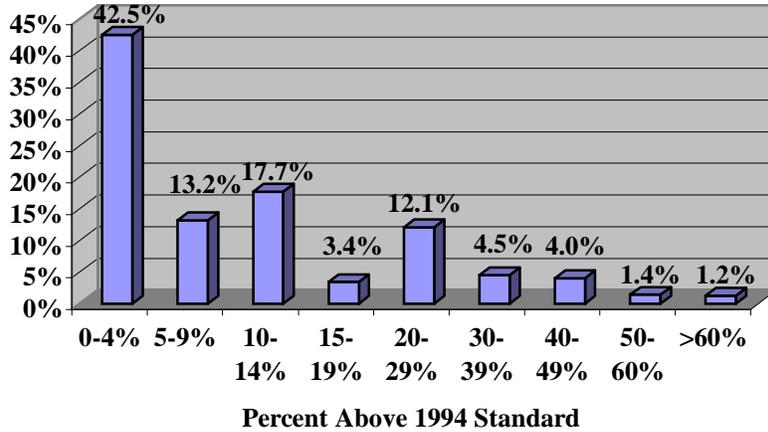
Dishwasher Efficiency Distribution

Dishwasher efficiency distributions in 1998 showed a similar distribution among models that was found with refrigerators; namely a large cluster (over 55 percent) of models within ten percent of the federal standard, and a much smaller number (approximately 23 percent) of models at or above 20 percent better than federal standard.

However, this data should be interpreted with some degree of caution; anecdotal evidence shows that the introduction of efficient dishwashers has been accelerating over the past two years, to the point at which over 50 percent of the models on the market meet the ENERGY STAR-qualification levels (13 percent above federal standards). DOE has proposed that the ENERGY STAR specification be moved in 2001 to approximately 25 percent better than the current standard, at which point slightly more than 20 percent of

the models in the marketplace would qualify.

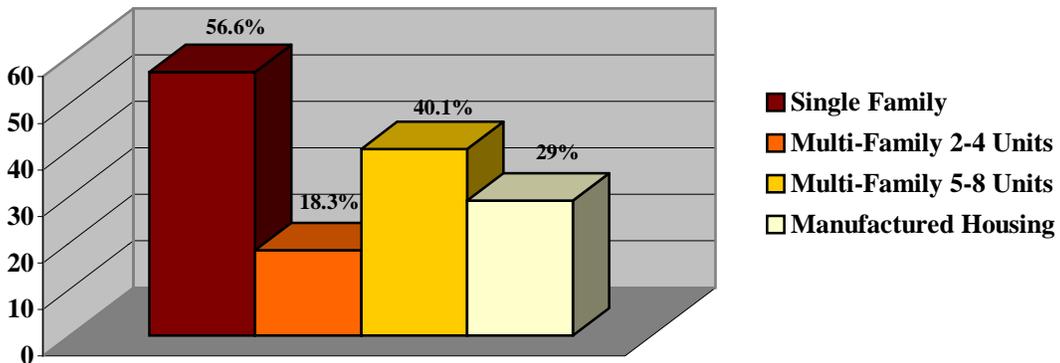
**Exhibit 2-48: 1998 Dishwasher Efficiency Distribution
(Percent of Total Models)**



G. Trends in Existing Stock and Ownership Patterns

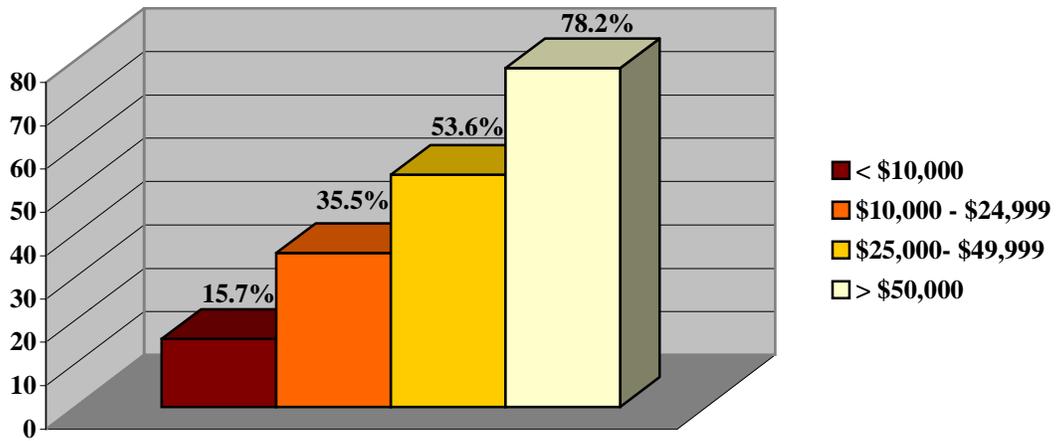
The most distinguishing characteristic of penetration levels in the dishwasher market is the wide disparity between penetration levels in the different housing stocks. The following chart shows the RECS results for 1997 on the national level. It shows that dishwasher penetration levels in single-family units were over 56.6 percent, a slight increase 52.4 percent from the 1993 levels. However, penetration levels in multi-family units and manufactured housing is considerably lower, ranging from 18.3 percent in multi-family housing with 2-4 units to 40 percent in larger multi-family settings. Finally, the penetration levels in manufactured housing showed strong growth between 1993 and 1997, increasing from 18 percent to 27 percent during that period.

**Exhibit 2-49: U.S. Dishwasher Penetration by Housing Type -1997
(Percent of Total Housing Stock)**



Finally, the greatest disparity in ownership patterns shows up in income level differences. As the chart below demonstrates, saturation levels for dishwashers directly correlates to household income levels nationwide:

***Exhibit 2-50: Dishwasher Penetration by Income Level - 1997
(Percent of Households)***



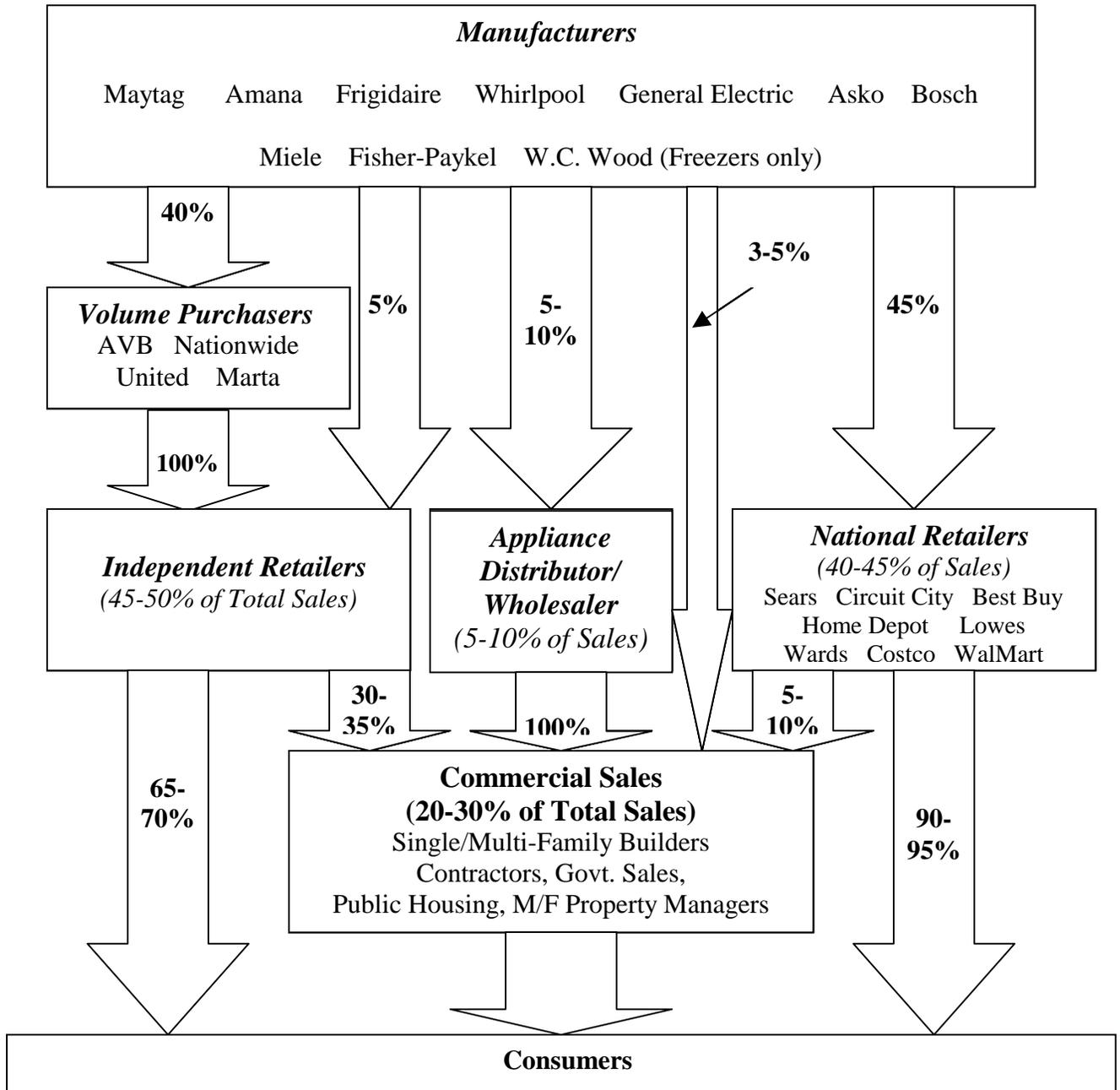
Again, we believe that this pattern may raise some equity issues that need to be considered in program design by the Alliance, which we discuss in more detail in Section V.

Section III Appliance Manufacturing and Distribution Analysis

In this section, we will address the following aspects of the appliance manufacturing market, with specific information provided where applicable for each appliance area investigated in this report.

1. Distribution Chain Analysis
2. Efficiency Potential and Emerging Technologies

1. Distribution Chain Analysis



Residential appliances flow to the consumer through three primary routes. The most common channels are through national and independent retailers. The third channel is through appliance distributors or wholesalers who serve contractors, builders, designers and architects primarily for single-family new construction, multi-family new construction, government sales, and high-end remodels. Many manufacturers are now vertically integrated with their own commercial sales departments, which have reduced the role that wholesaler distributors play¹⁷. In addition, many national retailers have commercial sales departments that serve contractors and builders. In some niche markets focused on high-end products, there does seem to still be a viable market for wholesale distributors to work with designers and architects involved in custom home design and remodeling.

National retailers, and in some cases, regional retailers, have relationships directly with manufacturers, but approximately 85% of independent retailers purchase products through an appliance buyers group. While there are many small buyers groups, there are 4 or 5 large players that are emerging as the primary source for independent retailers. The Internet is a fourth emerging channel of appliance distribution that has not yet made a quantifiable impact but will be explored in this section.

Summarized below are the key issues and drivers for the primary market actors who influence the sale and distribution of appliances. Included in the analysis are manufacturers, national retailers, independent retailers, single-family builders, multi-family builders/developers/property managers, remodeling contractors, and public housing authorities. In addition, we have included a summary of Internet activities and future appliance market impact projections.

A. Manufacturers

In the past two decades, production has been consolidated among a shrinking number of major manufacturers. The market share captured by the top three producers of each product range from 78% to 93%, with the exception of freezers in which 99% of the market is captured by two producers. Five large players dominate the market: GE, Whirlpool, Frigidaire, Maytag and Amana, each of which manufacture products under several different “nameplates” (refer to Appendix A for a list of brand names produced by each manufacturer). The market share of each player has been reasonably consistent over the past eight years as demonstrated by the manufacturer market share graphs below.

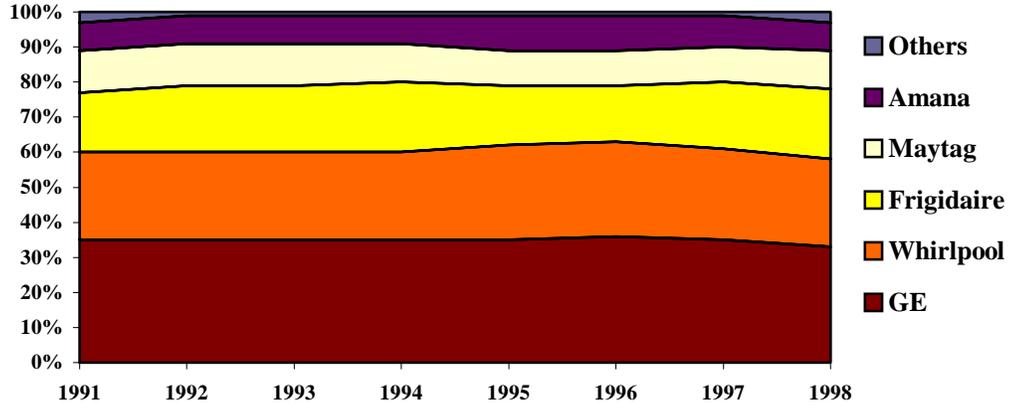
Refrigerators:

The refrigerator market features three dominant players: GE with 33 percent of the market; Whirlpool, which holds 25 percent of the market, and Frigidaire, which holds 20 percent of the market. Maytag also captured 25 percent of the market in 1998 and

¹⁷ California Phase I Baseline Assessment for the Statewide Residential Lighting and Appliance Program, December 1999

Amana held 8 percent market share. The remaining three percent of the market is divided among smaller manufacturers.

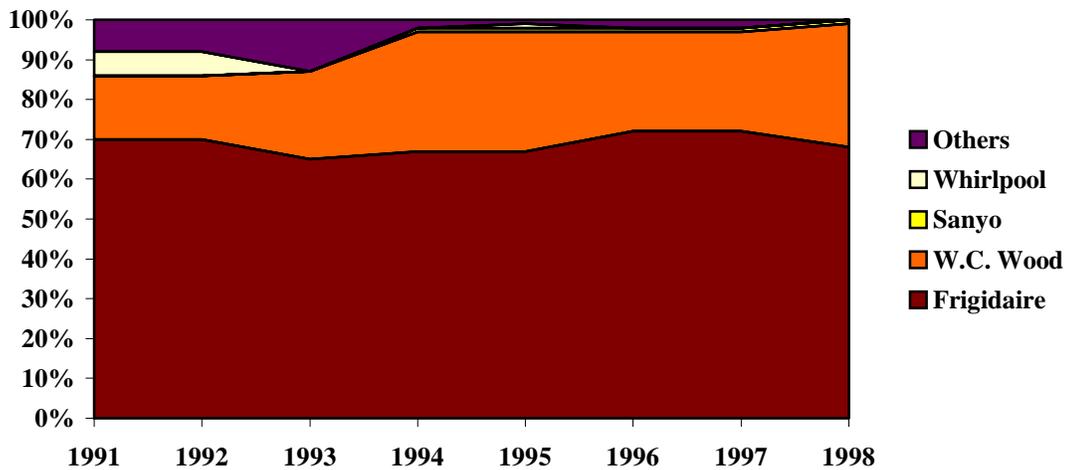
Exhibit 3-1: Refrigerator Market Share by Manufacturer (1991-1998)



Freezers:

The freezer market is the most consolidated of all the major appliance areas due to merger activity over the past few years. The two major players are Frigidaire, which holds 68 percent of freezer market share, and W.C. Wood, which held 31 percent of market share in 1998. The remaining players hold less than one percent.

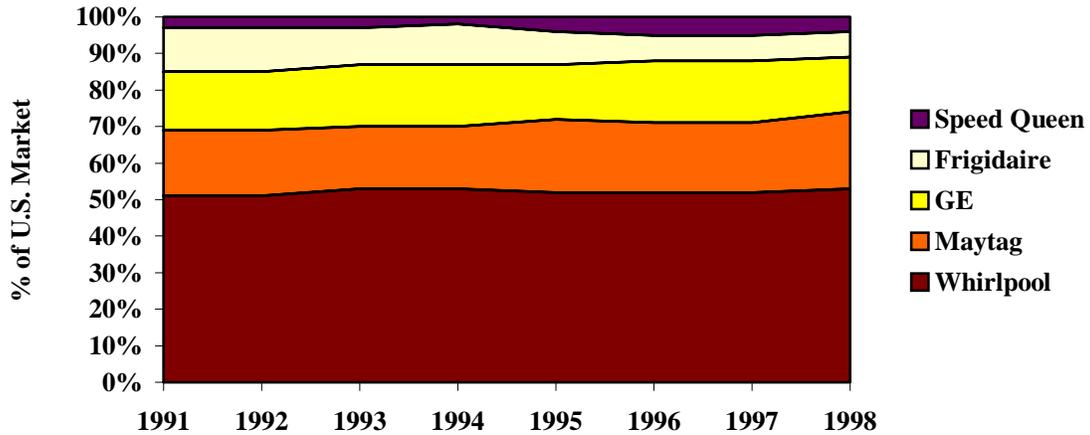
Exhibit 3-2: Freezer Market Share by Manufacturer (1991-1998)



Clothes Washers:

The clothes washer market share breaks down as follows: Whirlpool, 53 percent; Maytag, 21 percent; General Electric 15 percent; Frigidaire, seven percent, and Speed Queen, four percent.

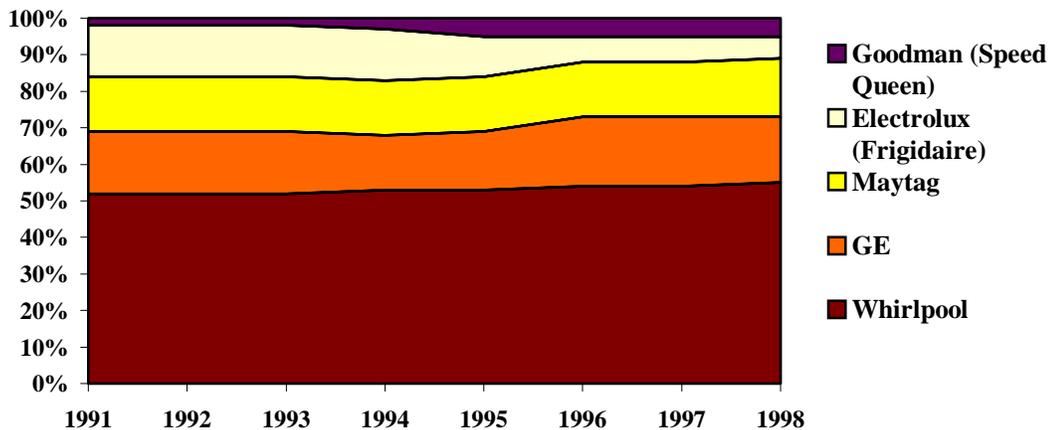
Exhibit 3-3: Clothes Washer Market Share by Manufacturer (1991-1998)



Electric Dryers:

The dryer market is dominated by Whirlpool with 55 percent of market share. Other key players include GE, with 18 percent market share and Maytag, which holds 16 percent of market share. Frigidaire and Speed Queen held six and five percent of total market share in 1998.

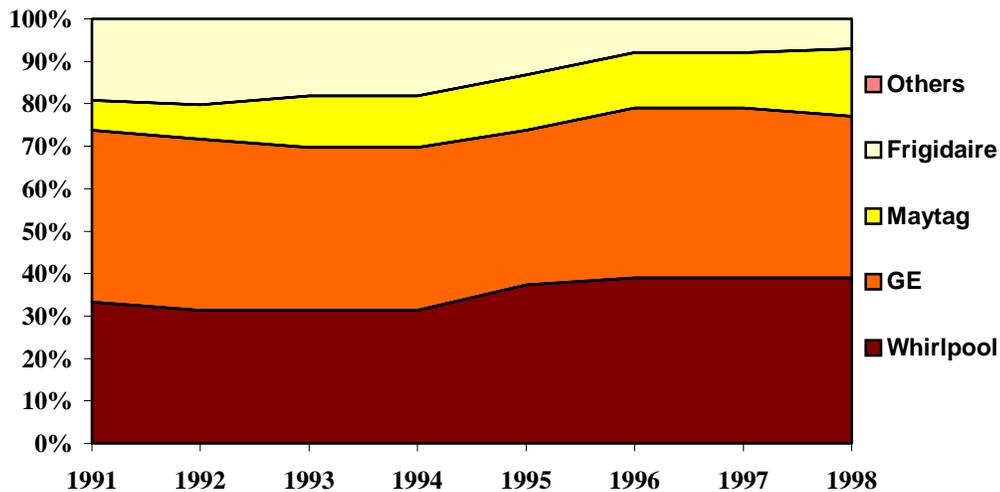
Exhibit 3-4: Electric Dryer Market Share by Manufacturer (1998)



Dishwashers:

Finally, the dishwasher market share for each manufacturer was as follows in 1998: Whirlpool, 39 percent; General Electric, 38 percent; Maytag, 16 percent; and, Frigidaire 7 percent. Other manufacturers market share was less than one percent.

Exhibit 3-5: Dishwasher Market Share by Manufacturer (1991-1998)



Despite the minor shifts seen in market share, the manufacturers continue to aggressively position themselves through product innovations and retailer affiliations. For example, G.E. and Maytag are the initial manufacturers to establish a relationship with Home Depot, one of the newest national appliance retailers. Similar to the recent explosion in appliance innovation, the pace of change in appliance distribution is picking up. Impacts such as Internet sales and the entry of large home improvement stores will require manufacturers to continually position themselves in order to maintain market share. Bill Beer, president, Maytag Appliances, says he sees technology and the Internet as the major business trend impacting the major appliance industry in 2000 and beyond.¹⁸

Overall, the industry is extremely optimistic about 2000 appliance sales. A recent article on 2000 industry forecasts posted on the Appliance Magazine website quoted David R. Whitwam, Whirlpool Corporation chairman and CEO as saying, “The North American appliance industry continues at record levels, and we expect full-year industry shipments to grow between 9 and 10 percent.” In addition, the article quoted Maytag Corporation chairman and CEO, Lloyd D. Ward, as saying, “We expect to gain momentum by delivering innovation across all popular price points and pairing that innovation with brand equity.”¹⁹

While the major manufacturers distribute a significant portion of their appliances through national retailers, there are small niche retailers such as Fisher and Paykel, Miele, Bosche, and Asko who primarily distribute their products through independent retailers,

¹⁸ appliancemagazine.com, Focus: 2000 Industry Forecasts, E-Commerce, March 10, 2000

¹⁹ appliancemagazine.com, Focus: 2000 Industry Forecasts, Perspectives from the Major Appliance Industry, March 10, 2000

wholesale distributors, architects and designers. Many of these small manufacturers specialize in high-end products that are commonly seen in niche retail outlets, such as kitchen and bath stores and showrooms. The majority of independent retailer sales are coordinated through appliance buyers groups (see discussion under independent retailers for details).

The appliance manufacturing market remains extremely consolidated and very competitive. Pricing remains very tight for the products that do not offer obvious additional advantages to the consumer beyond the primary function of the appliance. For this reason, the industry is focusing on consumer-valued features that differentiate their products. In addition, the industry is looking to the early replacement market as a way to increase sales, especially at the higher-end. Consumers might be enticed to upgrade before their existing model fails if there are highly valued features and benefits available in a newer model. Energy efficiency is marketed as one of the reasons to upgrade but is most compelling when packaged with additional features.

B. National Retailers

Industry experts estimate that retail appliance sales are split between the large national chains and the regional and local independent appliance dealers. This seems to be consistent across all five appliances. However, the profile of national retailers is changing dramatically with the entry of the large home improvement and “big box” retailers, including Home Depot, Lowes, Costco and others. National retailers interviewed noted the entrance of Home Depot and Lowes into the appliance arena as having a major impact on the industry. The chart below provides a perspective on the growth trend for these major players.

