A Unique Approach to Promoting Energy- and Resource-Efficient Home Appliances: The E-Rated Appliance Program

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The E-Rated Appliance Program was established under the U.S. Department of Energy's Technology Introduction Partnerships Program to accelerate the introduction and penetration of energy- and resource-efficient appliances into the new home market. Appliances in the program include refrigerators, washing machines, and dishwashers. The Oregon manufactured home market was chosen as the venue for a pilot program because of the manufactured housing industry's large share of new home sales and long history of participation in energy-efficiency programs in Oregon and because of the positive working relationship between the manufactured housing industry and the Oregon Department of Energy. The pilot program was expanded to Washington state in early 1996 and plans are underway to enter the Idaho manufactured housing market. Additional geographic regions and housing sectors are being investigated as potential program expansion opportunities.

Program staff at the Oregon Department of Energy and Pacific Northwest National Laboratory took a novel approach with the E-Rated Appliance Program's design. The program's success is not dependent upon the use of rebates or financial incentives and does not promote efficient appliances solely on the basis of their energy efficiency. Instead, the program relies on market forces to encourage participation by consumers, home retailers, and appliance manufacturers. The program promotes highly efficient appliances as a package that offers consumers energy savings plus many other attractive attributes. The package concept helps manufactured home dealers sell homes because the E-Rated appliances can be used in the sales process as indicators of the overall quality and comfort of the entire home. The program's high-performance specifications are intended to encourage technical innovation by appliance manufacturers.

INTRODUCTION

The E-Rated appliance (E-Rated) program was developed in early 1995 by the Pacific Northwest National Laboratory (PNNL) and the Oregon Department of Energy (ODOE) for the U.S. Department of Energy (U.S. DOE) as a way to promote energy- and resource-efficient appliances in the residential new construction market. The goal of the E-Rated program is to spur the development and sales of energy- and resource-efficient residential appliances, first in the Northwest manufactured housing market and eventually in other housing sectors. ODOE is implementing the pilot stage of the program in Oregon's manufactured housing market. Using materials developed and lessons learned in the pilot program, PNNL and ODOE are working with the Washington State University Cooperative Extension Service and the Idaho Department of Water Resources to implement the program in Washington and Idaho.

Unlike most utility-driven efficiency programs, the E-Rated program is not dependent upon rebates or other consumer incentives. Rather, the program relies on market forces to stimulate the purchase of energy- and resource-efficient appliances; the appliances are promoted as a package that has many benefits for consumers beyond their energy and water savings, including superior performance, improved comfort, and convenient financing. The program is implemented through agreements with manufactured home builders, manufactured home dealers, and appliance manufacturers and distributors.

This paper provides an overview of the unique design features of the program, successes and lessons learned from the program's pilot implementation in Oregon, and future plans for the program.

BACKGROUND

The E-Rated Appliance Program was introduced at the Salem Home Show in Salem, Oregon, in February 1995. Response from the industry and consumers to the program concept was very positive. In the months that followed, ODOE met with representatives from the manufactured home and appliance industries to determine the optimal way to implement the program. The program was initially implemented on a limited basis in order to allow logistical arrangements and other adjustments to be made before it became highly visible to home buyers. Sales of the E-Rated appliance

package following the home show averaged about 15 per month with little program promotion.

Oregon's manufactured housing market was chosen as the venue to launch the E-Rated appliance program's pilot program for a number of reasons. Oregon manufactured home producers have a long history of participation in energy-efficiency programs and a good working relationship with ODOE. Also, manufactured homes comprise a significant share (about 36%) of new home sales in Oregon, and Oregon manufacturers produce a large portion of the manufactured homes sold in neighboring Washington state. Since 1983 the manufactured housing sector in the Northwest has been involved in a number of studies and programs to improve energy efficiency. These efforts involved a wide variety of stakeholders including manufacturers, utilities, state energy offices, the Bonneville Power Administration, and the U.S. DOE (Gilbertson et al. 1993).

At its peak in 1992 the region's Manufactured Housing Acquisition Program (MAP) had the participation of all of the region's 18 manufactured home builders and every new manufactured home produced in the region was built to MAP's strict envelope conservation standards (Lee et al. 1995). These requirements were among the highest in the country for any housing type—they were 57% more efficient than the federal manufactured home standards in effect at the time and saved about 4,700 kWh annually for each new home (lEE 1996). Although MAP ended in 1994, much of the industry continues to comply with the subsequent voluntary Super Good Cents construction guidelines. According to ODOE, approximately 80% of all new manufactured homes produced in the Northwest meet the Super Good Cents standards, which are similar to the MAP standards.