Exhibit 3-6: Appliance Sales by National Retailer²⁰

Company	1995 Revenue	1998 Revenue	Growth 1995-1998
Sears	\$5,000.0	\$5,750.0	15%
Circuit City	\$896.0	\$1,238.0	38%
Wards	\$1,000.1	\$400.5	-60%
Best Buy	\$505.0	\$660.0	31%
Costco	\$225.0	\$280.0	24%
Lowes	\$373.0	\$809.0	216%
Home Depot	-	\$100.0	n/a
Total Revenues	\$7,999.10	\$9,237.50	21.6%

These national retailers have tremendous influence on manufacturing plans and appliance sales. However, they are unique in their customer targets, approach to marketing and

²⁰ Source: HFN. Figures in millions

merchandising, and ability to respond to energy efficiency programs. For example, stores like Home Depot and Lowe's both cater to do-it-yourselfers, as well as home improvement, construction and building maintenance professionals. Consumers shopping for appliances in one of these stores are likely to be involved in some type of home remodel. Each store stocks more than 40,000 home improvement items ranging from lumber and tools to appliances and home décor items. In an effort to appeal to a different target market, Home Depot also operates 15 Expo Design Centers, which provide a showroom environment for high-end products as opposed to their standard warehouse environment.

Retailers like Circuit City and Best Buy have a much more focused product line, both carrying consumer electronics, home office equipment, major appliances, and entertainment software. Circuit City is exploring further specialization by separating their appliances and consumer electronics stores. Dan Barzel from Circuit City reported that they cater to a broad spectrum of consumers but that their average consumer is a little bit older, has an above average income, and a few less children. They pride themselves on employing superior sales counselors that make the experience of shopping for appliances different. Best Buy describes their average consumer as married with a dual income, a few children, mid-30s to mid-40s, college educated and technically savvy. One of the innovative steps Best Buy has taken to reduce hassle for consumers is that they moved to an electronic rebate system where any applicable rebates are automatically printed when the consumer makes the purchase.

Costco offers a very different retail environment. They carry an extremely diverse product line including groceries, appliances, entertainment equipment, automotive supplies, office supplies and equipment, housewares, sporting goods, furniture and much more. Their approach is to offer lower prices and better values by eliminating virtually all the frills and costs associated with conventional wholesalers and retailers. They do not have salespeople on the floor assisting consumers, which helps keep the overhead low.

Sears provides a department store environment that includes apparel, furniture, automotive equipment and services, lawn and garden supplies, and hardware. Sears is the largest national retailer, selling over 35% of all major appliances. They are also the owner of the Kenmore brand name, which is the number one brand in America and sold only at Sears. They are the only retailer to offer the top six selling appliance brands. Sears continues to place great emphasis on sales person training as they view their knowledgeable sales staff as one of their primary competitive advantages. In addition, they have been an active participant in energy efficiency programs. John Schlenner, Project Operations Manager for Sears, recently announced that they sold 750,000 ENERGY STAR appliances in 1999 and have set a goal to sell 1 million in 2000.

Each of these national retailers plays a unique and critically important role in the appliance industry. It is key that energy efficiency programs are customized to their individual sales, merchandising and advertising strategies in order to maximize their effectiveness and participation.

The table below provides a listing of national retail store locations in the Pacific Northwest.

Exhibit 3-7: National Retail Locations in the Northwest²¹

	WA	ID	MT	OR
Best Buy	1	0	2	0
Circuit City	11	2	0	7
Sears	36	14	9	28
Wards	3	1	2	8
Home Depot	18	4	0	10
Costco*	14	2	1	8

Retailer Influences on Product Design:

All retailers exert influence over the design and production of appliances through their sales and ordering efforts. However, several national retailers—specifically Costco and Sears—have additional opportunities to directly affect appliance products through the sales and marketing of own their own appliance brands.

In all cases, the appliances are manufactured by one of the major manufacturers under contract to the retailer. Costco products, most of which are manufactured by Whirlpool, are marketed under the Kirkland brand name; Sears features the familiar Kenmore brand. In each case, the retailers’ decision-making process regarding which products will appear under each brand name is not dramatically different from their efforts to decide which brand and product features to stock during any given sales cycle. Generally, the companies study sales patterns and conduct consumer focus groups to determine which combination of product features and price consumers desire, then arrange with one or more of the major manufacturers for the design, construction and delivery of the finished product.

However, Sears and Costco have the ability to introduce or accelerate new appliance product configurations or features because the products will be marketed under their brand. Sears in particular regularly requests products that either add or slightly modify a feature to the standard features found on appliances built by one of the major manufacturer. For instance, Sears has recently indicated to major manufacturers its desire to increase both their stocking and sales of ENERGY STAR-compliant products, particularly in the refrigerator and clothes washer arenas. Since Sears represents a large portion of appliance sales in the U.S., most manufacturers are eager to work with the retailers to develop products and meet stocking requirements that fit Sears’ expectations.

Through this process, Sears and, to a lesser degree, Costco, are able to exert a reasonable amount of influence on product design and manufacturing patterns in the U.S; as such,

²¹ Source: D&R MIS database

they and others should be considered for consultation by the Alliance when discussing product design issues with the appliance manufacturers.

C. Independent Retailers

As previously noted, retail appliance sales are basically split between the large national chains and the regional and local independent appliance retailers. Among independent retailers, the trend toward consolidation is moderating somewhat. In general, the well-managed independent retailers have remained competitive in this market and will probably do so for the foreseeable future.

Approximately 85 percent²² of independent retailers purchase their appliances through a buyers group. Buyers groups are formed to pool independent retailer resources and therefore provide them with maximum leverage when negotiating purchases with manufacturers. A few large independents have enough leverage without a buyers group and a few small independents choose not to deal with manufacturers for a variety of reasons. Many independents that carry foreign appliances deal directly with the manufacturer. The foreign manufacturers deal with much smaller volumes and distribute their products solely through independent retailers and wholesale dealers.

The following table summarizes the average weighted response by retailers when asked what percentage of appliance sales fall into various categories. As demonstrated by their responses, there are a fair number of commercial-type sales that occur at the independent retailer level, most likely with the smaller builders and contractors that purchase appliances one or two at a time.

Exhibit 3-8: Categories of Appliance Purchasers

Categories of Purchasers	Percentage of Sales
Individual Consumers	62%
Single Family Builders	13%
Multi-Family Builders	6%
Public Housing Agencies	3%
Remodeling Contractors	11%
Manufactured Housing	4%

Retailers were then asked what percentage of their sales were motivated by various market events. As demonstrated in the table below, their average weighted estimate of appliance sales that occur due to appliance failure was only 47%. When removing appliance failure and moving from the total, the independent retailer responses indicate that 44% of their sales are basically discretionary purchases. Manufacturers and national retailers reported that this trend was occurring but the representatives we spoke with weren't close enough to this end of the business to give solid estimates. However, the several that guessed gave a much higher percentage of sales occurring due to appliance

²² Discussion with Tim Michel, Executive Director of the Electric and Gas Industries Association, April 21, 1999

failure – they estimated 65-80%. Regardless of the actual percentage, the trend that is indicated by all market actors is clearly moving in the direction of increased discretionary purchases.

Exhibit 3-9: Reasons for Appliance Purchases

Market Event	Percentage of Sales
Appliance Failure	47%
Remodeling	17%
Moving	11%
Upgrading appliances for additional features	12%
Adding appliance to the home for the first time	15%

Independent retailers continue to be extremely important players in the appliance distribution chain and in the promotion of efficient appliances. Many of these retailers differentiate themselves from their large competitors by going the “extra mile” for their consumers and are therefore receptive to incorporating the benefits of energy efficient appliances into their sales discussions.

D. Single Family Builders

Single-family builders report that they typically install only dishwashers and ranges or cooktops and ovens in the homes they build. However, many builders offer upgrade packages that include additional appliances. The upgrade packages are often made available directly from manufacturers, retailers or wholesalers who specialize in builder sales.

In the case of production homes, builders are extremely cost conscious in selecting their building materials and equipment, including appliances. Custom builders are much more likely to choose equipment based on consumer specifications, often with a trend towards higher-end appliances.

The interviews with builders revealed that it is very difficult to get their attention in relationship to efficient appliances. They are driven by so many other priorities that the best approach to influencing their appliance purchase decisions appears to rest with the manufacturers, retailers and wholesalers who focus on builder sales.

The table below estimates the number of appliances that are installed by single-family builders each year in the Pacific Northwest and represents the potential for influencing the purchase of efficient appliances. These estimates are based on the percentage of time that builders install the various appliances. While dishwashers are installed almost 100% of the time, refrigerators, clothes washers, and clothes dryers are only installed when the customer purchases an upgrade package that includes the various appliances. As indicated below, refrigerators are included more often than clothes washers and dryers, and freezers are not included at all in the upgrade packages.

Exhibit 3-10: SF New Construction Potential Table

Appliance	Pacific Northwest SF Building Starts/yr²³	Estimated Percent of Time Appliance Installed in New Home	Estimated Number of Appliances Installed/yr
Refrigerators	57,342	15%	8,601
Clothes Washers	57,342	5%	2,867
Clothes Dryers	57,342	5%	2,867
Dishwashers	57,342	100%	57,342
Freezers	57,342	0%	0

Consumers do not commonly purchase the appliance upgrades because they usually have a better selection and more competitive costs by going directly to a retailers. The consumers that do choose the upgrades usually do so as a way to include the appliances in their home financing.

E. Multi-Family Builders, Developers and Property Managers

Multi-family developers and builders report that they typically install refrigerators, dishwashers, and ranges in the units. Clothes washers and dryers are usually installed in common areas but in the case of higher-end buildings they are installed in the unit. The appliances are purchased by the contractor based on the specifications and the budget provided by the developer.

One multi-family property manager estimated that they replace refrigerators, clothes washers and dryers every seven to ten years and dishwashers every ten years. The appliances are purchased directly from GE or Whirlpool. This property manager also estimated that 75% of appliance replacements are driven by failure of the existing appliance and 25% are initiated by a remodel.

Similar to single-family builders, the best approach to influencing the appliance purchase of multi-family builders and property managers is through the manufacturers, retailers, and wholesale distributors.

F. Remodeling Contractors

The remodeling market is a growing driver of appliance sales. The appliances most often involved are the refrigerator and dishwasher, as kitchen remodels are common. Remodeling contractors report that the consumer almost always drives the purchase decision so they feel that they have minimal influence over the efficiency of the model chosen.

²³ DOC, Bureau of the Census [Statistical Abstract of the United States: 1999, No.75, p 63

Like single-family and multi-family builders, contractors occasionally purchase appliances through the manufacturer and retailer commercial sales divisions or wholesale distributors. This is especially true with high-end remodels where the consumer is installing European appliances. Many architects and designers will specify the high-end appliances that contractors purchase directly from a manufacturers' commercial sales representative. However, since many contractors purchase appliances one job at a time, they often purchase directly from a national or independent retailer, just like a consumer would. In many remodeling jobs, the consumers actually purchase the appliances themselves directly from a national or independent retailer.

Overall, approximately 50 percent of home improvement work is performed by remodeling contractors; however, the vast majority of the large remodeling or addition work is performed by general contracting firms. The Joint Center for Housing Studies at Harvard University estimated that 800,000 firms nationwide specialized in residential improvement and repairs. Of this number, approximately 45 percent (or 360,000) are classified as general contractors, who tend to specialize in larger, more complex jobs, involving a wide variety of skills and services (i.e., electrical, plumbing, and painting). Further, roughly 80 percent of these firms, or 288,000, typically focus on large additions, including kitchen and bathroom remodeling. These firms also tend to be slightly larger and more sophisticated than single-specialty contractors.²⁴

Using the estimate of 288,000 specialty remodeling firms in the U.S. in 1998, we can estimate that there are approximately 11,800 such firms in the Pacific Northwest (4.1 percent of 288,000), although this number may be slightly higher in 2000, given the large increases in remodeling activity over the past two years.

As would be indicated by the numbers, the industry is highly decentralized and contains few very large actors (e.g., those with annual receipts above \$1 million). For instance, the Harvard Study indicated that the top 100 remodeling firms nationwide captured only 6.5 percent of the remodeling receipts in 1992, compared to 11 percent and 34 percent in the single-family and multi-family construction markets, respectively.

However, the larger remodeling companies are most likely to concentrate on more sophisticated, higher-value jobs for upper income customers, which as we discussed in Section I, remains the driver for most manufacturer and retailer outreach in the remodeling sector. These firms are much more likely to use technology (such as estimating software) in their work and the principals of the firm are much more likely to have backgrounds in business or finance than construction.²⁵

Another trend the Harvard Study noted was that there has been a marked increase in the number of contractors that are offering credit to their customers. However, the share of firms that do so still remains small—only about 30 percent of the larger firms and 10 percent of the smaller remodeling firms offered credit in 1998.

²⁴ “Improving America’s Housing”, Joint Center for Housing Studies of Harvard University, 1998, pp. 22-23

²⁵ Ibid, p. 25

Overall, the Harvard study concluded that the remodeling market will likely increase by approximately \$5-6 billion per year between now and 2010, and the trend will continue toward high-end, professionally installed improvements and major upgrades. This would lead one to suspect that manufacturers and retailers will build alliances with sophisticated regional remodeling contractors as a way of focusing consumer attention and driving demand in this increasingly profitable market sector.

The table below estimates the potential for appliance sales through remodeling activity in the Pacific Northwest. The assumptions are based upon the Harvard study estimate of 6.5% of households remodeling as of 1995. This figure is most likely conservative given the indications of a trend towards increased spending in remodeling. As referenced in section I, a Bureau of the Census study estimated that 60% of remodeling jobs include replacement of refrigerators and dishwashers. The chart below assumes a 20% replacement of washers and dryers during a remodel, which is an educated guess.

Exhibit 3-11: SF Remodeling Potential Table

Appliance	Total # of Appliances in SF Units in Pacific Northwest	Estimated Percent of Existing Appliances Replaced During a Remodel/yr²⁶	Estimated # of Appliances Installed through Remodel/yr
Refrigerators	3,166,945	3.7%	115,910
Clothes Washers	3,166,945	1.2%	38,636
Clothes Dryers	3,166,945	1.2%	38,636
Dishwashers	3,166,945	3.7%	115,910
Freezers	3,166,945	0%	0

The estimated figures above of appliances installed during a remodel represent 33% of the 1998 AHAM reported Pacific Northwest refrigerator sales, 48% of the dishwasher sales, 16% of the dryer sales, and 13% of the washer sales. For refrigerators and dishwashers, this indicates that there is considerable opportunity to influence consumers to purchase energy efficient appliances when remodeling.

G. Public Housing Authorities

Public Housing Authorities commonly install refrigerators and sometimes clothes washers and dryers. The primary drivers that influence their appliance purchase decisions are the state procurement policies and a cost-effective payback.

The largest Public Housing agency in the Pacific Northwest, Seattle Housing Authority, reported during our interview that they have designated ENERGY STAR washers in some of their washer replacement projects that resulted in a switch from top loading washers to

²⁶ Based on assumption that 6.1% of households remodel per year (per Harvard study referenced in Section I) and 60% of those households replace refrigerators and dishwashers, 20% replace washers and dryers

front loading. Seattle Housing Authority bids out a one-year contract to appliance suppliers with an option to renew for two additional years. They are currently under contract with General Electric.

A Public Housing Agency baseline study conducted for the Alliance by the Washington State University Energy Program in 1999, found that 61% of those surveyed claimed that they implemented an energy efficiency project over the last five years that included the purchase of high efficiency appliance models. Forty percent claimed that they implemented procedures that include energy efficiency requirements for appliance or equipment purchase.²⁷ However, it is not clear from the study what their definition of “high efficiency” is based upon.

The Washington State University study estimates that there are 84 public housing authorities in the four Northwest states that operate 26,178 Federally (HUD) funded public housing units. However, the ten largest housing authorities account for 68 percent of these units in the region, which would make it manageable to influence the primary market players.²⁸ If you assumed that housing authorities replace 5% of their refrigerators per year, it would result in 1,308 units per year, or approximately 4% of the refrigerators sold in the Northwest per year. While this potential is not large, it would be worth pursuing low cost and less time intensive strategies such as educating housing authority representatives on the ENERGY STAR models available that could be specified into their appliance replacement contracts.

H. E-Commerce

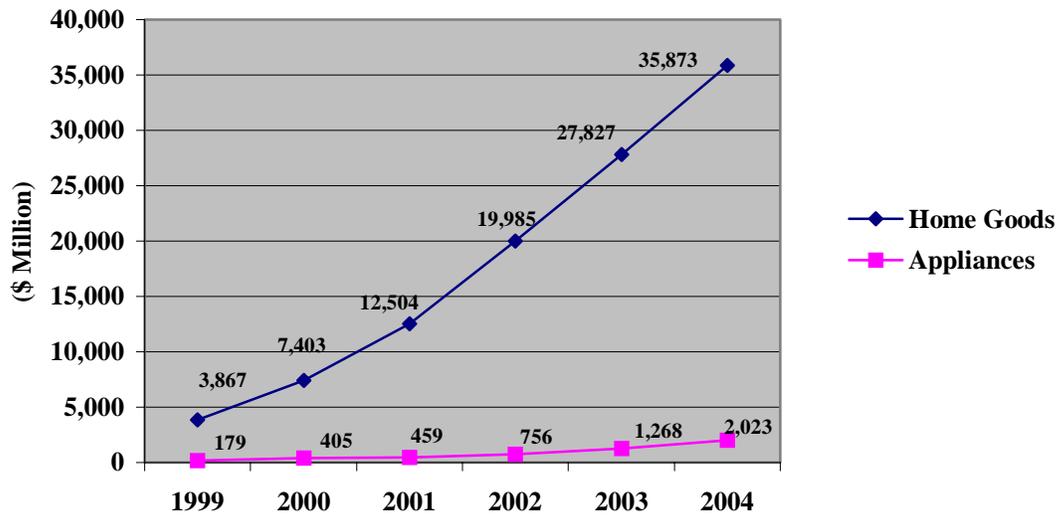
When asked about the future impacts of e-commerce on the appliance industry, the industry experts interviewed report widely different estimates (from 5 to 80 percent in five years). They all agree however, that the Internet has already changed their industry by arming the consumer with product knowledge. Even though Internet sales are not yet substantial, consumers use the Internet as a research tool prior to visiting a retailer to make the purchase.

Industry forecasts for Internet home goods sales (which includes appliances) are projected to increase fairly dramatically in 2000. However, while appliance sales are projected to increase, they will remain a small share (between four and six percent) of the total amount of home goods that will be sold over the Internet, as shown in the following chart:

²⁷ Northwest Energy Efficiency Alliance, Improving the Energy Efficiency of Public Housing in the Pacific Northwest Baseline Study, May 1999

²⁸ Northwest Energy Efficiency Alliance, Improving the Energy Efficiency of Public Housing in the Pacific Northwest Baseline Study, May 1999, page 4

*Exhibit 3-12: Internet Appliance Sales Forecasts
(1999-2004)*



Manufacturer Efforts on the Internet

The Internet provides significant opportunity and risk for many appliance manufacturers. While the possibility of new sales avenues are enticing, most are refusing to provide consumer purchasing functions on their website out of fear of damaging their existing relationships with their retail distributors. As one trade article put it: “Fear of alienating resellers runs deep among manufacturers and suppliers that are establishing e-commerce sites—especially those that will reach consumers directly for the first time. The only deeper fear is having no E-commerce story at all.”

Some industries, such as the airline industry have specifically chosen to challenge their traditional distribution chains to capture the potential for new sales that the Internet can provide. Forrester Research surveyed 50 consumer goods manufacturers and 66 percent said competing with retailers is one of the largest issues they face. Despite these concerns, over half already sell on line and two-thirds said they plan to do so within three years.

While these conflicts seem un-resolvable, some industry observers believe there may be a middle ground manufacturers can pursue to maintain working relationships with retailers as they conduct e-commerce. These include not undercutting partners on price, encouraging consumers to go to the retail outlets to complete purchases, and cross marketing key retail partners on the website.

However, despite the possibility that e-commerce and brick and mortar operations can co-exist, many industry observers we spoke with did not believe that manufacturers would set up business-to-consumer websites in the near future, except as a means of

providing branding support, product information and retail outlet locators. In some part, this may be a result of the generally low expectations for sales over the internet (as one manufacturer put it, "People still like to kick the tires when buying an appliance."). This is a portion of the Internet that bears watching over the next several years.

However, there is some potential for use of the Internet as a business-to-business strategy, particularly to provide a direct sales tool from manufacturers to the building industry. For instance, GE's web site, CustomerNet, provides a direct ordering mechanism for builders and contractors interested in providing GE appliances to their customers. Builder tools on the website include order tracking and access to information about product availability and delivery times from direct or remote web connections.

Retailer Efforts on the Internet

Another broad possibility for the net comes in the form of strategic alliances between internet-service providers (ISPs) and traditional bricks and mortar retailers. For instance, in March, Sears and AOL announced a partnership to provide special co-branded Internet software for Sears' customers who subscribe to AOL. This software would allow users to be immediately linked to specific parts of Sears' website based on their geographic areas and housing type. In addition, Sears and AOL anticipate that their partnership will ease the introduction of internet-enabled appliances.

Many of the national retailers already have the capacity for on-line shopping such as Sears, Circuit City, Best Buy, and Costco. When asking the retailers how they differentiate themselves from competitors, Sears listed their Internet site as one of their competitive advantages. Most retailers agreed however, that consumers will use the Internet for research and in some cases to make the final purchase, but for the most part consumers want to physically see and touch an appliance before purchasing.

2. Efficiency Potential and Emerging Technologies

Standby or Passive Losses

One area of growing concern in the appliance area is the potential for large increases in standby or passive energy losses. Generally, these losses occur when a product is "off", but require small amounts of energy to maintain internal memory (such as user settings or clocks) or to be ready to receive signals from remote devices. These losses are most commonly associated with consumer electronics products, most of which maintain internal clocks and are operated by remote control.

Because products requiring standby energy must operate constantly, small losses can produce large amounts of energy waste, especially when spread across a large stock of products in service. For instance, a television that uses five watts in standby mode will actually consume more almost 44 kilowatt-hours of electricity per year just to maintain its standby settings (5 watts x 8760 hours per year / 1000 watts per kilowatt). Since most experts agree that no more than one watt is required to maintain this function, the

television used in this example would be wasting approximately 35 kilowatt-hours of electricity per year. EPA estimated in 1998 that the standby losses from televisions and VCRs in service in the U.S. alone required the output from 5 medium sized power plants.²⁹

Although it is generally agreed by experts that many appliances on the market today do not have passive or standby modes of operation, it is also assumed that with the rise of "smart," network ready appliances the share will rise dramatically over the next several years. Unfortunately, no formal survey has been taken of appliance to determine the number that operate in standby mode and what the actual losses are for each.³⁰ The few appliances that have been monitored have generally used approximately 3-5 watts in standby mode. However, it should be cautioned that this data was not drawn from a scientific or systematic survey of appliances currently on the market.

Based on this picture, we believe it may be fruitful for the Alliance to consider several options in the near future. First, it may be worthwhile for the Alliance to work with other regional or national groups to conduct a more thorough survey of the overall scope of the problem in the appliance area. Based on the results of this survey, it may also make sense to engage appliance makers in discussions on ways to minimize these losses. Experience in the consumer electronics areas has demonstrated that many solutions to this problem are either no- or low-cost, provided manufacturers are given proper notice and the time to incorporate any design changes into their new product lines.³¹

A. Refrigerators

The latest Department of Energy (DOE) standards for refrigerator –freezers will take effect in 2001 and will cut consumers' energy costs by approximately 30 percent compared to the previous 1993 standards. As a part of the rulemaking process to establish these new standards, DOE developed a list of design options, or changes that could be incorporated into the design of a refrigerator-freezer to improve its efficiency. These design options reflect the modifications that manufacturers are making to comply with the 2001 standard and possibly to go beyond the standard to qualify for the new ENERGY STAR level and/or energy efficiency program requirements.³² The design options are listed below:

- Increased Insulation Thickness for Walls and Doors
- Improved Resistivity of Insulation

²⁹ Press releases for EPA's ENERGY STAR TV and VCR Program, January 1999

³⁰ The appliance test procedures currently in use do not require any explicit measurement of energy losses during standby or passive operations. In addition, independent monitoring of appliance losses in retail settings is complicated by the fact that many appliances' energy use cannot be easily monitored using simple equipment such as a Watt meter

³¹ Much of the information in this section based on conversations with Alan Meier, Lawrence Berkeley National Laboratories, and personnel at the ENERGY STAR Programs at the U.S. Environmental Protection Agency

³² U.S. Department of Energy, Technical Support Document: Energy Efficiency Standards for Consumer Products: Refrigerators, Refrigerator-Freezers, and Freezers

- Evacuated Insulation Panels
- Improved Gaskets
- Reduced Heat Load of Through-the-Door Feature
- Condenser Hot Gas for Anti-Sweat Heat
- Adaptive Defrost
- High-Efficiency Compressor Substitution
- Fan and Fan Motor Improvement
- Improved Evaporator and Condenser Heat Exchange

DOE's Technical Support Documents (TSDs) used in the recent refrigerator standards cycle provide data on the annual energy use for several design option scenarios. Comparing the data in the TSDs to the models currently available, it is clear that manufacturers have in some cases already met the requirements for the 2001 standard. In fact, Sears announced that they are going to shift their entire refrigerator stock to 2001 compliant models in 2000. Based on a discussion with Charlie Stephens from the Oregon Department of Energy (ODOE), it looks like there will be a fair number of models available at 10% more efficient than the new standard by the time the standard becomes effective in July of 2001. Manufacturers echoed this during the interviews. When asked what level of efficiency should be promoted above the 2001 standard, several manufacturers felt that 10% above standard would be achievable which is the level of the 2001 ENERGY STAR specification. However, it is unlikely that there will be many models available at 15% beyond standard. Industry experts project that at 15% beyond the 2001 standard, manufacturers have probably squeezed about all of the efficiency they can out of the existing designs. DOE has announced that the ENERGY STAR qualification level will increase to 15% above standard in 2004, which will allow manufacturers time to gear-up for this increase. Achieving 20% efficiency beyond the standard is likely to require an entirely new platform. While it is difficult to predict what technological improvements these new platforms would include, industry experts speculate that they may include new motor/compressor platforms, vacuum panel insulation, and improved controls. The major manufacturers might have already developed prototype units at these levels of performance, but they are not likely to consider bringing them to market without significant incentive.

As the table below demonstrates, the energy savings become so marginal beyond the 2001 standard, that the costs required for a new platform are likely to outweigh the benefits. The table below summarizes the energy savings for models that meet 2001 ENERGY STAR qualification level using the 2001 standard as the base. In addition, the table provides average energy savings for the best available models currently on the market in each model category. Given the numerous combinations of refrigerator size and configuration, the unit energy consumptions (UECs) provided in the table below are for an average model based upon historical percentages of shipments by size and configuration. The maximum potential takes into account the total possible energy savings per year if 100% of the models sold each year were at these higher efficiency levels.

Exhibit 3-13: Potential Refrigerator Savings

	UEC per unit (KWh/yr)	Energy Saved per unit (KWh/yr)	Energy Saved per unit %	\$ Saved per unit @ \$0.05 kWh	Estimated Maximum Potential Energy Savings in Northwest (aMW/yr) ³³
Average Standard '01 Maximum	527	-	-	-	-
2001 Energy Star Minimum	475	52	10%	\$2.60	2.1
Average Best Available on Market	561	34	6%	\$1.70	1.4

B. Freezers

Compared to the previous 1993 Department of Energy (DOE) standards for freezers, the new standards which will take effect in 2001 will cut consumers' energy costs by approximately 17% for upright freezers with automatic defrost, 13-15% for upright freezers with manual defrost, and 10% for chest freezers. DOE has not designated an ENERGY STAR qualification level for freezers and has no plans to do so in the foreseeable future.

The primary difference in freezer efficiency is based on size and configuration. Chest freezers are 10-25% more efficient than upright freezers because they are better insulated and air doesn't spill out when the door is opened. Manual defrost models consume 35-40% less energy than comparable automatic defrost ones, but periodic defrosting to keep ice build-up less than ¼ inch is necessary to ensure energy efficiency.³⁴

Historically, manufacturers have produced few models above the standard efficiency level. In fact, there is one major manufacturer who dominates this market and given the declining nature of this market, they are unlikely to invest in efficiency beyond what it will take for them to meet the upcoming standard.

The table below provides potential energy savings for the best available average model using the 2001 standard as the base. Given the numerous combinations of freezer size and configuration, the unit energy consumptions (UECs) provided in the table below are for an average model based upon historical percentages of shipments by size and configuration. The maximum potential takes into account the total possible energy savings per year if 100% of the models sold each year were at these higher efficiency levels.

³³ Assumptions – 1998 refrigerator sales in Northwest as reported by AHAM were 348,000 units, shipments for this specific product classification (top-mount with automatic defrost, all sizes) 66% or 229,680, assumes 100% of models sold at the designated efficiency level

³⁴ DOE's Office Of Codes and Standards Energy Efficient Appliances-Freezers Web Site, December 1999

Exhibit 3-14: Potential Freezer Savings

	UEC per unit (kWh/yr)	Energy Saved per unit (kWh/yr)	Energy Saved per unit %	\$ Saved per unit @ \$0.05 kWh	Estimated Maximum Potential Energy Savings in Northwest (aMW/yr) ³⁵
Average Standard '01 Maximum	602	-	-	-	-
Average Best Available	547	55	10%	\$2.75	.5

C. Clothes Washers

The efficiency of a clothes washer is measured by an energy factor, which is based on the cubic feet of washing capacity per kilowatt-hour of electricity. The latest DOE standard for clothes washers was set at 1.18 Energy Factor (EF) and became effective in 1994. Since almost all of the energy used by clothes washers is for heating the hot water used to wash the clothes, the best way to improve the efficiency of a clothes washer is to reduce the amount of water, particularly hot water, that is needed. The most common way that manufacturers have achieved significant energy savings in clothes washers is through the horizontal-axis (h-axis) design. Unlike a standard vertical-axis machine that fills the tub with approximately 39 gallons of water per cycle, an h-axis machine tumbles the clothes through the water using approximately 21 gallons per cycle. However, both Whirlpool and Fisher and Paykel recently introduced a specially designed v-axis machine that achieves similar water and energy savings. In addition to achieving significant energy savings through water reduction, most of the high efficiency models save energy by wringing more water out of clothing during the spin cycle, thereby saving energy by reducing the drying time.

In the last few years, efficient h-axis and v-axis washers have achieved a significant market share. Starting with less than 1% market share in 1993, these washers have achieved approximately 8%³⁶ market share nationally and up to 18%³⁷ in various markets offering incentive programs. Manufacturers were initially concerned about consumer acceptance of h-axis machines as the capacity tended to be smaller and the clothes were loaded through the front of the machine instead of the top. However, the recent increase in market share as well as numerous research studies both indicate that consumer acceptance is better than anticipated. A recent DOE consumer analysis on clothes washers found that 70% of survey respondents said that they would consider purchasing a front-loading machine if they were going to buy a new clothes washer.³⁸

Many attribute the success in consumer acceptance of efficient washers to the approach manufacturers have taken in the design and marketing of these products. While the basic

³⁵ Assumptions – 1998 freezer sales in Northwest as reported by AHAM were 78,600 units, assumes 100% of models sold at the designated efficiency level

³⁶ Appliance Standards Awareness Project website, Saving Energy and Cutting Pollution: Efficiency Standards for Clothes Washers

³⁷ Interview with Charlie Stephens, ODOE, 18% penetration based on Oregon's tax credit program

³⁸ DOE Clothes Washer Rulemaking, Technical Support Documents, 4/30/99

h-axis technology has been available for many years, manufacturers have made modifications to the design that give the machines a “hi-tech” feel. For example, Maytag’s Neptune clothes washer introduced a unique variation on the front load machine by designing the tub on an angle so that it is actually a “slant-load”. Manufacturers report that consumers respond to the package of features and benefits these machines offer, not solely the energy and water savings.

DOE recently announced a negotiated federal standard for clothes washers that will occur in two stages. First in 2004 when the Modified Energy Factor (MEF) will be set at 1.04, and again in 2007 when the MEF will increase to 1.26. The previous federal standard was based on an Energy Factor (EF) rating, which did not include the Remaining Moisture Content (RMC) savings that occurred in the dryer cycle due to the amount of moisture left in the clothes. The MEF basically combines the EF and RMC. While most stakeholders are satisfied with the energy savings that will result from the new federal standard, many are concerned that water efficiency is not addressed. By not addressing water, clothes washers could meet the new standard by reducing the use of warm and hot water but not necessarily reduce water use. It is likely that energy efficiency stakeholders will advocate for an additional clothes washer rulemaking in the near future since water is not included in the new standard and will become a major resource issue over the next decade.

In response to the new federal standard levels, DOE has announced plans to increase the ENERGY STAR qualification levels. The ENERGY STAR level will increase to 1.26 MEF in 2001, and 1.42 in 2004. There are currently 48 models on the market that will meet the 2001 ENERGY STAR level, the majority of which are h-axis. The table below summarizes the energy savings for the current, 2001 and 2004 ENERGY STAR levels and the 2004 federal standard level using the current standard as the base. The maximum potential takes into account the total possible energy savings per year if 100% of the models sold each year were at these higher efficiency levels.

Exhibit 3-15: Potential Clothes Washer Savings

	UEC per unit (kWh/yr)	Energy Saved per unit (kWh/yr)	Energy Saved per unit %	\$ Saved per unit @ \$0.05 kWh	Estimated Maximum Potential Energy Savings in Northwest (aMW/yr) ³⁹
Standard '94 Maximum	963	-	-	-	-
2004 NAECA Standard	519	444	46%	\$22.20	7.3
Current Energy Star Minimum	474	489	50%	\$24.45	8.0
2001 Energy Star Minimum	335	628	65%	\$31.40	10.3
2004 Energy Star Minimum	242	721	75%	\$36.05	11.8
Best Available Currently On Market	176	787	78%	\$39.35	12.9

³⁹ Assumptions – 1998 washer sales in Northwest as reported by AHAM were 287,000 units, yearly kWh usage based on DOE estimate of 392 washer cycles per year, assumes 100% of models sold at the designated efficiency level – savings adjusted by 50% based on electric water heater penetration ratio

D. Clothes Dryers

The 1994 DOE minimum efficiency standard level for an electric dryer is 3.01 EF. Unlike most other types of appliances, energy consumption does not vary significantly among comparable models. The most efficient model currently on the market uses 877 kWh per year compared to a model at the standard level using only 967 kWh. In this example, the potential for savings based on models currently available is only 90 kWh per year, or \$4.70. DOE has not designated an ENERGY STAR qualification level for dryers and has no plans to do so in the foreseeable future.

There are two features in the models currently available that contribute to the efficiency: moisture sensing control and thermostat-sensing control. The moisture sensor used to be limited to high-end models, but is increasingly offered on mid-price range models. Dryers with a moisture sensor use metal contacts inside the drum to measure moisture on the surface of the clothes. Such sensors gauge dryness more accurately than thermostats, which only infer dryness by sensing the temperature of the exhaust. On automatic settings, a dryer with a moisture sensor will complete its cycles in less time than a dryer without. The lower-cost, thermostat controlled models may overdry some types of clothes, but even these are much better than timed-dry machines. Compared with timed drying, you can save about 10% with a temperature-sensing control, and 15% with a moisture-sensing control.

Whirlpool introduced a new dryer at the recent National Association of Home Builders conference that will be available on the market in May 2000. The Senseon Drying System addresses one of the fundamental inconveniences of drying clothes by shortening the dryer cycle time to only 30 minutes compared to 50 minutes for an average dryer. The shorter drying cycle matches the time needed for a typical U.S. washer load. The dryer uses dual moisture sensors to tell the dryer when to stop, and a thermistor that helps regulate how much hot air is pumped in and out of the dryer to help ensure that air temperatures are never too high. In addition, a dual wattage heating process allows the user to choose a slower drying cycle that is said to be 30% more energy efficient. However, when the machine is used in the shorter cycle time it is not energy efficient and it is unlikely that consumers will pay more for a dryer with this feature and then not use it.

There are a few emerging technologies, the electric heat pump dryer and the microwave dryer, that have been on the horizon for several years but do not seem to be moving closer to commercialization. The electric heat pump dryer heats air at the condenser and circulates it within the drum. The air picks up moisture in the drum and passes over an evaporator that enables the vapor to condense.⁴⁰ Several problems plague the electric heat pump dryer such as high first cost, the enlarged size of these dryers, and potentially longer drying times.

⁴⁰ PG&E, Technical Assessment of Residential and Small Commercial Emerging Technologies, 9/98

Electric Power Research Institute (EPRI) developed a prototype microwave dryer that dries clothes about 15% faster than a conventional dryer and causes less wear and tear on clothes. While the prototype is able to handle a small amount of metal like zippers and buttons, researchers are concerned about metal objects left in the pockets of clothing. John Kesselring from EPRI reports that recent efforts have been focused on a counter top microwave dryer which will be positioned as a supplemental dryer for delicates or small emergency loads. The dryer is about the size of a counter top microwave oven. EPRI reports that there is interest by manufacturers in producing the counter top dryer. Even if one or more of these manufacturers produces the product, it is not likely to be available until late 2001 or early 2002. EPRI does not have plans at this time to pursue a standard size microwave dryer.

It does not appear that either the microwave or heat pump dryer is likely to have an impact in the marketplace in the near term. Since there are no emerging technologies on the horizon, the table below bases the maximum potential energy savings on 100% of models sold each year at the most efficient level currently available on the market. The price range for dryers range from about \$250 to \$500 with the sensor equipped dryers being at the high-end of the price range.⁴¹ Even a \$50 incremental cost would put the payback at over 10 years.

Exhibit 3-16: Potential Dryer Savings

	UEC per unit (kWh/yr)	Energy Saved per unit (kWh/yr)	Energy Saved per unit %	\$ Saved per unit @ \$0.05 kWh	Estimated Maximum Potential Energy Savings in Northwest (aMW/yr) ⁴²
Standard '94 Maximum	967	-	-	-	-
Best Available Currently on Market	877	90	9%	\$4.50	2.5

E. Dishwashers

The minimum allowed energy factor rating for dishwashers is 0.46 based on the 1994 DOE standard. About 80% to 90% of the total energy used by dishwashers goes toward heating the water so like clothes washers, the best way to improve the efficiency is to reduce the amount of water needed to clean the dishes. According to the American Council for an Energy Efficient Economy (ACEEE), U.S. dishwashers built since 1994 use between 8 and 10 gallons of water per cycle.⁴³

There is no revision to the DOE standard currently on the horizon but as mentioned in more detail below, there is a move underway to revise the test procedure, which could

⁴¹ PG&E, Technical Assessment of Residential and Small Commercial Emerging Technologies, 9/98

⁴² Assumptions –1998 dryer sales in Northwest as reported by AHAM were 239,500 units, usage based on DOE estimate of 416 cycles per year, assumes 100% of model sold at the designated efficiency level

⁴³ PG&E, Technical Assessment of Residential and Small Commercial Emerging Technologies, September 1998

result in the need to update the standard. However, DOE has recently announced an increase in the ENERGY STAR qualification level effective 2001 from approximately 13% more efficient than standard to 25% since such a large share of the market meets the current ENERGY STAR level.

Many new products on the market use fuzzy logic to sense water turbidity to deliver optimal washing conditions (i.e., water volume, temperature, etc). Cleaner loads require less water and energy, while dirtier loads require more. These products, such as Maytag's Intellisense and General Electric's CleanSensor, offer the potential for lower water and energy use. However, it is difficult to measure their energy performance under the current test procedure, which requires testing on clean loads only. Under these conditions, "smart" products perform optimally in terms of their energy use. According to tests by Consumer Reports, it appears that on dirty loads, these dishwashers tend to consume either the same amount or more energy and water than less sophisticated models.⁴⁴ A revision of the U.S. DOE test procedure is required to adequately measure and compare energy performance of fuzzy-logic based dishwashers with other models. This is a high priority issue for dishwashers, as a large percentage of models are now sensor equipped including the majority of Maytag models, about half of Whirlpool and Bosch models, and a significant share of GE models. Frigidaire is the only manufacturer that has no sensor-equipped models.

Many stakeholders are currently working with DOE to initiate a revision to the test procedure. However, the progress to date has been slow. Charlie Stephens of the Oregon Office of Energy claims that manufacturers recognize this issue and are open to inventing a new test procedure but it will require a good deal of research that DOE has not yet initiated.

As mentioned above, Frigidaire does not carry sensor equipped models but does have a line of low water use dishwashers, which use much less energy than their counterparts. These dishwashers use a spray system that activates the upper and lower spray arms alternately instead of simultaneously, and thereby reduces water use. A typical load for one of these washers requires 6 gallons of water compared to the standard of 8 to 10 and is about 35% more efficient than the DOE standards.

Residential dishwashers range in price from \$250-\$1000 for domestic models and \$600-\$2000 for European models. High-end models with electronic controls range in price from \$400 to more than \$800, which will buy a quiet machine with more features and sometimes-higher efficiency. Models that use mechanical controls usually cost from \$300 to \$500.⁴⁵ The table below estimates the energy and cost savings for a model that meets the current ENERGY STAR level, the 2001 ENERGY STAR level, and for the most efficient model currently on the market compared to the current standard. Based on an

⁴⁴ Northwest Energy Efficiency Alliance, Selecting Targets for New Market Transformation Initiatives in the Northwest, July 1998

⁴⁵ PG&E, Technical Assessment of Residential and Small Commercial Emerging Technologies, September 1998

incremental cost of \$100, the payback for a machine meeting the 2001 ENERGY STAR level would be about 15 years.

Exhibit 3-17: Potential Dishwasher Savings

	UEC per unit (kWh/yr)	Energy Saved per unit (kWh/yr)	Energy Saved per unit %	\$ Saved per unit @ \$0.05 kWh	Estimated Maximum Potential Energy Savings in Northwest (aMW/yr) ⁴⁶
Standard '94 Maximum	700	-	-	-	-
Current Energy Star Minimum	618	82	12%	\$4.10	1.1
2001 Energy Star Minimum	575	125	25%	\$6.25	1.7
Best Available Currently On Market	344	356	51%	\$17.80	4.9

⁴⁶ Assumptions – 1998 dishwasher sales in Northwest as reported by AHAM were 240,000 units, yearly kWh usage based on DOE estimate of 322 cycles per year, assumes 100% of models sold at the designated efficiency level – savings adjusted by 50% based on electric water heater penetration ratio

Section IV Activities of Other Market Transformation Stakeholders

1. Overview

One of the overriding objectives of this report is to examine how the Alliance can leverage the activities of other MT stakeholders to increase the reach of their own efforts and conserve the organization's resources. To help achieve those goals, we felt it would be useful to interview a variety of national and regional groups who are involved in appliance market transformation to determine their program plans for 2000 and beyond, as well as determine where opportunities for coordinated responses might exist.

Our questions were designed to elicit information about specific appliance program areas. These included:

- Program Design, including products covered under the programs and the role of incentives and delivery mechanisms
- Communications and Outreach
- Evaluation
- Cooperation and/or program coordination with Other Regional or National Groups
- Cross Marketing between appliances and other energy efficient or ENERGY STAR-qualified products.

The information was gathered from interviews conducted with stakeholders, as viewed from different vantage points in the MT community. These include:

- *National Program Leaders*, including the ENERGY STAR Program Managers at the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (EPA), as well as the Consortium for Energy Efficiency (CEE).
- *National energy efficiency or environmental advocacy groups*, including the National Resources Defense Council (NRDC) and the American Council for an Energy Efficient Economy (ACEEE), and the Oregon Office of Energy.
- *State, Regional and Utility Appliance Program Leads*, from the Wisconsin Energy Conservation Corporation (WECC), the New York State Energy Research and Development Authority (NYSERDA), the New England Energy Efficiency Partnerships (NEEP), the representatives of the California utilities, including Pacific Gas and Electric Company, San Diego Gas and Electric Company, Southern California Edison Company, and the Sacramento Municipal Utility District.

2. Summary

Several general trends were evident from these interviews:

- A. Program Designs in 2000 and 2001 appear to be moving away from rebates. Many, if not all of the programs have stopped providing incentives for ENERGY STAR Dishwashers, citing the current high compliance rate as the main reason. In addition, most programs will be cutting back or eliminating rebates for refrigerators later in 2000. It is unclear if rebates will re-appear for ENERGY STAR-qualified refrigerators after the 2001 standards are instituted.
- B. Almost every program sponsor we spoke to uses ENERGY STAR specifications as the basic efficiency level for their program efforts. The one exception to this rule is the tax credits at the State of Oregon, which offer credits for refrigerators at levels higher than the current ENERGY STAR levels. This is not to say that all programs offered rebates on ENERGY STAR products, merely that the ENERGY STAR label generally served as the language of discourse with the public, retailers and manufacturers.
- C. Most program managers we spoke to are examining ways of increasing the cross marketing of the ENERGY STAR label in their program marketing efforts. Most of the interviewees were running or had used program elements that promoted other ENERGY STAR-based MT efforts, including lighting (CFLs and fixtures), windows, homes, and consumer electronics. The value of cross marketing to achieve larger goals (such as increased consumer awareness of efficient products and their benefits) was deemed highly important by most program managers.
- D. Many, if not all, program managers are examining new program elements that will solicit increased participation from national retailers and manufacturers. It is clear that most of the program managers we spoke to have come to recognize that the manufacturers and retailers must be engaged more fully at an earlier stage of program design if these programs are to be successful. It was also clear that many participants recognize the need to work through the standard operating procedures of these market actors if their full and enthusiastic participation is to be expected. However, it is just as clear that no single model has emerged nation-wide for soliciting this participation from retailers and manufacturers.
- E. Programs are moving more broadly in the direction of conducting marketing and outreach on the broad benefits of efficiency and away from specific product focus. Even through many program managers still indicated that some outreach and advertising efforts would “lead” with a specific appliance, they believed their larger goal was to build better and more permanent consumer understanding of the benefits of energy-efficient products using the ENERGY STAR label as a vehicle to build that understanding.
- F. No program designers had any plans to feature high-efficiency freezers or dryers in their programs. Most cited the lack of any significant energy efficiency difference

between existing models and the generally low market share of freezers. However, some program managers expressed interest in continuing to monitor trends and discuss potential program designs for these appliance areas.

- G. Most programs use CEE's Super-Efficient Home Appliance (SEHA) efficiency tiers in some manner. All of the programs that used tiered rebating made reference in some form to the SEHA tiers for various appliances. Most program managers also believed that the SEHA Tiers served as a useful "roadmap" to ensure that all future efforts by utilities and regional groups featured products at the same efficiency levels. However, there was some concern that the SEHA could be construed as "competing" with ENERGY STAR. CEE is aware of, and is addressing this issue.

3. Program Design

The following table summarizes the highlights of various program design activities concerning high-efficiency or ENERGY STAR -qualified appliances in 2000 and 2001 at the local, regional and national level.

A. *Regional/Utility Groups*

Wisconsin Energy Conservation Corporation (WECC)

WECC began developing their programs in 1998 by focusing on education and retailer recruitment. To help jump start participation in the program by retailers and consumers, WECC provided a \$100 incentive on washers and \$15 SPIFF. In spring 1999, WECC also sponsored an instant rebate event with refrigerators and dishwashers. By fall 1999, they reduced clothes washer rebate to \$50 and SPIFF to \$5. To WECC's director, most of their effort in 1999 was concerned with getting the programs and program elements in synch with each other and with key MT stakeholders.

For 2000, WECC has turned its focus to the question of how to engage the national retailers and manufacturers as fully as the regional retailers and to encourage more active and direct participation by these important market actors. While washer rebates remain at \$50, SPIFFs have been eliminated, so some opportunities for engagement of retailers have been reduced.

WECC's solution was to put out a proposal to manufacturers to do cross training to integrate the WECC materials and messages more closely with those put out by the retailers and manufacturers. This has led to the early development of co-sponsored training, product launches, cooperative initiatives between WECC and several major appliance manufacturers. For instance, Amana has stepped up to co-sponsor a Wisconsin ENERGY STAR coupon, which will help reduce the consumer costs of ENERGY STAR appliances. 50 percent of the cost will be borne by Amana, 50 percent by WECC. Amana will also work to provide retailer training, while WECC handles material development, distribution and printing. Other manufacturers that are taking part in this

activity include Asko, Fisher-Paykel, and Bosch. Other major American manufacturers, including Frigidaire and Maytag, have expressed interest in the concept and are exploring participating in these joint activities.