The Northwest manufactured housing market is unique in the country for several reasons. The typical manufactured home in the Northwest tends to be a more upper-end product than is sited in other parts of the country. In 1994 the average new manufactured home price in Oregon, Washington, and Idaho was $46,400 versus $33,500 for the country as a whole, according to data collected from state manufactured home associations. Northwest manufactured home purchasers buy far more double- or triple-section homes than single-section homes. There are three times more multi-section than single-section home sales in Idaho, eight times more in Washington, and 10 times more in Oregon, while in most other states, single-wide homes sales equal or exceed multi-section home sales (Manufactured Housing Institute 1994). Manufactured homes comprise 36% of **all** new homes sales in Oregon, according to ODOE market research.

The E-Rated Program is a component of the U.S. DOE's TIPs program, which seeks to save 120 trillion Btu of energy by the year 2000 through an increase in the market penetration of advanced, energy-efficient equipment for space heating and cooling, water heating, lighting, refrigeration, laundry, cooking, etc., in residential and commercial buildings.

APPLIANCES

The pilot program has been limited to dishwashers, refrigerator/freezers, and clothes washers[2] to ensure simplicity in the early stages of program implementation. Electric cook tops/ovens and fluorescent lighting have been tested, but installation and quality issues need to be resolved before they are added to the program. The program intends to involve a lighting designer to work with home manufacturers on designs for appropriate high-efficiency lighting fixtures throughout the home. Other energy-efficient appliances being considered for inclusion in the program include heat pump water heaters, ventilation systems, water saving devices, and a gas appliance package.
Performance specifications for the E-Rated Program are quite high compared to the 1993 and 1994 DOE appliance standards, as shown in Table 1. The E-Rated program provides home manufacturers with a list of qualifying equipment and allows the manufacturer to select the set of products to offer in its E-Rated package.

No one appliance manufacturer produces all of the appliances offered in the E-Rated package. When the program was being planned, two U.S. manufacturers announced that they expected to come out with clothes washers that met the program specifications in 1995; however, introduction of both products was delayed. At the time this paper was written, most U.S. refrigerator manufacturers were selling refrigerators that met the E-Rated specifications (Sandahl et al. 1996). Three models by ASKO, several models by Bosch, Miele, and AEG, and one model by a U.S. manufacturer met the dishwasher requirements as of July 1995 (Stephens 1995). Models by ASKO, Creda, and Miele met the clothes washer requirements. Some U.S. manufacturers are planning to introduce models that meet the clothes washer requirement soon.

PARTICIPANTS

Program participants, including program coordinators, home manufacturers and dealers, and utilities, are listed in Table 2.

Program Coordinators

Under the E-Rated Appliance Program's pilot program, PNNL and ODOE provide the following: 1) sales training and training tools, 2) marketing and advertising tools, 3) product labeling, 4) brokering among program participants, 5) consumer research, and 6) new appliance demonstrations.

Table 1. *Appliance Specifications for E-Rated Appliance Program*

Appliance	E-Rated Specification	Current DOE Standard
Dishwasher	—energy factor of 0.58 cycle/kWh	1994—energy factor = 0.46 cycles/kWh
Clothes Washers	—energy factor of 2.5 ft^3/kWh/cycle —water factor of 11.0 gallons/ft^3/cycle —remaining moisture content of 50%[a]	1994-1.18ft^3/kWh/cycle
Refrigerators	—CFC-free —20% more efficient than U.S. DOE '93 standard	1993—varies by model, see 10 CFR 430.32

[a]Performance requirements of the Consortium for Energy Efficiency (CEE) clothes washer program.
Energy factor = the tub volume divided by the energy to heat the water + machine energy per wash cycle.
Water factor = total water used in one wash cycle per cubic ft.

Manufactured Home Builders and Dealers

To participate in the program, a manufactured home builder must identify dealerships that will display the package in a showroom setting and/or in a model home on the dealership lot. Dealerships must also make sales staff available for E-Rated training sessions and they must stock program promotional material.