In WECC's view, these partnerships offer several key benefits. First, it helps stretch their program dollars and ensures greater access to all retailers at a lower costs; it also enhances their credibility with retailers, since WECC's program activities and materials are now part of their normal training cycle and are familiar and easy for the retailers to assimilate. Finally, WECC has found that building these bridges with manufacturers and retailers had made them far more willing to share information critical information concerning program design and implementation issues.

WECC is also working with local outlets like Home Depot to provide contractor training on a variety of energy efficiency issues, including the selection of high-efficiency products such as appliances.

New England Energy Efficiency Partnerships (NEEP)

The utilities that make up NEEP have been running an ENERGY STAR washer program for the past two years. Under this program, the utilities offer rebates for qualifying washers (\$75 in New England, tiered rebates in the Long Island Power Authority service area). In addition, the utilities provide some rebates on qualifying refrigerators, although the incentives tend to be of limited duration. No rebates are offered on dishwashers.

The program consists of coordinated point of sale materials and training for participating retailers. The POP includes banners, stand-up boards highlighting the character from ENERGY STAR ads running in the region (see Marketing section), shelf "shouters" which dispense instant rebate coupons, and interactive products (milk cartons and dishes) that provide consumers with information on the benefits of ENERGY STAR qualified products. The training runs the gamut from total sales training to providing simple information on the ENERGY STAR Program and administration of rebates, depending on the retailer's needs.

NEEP contractors also act as recruiters to get local and independent retailers signed up as ENERGY STAR Retailers.

New York State Energy Research and Development Authority (NYSERDA)

For 2000, NYSERDA is running a program highlighting the benefits of all ENERGY STAR qualified appliances. At the retail level, they do not offer incentives on the appliances, but do offer participating retailers training and point-of-purchase materials, as well as offering some program resources for co-op advertising.

NYSERDA's program plans also include elements for multi-family and builders of new single-family homes. In the multi-family market, NYSERDA has two program elements: the first is a early retirement program for refrigerators under which refrigerators in low-

income, multi-family settings in the New York City area are pulled from service. NYSERDA requires that at least 50 units be replaced per apartment complex, and has established strict tracking methods to ensure both that the refrigerator is removed from service and the materials are properly handled and recycled. NYSERDA, in cooperation with Consolidated Edison in New York, offers a \$100 “bounty” on each refrigerator that meets program requirements.

NYSERDA has also made financing available to owners of low-income multi-family properties. Under the existing program, NYSERDA blends money provided by banks (at prime rate) with zero interest money provided by the state to create a loan pool for the use of multi-family property managers interested in improving the efficiency of their properties. Under the existing program, the banks receive Community Reinvestment Act credits for the monies contributed to the loan pool. NYSERDA has expressed interest in working with FannieMae to get that organization to underwrite additional loans for upgrades in all types of facilities.

NYSERDA also has a program under which they provide incentives to both single- and multi-family builders who use energy efficient appliances in their projects. Finally, NYSERDA will pilot a new “ENERGY STAR Kitchens” concept in several New York area stores this summer. The details of this effort are provided in the National Stakeholders portion of this discussion.

Sacramento Municipal Utility District (SMUD)

For the remainder of 2000, SMUD will run outreach and incentive programs specifically for refrigerators and clothes washers. SMUD will also invest in the overall promotion of ENERGY STAR appliances in their area (discussed in the communications and outreach portion of this Section).

Refrigerators: SMUD currently has the following plans for refrigerators in 2000 and beyond. First, they will offer a tiered rebate program (\$25 for 20% better than standard; \$75 for 25% better; \$100 for 30% or better). This program will continue through the end of the year or until program monies are exhausted. Depending on the pace of the program, in June or July they may switch to a simple \$100 rebate for refrigerators that are 30% or better than standard through October. In 2001 they have no plans for more rebates.

Washers: This year, SMUD is sponsoring two rebates: \$75 for CEE SEHA Tier A-1 (the minimum ENERGY STAR level), and \$125 at CEE SEHA Tier B-2. These rebates are limited to customers with electric water heat, which comprise approximately 15-20% of market. Similar programs in 1998 and 1999 provided 200 and 600 washer rebates, respectively. This program is planned to continue next year, as SMUD does not consider the market to be transformed (total market share is about 12%.) No coin op-program in works.

Clothes Dryers: SMUD has no dryer program planned, as no product existing in the market that would make it cost-effective to start a program.

Dishwashers: SMUD provided a small rebate for ENERGY STAR dishwashers in 1999, which was aligned with rebates given by the California investor-owned utilities. However, they are not providing any rebates this year.

Freezers: SMUD currently has no plans for a freezer program, but would consider a program, were it shown that such a program would be cost-effective.

California Statewide Initiative

The four investor-owned utilities in California launched a statewide appliance and lighting program in 1999. Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), San Diego Gas and Electric (SDG&E), and Southern California Gas Company (The Gas Co.) began the journey towards a statewide program in 1999 by releasing a competitively bid RFP to hire a statewide program administrator. All four utilities had a long history of running various appliance programs and had several programs active in the field at the time they began working together. They transitioned from the individual programs to the statewide initiative by continuing to run many elements of their existing programs throughout 1999 but made minor modifications where possible to further align efforts. They recognized that it would be destructive to the market if they made abrupt, radical changes to well-established programs and the infrastructure they served.

After hiring the statewide administrator in mid 1999, they began to develop plans for 2000 and beyond that would move the four utility programs almost entirely into alignment. They began by developing the following list of planning guidelines:

- Use financial incentives strategically
- Demonstrate value of ENERGY STAR merchandising
- Develop an integrated marketing strategy
- Coordinate nationally to increase investment by market players
- Incorporate long-term program planning
- Increase current market share of targeted products
- Incorporate feedback loops

The program design for 2000 is primarily based on three strategies: financial incentives, training, and advertising. A description of the financial incentives and training components will be discussed below and the advertising efforts will be discussed under the communication and outreach section.

The program was designed with ENERGY STAR serving as the overarching program platform and therefore the majority of the program elements support all ENERGY STAR appliances. However, there are a few specific technology incentives offered.

Clothes Washers: A \$75 consumer rebate is being offered from January through June on all ENERGY STAR qualified models. After the rebate ends in June, they will begin providing a \$25 SPIFF on the same qualified model through the end of the year.

Refrigerators: A \$100 consumer rebate is being offered from June through December on all models that meet the new 2001 standard level, which is approximately 30% more efficient than the current standard.

The training component of their program includes:

- Focused efforts through field reps including energy efficiency training, post-training tests to measure retention, and mystery shopping to see if the salespeople are discussing energy efficiency when working with consumers.
- Working with manufacturers to get space in their monthly employee publications that will serve as another method of communicating how to include energy efficiency in the sales pitch.

As the statewide team moves into 2001, they expect to see rebates reduced even further and will shift rebate dollars to consumer outreach and post-purchase promotion. The concept of post-purchase is to continue the education process after the sale to reinforce the message and value of energy efficiency. This also provides the opportunity to cross-sell with other programs. In addition, the group is exploring the options for an early replacement initiative that would include disposal and recycling of old units. SCE already has a refrigerator-recycling program in place.

B. National Programs

Department of Energy

Refrigerators: Currently, all five major refrigerator manufacturers have signed ENERGY STAR agreements, although their agreement with General Electric does not specifically mention refrigerators. Currently, Maytag is labeling refrigerators at the factory, and Whirlpool is considering doing so as well; the remainder of compliant products are labeled at the retail level. DOE has recently announced plans to increase the ENERGY STAR qualification level effective in 2001 when the new federal standard is implemented. The new ENERGY STAR level will be approximately 10% better than the 2001 standard (40% above existing standard).

Clothes Washers: The current ENERGY STAR specification is 2.5 EF or greater, well above the current federal standard of a 1.1 EF. There is no water provision in the ENERGY STAR qualifying level or in the standard. The federal standard will increase in two stages – first in 2004 when the Modified Energy Factor (MEF) will be set at 1.04 (the current EF rating is approximately equivalent to an MEF of .82), and again in 2007 when the MEF will increase to 1.26. In response to this recently announced negotiated federal standard, DOE has announced plans to set the ENERGY STAR qualification level at 1.26 MEF in 2001, and 1.42 in 2004.

Clothes Dryers: DOE currently has no plans to label dryers as a part of the ENERGY STAR Program. However, they would consider such a plan, should existing or emerging technologies demonstrate the ability to significantly reduce energy use in dryers.

Dishwashers: The current ENERGY STAR level is 13% better than minimum efficiency standard of EF .46. At this level, roughly 50 percent of current models comply. DOE has recently announced plans to increase the ENERGY STAR qualification level in 2001 to .575 EF, which is 25% better than standard. Approximately 25 percent of the models currently on the market will comply with this new level.

Freezers: Currently, DOE has no freezer program, as they have never been approached to conduct one. However, they would be interested in examining any potential for increased energy efficiency in this market in more detail.

Appliance “Packaging”:

One of the mechanisms that DOE (working in conjunction with EPA) is going to concentrate on is the “ENERGY STAR Kitchen” concept. Under this effort, consumers would be exposed to broad-based messages that highlight the many benefits of purchasing ENERGY STAR -qualified products for all of their kitchen upgrade needs (broadly defined as all major appliances including laundry, windows, lighting and insulation). The goal of this program is to focus consumer attention on the total “value” proposition that can be encompassed by the purchase and installation of high-efficiency products. Thus, the outreach will focus on a wide variety of product benefits, to include not only monetary savings, but also superior appliance construction, improved comfort (from windows and insulation), better ambiance through improved lighting quality, and improved product performance.

As noted earlier, this concept will be piloted by NYSERDA in several New York area stores this summer.

U.S. Environmental Protection Agency

Under its agreement with DOE on the ENERGY STAR Programs, EPA does not have the responsibility for program management of the technical aspects in the major appliances. Thus, they are not involved in the setting or changing of qualifying levels for the label. However, they do have a key role in both communications (discussed below) and in some

program areas, such as new and existing homes, that may have an impact on the way appliances are marketed in major retail outlets nationwide. We will discuss these here.

Currently, the ENERGY STAR New Homes Program focuses on increasing the number of new homes built in the United States with Home Energy Rating System (HERS) scores of 86 or better, equivalent to 30 percent better than the 1992 Model Energy Code (MEC). The Program focuses on providing target efficiency levels to builders, rather than using prescriptive measure packages to achieve the higher rating. More important for the appliance area is that neither HERS nor MEC include appliance efficiency in their overall rating; hence, the efficient homes get no ratings boost from having higher efficiency appliances built in. While the ENERGY STAR Homes Program does include information on efficient appliances to builders for their use, it is not a major feature of the program at this time.

EPA, in conjunction with DOE, is also working on a new outreach effort, the ENERGY STAR Home Improvement Program. This Program will focus on outreach to consumers and relevant contractors to ensure that efficiency is given proper consideration at key decision making points, such as remodeling and after the purchase of an existing home. Research shows that a large percentage of home upgrade or remodeling activity occurs within three years of the purchase of an existing single-family home. Thus, if consumers have access to good information and tools (such as financing) during this window of opportunity, the likelihood that upgrades will explicitly integrate efficiency considerations will rise.

C. Other Stakeholders

The other MT stakeholders interviewed for this report generally agreed that the advent of standards for refrigerators in 2001 and the limited upside efficiency potential would probably dictate that refrigerators will only be cost effective to promote if bundled with other ENERGY STAR products with an emphasis on the total benefits of energy efficiency to consumers. They also believe that MT programs in general need to pay more attention to alternate distribution avenues, such as new homes and multi-family settings.

In the area of clothes washers, the stakeholders seemed to agree that the program response from the MT Groups and the ENERGY STAR Programs would depend in large part on the progress of negotiation on standards currently underway. However, stakeholders are concerned that whether the standards are completed through a negotiation or the full DOE process, the resulting standard level is not going to be nearly as high as it could be. Advocates will probably push to start another rulemaking process as soon as the current one is complete. Not only is there concern about the energy level of the new standard, but also it is questionable whether it will include a water factor. Many stakeholders report water to be the critical issue over the next decade that must be addressed in the standard. Further program collaboration with water and wastewater agencies was recommended as a way to leverage promotion costs and to bring these important stakeholders into the arena.

The question of dishwashers evoked a variety of responses from the stakeholders. Most seemed to agree that an ENERGY STAR-qualifying level of .575 Energy Factor was appropriate for the short- to medium-term, since it appears that a new standard rulemaking does not appear to be in the works for this year at the Department of Energy. One issue that all agreed upon was the need for a new test procedure from DOE in the very near future to ensure that the energy use results are more reflective of real-life conditions, particularly for dishwashers that use “fuzzy logic” technologies.

Finally, none of the stakeholders seemed to indicate support for new ENERGY STAR Programs for either freezers or dryers at this time. Most cited the limited upside potential for cost-effective efficiency improvements in both appliances as the reason for their recommendation.

4. Communications and Outreach

A. Regional and Local Programs

WECC

In 2000, WECC has a \$1 million marketing budget, which will be largely spent on the development and deployment of point-of-purchase materials and radio and newspaper advertisements. WECC’s efforts are going to be focused more on promoting ENERGY STAR label awareness and the associated benefits, including economic savings and “softer” elements like drying time and gentleness. WECC will also be pushing to do more cross-marketing of the ENERGY STAR message, by using data from rebates to send thank you messages to consumers; messages that will help reinforce the ENERGY STAR message, increase awareness and hopefully influence future decision making.

Finally, later in this year, WECC will introduce their mascot, Energy Squirrel, who will help introduce Wisconsin residents to energy efficiency and make the connection between energy efficiency and the environment in a gentle, light-hearted way.

NEEP

NEEP has a budget of around \$4.7 million to focus on advertising for 2000. All of NEEP’s member utilities work through a single contractor (Conservation Services Group), to provide consistency in messaging and as a method of conserving program resources. This year the outreach and advertising is concentrated on television and print advertising, bill inserts, and advertising in regional versions of upscale remodeling and decorating magazines. The television and print advertising, as well as much of the POP used in stores, has focused on “Susie,” a young girl encouraged to get as dirty as possible, since her family’s h-axis washer offers superior cleaning power.

The programs also work with homes sections of regional newspapers to include articles about the benefits of purchasing efficient appliances. Additional efforts have included

PR that highlight consumers' attitudes about and uses of their appliances, working with the Salvation Army to deliver high-efficiency appliances to needy families, and conducting auctions on public television stations.

NEEP stated that it was beginning to move away from an economics-based efficiency message to one that focused on the environmental and quality attributes of efficient appliances and products. They are working with their communications contractors to explore the best method of getting this message to consumers downstream.

NEEP has built a regional website for the program and has explored ways in which they can work to get integrated into other stakeholders' websites; however, they have limited resources to do so and have not made much progress to date.

Finally, NEEP will be working on a demonstration project to demonstrate the benefits of high-efficiency washers in a condominium project near Boston. This project will be modeled on the Bern, Kansas demonstration project sponsored by the Department of Energy. Maytag will once again be the participating manufacturer.

NYSERDA

NYSERDA will be sponsoring a variety of outreach efforts, including television, radio and print advertising, mall kiosks, transit advertising, and outreach at home shows and state and country fairs throughout New York. Most of the materials and treatments are designed to promote public awareness of the benefits of energy efficiency and the ENERGY STAR label, rather than as "call to action" advertising for any specific appliance.

NYSERDA will also launch a website (getenergysmart.org) which will provide consumers the opportunity to conduct a simplified home energy audit, offer energy efficiency tips, provide hotlinks to ENERGY STAR retail locator and product pages, and list contractors that have been qualified to perform energy efficient upgrades and equipment installations under NYSERDA programs. This website should be operational by early summer.

In all of these efforts, NYSERDA believes the marketing needs to emphasize the broader benefits of energy efficiency, including the superior performance of many energy efficient products. In addition, they believe that the marketing will not be successful if it tries to connect with consumers based on the benefits from a single appliance or product in their home. Instead, NYSERDA will emphasize the benefits to consumers on a whole-house level.

SMUD

SMUD promotes their programs mainly through bill inserts and newsletters that go out with customer bills. They also print energy efficiency and ENERGY STAR messages on the pack of customer payment envelopes. Customers are also provided (upon request) a

list of participating retailers and product fact sheets. However, since much of the advertising is too expensive for the utility's program budgets, SMUD does newspaper advertising for light bulbs, but not for appliances. SMUD also does outreach on ENERGY STAR appliances at trade shows and home and garden shows.

California Statewide Initiative

The California team is planning an extensive consumer outreach campaign that will include an overall ENERGY STAR branding effort, specific technology advertising, co-op advertising, in-store promotion, and individual utility bill inserts, community events and trade-shows. The branding campaign begins with two months of radio advertising followed by newspaper print- ads. In addition, they will place specific technology newspaper- ads.

The co-op advertising program allows both national retailers and manufacturers to participate but sets a cap on the dollars that can be allocated to each market actor. The statewide program will cover about half the costs of the insertion rates and the manufacturers and retailers will cover the remaining costs.

The in-store promotional activities will include general brochures and point-of-purchase (POP) materials. The team is currently working with retailers to develop "high-impact" POP, which provides a 3-D effect.

In addition, each utility sponsors promotional efforts outside of the statewide campaign such as bill inserts, community event and trade show sponsorship, and utility specific advertising campaigns.

B. National Programs

DOE/EPA

ENERGY STAR Communications is a joint responsibility of the two federal agencies; hence we will combine our discussion of the agencies' efforts for the remainder of 2000.

In general, EPA and DOE are focusing on continued development of outreach materials that will build the visibility of brand and increase consumer awareness and understanding of the message behind the label. By so doing, the federal programs will attempt to increase the value of the brand's "equity," thereby making it easier and more profitable for retailers, manufacturers and other market actors to feature the label in advertising and marketing materials.

To help achieve these aims, the programs will work on several fronts. First, the agencies will work with Partners to continue to disseminate their existing television public service advertisement (PSA). The spot is currently in distribution in most major media markets in California, the Pacific Northwest, Wisconsin, New York and New England, but many "secondary" markets have not received distribution to date. There are no plans for 2000

to develop and distribute a new spot. However, the agencies are planning the development of a new print PSA that should be developed and disseminated by Summer 2000.

The programs have also indicated that they will continue to focus on the development of broad based materials that can be used by programs interested in promoting the broad ENERGY STAR message. In 1999, the agencies, working with NYSERDA, developed a broad based outreach programs in which NYSERDA was able to use existing, federal-government produced materials, including an animated television spot, for a portion of their overall outreach and advertising package in New York State. These products helped NYSERDA reduce costs and get programs to market sooner. These forms of cooperation continue between the two agencies (see the ENERGY STAR Kitchen discussion, above).

Building on these efforts, the Federal ENERGY STAR Program will focus in 2000 and 2001 on developing what they call “joint national campaigns.” Under this concept, the federal agencies, working in tandem with regional programs’ communications directors, as well as retailers and manufacturers, would develop a series of outreach materials and advertisements that highlight the importance of energy efficiency and the ENERGY STAR label as a means of identifying products. The federal government would bear the costs of creative development and production of the materials; placement of the materials and advertisements would be borne by regional groups, retailers and manufacturers. The hope is that these efforts will assist all groups in leveraging program dollars and resources to the greatest extent possible. One early tangible result of these efforts has been a joint campaign between EPA and the consumer electronics manufacturers to get an ad featuring ENERGY STAR placed in Rolling Stone Magazine this April.

Other Stakeholders

Most of the stakeholders emphasized the need to improve the labeling of products and the quality of the signage and support in stores as a priority for programs as they move forward. In addition, some indicated that they felt the level of discussion on communications and outreach should concentrate less on building the ENERGY STAR brand and more on working to lay a solid groundwork for the introduction of new highly efficient appliances.

5. Evaluation

A. Regional and Local Programs

WECC

WECC has performed some baseline studies of the effect of their programs on market share in Wisconsin. They are currently working to conduct on-going evaluations of their programs; a report is due out the summer.

NEEP

NEEP collects sales data from independent retailers on a quarterly basis, which then compared to the baseline data gathered prior to the program. A progress report was completed in 1999.

NYSERDA

NYSERDA will be performing evaluations designed to estimate the impact of their advertising and outreach efforts in New York. Under this effort, sales data from participating retailers will be analyzed and compared to the timing and scope of ENERGY STAR advertising in the retailers' specific markets. This data will be compared to the results of the baseline studies sponsored by NYSERDA prior to the implementation of the program. These efforts should be complete by this summer.

SMUD

SMUD has conducted a brief evaluation of the success of their rebate program to date in 2000. At the end of March, SMUD had paid 1,200 rebates—including 220 refrigerator rebates at the 30% better than standard level. Their annual goal for the program is to pay at least 4,500 rebates.

California Statewide Initiative

Phase I of the statewide appliance and lighting study was completed in December of 1999 by Xenergy and served as a baseline study. Phase II is scheduled for completion in June of this year and will serve as a progress report based on accomplishments to date and recommended changes to the program.

B. National Programs

DOE

In late 1999, DOE hired the Gallup Organization to conduct a non-scientific survey of the major manufacturers and retailers participating in the ENERGY STAR Program. The organization conducted interviews with 44 ENERGY STAR Program Partners and found, in general, that Partners were very satisfied with the program. Most importantly, over 89 percent of respondents said that they believed the process used to establish qualification levels for ENERGY STAR compliance was either "very fair" or "fair."

On the communications front, many of the respondents cited the lack of a firm understanding in the public's mind about the benefits of ENERGY STAR products. For that reason, many cited the need for more consistent and focused outreach and communications efforts by DOE, EPA and their stakeholders.

EPA

EPA hired the New York advertising firm of Cohn and Wolfe to conduct a review of the ENERGY STAR brand and its progress to date as a tool to deliver the energy efficiency message to consumers. The firm conducted interviews with 28 “influencers” from manufacturers, retailers, regional MT groups, utilities, environmental groups, and the news media. Based on these interviews, Cohn and Wolfe reached the following conclusions:

- Despite the good work that has been done to establish the brand, a lot of work remains; only one in three Americans are aware of the logo, and a smaller percentage can articulate what it stands for.
- The branding work conducted for the ENERGY STAR label needs to be simplified, consistent and clearly articulated to consumers on a repetitive basis.
- The brand needs to establish emotional *and* rational connections to consumers.
- Consumers’ attitudes towards environmental purchasing are becoming more complex and tend to concentrate on issues that affect them in an immediate and significant to their lives.
- The highest value of the ENERGY STAR label is as an endorsement brand. However, the success of the label in this role will require a strong partnership between the federal government, the utilities and regional MT groups to aggressively position the brand with consumers.

6. Cooperation with Other Regional or National Groups

A. Regional and Local Groups

WECC

WECC has not actively coordination with other regional or state efficiency groups. The main concern is time constraints and the need to get their programs established over the past several years. However, they are quite open to doing so, and would welcome a national or super-regional meeting that would concentrate on helping foster greater sharing of ideas between groups and better cooperation and coordination on key program design issues.

WECC also works with CEE on the SEHA appliance levels, which they see as a great roadmap for future. However, they do see a need to get manufacturers involved in understanding that SEHA is a road-mapping exercise, not a program unto itself.

NYSERDA

NYSERDA coordinates with other groups on a variety of levels. First, they are a member of NEEP and participate in the discussions with other utilities that are part of

that organization's charter. They also follow CEE's efforts to develop and publicize new SEHA tiers for appliances, which they consider to be an important roadmap to future ENERGY STAR levels.

NYSERDA also expressed interest in working with other regional and utility-sponsored MT groups to explore the opportunities for more coordination outreach and program implementation strategies for the national retailers and manufacturers. In NYSERDA's view, coordinated efforts are going to be required if the participation and resources of these key market actors are going to be leveraged through the publicly funded programs.

SMUD

In general, SMUD has attempted to align its programs with those sponsored by the other California utilities. They also use CEE's SEHA tiers as a guide to set their tiered rebate structures.