The appliance package is offered as an option to home buyers at the time of the home purchase. The package is installed at the factory by the home manufacturer when an order is received from a dealer. Home builder installation of the E-Rated appliances was considered the optimal way to implement the program. Builder installation of the appliances was the preferred approach because the builder would be better able to take advantage of the volume discounts involved with purchasing large appliance orders, there would be better quality control over appliance installation, and less oversight would be required by E-Rated program staff. The alternative implementation strategy was dealer installation, which would require that the dealer order and stock the E-Rated appliances and install the appliances for customers who ordered the package when the home arrived at the dealership. This approach was tried on a limited basis early in the program's implementation when it appeared that few manufacturers would offer factory installation. Dealers who participated in the program through installation at their dealership also believed that factory installation was the ideal approach and relayed this opinion to the manufacturer.

Three home builders are now participating in the program: Western Homes/Silvercrest, Marlette Homes, and Palm Harbor Homes. Together these three builders produce about 20 percent of the manufactured homes produced in Oregon, according to data provided to the author by the National Conference of States on Building Codes and Standards, May 1996.

Utilities

Several utilities showed initial interest in the program. Suggested activities for utilities included supporting cooperative advertising, hosting promotional events, and providing financial incentives to consumers to promote E-Rated appliances. For example Northwest Natural Gas helped sponsor some early consumer research. Unfortunately utility industry uncertainty over the 1994–1995 time period led most utilities to reconsider involvement in this and many other conservation programs. Utilities that had supported the program at its inception were unable to follow through with the financial support originally anticipated. Although the E-Rated program is not directly tied to Bonneville or the Northwest utilities, the program planners recognize the efforts of these organizations in the MAP and Super Good Cents programs, which has helped lay the groundwork for a successful pilot program with the manufactured housing industry.

Appliance Manufacturers

Program staff have identified products that meet the program specifications from U.S. and non-U.S. appliance manufacturer product lines. During 1995, ODOE staff sent a letter to appliance manufacturers that described the E-Rated program and identified products that met the E-Rated standards for

Table 2. *E-Rated Appliance Program Participants*

Program Manager	Program Sponsor
Pacific Northwest National Laboratory	U.S. Department of Energy
Program Coordinators	**Consultants**
Oregon Department of Energy Washington State Energy Extension Service Idaho Department of Water Resources	River City Resource Group InterActive Marketing AKA Advertising Agency
Appliance Manufacturers/Distributors	**Utilities**
Whirlpool ASKO	Northwest Natural Gas[a]
Manufactured Home Builders and their Dealerships	
Builders	**Dealerships**
Western Homes/Silvercrest	Luxury Homes, Eugene, OR Western Living Homes, Salem OR Florentine Estates, Florence, OR McMinnville Factory Homes, McMinnville, OR Park Place Homes, Portland OR River Country Homes, Bend, OR
Marlette Homes	Pacific Crest Homes, Bend, OR Shamrock Homes, Eugene, OR Florentine Homes, Florence, OR McMinnville Factory Homes, McMinnville, OR Santiam Homes, Woodburn, OR Santiam Homes, Stayton, OR Reliable Homes, White City, OR Reliable Homes, Medford, OR
Palm Harbor Homes	Magic Living Factory Homes, Millersburg, OR[b]

[a]Other utilities have expressed an interest in participating in the program; however, they have not yet defined their involvement or committed any funds.
[b]Two other Palm Harbor dealerships are negotiating to join the program.

energy efficiency. Appliance manufacturers were asked to identify any additional products they believed met the program specifications.

Appliance manufacturers and distributors have contributed model appliances and sales staff to help demonstrate E-Rated products at promotional events. Some appliance manufacturers also offer monetary awards to dealers for each sale of an E-Rated appliance and offer dealers attractive purchasing programs for appliances that will be used in a showroom or model home.

Marketing and advertising support for the program has been requested of appliance manufacturers. To date, the program has received strategic marketing support and one-third of its financial support for advertising and promotion from appliance manufacturers.

PROGRAM IMPLEMENTATION

PNNL and ODOE have taken several steps to implement the pilot program.

Sales Training and Tools

Program staff will conduct at least two sales training sessions at each of the 15 dealerships participating in the program. A training notebook and other materials explaining the benefits of the E-Rated appliances to consumers have been developed and distributed. At the time this paper was written we had completed sales training and had appliance displays set up in model homes at all of the Silvercrest dealerships but not yet at all of the Marlette and Palm Harbor Homes dealerships. Silvercrest has had at least one E-Rated appliance (usually the dishwasher) in every home it has sold since joining the program in February 1996.

Marketing and Advertising

ODOE has contracted for the development of marketing and advertising tools, such as market studies, logos, video clips, and art work for the manufactured housing dealers to use in advertising campaigns. The program was promoted at the Salem Home Show (the state's largest annual trade show for manufactured homes) in Salem, Oregon, in February of 1995 and 1996 as well as at the Portland Meadows Home Show in September 1995. Several publications have carried stories about the program (see, for example, *Demand-Side Technology Report* Sept. 1995, *The Oregonian* Sept. 17, 1995, *Manufactured Homes Today* Sept./Oct. 1995, and *Manufactured Homes Magazine* Sept./Oct. 1995). Advertisements describing the E-Rated program were placed in *The Oregonian*, *Manufactured Homes Magazine* (1995), and *Manufactured Homes Today* (1996). The E-Rated program provides industry partners with potential advertising layouts, but does not pay for running advertisements in the media.

Certification and Labeling

The E-Rated appliance specifications were established by the U.S. DOE. Product manufacturers have their products tested according to DOE guidelines. Program staff prepared a list of products meeting the program specifications. Program staff contacted the Association of Home Appliance Manufacturers to verify that products met the program criteria. With the E-Rated program labeling, manufactured home dealerships can assure consumers the appliances they purchase meet the program's stringent efficiency requirements.

Brokering

Beginning in 1995, PNNL and ODOE have met with numerous parties to negotiate arrangements for the program. Program staff have discussed the program with staff from approximately 7 appliance manufacturers and 4 distributors, 15 utilities, 5 home manufacturers and numerous home dealers to establish the arrangements for the program. The program brings together appliance distributors and manufacturers with manufactured home producers and dealers so that these parties can set price and delivery schedules for E-Rated appliances. Program staff do not become involved in the price negotiations.

Consumer Research

The E-Rated program benefits home manufacturers by conducting consumer research to determine the appropriate message to deliver to consumers. With the assistance of the Qualitative Research Centre, Inc., ODOE conducted a series of six consumer focus group sessions in Portland in July 1995. The groups included recent purchasers of manufactured homes, consumers intending to purchase manufactured homes, and consumers intending to purchase new site-built homes. Results from these sessions were used to help shape the program. Information was also collected at the Salem and Portland Home Shows as program staff spoke to industry participants and consumers.

New Product Investigations and Demonstrations

E-Rated Appliance Program staff remain current on the latest in appliance technologies and new product developments so that new energy-efficient products can be added quickly to the program (when applicable). E-Rated staff also investigate new product categories and in some cases will perform product demonstrations and evaluations of the performance and market acceptance potential for selected appliances. During 1995, ODOE conducted a demonstration of heat pump water heaters, which resulted in a decision not to include this product category in the program at this time because of low consumer response. The product's energy performance is still being evaluated.

An E-Rated package for homes fueled by natural gas is being contemplated so that buyers of gas homes will have the opportunity to purchase a home with E-Rated appliances. Although only about 8 percent of the manufactured homes sited in the Northwest are located in areas where natural gas is available (Lee et al. 1994), the availability of natural gas may increase as the program is expanded to other geographic areas. Washington program staff are investigating products that could potentially be included in an E-Rated package

for natural gas homes. No decision has been made yet regarding the components of the gas package.

Energy-efficient lighting is being investigated and is expected to be offered as an appliance component of the E-Rated program once technical design issues related to fluorescent lighting have been addressed.

PROGRAM DESIGN ISSUES

E-Rated program planners designed the program so that it could be successful in the absence of consumer discounts or rebates. The program was designed to make sense to home manufacturers from a business perspective and to be attractive enough to entice consumers without financial incentives. The following elements were key to the program's design.

Promotion of Non-Energy Features

It is no secret that energy efficiency is not on the top of most consumers' lists of purchasing criteria when it comes to appliance purchases. While consumers say that energy and resource efficiency are important, other things such as price, performance, quality, durability, dependability, quietness, style, and special features are also considered when making an appliance purchase.