California Statewide Initiative

The California statewide team is extremely interested in both regional and national coordination. They feel that leveraging efforts provides a better outcome for all of those involved, including manufacturers and retailers. They are working with all regional groups around the country to develop a document entitled Market Transformation Resumé, that will lay out the program elements and plans of all players. This document will be used as the basis for planning future programs together.

B. National Programs

DOE/EPA

DOE has worked to cooperate with regional groups through a variety of means, including membership in CEE and the efforts undertaken by D&R International on their behalf and that of the EPA. They are very supportive of these groups' efforts and find them very effective as a means of personalizing/localizing the message, and adding a level of trust to promotional campaigns.

However, DOE also sees the need for all parties to take the next step to ensure consistency in branding message among all the market actors. For their part, they see that they need to provide more and increasingly consistent brand materials for use by partners.

Other Stakeholders

All stakeholders agree that regional and national coordination is critical to success in the appliance industry given the national focus of manufacturers and major retailers. In addition, they recommend broadening the scope of coordination to include other stakeholders such as water agencies and those focused on sustainability.

7. Cross Marketing Activities

Most of the organizations contacted for this report also promote their programs through a variety of marketing avenues in order to maximize public exposure to the energy efficiency message and to help build awareness of the ENERGY STAR brand. This section will discuss what venues and programs are used in this effort.

A. Regional and Local Groups

SMUD

SMUD administers a variety of programs that publicize energy efficiency in general and touch on ENERGY STAR outreach. These include:

ENERGY STAR Lighting Program: SMUD promotes ENERGY STAR-labeled lighting products through rebates, advertisements and events at local retailers.

Residential Services Program: which provides educational materials to residents of single-family homes, including 5,000 energy-survey diskettes, distributed to customers who want to better understand their energy usage.

Multi-family Program: which provides energy efficiency services to tenants, property managers, and owners of multi-family properties. These services include educational workshops for both tenants and owners on energy efficiency.

ENERGY STAR Homes Program: As part of its Residential New Construction Program, SMUD promotes both its *SMUD Advantage Home* and *SMUD Advantage Plus Home*, along with ENERGY STAR Homes (which are roughly equal to the *Advantage Plus Home* in terms of performance).

California Statewide Initiative

Each of the California investor owned utilities have slightly different program portfolios that provide unique opportunities for cross marketing. One way that all California utilities cross market programs is by using the ENERGY STAR label as the platform to promote all efficient products. Several of the utilities do this through ENERGY STAR focused advertising outside of the statewide promotional efforts.

SCE cross-markets the refrigerator component of the statewide initiative with their refrigerator and freezer recycling program that has been in place for several years. They encourage consumers recycling old refrigerators to replace with 2001 compliance models. In addition, all California utilities require low-income program contractors to install ENERGY STAR qualified refrigerators in their low-income refrigerator replacement programs.

NEEP

The NEEP utilities work on a variety of programs, including ENERGY STAR Lighting and Homes that allow for cross marketing of program messages to consumers and participating retailers and stakeholders, including home builders. These efforts will be continued in the future as NEEP continues to move toward a broader marketing message built around the environmental attributes and quality in efficient products.

NYSERDA

NYSERDA has made the ENERGY STAR label the focal point of their public outreach efforts in order to provide a platform for discussion of efficiency at a variety of levels. They will also be sponsoring ENERGY STAR Programs for lighting and homes, as well as packaging the appliances into the ENERGY STAR Kitchen concept discussed earlier. Finally, they will be working with the federal government and FannieMae to discuss launching an ENERGY STAR Financing Program for major home upgrades including kitchen upgrades and appliance replacements.

B. National Programs

DOE/EPA

The biggest need identified by the federal programs is to work with large national retailers that sell a variety of products –including lighting, heating and cooling equipment, computers, and audio-visual equipment–to use the ENERGY STAR brand to help “cross-market” efficiency in their venues. Some of the retailers interviewed for this report indicated that the broad nature of the ENERGY STAR label was an attractive feature, since it increased the likelihood that consumers had seen it in another context and were more aware of the basic message attached to the label.

Another effort spearheaded by the federal programs to broaden the appeal and use of the ENERGY STAR brand is the promotion of ENERGY STAR Financing for key products or groups of products. Under these efforts, loan originators in various areas of the country would have access to lower-cost FannieMae money to provide unsecured consumer loans for the purchase of ENERGY STAR-qualified products. Terms on the loan are attractive–qualifying consumers would receive a two percent interest rate reduction and extended payment terms. Minimum loan size is \$1,000, and the loans could be used for a variety of products, including heating and cooling equipment, windows, and appliance packages, with the caveat that all equipment purchases must be at the ENERGY STAR -qualifying level or better. In addition, these loans could be used to finance larger projects–such as remodeling projects–as long as the equipment and materials used all meet ENERGY STAR-qualifying levels.

These loan products have been around for several years as part of the ENERGY STAR HVAC program. However, some utilities are beginning to examine how they can use the Financing Program as a means of increasing market share for key products. Under this

model, the utilities would be responsible for selecting FannieMae-approved loan originators in their service territory that meet certain pre-defined requirements (such as approval times). They also agree to market the programs to their customers through bill stuffers and advertising. In return, loan originators and FannieMae agree to reduce the interest rate on the loan by two percent over similar loan products for standard efficiency equipment. They also agree to assume the default risk associated with this loan. Currently, PG&E has begun an ENERGY STAR financing program and other utilities have express interest in pursuing program activities in this area.

Other Stakeholders

In general, the other stakeholders felt that the efficient appliance programs are not well integrated into other programs areas, particularly the new homes arena.

Section V

Program Opportunities and Design Recommendations

In Sections I-IV of this report, we provided a broad outline of appliance manufacturing and distribution markets and identified major product trends that are occurring in various appliance areas. We have also reviewed the program activities currently underway nationally and in various regions of the country, including New York, New England, California, and Wisconsin.

This section will focus on the various program opportunities available to the Alliance in the appliance area. Using the backdrop of the information gathered from the research and interviews conducted for this report, we will discuss the challenges and benefits of various program options. The elements that will be discussed in this section include:

1. General Themes for Program Design
2. Program Design Feedback from Market Actor Interviews
3. Program Opportunities and Design Recommendations

1. General Themes For Program Design

Before beginning the discussion of various program opportunities, it may be useful to discuss our understanding of the general principles the Alliance relies upon when developing program plans. We believe these considerations have a significant impact both on the relevance of specific program options, as well as on the resource allocations that will be required to achieve these broad goals.

In our view, the Alliance's main goals in developing and deploying MT programs are as follows:

- To produce real, meaningful and lasting energy use reductions in the Northwest within a reasonable timeframe.
- To institute sustainable changes in the way products or services are purchased, sold, and ultimately manufactured in the Northwest and the U.S. as a whole.

While these two goals are not mutually incompatible, we believe that meeting both requires careful consideration of the form and duration of the programs considered by the Alliance. For instance, as discussed below, many of the market actors interviewed support MT program efforts as a means of stimulating demand for efficient products by focusing consumer attention on the benefits of efficient products. However, they believe that these efforts will only be effective if they focus on simple, consistent messages that touch on the many benefits of efficiency across a wide range of product types. Developing such marketing messages will require the Alliance to both add more products to its current suite of programs and to increase the scope of its marketing and outreach efforts.

Later in this section, we will present both the results of the interviews and research conducted for this program, as well as discuss the benefits of the recommended program options. A good deal of our treatment and discussion of these program options will be informed by what we consider to be some overarching program design issues that we have outlined below. These issues should be considered as the Alliance develops any future appliance programs.

- **It is difficult for a large portion of the appliance retailing and manufacturing marketplace to react to regional variations in program design and delivery.** As noted earlier, all of the appliance manufacturing and roughly half of appliance retailing are conducted on a national basis. Over the past ten years, most of these actors have eliminated their regional focus in favor of more national marketing and sales operations and developed internal structures that rely on uniform product offerings and marketing strategies throughout the country. As a result of these changes, it is difficult for most national retailers and manufacturers to respond to MT program design and delivery that vary in important respects in key regions of the country.

As we will discuss in greater detail in the Program Options section, we strongly urge the Alliance to work in conjunction with other efficiency groups and with national manufacturers and retailers to develop MT program strategies and delivery mechanisms that are consistent across the country to the greatest extent possible.

- **Program designs should be increasingly tailored to meet the needs of different actors within specific elements of the distribution chain.** Another common theme we heard was that some manufacturers and retailers at the national level did not believe that MT program designs reflected their specific needs or could be incorporated easily into their business models. Many of these participants perceived that they were being forced into modes of participation that were more appropriate for their competitors. These complaints included the typical complaints about the use of SPIFs, but also touched on the form and frequency of sales personnel training, the types of POP used in stores, and the forms of rebates used in campaigns.

We believe it will be useful for the Alliance to develop very specific strategies for interacting with various actors within the distribution chain, perhaps to the point of working on a company-by-company focus with the national chains, which may be possible given the limited number of actors in this distribution avenue, especially if such efforts are coordinated nationally among various MT groups. This cannot and should not compete with or take away from the already strong efforts in place with local and regional retailers.

- **The level and frequency of interaction between the Alliance, other MT groups and manufacturers should increase and focus on the development of long-term strategies and program options to reduce appliance energy use trends in new products.**

In Section III, we noted that the short-term upside efficiency potential is somewhat limited in many appliance areas. However, we have also noted that there are appliance feature and manufacturing trends that may deserve increased attention from the Alliance and other MT groups in specific appliance areas. For instance, consumer preferences for shorter clothes drying cycles may actually result in energy intensity increases over the next few years. In addition, the emergence of “smart” appliances area that could potentially reduce appliance energy intensity if manufacturer and component manufacturer attention can be focused on this issue early in the design process.

We believe that it would be in the best interests of the MT community to establish stronger links with the manufacturers to examine trends in consumer behaviors and develop strategies by which manufacturers can meet these demands and maximize efficiency. Again, to the extent possible, we believe that it would be in the best interests of the MT community to coordinate these efforts at a national level.

The logical place for this dialogue to occur would be through the Consortium for Energy Efficiency (CEE). However, two issues may arise here. In the past, questions have been raised surrounding anti-trust regulations that have been a barrier to inter-regional program coordination (It should be noted that CEE has recently developed a procedure to address these concerns to allow the development of national program “templates” and promotional efforts). Secondly, the role of CEE needs to be more clearly articulated to the retailing and manufacturing community, since many private sector stakeholders do not understand where the organization and particularly the Super Efficient Home Appliance (SEHA) program fits in with national and regional efforts around the ENERGY STAR label.

- **Despite increases in consumer awareness of the ENERGY STAR label, the scope and scale of outreach and advertising efforts needs to be expanded.** Most of the retailers and manufacturers we spoke with agreed that both the public’s interest in energy efficiency and their awareness of the ENERGY STAR label had improved to a moderate extent over the past several years. In addition, most groups believed that there was considerable upside potential to these efforts, but only if there were concerted efforts by MT groups to engage in *long-term* marketing and outreach campaigns that focused on a simple consistent message at the regional and national levels. The manufacturers and retailers also cautioned that the amount of resources being dedicated to marketing and outreach by the MT groups, while unprecedented for efficiency programs, is reasonably small when compared to the combined marketing and advertising budgets of the manufacturers and retailers at the national level.

This presents three challenges for the Alliance as it moves forward. First, to be most effective, the Alliance must be able to present a program plan to stakeholders which clearly articulates a multi-year strategy for promoting efficient appliances and other products. Second, successfully leveraging the marketing and advertising resources of the national manufacturing and retailing stakeholders will

require the Alliance to demonstrate that these plans are somewhat coordinated at a cross-regional and/or national level. Finally, the Alliance must concentrate on marketing messages that allow it to use its “equity”--specifically, the organization’s credibility as a source of unbiased information about efficient products--to encourage product manufacturers and retailers to devote more of their equity--advertising and program dollars--to promote efficient products.

- **The Alliance should consider ways to more aggressively cross-market efficient products.** Currently, much of the efficiency outreach conducted in the Northwest concentrates on specific products or classes of products (such as lighting). We believe that this marketing needs to be broadened for three reasons. The most practical is that product-specific marketing is expensive and limits the number of consumers the advertising is likely to reach. The second reason is that several appliances included in this report are not cost effective to promote on their own but will be when included in a portfolio of products. The third and broader reason is that such advertising is less likely to touch on broader messages about efficiency that will be necessary to alter consumer attitudes about and demand for a wide variety of efficient consumer products.
- **Finally, the Alliance’s marketing efforts should concentrate on the full range of product benefits and less on economic savings.** As we discuss below, many of the manufacturer and retailers we spoke with echoed concerns from consumer-based studies; namely, that the savings levels for appliances need to be both significant and relatively immediate if they are to be a major driver of consumer buying habits. However, in the case of most many of the appliances researched for this report, the savings were relatively small or the payback period was sufficiently long which dampened consumer enthusiasm for the products. While this increases the difficulty of marketing these product somewhat, we also believe that it provides the opportunity for the Alliance to test marketing and outreach strategies that focus consumer attention on the broader benefits of these products, whether they be water savings, noise reduction, better construction, or advanced features. By so doing, we believe that this will create a stronger nexus between efficiency and enhanced product benefits in the consumers’ minds, which in itself would be a huge step toward creating a self-sustaining market for efficiency.

2. Program Design Feedback from Market Actor Interviews

A. Manufacturers

Overall, manufacturers feel that the ENERGY STAR label has low consumer recognition and has been only moderately effective as a sales tool. Several manufacturers noted however that they are still in the early stages of using the label as a marketing tool and that it has the possibility of having a significant impact. They cautioned that the label must be promoted in a consistent manner to fully realize its potential.

When asked if manufacturers were supportive of the Alliance and/or ENERGY STAR expanding efforts to include freezers and dryers, most responded affirmatively. A few manufacturers noted that there is a slight danger of diluting the brand if the savings aren't significant or more importantly, if too many models in any given appliance category qualify. The label should differentiate efficient models from standard efficiency by setting qualification levels that only allow the top performers to qualify.

The foreign manufacturers differed from the U.S. manufacturers when asked if regional and/or national programs have had a significant impact on their company's production and marketing plans. Efforts conducted in the U.S. do not have as much impact on foreign manufacturers since the majority of their business is conducted in other countries. The U.S. manufacturers reported that energy efficiency efforts have had moderate to significant influence on their production plans.

Manufacturers were asked how effective they thought ENERGY STAR advertising campaigns were in increasing consumer awareness of ENERGY STAR and promoting efficient appliances in general. While most manufacturers thought it was an effective promotional strategy, they cautioned that the advertising and marketing efforts must be an integrated component of a more comprehensive program, that the messages should be consistent regionally and nationally, and that the level of investment must be significant. As noted earlier in the report, the major manufacturers emphasized that their advertising and marketing is primarily conducted on a national basis so it would be most effective if all energy efficiency programs use consistent advertising messages that could be leveraged in manufacturer advertising. The smaller, foreign manufacturers seem to have more flexibility to respond to regional variations in their advertising.

The table below provides the average weighted score for a variety of program elements that manufacturers were asked to rate based on their effectiveness in promoting and selling efficient appliances.

Program Element	Score 1-10 (1 low, 10 high)
Rebates	7.8
Tax Credits	7.3
Bulk Purchases	7.0
SPIFF's	6.5
Point-of-Purchase Materials	5.8
Advertising Campaign	5.3
Sales Person Education	4.7
Consumer Contests	4.5
Retailer Contests	4.5

In addition to asking manufacturers to score the program elements above, manufacturers were asked what advice they would like to give the Alliance in relation to designing energy efficiency programs. One manufacturer commented that anytime a program does not take into account the natural distribution chain, it creates major problems. "Honor

thy distribution chain,” he advised. Another manufacturer said that consistency is the critical element for his company. A smaller manufacturer noted that it creates difficulty for his company when a program is designed in a manner that is biased towards one manufacturer. And finally, one manufacturer encouraged the Alliance to keep messages simple and straightforward.

B. National Retailers

Interview responses from the national retailers were very similar to the manufacturers. In general, they felt that consumer awareness of the ENERGY STAR label is low but one retailer noted that awareness is medium to high in regions that have sponsored programs. They like the fact that the ENERGY STAR label provides a third party endorsement and gives them a chance to “sell-up.” One large retailer said that ENERGY STAR provides a way to differentiate appliances but it does not influence their stocking patterns like rebate programs do. Another retailer emphasized the importance of program sponsors using the ENERGY STAR brand as an umbrella and recommended that they avoid developing regional program brands. In fact, the national retailers seem to feel even stronger than manufacturers about the necessity for national coordination. As one retailer said, “It would be much more powerful if they would form a national alliance – this regional focus is very difficult!”

Like manufacturers, national retailers support the expansion of the ENERGY STAR label to dryers and freezers but have concerns about diluting the brand. Several of those interviewed felt that this has already occurred with the ENERGY STAR labeled office products. Several retailers commented that consumers must see realistic savings projections that are significant in the short term.

When asked about the impact of energy efficiency advertising campaigns, retailers were very supportive of these efforts, but warned that the outreach budgets must be large enough to create a lasting impact or the money is wasted. To give us a perspective on what it really takes to create impact through advertising, one of the large retailers reported that several companies in this industry spend about \$500 million on marketing and advertising each year. National retailers feel strongly about the use of SPIFs as a promotional strategy. Several of these players do not allow the money to flow through to the salespeople, so if they are offered, the companies must have the ability to control what they do with the dollars generated. However, several retailers noted that SPIFs generate the wrong behavior. These retailers want their salespeople to guide the customer to a product that meets their specific needs, not a product that puts more money in the salesperson's pocket.

Point-of-purchase (POP) materials are problematic for some of the large retailers. One said they will not use POP materials and the others said they need long lead times to coordinate and flexibility on how the materials are designed and used. As with manufacturers, we asked the national retailers to score a variety of program elements in terms of their effectiveness as a promotional strategy for efficient appliances. When comparing the average weighted retailer responses below to manufacturer responses, the

most notable differences are for SPIFs, advertising campaigns, salesperson education and retailer contests. SPIFs and retailer contests scored much lower and advertising campaigns and salesperson education scored much higher.

Program Element	Score 1-10 (1 low, 10 high)
Rebates	8.8
Advertising Campaign	7.0
Sales Person Education	6.5
Tax Credits	6.5
Point-of-Purchase Materials	6.0
SPIFF's	4.3
Consumer Contests	4.0
Retailer Contests	1.0
Bulk Purchases	No Comment

As with manufacturers, national retailers were asked a general question about any advice they would like to give the Alliance when designing and executing energy efficiency programs. The theme we heard repeatedly was to build from the ENERGY STAR platform and strive towards national consistency in design and promotional messages. In addition, one retailer mentioned that integration of all program elements is critical for success. He also advised program sponsors to remember that energy efficiency is a very small part of their business – it accounted for about 7% of their sales last year. It is not worth the effort if the programs are too complicated and deviate too much from their standard practices. “Please keep it simple,” this retailer requested.

C. Independent Retailers

Overall, independent retailers responded more favorably when asked about the effectiveness of the ENERGY STAR label than manufacturers and national retailers. As shown in the table below, 79% felt that the label has been moderately to extremely effective.

Effectiveness of the ENERGY STAR Label as a Sales Tool	Number of Responses
Extremely Effective	21
Moderately Effective	9
Not at all Effective	6
Don't Know	2

However, their perception of consumer awareness and recognition of the label is much more in line with what was reported by manufacturers and national retailers. Over half of the retailers feel that label recognition is low. The table on the following page summarizes responses to this question.

Consumer Recognition of ENERGY STAR Label	Number of Responses
Low	20
Medium	14
High	4

When asked how significantly regional and national energy efficiency programs have influenced retailer-stocking patterns, we found that over 60% of retailers report a moderate to significant influence as demonstrated in the table below.

Influence on Stocking Patterns	Number of Responses
Minor Influence	11
Moderate Influence	10
Significant Influence	9

Retailers were asked to rate the same list of program elements that manufacturers and national retailers rated in terms of their effectiveness in promoting efficient appliances. In comparison to responses from manufacturers and national retailers, independent retailers rated most program elements higher, which leads us to believe that they have more flexibility to implement various program elements and, in general, place greater value on the programs.

The most notable differences where retailers rated the elements higher than both manufacturers and national retailers were with SPIFS and salesperson education. The one program element they rated lower than manufacturers was bulk procurement. National retailers had no comment primarily due to limited experience with this program element. We relate this to the negative perception some retailers have had about bulk procurement bypassing retailers. The average weighted scores given by the independent retailers are summarized below.

Program Element	Score 1-10 (1 low, 10 high)
Rebates	8.6
SPIFs	8.1
Sales Person Education	7.9
Advertising Campaign	6.5
Point-of-Purchase Materials	6.4
Tax Credits	6.2
Retailer Contests	5.4
Bulk Purchases	4.3
Consumer Contests	3.5

Finally, the independent retailers were asked if they had any general comments or suggestions for the Alliance in relation to appliance programs. A full listing of these comments is provided in the appendices. Several retailers had very positive feedback for the Alliance in terms of their performance in past programs and several requested additional support through rebates, SPIFs and advertising.

D. Other Market Actors

The feedback received on program design from the other market actors interviewed was minimal since most of these players have limited experience with energy efficiency programs. However, all of these actors were familiar with the ENERGY STAR label and most responded positively when asked if they would be interested in participating in an ENERGY STAR appliance program.

3. Program Opportunities and Design Recommendations

After exploring the opportunities for influencing appliance sales through several market channels, it is clear that the largest opportunities reside with manufacturers, and the national and independent retailers. A program targeted at these market actors will not only influence individual consumer sales, but will influence commercial sales to builders, contractors, public housing agencies, and multi-family builders and property managers. However, to maximize commercial sales, the program should include marketing and outreach strategies specifically targeted at each of these market actors.

We believe that there are two strong program opportunities that the Alliance should consider to increase the flow of more efficient products into the appliance marketplace. The first program recommendation is a bundled ENERGY STAR appliance program, which could include multiple intervention and marketing strategies depending upon the Alliances budget, goals, and target market. The second program opportunity is a refrigerator and freezer early retirement/replacement program.

A. Bundled ENERGY STAR Appliance Program

The bundled ENERGY STAR appliance program we are recommending would build on the success the Alliance has already achieved through the clothes washer program but would be broadened to promote all of the appliances currently covered by the ENERGY STAR program (refrigerators, dishwashers, and clothes washers). The program would be built upon the ENERGY STAR platform, but would not preclude the Alliance from promoting appliances that exceed the ENERGY STAR qualification levels. While the overall marketing message would focus consumer attention on all ENERGY STAR-qualified appliances, specific program elements, such as targeted incentives, may be used to encourage the purchase of appliances that are more efficient than ENERGY STAR or that include water savings which is not included in the ENERGY STAR qualification criteria.

The benefits of a multi-appliance program strategy are several. First, it would ensure that the Alliance's programs would reach a larger audience, since it would address the needs of consumers shopping for any of several appliances (rather than just washers), and expand the number of channels through which they can be reached. By so doing, we believe the Alliance would help the efficiency message, as represented by ENERGY STAR, be more readily reinforced and memorable for consumers.

Secondly, a broader program would provide the additional impetus for retailers and manufacturers to increase their level of involvement in Alliance's programs. Again, because the efficiency message would be broader and more universal, it would make it easier for retailers and manufacturers to justify the investments in efforts to co-promote the products in their advertising, training or other product materials.

Third, such an effort would also allow the Alliance to work with and tap into the efforts of other regional MT programs across the country. As discussed earlier, we believe the Alliance will be able to make its program resources go further by working with other groups to discuss coordinated marketing, creative development and outreach with manufacturers and national retailers.

Each of the following potential program elements will be discussed.

- Advertising and Marketing
- Training and Retailer Support
- Targeted Incentives
- Continued Advocacy for the Advancement of Appliance Efficiency Levels
- Interventions Targeted at Specific Markets

Advertising and Marketing

The Alliance has been extremely successful in using creative advertising and marketing to highlight the benefits of clothes washers in the Northwest. The expansion of the programs to include dishwashers and refrigerators would provide several benefits to the Alliance, consumers in the Northwest, and other MT stakeholders, including retailers and manufacturers. The broadening of the message allows the advertising to hit on themes that make a better case for the purchase of efficient products in general; namely, that these products offer advanced features and superior construction, are better for the environment, and offer the monetary savings people come to expect.

The long-term transformation of this marketplace will occur when consumers begin to associate efficiency with quality, choice and durability, rather than just as a means of realizing some economic benefits, which are often too small or too far in the future to drive consumer demand. As noted earlier, many manufacturers have mentioned that consumers are willing to invest in products that offer superior value and features. For that reason, we strongly advocate that the Alliance begin to investigate new messages that make the link between efficiency and superior product capability and/or improved construction in the appliance area.

While the environmental benefits should continue to be an important part of the message, many manufacturers and retailers cautioned against using the environment as the main sales hook in most cases. It has been noted many times that while consumers overwhelmingly identify themselves environmentally conscious, they chronically underinvest in products that help protect the environment. The exception has been products that produce environmental benefits that are immediate, tangible, and hit on “hot button” issues—such as conserving water in the Northwest or California. Where the benefits are less immediate or obvious (i.e., reduced air pollution), it is more difficult to explain or sell these benefits to consumers. For this reason, we believe that the environmental benefits must be associated with the quality and durability issues noted above to ensure broader acceptance by consumers.

As we have noted in other areas of this report, the manufacturers and retailers contacted for this report all supported efforts by the Alliance to sponsor marketing and outreach on efficient appliances, as long as it remained focused and of sufficient duration to create a significant impact on consumer behavior. We believe there are many avenues that the Alliance can explore to further develop this market. In some instances, certain efforts would be best undertaken by the Alliance in conjunction with the national and regional MT groups, while others can be regionally focused. The following are activities that we believe can and should be taken at the national level:

- Development and/or revisions to existing point-of-purchase materials for each of the major national retail chains. For instance, Sears has shown increased willingness to promote efficient dishwashers and refrigerators in their stores, and we believe these efforts can be duplicated with other national retail chains. However, this strategy will only be effective if it is done at a national level and customized to reflect the needs of individual chains.
- Development of articles and editorial strategies for major consumer-oriented product rating, remodeling and home decorating magazines. This is a strategy being actively pursued by both the national and New England programs.
- Co-promotion of ENERGY STAR products in national advertising by the regional and national MT groups and the retailers and manufacturers. Under this scenario, the MT groups would pay for the creative development of the advertisements, and the private groups would pay for its placement in return for having their participation mentioned and/or logo displayed in the ad. EPA has executed such a strategy on the consumer electronics program and NYSERDA is actively pursuing such ads for their program. In addition, EPA is considering the sponsorship of a national campaign in which they would cover the campaign development costs and program sponsors would cover the costs of ad placement, possibly by leveraging manufacturer and retailer co-op funding.

- Development of content for manufacturer and retailer websites that mention ENERGY STAR and the benefits of efficient appliances more consistently and prominently. This should include linkages to local program activities and incentives on various products and retail locators.

We also believe that the Alliance can develop various marketing and outreach materials and activities that are specific to the Northwest and that are built around the appliance areas in general. These include:

- Continuing with targeted promotions, such as the “weekend blitzes” undertaken for washers. Again, these were strongly supported by retailers and manufacturers, provided they were given enough notice to respond through their advertising and stocking practices.
- Investigating less traditional forms of outreach, including, but not limited to, the following types of activities:
 - Insertion of advertising in the appliance section of the Yellow Pages.
 - Targeted promotions and/or mailings to recent purchasers of existing homes, many of whom undertake remodeling projects soon after purchase.
 - Continued tie-ins or sponsorship of popular sporting events, such as 5k runs and during intermissions at professional sports contests, particularly in conjunction with major retailers or manufacturers.
 - Development of sales materials targeted at buyers of new homes encouraging them to upgrade their appliance packages to ENERGY STAR -qualifying levels. Again, tie-ins with both builders and manufacturers should be explored.

Training and Retailer Support

As noted above, most of the retailers interviewed for this report were supportive of the concept of training. For local and independent retailers, we believe the level of training and interaction provided under the Alliance clothes washer program seems appropriate and should be continued. However, most of the national retailers believed that much of the training was less useful and not reflective of their corporate training policies for their sales personnel.

We believe it would be fruitful for the Alliance, working in conjunction with national and other regional programs, to sit down with each of the national retailers to develop unique training strategies for each major national chain. For instance, the level of interaction between sales personnel and customers in Sears calls for provisions of more training materials which will help the sales staff better convey the benefits of efficiency, as long as these formats work within Sears’ already well-developed training schedule and format.

Conversely, sales personnel in home centers such as Lowes and Home Depot are not primarily trained to sell specific products to consumers, but rather respond to specific questions that arise on the sales floor. In this instance, different sales and promotional

strategies are called for would differ greatly from those more appropriate in the more traditional retail settings.

However, we also believe that the Alliance should begin to engage these retailers to develop messages and marketing support materials aimed at their commercial sales customers. In most cases, commercial sales clientele consist of single-family homebuilders, multi-family property managers and builders, remodeling contractors, and public housing agencies. For most of the manufacturers we spoke to, these audiences are an increasing focus of their outreach efforts for top end and value added products.

Targeted Incentives

We believe that it may be useful for the Alliance to consider using targeted financial incentives to promote the purchase of efficient products. In some instances, this is a good introductory strategy to focus both consumers and retailers on the broader message of efficiency.

However, rebates and other incentives are probably weak tools to help “sell” the message of efficiency, for the following reasons. First, we believe that rebates can be the equivalent of putting products on permanent discount and help reinforce consumer and retailer beliefs that efficient products are not good investments. Second, as currently formulated, rebates do not require manufacturers or retailers to take any financial stake in the promotion of the product. Finally, and perhaps most salient from a program design point-of-view, rebates are expensive and reduce both the duration and breadth of the outreach and marketing efforts that we believe to be vital to the success of these efforts.

That said, we believe there may be instances in which targeted, limited incentives may be a good strategy to either jump-start a market or increase the level of manufacturer or retailer involvement in the marketing and selling of efficient products. One model that seems especially promising is currently being used by the Wisconsin Energy Conservation Corporation. WECC forms “partnerships” with manufacturers interested in promoting efficient appliances in the state, under which any financial incentives are split evenly between the manufacturer and WECC. WECC also takes responsibility for designing and printing the promotional and training materials to be used to highlight the campaign to retailers and consumers. The manufacturers, in turn, are responsible for delivery of the materials to retail outlets and training of sales personnel, as well as any advertising for the campaign. Currently WECC is working with Amana on one such campaign and has been approached by several other manufacturers about instituting similar programs

The benefit of this model is that the manufacturers take an active, if not aggressive, part in the success of these efforts and use their areas of strength (training of sales personnel and advertising) to help deliver the message to consumers. WECC, on the other hand, is relieved of many of the more expensive and time-consuming tasks of delivering a program in the field.

Finally, there may be a role for targeted incentives to play in the introduction of super-efficient appliances into the marketplace. This is perhaps most relevant in the washer market, where several new products have been introduced in recent months that are significantly above minimum ENERGY STAR-qualifying levels. Some limited rebate activity to encourage retailers to carry these products and to increase consumer awareness of their benefits may be useful over the short-term.

However, as we stated before, we do not believe that rebates should be a permanent fixture in this marketplace, but used instead as a strategic option to help focus consumer and retailer attention on new products, or to leverage increased participation and investment in the Alliance's programs by key actors in the distribution chain.

Continued Advocacy for the Advancement of Appliance Efficiency Levels

Finally, we believe that adoption of the ENERGY STAR platform by the Alliance will give the organization a good opportunity to advocate for the continued improvement in the efficiency of all appliances. We understand that the Alliance and some of its board members have taken strong positions on the need for aggressive federal standards in various appliance areas. Continued advocacy in this area is important as well as continued monitoring of the ENERGY STAR qualification levels and opportunities for ENERGY STAR to expand the portfolio of appliances covered. We see an opportunity for the Alliance to establish ongoing discussions with manufacturers regarding future product development to explore opportunities that concentrate on efficiency in new product designs. We will discuss each of these in turn.

Advocacy for New ENERGY STAR Appliances or Higher Compliance Levels

As noted earlier, the ENERGY STAR designation currently covers washers, refrigerators and dishwashers. Many of the regional manufacturers we spoke with were very supportive of extending the Alliance's programs to refrigerators and dishwashers. Most of the national retailers and manufacturers were interested in the prospect of extending the ENERGY STAR designation to freezers and dryers, but cautioned that the qualification levels must be set at a level that would provide for a meaningful distinction between products; otherwise the label would lose its meaning and become diluted.

For this reason, we would not recommend the Alliance advocate for an ENERGY STAR designation for dryers and freezers at this time. On a per unit basis, models currently on the market do not offer the level of energy savings or additional product benefits or features that would warrant a full-scale program effort. In addition, there are currently no commercially available, cost-effective technologies on the market that would significantly improve the efficiency of either product.

In the case of freezers, the relatively small market share and the lower sales forecasts between 2000 and 2005 make it unlikely that manufacturers would be willing or able to invest in improving the efficiency of existing units. Several observers have pointed out that freezer efficiency may have reached its limit on the existing freezer platform. It is

doubtful that manufacturers would be willing to make significant incremental investments to earn an ENERGY STAR designation for this product.

Dryers show somewhat greater promise over the long-term. Several manufacturers indicated that there will be products on the market soon that offer fairly substantial per unit energy savings that may make an ENERGY STAR designation feasible and attractive for consumers, although they were unwilling to provide details on these technologies for competitive reasons. We would therefore advocate that the Alliance continue to monitor developments in the dryer market through CEE or other organizations.

DOE recently announced the following increases in ENERGY STAR qualification levels for refrigerators, dishwashers, and clothes washers:

- *Refrigerators:* In 2001, the ENERGY STAR qualification levels will rise in response to the new refrigerator standard--the new ENERGY STAR level will be approximately 10 percent better than 2001 standard. At this point, the average ES-compliant product would consume about 440 kilowatt-hours per year, a reduction of about 50 kilowatt-hours per year over a standard product.
- *Dishwashers:* The qualifying level for an ENERGY STAR Dishwasher will also change in 2001. The new level will be set at approximately 25 percent better than standard (a .575 Energy Factor). At this level, approximately 25 percent of the models currently on the market would comply; however, this figure may change, depending on the outcome of the on-going discussions with DOE regarding the efficiency measurement protocols to be used for dishwashers.
- *Clothes Washers:* In response to the recently announced negotiated federal standard for clothes washers, DOE has announced plans to increase the ENERGY STAR qualification level. The federal standard will increase in two stages – first in 2004 when the Modified Energy Factor (MEF) is increased from the current level of .82 to 1.04, and again in 2007 when the MEF will increase to 1.26. The ENERGY STAR level will increase to 1.26 in 2001, and 1.42 in 2004. While most participants in the standard setting process are satisfied with the outcome in terms of energy savings, many are concerned that water efficiency is not addressed. For this reason, it is particularly important that the Alliance continue to promote appliances more efficient than the base ENERGY STAR qualification level.

Given these recent increases in ENERGY STAR levels, it is not likely that additional increases are on the horizon for these three appliances. However, the discussion of new program options and timing needs to be a regular part of MT groups discussions to ensure the steady advancement of efficiency levels outside of the standards setting process. The questions that should be introduced into this discussion should include the following:

- At what market share should consideration of a new ENERGY STAR level be triggered?

- What role can targeted or tiered rebates play in helping pull better technologies into the marketplace? If they are used, how long should the rebates be in place before they are eliminated?
- What's the role of SEHA in helping introduce new levels into the marketplace? Is this role generally understood and supported by the manufacturers? If not, are there strategies that can be pursued to increase their understanding and adopt more focused strategies with various MT groups around the country to use SEHA as the next step for ENERGY STAR compliance?
- What role should cost effectiveness play in new levels? Should there be targets established for payback periods on efficient appliances?

We believe that establishing a group to discuss such issues at the national level will help clarify for all participants, including participating manufacturers, how these programs will advance into the future and what activities can be reasonably anticipated and planned. This, in turn, should help rationalize the planning process and establish a firm basis for moving these programs forward in a timely manner to ensure they retain their meaning in the marketplace.

Focus on Trends in Product Developments:

We also believe that the Alliance would be well served by working with national manufacturers, CEE, other MT groups, and the national ENERGY STAR programs to establish a process for working together to anticipate trends in product development and design strategies to improve the efficiency of products currently in the development stage.

Many of the major manufacturers indicated in their interviews that they do not believe that the MT groups get involved early enough in their internal process to affect the way new products are designed and built. Most of them indicated that they need anywhere from 18 months to four years advance notice to successfully alter the way they will manufacture or design a product, depending on the type and scope of the changes needed. There are several technology developments currently early enough in the design process stage (including so-called "smart" appliances) for which efficiency improvements are possible.

Other impending product developments that bear watching by the Alliance for their energy saving potential include the development of more sophisticated sensor-driven dryer technologies, which have the potential to significantly reduce dryer energy use, and the development of new quick cook oven technologies, which drastically reduce cooking and preheating times.

Interventions Targeted at Specific Markets

A bundled ENERGY STAR appliance program could include intervention strategies targeted at specific markets such as the new homes market, the existing homes market, the multi-family market, or the public housing market. Each of these will be discussed below.

New Homes Market:

We believe that the program options for the new single-family home market are fairly limited at this time. The most obvious program strategy would be to work with builders to develop ENERGY STAR appliance upgrade packages for consumers purchasing a new home, and cross-marketing windows, heating systems and other ENERGY STAR products. However, we believe there is limited upside market potential for such an effort. First, only a small percentage of builders offer appliance packages to their customers and, of those who do, only a small percentage (25 percent or less) of consumers opt to purchase the packages through the builders.

Second, such a program may send the wrong message to both buyers and builders of single-family homes. Appliances account for a relatively small percentage of total home energy use. Concentrating on the provision of efficient appliances in homes that may not include tight envelopes or quality HVAC installations may inadvertently send a message that the consumer is purchasing an efficient home simply because they have chosen the efficient appliances.

For these reasons, we would not recommend that the Alliance pursue a program in the new single-family home market that concentrates *solely* on appliances; however, it may wish to advocate for programs that provide for efficient appliances in homes as an add-on to program elements that highlight homes that have met or exceeded high standards for energy performance, as defined by HERS or MEC.

Existing Homes Market:

Conversely, there may be significant opportunities to highlight the importance of efficient appliances and other products at a variety of distribution points in the remodeling market. We could foresee three potential program responses that would effectively highlight the importance and benefits of efficient products at key points of contact with consumers that are in the process of or likely to consider upgrading their existing single family home. Specifically, these are:

- Interventions at Point of Sale
- Interventions at the Retail Level
- Outreach Through Consumer Press

Each of these will be discussed in turn.

Interventions at Point of Sale

We believe that the Alliance may benefit from a program that highlights the importance and benefits of efficient appliances and other products at the point of sale of an existing home. The sale of existing homes in the U.S. is roughly five times larger on an annual basis than the sales of new homes.⁴⁷ In many existing homes, the appliances do not convey with the property, which puts many buyers in the market for new appliances. Finally, EPA research has indicated that a huge portion of the remodeling activity in new homes is conducted within three years of purchase of an existing home.

The program responses in this area by the Alliance could take several forms. The most obvious is to work with realtors to provide homebuyers with information on and/or incentives for efficient appliances at the point of purchase. However, we believe that the realtors may not be enthusiastic participants in such an effort if their role is limited to the presentation of information alone, given the complexity of the purchase process and the volume of documents that need to be provided as a part of the purchase transaction.

However, the upside potential for intervention in this area might be greater should the Alliance be willing to develop special incentives for the purchase of new appliances or other products, either in the form of discount coupons or reduced or zero interest financing rates for single or groups of qualifying ENERGY STAR appliances. This may provide the Alliance a good opportunity to work with interested retailers and/or manufacturers who may be willing to bear a portion or all of the cost of the incentives, as demonstrated by the WECC program experience.

The conduit for delivery of this information could take several forms. Again, since this program option offers real benefits to consumers, the realtors may enthusiastically work with the Alliance to deliver the incentive packages and information to homebuyers. Another option is to work with the U.S. Postal Service to provide information and/or incentive coupons with the relocation kits that are regularly mailed to households with new addresses. Again, if the Alliance were to defray a portion of the development and insertion costs, they may be able to locate a manufacturing or retail partner that could offset the advertising and incentive costs.

Interventions at the Retail Level

Another opportunity to tap into the existing home market may be to design program elements that are more explicitly designed for consumers in the process of remodeling. Such interventions may take several forms. The first may be to work with retailers or commercial sales distributors to design special financing or incentives for consumers interested in purchasing more than one ENERGY STAR-qualified appliance, since this purchase behavior would indicate either a recent home purchase or a remodel, or both.

⁴⁷ Thompson Global Markets forecasts the annual rate of existing home sales in the U.S. as of April 2000 to be approximately 4.8 million units; the U.S. Census Bureau reports that 1999 new home sales were approximately 900,000 units.

Another opportunity may be to work with retailers to develop information packages and special incentives for the remodeling contractor trade, which is an important and growing portion of the business of such retailers as Home Depot, Lowes, and many independent and local retailers. Again, these packages would include information the contractors could provide to consumers planning upgrade projects, and may include low- or zero interest financing on qualifying appliance packages.

This is another element that we believe could have a much greater chance of success if it were undertaken by a variety of groups nationwide. Several of the key targets of this strategy would be national retailers such as Lowes and Home Depot, who would be much more likely to participate if there were a more national basis for the efforts.

Outreach Through Consumer Press

Finally, as mentioned under the Advertising and Marketing section in greater detail, the Alliance (and other MT organizations) could pursue a much more aggressive outreach and editorial strategy with the major consumer-oriented remodeling magazines, since many consumers consult these magazines before they contact retailers or contractors about potential remodeling.

Multi-Family and Public Housing Market:

Our research indicates that the most effective strategies for influencing efficient appliance sales in these market is to increase communications with these actors and to work with the commercial sales divisions of manufacturers, retailers, and wholesale distributors.

Without investing considerable resources in these markets, the Alliance could increase communications with multi-family builders and property managers and public housing agencies to increase their awareness of energy efficient appliance options. Given the importance on first cost in these markets, it is unlikely that these market actors will be willing to purchase appliances that have an incremental cost above standard efficiency appliances. In many cases (especially with refrigerators and dishwashers) there is no incremental cost, but there are economic benefits in terms of monthly utility savings for property managers and public housing agencies that pay the utility bills. In addition, public housing agencies can tout the political benefits of purchasing energy efficient appliances.

By working with the commercial sales departments of manufacturers, retailers and wholesale distributors, the Alliance can explore ways to market ENERGY STAR appliances to the multi-family and public housing markets. Financing, targeted incentives, and bulk purchase pricing on ENERGY STAR appliances would all be strategies to consider.

B. Refrigerator and Freezer Early Retirement/Replacement Program

As we noted earlier in this report, there are a significant number of freezers and refrigerators in the marketplace that are ten years or older. We believe that it would be in the best interests of the Alliance and consumers in the Northwest to begin investigating an early replacement or retirement program for older appliances, particularly in certain sectors of the refrigerator and washer markets. While this is not technically a Market Transformation program option, it may be very attractive to local utilities that are considering local conservation options.

Under an early replacement program, the Alliance would offer various incentives to encourage the early turn-in of older appliances, which consume significantly more energy than newer appliances. The most important design elements of early replacement programs are: (a) ensuring the appliances being replaced are those which would have remained in stock for a reasonably long period of time absent the intervention; (b) setting the target level incentives so that the program has net benefits for both the consumer and society at large; and, (c) guaranteeing that the units targeted by the program are actually removed from service and not used by the consumer as a second unit or is sold into another part of the market place. This last issue is particularly important from an environmental perspective to ensure that the ozone-depleting chemicals used as refrigerants are properly recovered for disposal by a qualified organization.

It does appear that there is some promise for replacement/retirement programs to meet these challenges in the Northwest, but only in limited situations. The biggest hurdle faced by most early retirement/replacement programs appears to be designing strategies that will guarantee enough unit replacements or retirements and still be cost-effective from a programmatic point of view. Some research has indicated that this issue would be particularly difficult for units in single-family settings, as the typical consumer with an older appliance in service in his or her home has not been shown to be responsive to inducements to replace their products before the end of their useful life.⁴⁸

We believe much larger opportunities for early replacement or retirement could exist in multi-family and low-income/public housing settings because they provide for a high number of potential unit replacements or retirements at a single distribution point. It also makes it easier to track and guarantee the ultimate disposition of old refrigeration units, and provides an entry point for the Alliance into a previously under-served sub-sector of the population in the Northwest. Finally, such a program could be organized through normal retail distribution channels, thereby providing an effective impetus for retailers and distributors to participate in Alliance-sponsored efforts.

These efforts could be modeled on a similar effort currently sponsored by NYSERDA and Consolidated Edison in the New York City area. Under this program, NYSERDA and Consolidated Edison offer a package of incentives and technical assistance to owners of multi-family facilities. The minimum threshold for the program in this case is 100 units. Con Ed pays a small bounty for older units (which are verified by model numbers),

⁴⁸ Conversation with Tom Eckman, Northwest Power Planning Council, May 1, 2000.

and NYSERDA assists the multi-family owners in getting competitive bids for new units for their properties. NYSERDA also coordinates all of the handling and recycling of the units, including the Freon recovery process.

By organizing an early retirement program in this manner, NYSERDA will ensure that old units are permanently removed from the marketplace and properly disposed of. This effort helps the organization extend program benefits to both consumers and owners of multi-family units, who often are not able to take advantage of these programs. By working directly with manufacturers and retailers interested in supplying the ENERGY STAR-compliant units, NYSERDA is able to gain the active participation of an upstream actor.

The California Public Utilities Commission (CPUC) has released a Proposed Decision (PD) that mandates all California utilities to implement a refrigerator recycling/replacement program like the one that Southern California Edison has had in place for several years. It is not clear whether the PD will become a final order, but the Alliance should continue to monitor the California situation, as there could be leveraging opportunities with California utilities.

APPENDIX A

INTERVIEW QUESTIONNAIRE GUIDE

Remodeling Contractor Interview Questionnaire

Independent Retailer Interview Questionnaire

Manufacturer Interview Questionnaire

Single Family Home Builder Interview Questionnaire

Multi Family Developer and Builder Interview Questionnaire

Multi-Family Property Owner/Manager Interview Questionnaire

National Retailer Interview Questionnaire

Public Housing Organization Interview Questionnaire

Regional and National MT Program Sponsors and Stakeholders Interview Questionnaire

Remodeling Contractor Interview Questionnaire

Date _____ Company _____
Contact Name _____ Title _____
Phone _____

Company Data

- Q1. How many remodeling jobs does your company complete each year?
- Q2. What percentage of those includes at least one of the appliances mentioned in this survey?
- Q3. Approximately what has your growth rate been over the past 3 years?
- Q4. Have the types of remodeling jobs you have been asked to do changed over the last five years?
- Q5. Please describe the major trends in the remodeling industry.
- Q6. If your remodeling jobs call for new windows, where do you purchase most of your windows? [***DON'T READ LIST; CIRCLE ALL THAT APPLY***]
1. Direct from manufacturer
 2. Hardware stores
 3. Home centers (e.g., Home Depot, Homebase, Eagle)
 4. Lumber yard
 5. Distributor
 6. If Other, Name (write name/type) _____
- Q7. A higher U-Factor means a less efficient window. For 1999, what percent of the windows you installed were:

More than U 0.35 (Less energy efficient) _____%
[- ***IF MORE THAN 0, ASK questions below***]

What percent of these over U 0.35) were (READ EACH):
(answers below should add to 100%)

- a. wood _____%
- b. vinyl _____%
- c. metal _____%
- d. other _____? (Please describe: _____)

Q8. **A lower U-Factor means a more efficient window.** For 1999, what percent of the windows you installed were U 0.35 or less (energy efficient) _____%
[- IF say 0, Check:] "So you didn't install any high efficiency windows in 1999?"