The E-Rated program promotes the full set of appliance attributes that consumers find appealing. Of course consumers also want high performance from their appliances. For example, they want a reliable clothes washer that provides cleaner, longer lasting clothes, and a dishwasher that does a great job of cleaning dishes. Studies have also found that low noise levels are very important to consumers when purchasing a dishwasher. This attribute is especially important in manufactured housing because of the open floor plans desired today.

High performance expectations are especially true of new home buyers. According to a consumer focus group study of new site-built and manufactured home buyers conducted for the program in 1995 by the Qualitative Research Centre, Inc., the core appeal of new homes is the sense of contemporary high standards and the perceived absence of problems. The study authors reported that ''Not only do they (new home buyers) assume everything will work, they also assume that everything will work better; from basic quality of construction, to insulation, to appliance choices.'' E-Rated appliances offer these advantages.

Package Concept

The E-Rated program encourages home manufacturers to promote the full set of attractive attributes E-Rated appliances offer as a way of helping to sell an entire home, instead of offering appliances as stand-alone purchases. The quality, comfort, efficiency, and value of a package of appliances is used to help convey the quality, comfort, efficiency, and value of an entire home. This is similar to the options packages that automobile manufacturers have offered for years including such high-end features as power windows and automatic door locks, air conditioning, and upgraded stereo equipment.

Since manufactured home producers know their customers better than do energy-efficiency program planners, they are in the best position to select appliances that fit with their home product planning strategy. The E-Rated program provides manufacturers with a list of qualifying equipment and allows the manufacturer to define the package that best fits their customers' needs.

According to site-built home builders interviewed by the program coordinators, home buyers tend to prefer to buy all of their appliances from one manufacturer and builders tend to install appliances that are all of one brand; this is especially true of kitchen appliances. Unfortunately at the time the program was set up and at the time this paper was written, no one appliance manufacturer produced an appliance in every E-Rated appliance category that met the requirements of the E-Rated program. This will need to be resolved for the future success of the program. Manufactured home builders have stated that they would prefer to work with one appliance manufacturer for the sake of program simplicity and site-built builders have implied that they would insist on working with only one manufacturer if they were to participate in the program. It is anticipated that one or more U.S. manufacturers will soon have appliances on the market that meet the E-Rated specifications in every appliance category.

Consumer Affordability

Although the E-Rated appliances are more expensive on a first-cost basis than appliances typically installed in manufactured homes, some of this added cost is recouped through lower energy and water bills. However, not all of the additional cost of the E-Rated appliances can be tied directly to energy use. Many of the desirable features, such as lower noise levels, less detergent usage, reduced operating times, or compact size, are not energy related. Therefore the E-Rated specifications for energy efficiency are not tied to consumer payback periods.

Consumers who finance their home purchase are able to include the purchase of the E-Rated appliances in their home mortgage, i.e., the appliances are included in the sale price of the home. By including the appliance purchase in the home price, the incremental cost of these appliances is made more affordable on a per-month basis than it would be if

the appliances were purchased separately with traditional consumer financing. While refrigerators and dishwashers have typically been purchased with new manufactured homes, very few homes are traditionally shipped with clothes washers or dryers. According to a 1995 draft report by PNNL, in 1994 93% of Oregon manufactured homes were shipped with refrigerators and 89% were shipped with dishwashers but only 2% were shipped with clothes washers or dryers. Offering clothes washers and eventually other high-efficiency appliances not traditionally shipped with manufactured homes will give consumers the added benefit of convenient financing for these products.

Use of Market Forces to Spur Participation

Because the E-Rated program does not involve rebates to consumers, home dealers, or manufacturers, the program had to be designed to promote participation based on market forces. There is an important program design goal implicit here—that consumers will be motivated to purchase the highly efficient E-Rated appliances because of their desire to own a package of the most advanced, high-performance appliances available in the market today (which happen to be energy and resource efficient) and that home manufacturers and dealers will be motivated to sell them because they increase the perceived value of the entire home.

The E-Rated program was designed to offer participating home manufacturers a means to differentiate their products with high-end, energy- and resource-efficient appliances. The E-Rated program provides home dealers with promotional materials and training and encourages sales staff to use the quality, performance, and comfort features of the appliance package to sell the quality, performance, and comfort of the entire home.[3] The high-performance appliance package appeals to home buyers' desire for high quality and worry-free appliances, as cited in the findings of the Quality Resource Centre report on new home buyer focus groups.