[IF did install some, Ask:] What percent of those less than or equal to U 0.35 were:
(READ EACH):

(Answers should add to 100%)

- a. wood _____%
- b. vinyl _____%
- c. metal _____%
- d. other _____%? Describe _____)
- e. Of those high-efficiency windows, what percent are 0.30 or better?
_____% (just percentage of above Q3)

Q9. **(SKIP IF SAY "DON'T HAVE CODE")** What percent of those less than or equal to U 0.35 were better than code, but not high efficiency? _____%
[Be sure to fill in]

Q10. What do you estimate the additional cost would be to install high efficiency U 0.35 windows and doors, and high-efficiency U 0.45 skylights into an average 2,000 sq. ft. house?

- 1. \$ _____
- 2. _____ (Don't read) Don't Know / Refused

Consumer Preferences *Open-ended responses to the interview questions will be recorded in addition to the closed ended options listed below.*

Q11. Where do you believe efficiency fits in the range of factors a consumer considers when remodeling their home?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q12. Has this changed over the last 5 years? **Yes, No**

Q13. If so, how would you have answered this question 5 years ago?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q14. Are you noticing an increase or decrease in the number of consumers that inquire about efficiency when remodeling their homes?

Large Increase, Moderate Increase, No Increase or Decrease

Q15. In your opinion, are consumers willing to pay more for energy efficient features or appliances in the home? **Yes, No**

If so, what percentage over the average price do you think they are willing to pay?

Q16. Please rate the impact of the following motivating factors for consumers who purchase high efficiency appliances:

Economic Savings	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Environmental Considerations	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Better Construction	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advanced Technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Presence of Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Other _____	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Contractor Industry Practices

Q17. Which of the following appliances do you install when remodeling homes? Please estimate the percentage of time they are included.

Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q18. Do you ever include energy efficiency in your advertising and marketing? **Yes, No**

If so, how?

Q19. If you include appliances in your upgrades, where do you purchase the appliances?

Q20. Do you consider energy efficiency to be a valuable strategy to differentiate yourself from your competitors? **Yes, No**

Why or why not?

Q21. Who makes the decision about what models of appliances are installed when you remodel homes?

If it is the consumer, do you have any influence on what models they are choosing from?

Q22. Overall, how much influence do you have on the appliances installed during a remodel?

None, Slight, Moderate, or Substantial

Q23. Has this changed over the last 5 years? **Yes, No**

Q24. If so, how would you have answered this question 5 years ago?

None, Slight, Moderate, or Substantial

Q25. Please rate the importance of the following factors when you are involved in choosing the models to be installed:

Price	L, M, H
Existing relationship with distributor or manufacturer	L, M, H
Quality	L, M, H
Special features	L, M, H
Energy Efficiency	L, M, H
Other _____	L, M, H

Program Design/Influence

Q26. Are you familiar with the ENERGY STAR Label? **Yes, No**

Q27. Has the ENERGY STAR Label been an effective tool in influencing consumers to purchase energy efficient products?

- Not Effective**
- Somewhat Effective**
- Extremely Effective**

Q28. How do your customers commonly finance their projects?

Please provide the approximate percentage of consumers that use the following financing vehicles:

- Cash** _____
- Credit Card** _____
- Unsecured Loan** _____
- Line of Credit** _____
- Second Mortgage** _____
- Home Equity Loan** _____

Q29. How often are you in a position to influence the consumer's financing vehicle?

Never
Seldom
Often
Always

Q30. How comfortable are you in recommending various financing options?

Not at all comfortable
Somewhat comfortable
Very comfortable

Q31. Are you familiar with the ENERGY STAR Financing Program?

Very Familiar
Somewhat familiar
Not at all familiar

If so, do you have any reactions to the product?

Q27. If the Alliance were to offer some type of incentive for contractors to promote ENERGY STAR qualified appliances, how likely is it that you would participate?

Not Likely **Somewhat Likely**
Very Likely

Q28. Do you have any suggestions for ways that energy efficient appliances could be promoted through the remodeling process?

Independent Retailer Interview Questionnaire

Date _____ Company _____
Contact Name _____ Title _____
Phone _____

Company Data

Q1. What was your sales volume last year?

Total _____
Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q2. Approximately what has your growth rate been over the past 3 years?

Q3. Please describe the major trends your industry is experiencing.

Q4. What is the profile of your average consumer?

Consumer Preferences *Open-ended responses to the interview questions will be recorded in addition to the closed ended options listed below.*

Q5. Where do you believe efficiency fit in the range of consumer preferences?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q6. Has this changed over the last 5 years? **Yes, No**

Q7. If so, how would you have answered this question 5 years ago?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q8. When consumers purchase high efficiency appliances, they are often motivated by one of the following factors. Please rate the importance of the following motivating factors for consumers that purchase high efficiency appliances:

Economic Savings	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Environmental Considerations	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Better Construction/Quality	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advanced Technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Presence of Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Other _____	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q9. When consumers choose not to purchase high efficiency equipment, how significant would you say the following factors were in influencing their decision.

Higher purchase price	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of confidence in savings estimates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Unproven technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of model or feature choices	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Other _____	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q10. Does the importance of efficiency and the related cost savings differ among the 5 appliances included in this survey?

If so, please rate the level of importance for each appliance.

Refrigerators	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Clothes Washers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Clothes Dryers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Dishwashers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Freezers	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q11. What do you see to be the critical price points for the following appliances? Please estimate what percentage above this price point you think consumers are typically willing to pay for energy efficiency

Refrigerators	_____
Clothes Washers	_____
Clothes Dryers	_____
Dishwashers	_____
Freezers	_____

Q12. Are you noticing an increase or decrease in the number of consumers that inquire about the efficiency of appliances?

Large Increase, Moderate Increase, No Increase or Decrease

Q13. How about an increase or decrease in the number of inquiries about hi-tech appliances?

Large Increase, Moderate Increase, No Increase or Decrease

Q14. What trends are you seeing in terms of consumer preference for various features in the following appliances?

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

Q15. Please estimate what percentage of your sales are motivated by the following events (total to equal 100%)?

Appliance Failure _____
Remodeling _____
Moving _____
Upgrading appliance for additional features _____
Adding appliance to the home for the first time _____
Other _____

Q16. Has this trend changed over time? **Yes, No**

Q17. If so, how would you have responded to the percentages 5 years ago?

Appliance Failure _____
Remodeling _____
Moving _____
Upgrading appliance for additional features _____
Adding appliance to the home for the first time _____
Other _____

Q18. What percentage of the time do you think consumers purchase the following:

Whole suite (refrigerator, dishwasher, washer, dryer) _____
Laundry suite (washer, dryer) _____
Kitchen suite (fridge, dishwasher) _____
Individual appliances _____

Retailer Analysis

Q19. What percentage of your appliance sales fall into the following category?

Individual Consumers _____
Single Family Builders _____
Multi-family Builders _____
Public Housing Agencies _____
Remodeling Contractors _____
Manufactured Housing _____
Other _____

Q20. How much lead-time does your company need to stock and promote energy efficient appliances?

Does this time frame differ for standard efficiency? **Yes, No**
Number of months _____

Q21. What are the primary drivers that influence which models of appliances you stock?

Q22. How interested are you in carrying new, innovative products that might not have a proven track record?

Extremely Interested
Moderately Interested
Prefer to wait until the product has a track record

Q23. What is the average length of employment for your sales staff?

Years/Months _____

Q24. How much sales experience do your employees typically have?

Years/Months _____

Q25. How does your company differentiate itself from the competitors?

Q26. Please describe a typical interaction between one of your sales staff and a consumer:

Program Design/Influence

Q27. Has the ENERGY STAR label been an effective sales tool?

Extremely effective
Moderately effective
Not at all effective
Don't know

Q28. What is your perception of consumer recognition and awareness of the label?

Low, Medium, High

Q29. Which ENERGY STAR qualified appliances do you currently stock?

Refrigerators
Clothes Washers
Dishwashers

Q30. How effective/important has the ENERGY STAR Clothes Washer program been for your store?

Extremely effective
Moderately effective
Not at all effective
Don't know

Q31. Could you discuss the potential response from your store to efforts by the Northwest and/or ENERGY STAR to expand their efficiency programs into new product areas, such as dryers and freezers? For instance, would these efforts make your company more or less willing to feature the ENERGY STAR brand, or not significantly change your efforts?

Q32. Would you say that regional and national energy efficiency efforts have influenced your company's stocking and sales patterns?

If so, would you say they have had a:

Minor influence,
Moderate influence
Significant influence

Q33. What is your opinion on the effectiveness of energy efficiency awareness campaigns? Please respond in terms of a campaign that is a part of a comprehensive program involving other promotional strategies and one that is strictly an advertising campaign to increase awareness of the ENERGY STAR label.

- Extremely effective**
- Moderately effective**
- Not at all effective**
- Don't know**

Q34. This is your chance to give the Alliance advice on how to promote efficient appliances. Please rate the following promotional strategies on a scale from 1-10 with 1 being not at all effective and 10 being extremely effective.

SPIFs	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advertising Campaigns	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Point-of-Purchase Materials	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Sales Person Education	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Consumer Contests	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Retailer Contests	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Tax Credits	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Bulk Purchases	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Are there any program elements that create difficulty for your store? (Determine the nature of the difficulty.)

Q35. Do you have any suggestions for program types, marketing messages and/or advanced efficiency products that you would like to see the Alliance support?

Manufacturer Interview Questionnaire

Date _____ **Company** _____
Contact Name _____ **Title** _____
Phone _____

Corporate Data

Q1. What was your sales volume last year for all appliances carrying your corporate brand? (In total and by appliance.)

Total _____
Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q2. What was your sales volume last year under all other brand names? (In total and by appliance.)

Total _____
Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q3. What has your growth rate been over the past 3 years?

Q4. Please describe the major trends your industry is experiencing.

Q5. What is the profile of your average consumer?

Consumer Behavior/Preferences *Open-ended responses to the interview questions will be recorded in addition to the closed ended options listed below.*

Q6. Where do you believe efficiency fits in the range of consumer appliance preferences?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q7. Has this changed over the last 5 years? **Yes, No**

Q8. If so, how would you have answered this question 5 years ago?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q9. Please rate the impact of the following motivating factors for consumers that purchase high efficiency appliances:

Economic Savings	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Environmental Considerations	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Better Construction	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advanced Technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Presence of Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Other _____	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q10. Please rate the frequency of the following reasons consumers give when deciding against investing in high efficiency appliances:

Higher purchase price	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of confidence in savings estimates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Unproven technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of model or feature choices	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Other _____	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q11. Does the importance of efficiency and the related cost savings differ among the 5 appliances included in this survey? If so, please rate the level of importance for each appliance.

Refrigerators	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Clothes Washers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Clothes Dryers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Dishwashers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Freezers	(low) 1 2 3 4 5 6 7 8 9 10 (high)

12. What do you see to be the critical price points for the following appliances? Please estimate what percentage above this price point you think consumers are willing to pay for energy efficiency?

Refrigerators	_____
Clothes Washers	_____
Clothes Dryers	_____
Dishwashers	_____
Freezers	_____

Q13. Are you noticing an increase or decrease in the number of consumers that inquire about the efficiency of appliances?

Large Increase, Moderate Increase, No Increase or Decrease

Q14. How about an increase or decrease in the number of inquiries about hi-tech appliances?

Large Increase, Moderate Increase, No Increase or Decrease

Q15. What major trends are you seeing in terms of consumer preference for various features in the following appliances?

- Refrigerators**
- Clothes Washers**
- Clothes Dryers**
- Dishwashers**
- Freezers**

Q16. Please estimate what percentage of your sales are motivated by the following events (total to equal 100%)?

- Appliance Failure** _____
- Remodeling** _____
- Moving/New Housing Stock** _____
- Upgrading appliance for additional features** _____
- Adding appliance to the home for the first time** _____
- Other** _____

Q17. Has this trend changed over time? **Yes, No**

Q18. If so, how would you have responded to the percentages 5 years ago?

- Appliance Failure** _____
- Remodeling** _____
- Moving/New Housing Stock** _____
- Upgrading appliance for additional features** _____
- Adding appliance to the home for the first time** _____
- Other** _____

Q19. What percentage of the time do you think consumers purchase the following:

- Whole suite (refrigerator, dishwasher, washer, dryer)** _____
- Laundry suite (washer, dryer)** _____
- Kitchen suite (fridge, dishwasher)** _____
- Individual appliances** _____

Manufacturing Analysis

Q20. Have you noticed large-scale changes in the distribution network for your products?

If so, how?

Q21. What percentage of your products would you estimate move through the following distribution channels?

National Retailers (Sears, Circuit City, Best Buy, etc.) _____
Home Improvement Chains
(Home Depot –including Expo, Lowes, etc.) _____
Independent Retailers _____
Builder Sales (SF & MF) _____
Public Housing _____
Remodeling Contractors _____
Manufactured Housing _____
Other _____

Q22. Has electronic commerce made much of an impact in the appliance industry? If so, what percentage of sales would you estimate through this channel? If not, do you anticipate one? Does your company have an estimate of what percentage of sales might move through this channel in the next 5 years?

Q23. How long does it take your company to make product change outs? (i.e. increase efficiency of an already existing product)

Does this differ per appliance? If so, how?

Q24. How long does it take your company to develop and market new products? (i.e. energy efficient washers)

Does this differ per appliance? If so, how?

Q25. What sales volume is large enough to interest your company? (10,000 units, 20,000 units, etc.)

Does this differ per appliance? If so, how?

Q26. What is the approximate expense to make product changes?

Does this differ per appliance? If so, how?

Q27. How irreversible are most product changes?

Does this differ per appliance? If so, how?

Q28. What is your opinion on the likelihood of success for the following emerging technologies?

Smart Appliances
Heat Pump Clothes Dryers
Microwave Clothes Dryers
Low Energy/Water Dishwashers
Others

Program Design/Influence

Q29. Has the ENERGY STAR label been effective as a sales tool? What is your perception of consumer recognition and awareness of the label? **Low, Medium, High**

Q30. How effective/important has the ENERGY STAR Clothes Washer program been for your company?

Q31. Could you discuss the potential response from your company to efforts by the Pacific Northwest and/or ENERGY STAR to expand their efficiency programs into new product areas, such as dryers and freezers? For instance, would these efforts make your company more or less willing to feature the ENERGY STAR brand, or not significantly change your efforts?

Q32. Similarly, do you believe that there is a danger of diluting brand identity and meaning by labeling too many products or products that do not save significant amounts of energy on a unit basis?

Q33. Would you say that regional and national energy efficiency efforts have influenced your company's manufacturing and marketing plans? If so, would you say they have had a minor influence, a moderate influence or a significant influence?

Q34. What is your opinion on the effectiveness of energy efficiency awareness campaigns? Please respond in terms of a campaign that is a part of a comprehensive program involving other promotional strategies and one that is strictly an advertising campaign to increase awareness of the ENERGY STAR label.

Extremely effective
Moderately effective
Not at all effective
Don't know

Q35. Have you noticed changes in your stocking/order patterns in the Pacific Northwest compared to other areas of the country? If so, is this only for the appliance categories that were included in a promotional program or all appliance categories?

Q36. Does your company view consumer preferences in the Pacific Northwest as different from other areas of the country? Do you customize your products or marketing plans in any way based on these differences? What about differences within the Pacific Northwest (west and east of Cascades)?

Q37. How much ability does your company have to respond to regional variations in program scope and delivery vehicles? For instance, do your marketing and advertising efforts allow you to vary the message to anticipate and take advantage of region specific promotions or campaigns, or do you operate on a national basis?

Q38. This is your chance to give the Alliance advice on how to promote efficient appliances. Please rate the following promotional strategies on a scale from 1-10 with 1 being not at all effective and 10 being extremely effective.

SPIFs	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advertising Campaigns	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Point-of-Purchase Materials	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Sales Person Education	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Consumer Contests	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Retailer Contests	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Tax Credits	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Bulk Purchases	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Are there any program elements that create difficulty for your company?

Q39. Do you have any suggestions for program types, marketing messages and/or advanced efficiency products that you would like to see the Alliance support?

Q40. If the Alliance were going to promote refrigerators more efficient than the 2001 standard level, what percentage above the standard would you say is feasible?

What would be the incremental retail cost?

What kinds of design changes would likely be applied to reach this efficiency level?

Single Family Home Builder Interview Questionnaire

Date _____ Company _____
Contact Name _____ Title _____
Phone _____

Company Data

- Q1. About how many single family homes and duplexes did your company build, or start, in 1999? _____
[ALWAYS TRY FOR SPECIFIC NUMBER - NOT RANGES]
- a. What percentage of these were spec homes (built without a specific buyer in mind?) _____ %
b. What percentage of these were presale homes (pre-sale tract homes built as a model but sold before construction was finished)? _____ %
c. What percentage of these were custom homes (pre-sold before they were constructed)?
- Q2. Approximately what has your growth rate been over the past 3 years?
- Q3. Please describe the major trends in the SF new construction industry.
- Q4. Where do you purchase most of your windows? [DON'T READ LIST; CIRCLE ALL THAT APPLY]
1. Direct from manufacturer
 2. Hardware stores
 3. Home centers (e.g., Home Depot, Homebase, Eagle)
 4. Lumber yard
 5. Distributor
 6. If Other, Name (write name/type) _____
- Q5. A higher U-Factor means a less efficient window. For 1999, what percent of the windows you installed were more than U 0.35 (Less energy efficient)? _____ %
[IF MORE THAN 0, ASK below questions]

What percent of these over U 0.35 were (READ EACH):
(answers below should add to 100%)

- a. wood _____ %
b. vinyl _____ %
c. metal _____ %
d. other _____ ? (please describe: _____)

Q6. **A lower U-Factor means a more efficient window.** For 1999, what percent of the windows you installed were U 0.35 or less (energy efficient)? _____%
[- *IF say 0, Check by asking "So you didn't install any high efficiency windows in 1999?"*]

[IF did install some, ASK]

What percent of those less than or equal to U 0.35 were (READ EACH):
(Answers should add to 100%)

- a. wood _____%
- b. vinyl _____%
- c. metal _____%
- d. other _____%? (Describe_____)
- e. Of those high-efficiency windows, what percent are 0.30 or better?
_____% (just percentage of above Q3)

Q7. (**SKIP IF SAY DON'T HAVE CODE**) What percent of those less than or equal to U 0.35 were Better than code, but not high efficiency? _____%
[Be sure to fill in]

Q8. What do you estimate the additional cost would be to install high efficiency U 0.35 windows and doors, and high-efficiency U 0.45 skylights into an average 2,000 sq. ft. house?

- 1. \$ _____
- 2. ___(Don't read) Don't Know / Refused

Consumer Preferences *Open-ended responses to the interview questions will be recorded in addition to the closed ended options listed below.*

Q9. Where do you believe efficiency fits in the range of factors a consumer considers when purchasing a home?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q10. Has this changed over the last 5 years? **Yes, No**

Q11. If so, how would you have answered this question 5 years ago?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q12. Are you noticing an increase or decrease in the number of consumers that inquire about the efficiency of your homes?

Large Increase, Moderate Increase, No Increase or decrease

Q13. In your opinion, are consumers willing to pay a bit more for energy efficient features or appliances in the home? **Yes, No**

If so, what percentage over the average price do you think they are willing to pay?

Building Industry Practices

Q14. Which of the following appliances are included in your standard home package? If it varies, please estimate the percentage of time they are included.

Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q15. Do you offer an upgrade package that includes additional appliances?

If so, please answer the following questions:

A. Which of the following appliances are included?

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

B. What percentage of homebuyers purchase the upgrade option?

C. Who do you typically purchase the appliances from?

D. Have your sources changed over the past five years?

Q16. Do you ever include energy efficiency in your advertising and marketing? **Yes, No**

If so, how?

Q17. Do you consider energy efficiency to be a valuable strategy to differentiate yourself from your competitors? **Yes, No**

If so, why?

Q18. Who makes the decision in your company about what models of appliances are installed in your homes?

Q19. Please rate the importance of the following factors when choosing the models to be installed:

Price	L, M, H
Existing relationship with distributor or manufacturer	L, M, H
Quality	L, M, H
Special features	L, M, H
Energy Efficiency	L, M, H

Program Design/Influence

Q20. Please rate the importance of the following factors when consumers are considering the purchase of an energy efficient home or appliance.

Economic Savings	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Environmental Considerations	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Better Construction	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advanced Technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Presence of Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q21. Are you familiar with the ENERGY STAR Label? **Yes, No**

Q22. Are you familiar with Energy Efficient Mortgages? **Yes, No**

Q23. If so, approximately what percent of your customers have used an Energy Efficient Mortgage?

Q24. If the Alliance were to offer some type of incentive for homebuilders to sell an upgrade package of ENERGY STAR qualified appliances, how likely is it that you would participate?

- Not Likely**
- Somewhat Likely**
- Very Likely**

Q25. If the Alliance were to offer homebuilders the opportunity to promote and display ENERGY STAR appliances in their model homes, how likely is it that you would participate?

- Not Likely**
- Somewhat Likely**
- Very Likely**

Q26. Do you have any suggestions for ways that energy efficient appliances could be promoted through the new construction purchase process?

Multi-Family Developer and Builder Interview Questionnaire

Date _____ Company _____
Contact Name _____ Title _____
Phone _____

Questions for Developers Only

- Q1. How many multi-family home projects is your company involved with each year?
- Q2. How many units are typically involved in the projects?
- Q3. Approximately what has your growth rate been over the past 3 years?
- Q4. Please describe the major trends in the MF new construction industry.
- Q5. Where do you believe efficiency fits in the range of factors a property owner considers when designing/purchasing a multi-family building?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

- Q6. Has this changed over the last 5 years? **Yes, No**
- Q7. If so, how would you have answered this question 5 years ago?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

- Q8. Are you noticing an increase or decrease in the number of property owners that inquire about efficiency in MF buildings?

Large Increase, Moderate Increase, No Increase or Decrease

- Q9. A. In your opinion, are property owners willing to pay more for energy efficient features or appliances in the buildings? **Yes, No**
- B. If so, what percentage over the average price do you think they are willing to pay?
- Q10. Who makes the decision about what models of appliances are installed in the units?
- Q11. Approximately what percentage of time is your client:

The future owner of the building _____
A property management company _____
Other _____

Questions for Builders Only

Q12. How many multi-family home projects is your company involved with each year?

Q13. How many units are typically involved in the projects?

Q14. Approximately what has your growth rate been over the past 3 years?

Q15. Please describe the major trends in the MF new construction industry.

Q16. Who makes the decision about what models of appliances are installed in the units?

Q17. Which of the following appliances do you typically install when building multi-family homes? If it varies, please estimate the percentage of time they are included.

Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q18. What percentage of the time are the clothes washers installed:

In the unit _____
In a common area _____

Q19. Please rate the importance of the following factors when choosing the models to be installed:

Price	L, M, H
Existing relationship with distributor or manufacturer	L, M, H
Quality/Reliability	L, M, H
Special features	L, M, H
Energy Efficiency	L, M, H
Size	L, M, H
Other _____	L, M, H

Q20. Where do you typically purchase the appliances?

Q21. Is it your decision where to purchase the appliances or is the purchase decision made by the developer or owner?

Questions for both Developers and Builders - Program Design/Influence

Q22. Are you familiar with the ENERGY STAR Label? **Yes, No**

Q23. If the Alliance were to offer some type of incentive for multi-family developers and homebuilders to specify a package of ENERGY STAR qualified appliances, how likely is it that you would participate?

- Not Likely**
- Somewhat Likely**
- Very Likely**

Q24. Do you have any suggestions for ways that energy efficient appliances could be promoted through the multi-family new construction process?

Q25. Where do you purchase most of your windows?
[DON'T READ LIST; CIRCLE ALL THAT APPLY]

1. Direct from manufacturer
2. Hardware stores
3. Home centers (e.g., Home Depot, Homebase, Eagle)
4. Lumber yard
5. Distributor
6. If Other, Name (write name/type) _____

Q26. A higher U-Factor means a less efficient window. For 1999, what percent of the windows you installed were:

More than U 0.35 (Less energy efficient) _____%
[IF MORE THAN 0, ASK questions below]

What percent of these over U 0.35 were (READ EACH):
(Answers below should add to 100%)

- a. wood _____%
- b. vinyl _____%
- c. metal _____%
- d. other _____? (Please describe:_____)

Q27. A lower U-Factor means a more efficient window. For 1999, what percent of the windows you installed were U 0.35 or less (energy efficient) _____%
[IF say 0, Check by asking "So you didn't install any high efficiency windows in 1999?"]