The program's reliance on market forces instead of financial incentives has posed challenges for program coordination not found with traditional incentive-based programs. Program coordinators have had to develop a stronger understanding of the market to determine what would motivate participation by consumers, dealers, and manufacturers. They've had to overcome some reluctance to participate on the part of these market players who are used to incentives from a history of regional incentive-based programs funded by utilities and Bonneville. Program coordinators also have done more of the hands-on work, which industry representatives are sometimes more likely to provide when they are given financial incentives for program participation.

Interaction with Other Home Conservation Programs

One reason the Northwest manufactured housing sector was chosen as the venue for launching the E-Rated Appliance pilot program was because this housing sector already has a strong building envelope conservation program. As noted earlier, over 80% of the manufactured homes sited in the region meet the Super Good Cents requirements. The long-term goal of the E-Rated Appliance program is to move to other housing sectors including site-built homes in the Northwest and other regions.

As the E-Rated Appliance program expands, it will look for ways to coordinate efforts with other government and private-sector programs. Possible sectors to target include retail sales staff who work with small and mid-sized builders and contractors. Examples of other government programs targeting appliance efficiency include U.S. DOE's Retailer program and U.S. EPA's Energy Star program. As the E-Rated program expands, we will need to coordinate efforts with these programs and re-evaluate program goals.

There are many different utility-sponsored building envelope programs for the residential market. Some of these may include appliance components. One example is the E Seal program, sponsored by the Edison Electric Institute, EPA, U.S. DOE, and several utilities. The program contains an optional appliance component allowing a builder to gain points for using appliances that exceed the DOE standard. There has also been talk of adding an appliance component to the Home Energy Rating Systems (HERS) software. Program staff are looking into how appliance standards relate to HERS and continue to seek ways to coordinate with other programs and not duplicate efforts.

PRELIMINARY SUCCESS INDICATORS

(1) Number of manufactured home producers participating in the program—Three Oregon manufacturers participating as of May 1996: Silvercrest, Marlette, and Palm Harbor. These manufacturers represent about 20 percent of production in Oregon.

(2) *Number of manufactured home producers seriously considering participating in the program*—Four manufacturers were seriously considering joining the program as of May 1996. Fuqua of Oregon, which represents about 7 percent of Oregon production; Fleetwood of Washington, which represents about 44 percent of Washington production; Moduline representing about 38 percent of Washington production; and Nashua representing about 18 percent of Idaho production.

(3) *Number of dealers offering E-Rated appliances (E-Rated dealers must display the appliances in a showroom setting and/or in a model home. Dealer sales staff must attend E-Rated sales training)*—Fifteen dealers representing participating manufacturers had agreed to offer E-Rated appliances as of May 1996. These dealers were at different stages in the process of ordering and installing the appliances and receiving sales training.

(4) *Home design enhancements that incorporate E-Rated appliances offered to consumers*—Silvercrest offers a redesigned laundry room that takes advantage of the ability to stack the h-axis washer and accompanying dryer. The space saved by stacking the washer and dryer is used to accommodate sink and counter space in the utility room.

(5) *Sales of E-Rated appliances*—Sales of the E-Rated appliances totaled about 200 units through May 1996, which is well short of the goal of 800 unit sales for Oregon. The reason for the low volume of E-Rated sales is due to unanticipated delays in getting dealers equipped to sell E-Rated appliances, and a soft Northwest manufactured home market. Manufactured home sales have been about 20% lower compared to 1995. As of May 1996, just one of the E-Rated dealers was fully equipped to offer the E-Rated appliances as intended. This dealers has received and installed the E-Rated appliances in the showroom and in a model home, and sales staff have attended two E-Rated sales training sessions. Every home sold to date at one dealership has included at least one of the E-Rated appliances (usually the dishwasher).

(6) *Number of states*—The program was introduced as a pilot program in Oregon in 1995 and has since been expanded to Washington and Idaho. Expansion into additional states is being considered.

(7) *Number of partners*—Industry participants that can assist with program implementation through financial and in-kind support are critical to the success of the program. ASKO, a manufacturer of complying dishwashers and clothes washers provides sales literature and promotional support; Whirlpool, a manufacturer of a complying refrigerator (SERP model) has agreed to provide promotional support and product literature; Northwest Natural Gas has funded market research and provides promotional support; E-Rated dealers provide promotional support.

(8) *Availability of energy-efficient appliances*—At the E-Rated programs inception it was anticipated that at least two leading U.S. appliance manufacturers would introduce new washer models that would meet the E-Rated minimum specifications for energy efficiency. It was also anticipated that new energy-efficient dishwashers would be introduced by U.S. appliance companies. As of May 1996, no U.S. appliance manufacturers have introduced new models of energy-efficient washers or dishwashers. Therefore products that meet the E-Rated specifications for dishwashers and clothes washers is limited to relatively unknown, relatively expensive, foreign products. Availability of refrigerators that meet the E-Rated specifications is relatively good. Several well known U.S. manufacturers (Whirlpool and Amana) offer products that comply with the E-Rated specifications.

CONCLUSIONS

The E-Rated Appliance Program is currently expanding to the states of Washington and Idaho from the original pilot state of Oregon. The Northwest manufactured home industry is unique in terms of the high energy-efficiency of the housing stock, the history of strong participation in energy-efficiency programs by the industry, and the industry's positive working relationship with energy-efficiency program implementers (i.e., the U.S. DOE and state energy offices). Once the program has been in the Northwest it is likely that it will be expanded to other geographic regions and housing sectors. Additional planning and modifications to the program will likely need to occur if the program for expansion beyond the Northwest.

This paper described how the program was designed to use market forces to deliver energy-efficient appliances to new home buyers without dependence on consumer rebates and incentives. The paper also discussed lessons learned during program development and implementation. These are summarized below:

- When working with the manufactured home industry, factory installation of appliances (and other home components) is ideal.

- The manufactured home industry suffers from image problems which may need to be dealt with when dealing with persons unfamiliar with recent improvements in this housing sector.

- Use market forces to the fullest extent possible to reduce the reliance on consumer rebates for energy-efficient products. Also use the competitive nature of the industry to get participation from many manufacturers and dealerships.

- Consumers will choose what works best for them. Even though we promote the appliances as a package, some

consumers will choose to buy individual appliances without purchasing the entire package.

- Product testing issues may arise that make it difficult to determine whether a certain product or category of product should be included in an energy-efficiency program. Ways to resolve this should be addressed.

- Manufactured and site-built home builders would prefer to work with just one appliance manufacturer who could provide all of the appliances for the E-Rated package, instead of working with two or more different manufacturers.

- When instituting a program that relies on market forces instead of financial incentives, program coordinators need to have a strong understanding of how market forces affect all of the potential participants. Program coordinators need to be prepared to work harder to overcome the reluctance of participants who are used to receiving financial incentives.

ENDNOTES

1. The Pacific Northwest National Laboratory is a multiprogram national laboratory operated for the U.S. Department of Energy by Battelle Memorial Institute under Contract DE-AC06-76RLO 1830.

2. All three home manufacturers sell a clothes dryer as part of the appliance package. However, program specifications have not been set for the clothes dryer because the range of energy efficiency levels in clothes dryers is not significant; they all perform at a similar level of efficiency so there are few efficiency gains to be made. One manufacturer, Silvercrest, has made the washer/dryer combination an attractive selling feature by designing a utility room around it. Because the washer and dryer come as a stackable unit that takes up less floor space than side-by-side models, Silvercrest was able to add a counter top and sink to the laundry room.

3. Despite lingering perceptions that manufactured home buyers are motivated by price above all other factors, a recent article in the *Idaho Manufactured Housing Association News* states that ''quality, energy saving construction features were the number one sales attraction'' for manufactured home buyers in Idaho. The author, Executive Director of the Idaho Manufactured Housing Association, Gub Mix, based his argument on state-wide permit totals which showed that manufactured home sales had increased 25 to 40% in 1992, 1993, and 1994—the years when the MAP program of highly efficient manufactured home construction was in operation and heavily promoted in the Northwest. Since MAP ended, manufactured home sales had dropped by 42% and site-built home sales had risen by 35% for the same period in 1995 because, according to Mix, the industry returned to a focus on price instead of the high quality, energy-efficient features the buying public desired (Mix 1996).

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