[IF did install some, ASK:]

What percent of those less than or equal to U 0.35 were:
(READ EACH): (Answers should add to 100%)

- a. wood _____%
- b. vinyl _____%
- c. metal _____%
- d. other _____%? (Please describe_____)
- e. Of those high-efficiency windows, what percent are 0.30 or better?
_____% (just percentage of above Q3)

Q28. (SKIP IF SAY DON'T HAVE CODE) What percent of those less than or equal to U 0.35 were Better than code, but not high efficiency? _____%
[Be sure to fill in]

Multi-Family Property Owner/Manager Interview Questionnaire

Date _____ Company _____
Contact Name _____ Title _____
Phone _____

- Q1. Are you a multi-family property owner or manager?
- Q2. How many multi-family home buildings do you own or manage?
- Q3. How large are the buildings (how many units)?
- Q4. Please describe the major trends in the MF building industry.
- Q5. Where do you believe efficiency fits in the range of factors a property owner/mgr considers when replacing appliances in a multi-family building?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

- Q6. Has this changed over the last 5 years? **Yes, No**
- Q7. If so, how would you have answered this question 5 years ago?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

- Q8. A. In your opinion, are property owners willing to pay more for energy efficient appliances in the building? **Yes, No**
- B. If so, what percentage over the average price do you think they are willing to pay?
- Q9. Who makes the decision about what models of appliances are installed in the units?
- Q10. Approximately how often do you replace the following appliances in the units?

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

- Q11. What percentage of the time do you replace appliances for the following reasons?

Appliance Failure _____
Remodeling _____
Other _____

Q12. What percentage of the time are the clothes washers provided:

In the unit
In a common area

Q13. Please rate the importance of the following factors when choosing the models to be replaced:

Price	L, M, H
Existing relationship with distributor or manufacturer	L, M, H
Quality	L, M, H
Special features	L, M, H
Energy Efficiency	L, M, H
Size	L, M, H
Other _____	L, M, H

Q14. Where do you typically purchase the appliances?

Program Design/Influence

Q15. Are you familiar with the ENERGY STAR Label? **Yes, No**

Q16. If the Alliance were to offer some type of incentive for multi-family owners to purchase ENERGY STAR qualified appliances, how likely is it that you would participate?

Not Likely
Somewhat Likely
Very Likely

Q17. Do you have any suggestions for ways that energy efficient appliances could be promoted through the multi-family appliance replacement process?

National Retailer Interview Questionnaire

Date _____ Company _____
Contact Name _____ Title _____
Phone _____

Corporate Data

Q1. What was your sales volume last year? (Total and by appliance)

Total _____
Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q2. What has your growth rate been over the past 3 years?

Q3. Please describe the major trends your industry is experiencing.

Q4. What is the profile of your average consumer?

Consumer Preferences Open-ended responses to the interview questions will be recorded in addition to the closed ended options listed below.

Q5. Where do you believe efficiency fits in the range of consumer appliance preferences?

(low)1 2 3 4 5 6 7 8 9 10 (high)

Q6. Has this changed over the last 5 years? **Yes, No**

Q7. If so, how would you have answered this question 5 years ago?

(low)1 2 3 4 5 6 7 8 9 10 (high)

Q8. Please rate the impact of the following motivating factors for consumers that purchase high efficiency appliances:

Economic Savings	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Environmental Considerations	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Better Construction	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advanced Technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Presence of Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Other _____	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q9. Please rate the frequency of the following reasons consumers give when deciding against investing in high efficiency appliances:

Higher purchase price	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of confidence in savings (estimates)	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Unproven technologies	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Lack of model or feature choices	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Other _____	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q10. Does the importance of efficiency and the related cost savings differ among the 5 appliances included in this survey? If so, please rate the level of importance for each appliance.

Refrigerators	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Clothes Washers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Clothes Dryers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Dishwashers	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Freezers	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q11. What do you see to be the critical price points for the following appliances? Please estimate what percentage above this price point you think consumers are typically willing to pay for energy efficiency.

Refrigerators	_____
Clothes Washers	_____
Clothes Dryers	_____
Dishwashers	_____
Freezers	_____

Q12. Are you noticing an increase or decrease in the number of consumers that inquire about the efficiency of appliances?

Large Increase, Moderate Increase, No Increase or Decrease

Q13. How about an increase or decrease in the number of inquiries about hi-tech appliances?

Large Increase, Moderate Increase, No Increase or Decrease

Q14. What major trends are you seeing in terms of consumer preference for various features in the following appliances?

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

Q15. Please estimate what percentage of your sales are motivated by the following events (total to equal 100%)?

Appliance Failure _____
Remodeling _____
Moving _____
Upgrading appliance for additional features _____
Adding appliance to the home for the first time _____
Other _____

Q16. Has this trend changed over time? **Yes, No**

Q17. If so, how would you have responded to the percentages 5 years ago?

Appliance Failure _____
Remodeling _____
Moving _____
Upgrading appliance for additional features _____
Adding appliance to the home for the first time _____
Other _____

Q18. What percentage of the time do you think consumers purchase the following:

Whole suite (refrigerator, dishwasher, washer, dryer) _____
Laundry suite (washer, dryer) _____
Kitchen suite (refrigerator dishwasher) _____
Individual appliances _____

Retailer Analysis

Q19. What percentage of your appliance sales fall into the following category?

Individual Consumers _____
SF Builders _____
MF Builders _____
Public Housing Agencies _____
Remodeling Contractors _____
Manufactured Housing _____
Other _____

Q20. Has electronic commerce made much of an impact in the appliance industry?

If so, what percentage of sales would you estimate through this channel?

If not, do you anticipate one?

Does your organization have an estimate of what percentage of sales might move through this channel in the next 5 years?

Q21. How much lead-time does your company need to stock and promote specific energy efficient appliances?

Does this differ per appliance? If so, how?

Q22. How willing is your company to stock new, innovative products? How long of a track record does the product need to have?

Q23. What is your opinion on the likelihood of success for the following emerging technologies?

Smart Appliances
Heat Pump Clothes Dryers
Microwave Clothes Dryers
Low Energy/Water Dishwashers
Others

Q24. How does your company differentiate itself from the competitors?

Q25. Please describe a typical interaction between one of your sales staff and a consumer

Q26. What is the average length of employment for your sales staff?

Years/Months _____

Q27. How much sales experience do your employees typically have?

Years/Months _____

Program Design/Influence

Q28. Has the ENERGY STAR label been effective as a sales tool? What is your perception of consumer recognition and awareness of the label? **Low, Med, High**

Q29. How effective/important has the ENERGY STAR Clothes Washer program been for your company?

Q30. Could you discuss the potential response from your company to efforts by the Pacific Northwest and/or ENERGY STAR to expand their efficiency programs into new product areas, such as dryers and freezers? For instance, would these efforts make your company more or less willing to feature the ENERGY STAR brand, or not significantly change your efforts?

Q31. Similarly, do you believe that there is a danger of diluting brand identity and meaning by labeling too many products or products that do not save significant amounts of energy on a unit basis?

Q32. Would you say that regional and national energy efficiency efforts have influenced your company's stocking and sales patterns? If so, would you say they have had a minor influence, a moderate influence or a significant influence?

Q33. What is your opinion on the effectiveness of energy efficiency awareness campaigns? Please respond in terms of a campaign that is a part of a comprehensive program involving other promotional strategies and one that is strictly an advertising campaign to increase awareness of the ENERGY STAR label.

Extremely effective
Moderately effective
Not at all effective
Don't know

Q34. Have you noticed changes in your stocking and sales patterns in the Pacific Northwest compared to other areas of the country? If so, is this only for the appliance categories that were included in a promotional program or all appliance categories?

Q35. Does your company view consumer preferences in the Pacific Northwest as different from other areas of the country? Do you customize your stocking or marketing plans in any way based on these differences? What about differences within the Pacific Northwest (west and east of Cascades)?

Q36. How much ability does your company have to respond to regional variations in program scope and delivery vehicles? For instance, do your marketing and advertising efforts allow you to vary the message to anticipate and take advantage of region specific promotions or campaigns, or do you operate on a national basis?

Q37. This is your chance to give the Alliance advice on how to promote efficient appliances. Please rate the following promotional strategies on a scale from 1-10 with 1 being not at all effective and 10 being extremely effective.

SPIFs	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Rebates	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Advertising Campaigns	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Point-of-Purchase Materials	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Sales Person Education	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Consumer Contests	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Retailer Contests	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Tax Credits	(low) 1 2 3 4 5 6 7 8 9 10 (high)
Bulk Purchases	(low) 1 2 3 4 5 6 7 8 9 10 (high)

Are there any program elements that create difficulty for your company? If so, why?

Q38. Do you have any suggestions for program types, marketing messages and/or advanced efficiency products that you would like to see the Alliance support?

Public Housing Organization Interview Questionnaire

Date _____ Company _____
Contact Name _____ Title _____
Phone _____

Public Housing Analysis

Q1. Where does efficiency fit in the range of factors your organization considers when purchasing appliances for public housing units?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q2. Has this changed over the last 5 years? Yes, No

Q3. If so, how would you have answered this question 5 years ago?

(low) 1 2 3 4 5 6 7 8 9 10 (high)

Q4. Which of the following appliances do you provide in public housing units? If it varies, please estimate the percentage of time they are included.

Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q5. What percentage of the time are the clothes washers installed:

In the unit _____
In a common area _____

Q6. Who makes the decision in your organization about what models of appliances are installed in the units under the following circumstances?

a. New Construction _____
b. Appliance replacement or upgrades _____
c. Bulk Purchase of Appliances _____

How often do you make bulk purchases versus single purchases?

Q7. Please describe the procurement process that occurs when purchasing appliances for public housing units. Again please respond for new construction versus replacement.

Q8. Please rate the importance of the following factors when choosing the models to be installed:

Price	L, M, H
Existing relationship with distributor or manufacturer	L, M, H
Quality/Reliability	L, M, H
Special features	L, M, H
Energy Efficiency	L, M, H
Size	L, M, H
Other	L, M, H

Q9. Are there state or federal mandates that encourage the installation of energy efficient products? **Yes, No**

If yes, please describe:

Q10. How often are the following appliances replaced?

Refrigerators _____
Clothes Washers _____
Clothes Dryers _____
Dishwashers _____
Freezers _____

Q11. How many appliances are typically purchased at one time?

Q12. Who do you typically purchase your appliances from?

Q13. What percentage of your projects are section 8 housing vs. dedicated public housing?

Section 8 Housing _____
Public Housing _____

Q14. What is the typical size of your housing projects?

Q15. Have you ever participated in bulk purchases with other organizations?

Program Design

Q16. Are you familiar with the ENERGY STAR Label? **Yes, No**

Q17. Does your organization ever specify ENERGY STAR in purchase orders? **Yes, No**

Q18. If the Alliance were to offer some type of incentive for public housing organizations to purchase ENERGY STAR qualified appliances, how likely is it that you would participate?

- Not Likely**
- Somewhat Likely**
- Very Likely**

Please explain.

Q19. Do you have any suggestions for ways that the Alliance could encourage public housing organizations to specify and install energy efficient appliances?

Agency Data

Q20. How many building and units does your organization manage?

Q21. How many of the following appliances does your organization purchase each year? Please respond for both new construction and replacement.

- Refrigerators** _____
- Clothes Washers** _____
- Clothes Dryers** _____
- Dishwashers** _____
- Freezers** _____

Q22. Please describe the major trends your industry is experiencing.

**Regional and National MT Program Sponsors and Stakeholders
Interview Questionnaire**

Date _____ **Company** _____
Contact Name _____ **Title** _____
Phone _____

ENERGY STAR Questions (DOE and EPA only)

Q1. Describe the ENERGY STAR labeling plan for the following 5 appliances. Please include bundling strategies with other programs such as the ENERGY STAR Homes Program, changes in the qualification specs, standard impacts, and the feasibility of establishing a label for products not currently labeled).

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

Q2. How effective have the ENERGY STAR awareness efforts been?

Q3. Do you have any data that documents an overall increase in consumer awareness?
(If so, get copy)

Q4. How does DOE and EPA quantify the impacts of an increase in consumer awareness as it relates to energy savings?

Q5. What is your opinion on the effectiveness of regionally sponsored ENERGY STAR awareness campaigns? Are any other regions currently sponsoring a campaign and does it leverage the national campaign?

MT Program Questions (Regional Program Sponsors only – NYSERDA, PG&E, SDG&E, Edison, NEEP, Wisconsin, SMUD)

Q6. Please describe your current and future program plans for the following 5 appliances. *(ask for copies of program plans and promotional materials)*

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

- Q7. Has your organization sponsored any general ENERGY STAR awareness advertising? If so, was it a stand-alone campaign or tied to other program components and how are you measuring its' effectiveness? If not, have you considered this strategy?
- Q8. Has your organization promoted these 5 appliances through non-traditional distribution channels, such as renovation markets or web-based markets? If not, do you plan to?
- Q9. What baseline and/or characterization studies has your organization conducted for the appliances included in this research? (*ask for copies*)
- Q10. What would you say has been the most effective component of all your efforts in the appliance industry?
- Q11. Are you using the SEHA levels to promote efficiencies above the ENERGY STAR qualification level? If so, for which appliances?

Other MT Stakeholders (NRDC, ACEEE, ODOE)

- Q12. What does your organization view as the top priorities for the following 5 appliances?

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

- Q13. How well do you think regional programs are coordinated with the national ENERGY STAR efforts?

Questions for All Stakeholders and Program Sponsors

- Q14. How feasible do you think that regionally coordinated programs are? In your opinion, have efforts in this area been successful?
- Q15. In your opinion, what are the most important strategies/components that the Alliance should consider in their appliance program design to support regional and national efforts?

Q16. In your opinion, what is it going to take for manufacturers to reach higher levels of efficiency than is currently available for the following appliances?

Refrigerators
Clothes Washers
Clothes Dryers
Dishwashers
Freezers

APPENDIX B

EXHIBIT LIST

- Exhibit 2-1 Refrigeration Penetration Levels in the U.S. and Northwest
- Exhibit 2-2 Estimation of Total Refrigerator Stock in the Pacific Northwest
- Exhibit 2-3 U.S. Refrigerator Sales (1991-1998)
- Exhibit 2-4 Northwest Refrigerator Sales by State (1998)
- Exhibit 2-5 Estimated Refrigerator Sales in U.S. (1999-2005)
- Exhibit 2-6 1999 Market Share of ENERGY STAR Refrigerators in the U.S. and Pacific Northwest
- Exhibit 2-7 Refrigerator Energy Use Trends from 1980-1997 (Kilowatt Hours per Year)
- Exhibit 2-8 1998 Refrigerator Efficiency Distribution
- Exhibit 2-9 Age of Refrigerator by Region (Percent of Total Stock)
- Exhibit 2-10 Refrigerator Size by Region (Percent of Total Stock)
- Exhibit 2-11 Refrigerator Size by Housing Type
- Exhibit 2-12 Refrigerator Age by Housing Type (Percent of Housing Stock)
- Exhibit 2-13 Freezer Penetration by Region (Percent of Households)
- Exhibit 2-14 Estimated Freezer Unit Numbers by State (1998)
- Exhibit 2-15 U.S. Freezer Sales Sales (1991-1998)
- Exhibit 2-16 1998 Freezer Sales by State
- Exhibit 2-17 Freezer Sales Forecasts (1999-2005)
- Exhibit 2-18 Freezer Energy Use Trends (1980-1997)\
- Exhibit 2-19 Freezer Efficiency Distribution - Percent of 1998 Models
- Exhibit 2-20 Freezer Penetration by Housing Type - 1997 (Percent of U.S. Housing Stock)
- Exhibit 2-21 Freezer Age by Region - 1997 (Percent of Households)
- Exhibit 2-22 Freezer Size by Region - 1997 (Percent of Households)
- Exhibit 2-23 Washer Penetration by Region (% of All Homes)
- Exhibit 2-24 Estimate of Total Washer Units by State
- Exhibit 2-25 U. S. Clothes Washer Sales 1991-1998
- Exhibit 2-26 Northwest Clothes Washer Sales by State (1998)
- Exhibit 2-27 Forecasted U.S. Clothes Washer Sales (1999-2005)
- Exhibit 2-28 1999 ENERGY STAR Washer Sales by Region (Percent of Total Sales)
- Exhibit 2-29 Clothes Washer Energy Use Trends (1983-1998)
- Exhibit 2-30 1998 Washer Efficiency Distribution (Percent of Models on Market)
- Exhibit 2-31 Washer Penetration by Housing Type (Percent of Housing Stock)
- Exhibit 2-32 Washer Penetration by Income Level (Percent of U.S. Households, 1997)
- Exhibit 2-33 Electric Dryer Penetration by Region (Percent of Total Households)
- Exhibit 2-34 Estimate of Total Electric Dryer Units by State
- Exhibit 2-35 U.S. Electric Dryer Sales (1991-1998)
- Exhibit 2-36 Electric Dryer Sales by State (1998)
- Exhibit 2-37 Electric Dryer Sales Forecasts (1999-2005)
- Exhibit 2-38 Dryer Efficiency Distribution (Percent of 1998 Models)
- Exhibit 2-39 Electric Dryer Penetration by Housing Type (Percent of Housing Stock - 1997)

- Exhibit 2-40 Electric Dryer Penetration by Income Level - 1997 (Percent of Households in U.S.)
- Exhibit 2-41 Dishwasher Penetration by Region (Percent of Households - 1997)
- Exhibit 2-42 Dishwasher Units by State
- Exhibit 2-43 U.S. Dishwasher Sales (1991-1998)
- Exhibit 2-44 Northwest Dishwasher Sales by State (1998)
- Exhibit 2-45 U.S. Dishwasher Sales Forecasts (1999-2005)
- Exhibit 2-46 1999 E S Dishwasher Sales by State
- Exhibit 2-47 Energy Use Trends in Dishwashers - 1983-1998 (Kilowatt Hours Per Cycle)
- Exhibit 2-48 1998 Dishwasher Efficiency Distribution (Percent of Total Models)
- Exhibit 2-49 U.S. Dishwasher Penetration by Housing Type - 1997 (Percent of Total Housing Stock)
- Exhibit 2-50 Dishwasher Penetration by Income Level - 1997 (Percent of Households)

- Exhibit 3-1 Refrigerator Market Share by Manufacturer (1991-1998)
- Exhibit 3-2 Freezer Market Share by Manufacturer (1991-1998)
- Exhibit 3-3: Clothes Washer Market Share by Manufacturer (1991-1998)
- Exhibit 3-4 Electric Dryer Market Share
- Exhibit 3-5 Dishwasher Market Share by Manufacturer (1991-1998)
- Exhibit 3-6 Appliance Sales by National Retailer
- Exhibit 3-7 National Retail Store Locations in the Pacific Northwest
- Exhibit 3-8 Categories of Purchasers
- Exhibit 3-9 Reasons for Appliance Purchases
- Exhibit 3-10 Single Family New Construction Potential Table
- Exhibit 3-11 Single Family Remodeling Potential Table
- Exhibit 3-12 Internet Appliance Sales Forecasts
- Exhibit 3-13 Potential Refrigerator Savings for 18.2 ft.³ Top Mount Auto Defrost Refrigerator
- Exhibit 3-14 Potential Freezer Savings
- Exhibit 3-15 Potential Clothes Washer Savings
- Exhibit 3-16 Potential Dryer Savings
- Exhibit 3-17 Potential Dishwasher Savings

APPENDIX C

APPLIANCE BRANDS BY RETAILER AND MANUFACTURER

Sears

Refrigerators – Amana, GE, Kenmore, Kitchen Aid, Whirlpool, Frigidaire, Jenn-Air, Maytag

Freezers – Galaxy, Kenmore

Dishwashers – Amana, Bosch, Frigidaire, Galaxy, GE, Jenn-Air, Kenmore, Kitchen Aid, Maytag, Whirlpool

Clothes Washers – Amana, Frigidaire, Galaxy, GE, Kenmore, Kitchen Aid, Maytag, Whirlpool

Dryers – Amana, Frigidaire, Galaxy, GE, Kenmore, Kitchen Aid, Maytag, Whirlpool

Circuit City

Refrigerators – Admiral, Danby, Hotpoint, Roper, Amana, Frigidaire, Kitchen Aid, Sanyo, Magic Chef, GE, Maytag, Whirlpool

Freezers – Frigidaire

Dishwashers – GE, Jenn-Air, Whirlpool, Frigidaire, Kitchen Aid, Hotpoint, Maytag

Clothes Washers – Amana, Hotpoint, Sanyo, Frigidaire, Maytag, Whirlpool, GE, Roper

Dryers – Amana, Hotpoint, Sanyo, Frigidaire, Maytag, Whirlpool, GE, Roper

Best Buy

Refrigerators – Sanyo, Frigidaire, GE, Hotpoint, Roper, Whirlpool, Amana, Maytag

Freezers – Frigidaire, White-Westinghouse

Dishwashers – GE, Whirlpool, Frigidaire, Maytag

Clothes Washers – GE, Whirlpool, Frigidaire, Hotpoint, Maytag, Amana

Dryers – GE, Whirlpool, Frigidaire, Hotpoint, Maytag, Amana

Wards

Refrigerators – Admiral, Amana, Absocold, Frigidaire, GE, Hotpoint, Maytag, Signature, Tappan, Whirlpool

Freezers – Not available on website, but they do sell a few

Dishwashers – GE, Whirlpool, Frigidaire, Maytag, Hotpoint, Signature, Tappan

Clothes Washers – GE, Whirlpool, Frigidaire, Hotpoint, Maytag, Admiral, Signature, Tappan

Dryers – GE, Whirlpool, Frigidaire, Hotpoint, Maytag, Admiral, Signature, Tappan

Wal-Mart

Refrigerators – Magic Chef

Costco

Refrigerators – Kirkland

Freezers – Kirkland

Dishwashers – Kirkland

Clothes Washers – Kirkland

Dryers – Kirkland

Brand to Manufacturer Comparison

Admiral = 95% Maytag, 5% Amana

Galaxy = subset of Kenmore

Hotpoint = GE

Jenn-Air = Maytag

Kenmore = Amana, Frigidaire, GE, or Whirlpool

Kirkland = Whirlpool

Kitchen Aid = 95% Whirlpool, 5% Amana

Magic Chef = Maytag

Roper = 95% Whirlpool, 5% Frigidaire

Signature = GE

Tappan = Frigidaire

White-Westinghouse = Frigidaire

APPENDIX D

INDEPENDENT RETAILER COMMENTS ON APPLIANCE PROGRAMS

- Do more with dishwashers and refrigerators
- Focus on water efficiency as well as energy efficiency
- Offer rebates to consumers
- The Alliance is on the right track
- More rebates and sales support
- Everything is good
- Promote microwave clothes dryers
- The Alliance is very good at what they do
- Offer a dryer program with rebates
- Focus on consumer education about energy efficiency
- Promote all energy efficient appliances
- Offer SPIFs on other appliances besides washers
- Offer co-op advertising opportunities
- Promote flash-bake and steam ovens
- The Alliance is doing a good job with what they support
- Include refrigeration in promotions
- Direct mail to consumers with specific energy efficiency information
- Offer rebates – they help even out the costs
- Offer more SPIFs
- Promote dishwashers and refrigerators
- Coordinate local utility support with rebates
- Offer SPIFs on all ENERGY STAR products – very motivating for sales people
- More POP, tax credits, advertising, Earth day promotions
- ENERGY STAR water heaters, rebates, incentives
- Offer rebates with local utilities
- More promotion of independent dealers
- Keep retailers updated to availability on products
- Provide posters for in-store advertising of ENERGY STAR
- Provide magnetic stickers, and more aggressive sales support
- Provide displays and signage showing savings
- More local advertising
- Heck of a program (excellent) – glad to be a part of it
- Coordinate utility rebates, low interest loans