

EFFICIENT REFRIGERATORS AND WATER HEATERS: THE ROLE OF THIRD PARTY BUYERS

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Although refrigerators and water heaters account for up to 50 percent of the energy used in Northwest homes, highly efficient models of these appliances are rarely installed in new homes. Why, when the savings are very cost-effective? The common wisdom would lay the blame at the feet of the general consumer or end-user who doesn't demand such appliances. However, the end-user often does not buy water heaters; plumbers and builders do. And even though end-users do buy refrigerators, they may be greatly influenced by builders. This paper investigates the role of third party buyers in refrigerator and water heater purchases for new homes, analyzes how these buyers may discourage installation of highly efficient appliances, and suggests what might be done to increase the use of highly efficient appliances.

SITUATION ANALYSIS

We undertook this project to better understand the market for energy efficient water heaters and refrigerators in new homes in the Northwest. According to the Northwest Power Planning Council, these two appliances account for up to 50 percent of the energy used in Northwest homes. While the potential energy savings from improving the efficiency of these appliances appear both substantial and cost effective if aggregated regionwide (Northwest Power Planning Council, 1989, p.2-3), there is little demand for these appliances and they are rarely installed.

A number of factors may contribute to this situation. First, each appliance may be decided upon and purchased by one of two groups: either the home buyer or a third party buyer such as a builder, plumber, or producer of manufactured housing. Second, these two types of buyers may be motivated by different things. For instance, the third party buyer may be more motivated by minimizing the first cost to enhance profits, while home buyers may also consider the cost of operation over the life of the appliance. Third, each type of buyer simply may not know about highly efficient appliances, may not know where to purchase them, or may not

appreciate the economies they offer. Finally, utility activities may also influence demand for highly efficient appliances, since they often provide information and/or incentives.

Before effective programs can be designed to encourage the use of very efficient refrigerators and water heaters, we felt the purchase decision process should be better understood. Review of other documents (e.g., Lerman, 1988; New York State Energy Office, 1987) suggested a need to understand third party buyers and appliance installation in new homes. In this study we look at three "third party" groups:

1. Home builders who have participated in energy efficient home building programs in the Northwest. (Utilities sponsor these programs and provide training and/or incentives for building highly efficient new homes.)
2. Producers of manufactured housing.
3. Utilities which provide builders with incentives to construct energy efficient homes (incentives do not currently apply to appliances).

Our overall research goals were to:

1. Better understand how these three groups affect the market for efficient water heaters and refrigerators in the Northwest; and
2. Gather information to help design programs that promote the use of water heaters and refrigerators that exceed national efficiency standards.

Methods used to collect data are discussed with each respondent group. We collected data in the summer and fall of 1989.

ENERGY EFFICIENT HOME BUILDERS AND ENERGY EFFICIENT APPLIANCES

Methodology

Because we wanted basic information, knew the difficulty of reaching builders by phone, and had a limited budget, we chose to do a mail survey. We sent a short mail questionnaires to one thousand builders who had participated in energy efficient home building programs throughout the region. Of those mailed surveys and one follow-up reminder card, 383 responded.

To shorten the length of the questionnaire, we split the survey into two versions, Half the sample received questions on refrigerators, and half on water heaters. Almost an equal number of builders returned each version of the survey (N= 188 for refrigerators; N = 191 for water heaters.) While we did not ask who completed the survey form, most of these builders are small concerns (as shown in the next section in Table 1) where the business owners would be the most likely ones to fill out the questionnaire.

Builder Profile

At least in terms of experience with energy efficiency, the builders surveyed probably do not represent the larger population of builders in the region. And, given their size, they do not represent volume builders. But it is precisely because they had already demonstrated an interest in energy efficiency that we were interested in their appliance decisions.

Table 1. Builder Characteristics

Number of homes built	%
1 - 3 homes	50
4 - 9 homes	30
10 - 20 homes	11
21+ homes	9
Years in business	
0 - 3 years	5
3 - 5 years	8
5 - 10 years	17
10+ years	70
Price Range of Homes	
High	12
Middle	73
Modest	15

We assumed this group would be the most responsive to our inquiries and the most receptive to future appliance programs if they were to be developed.

Table 1 shows that these builders are small volume builders (50 percent built 3 or less homes per year) who have been in business for a substantial time and who build for middle income home buyers. (This profile is consistent with utility surveys done with this group.)

General Behaviors, Attitudes, and Knowledge about Appliances

We first asked builders to indicate how often they include a variety of appliances in the homes they build. Builders in the Northwest often include - not necessarily purchase - water heaters (96 percent), dishwashers (90 percent), and stoves (84 percent), but routinely do not include refrigerators (30 percent), washers (20 percent) or dryers (19 percent), or small appliances such as microwaves and air conditioners. Forty-one percent report they often include a wood heat device.

A strong majority (65 percent) of the builders surveyed are convinced of the importance of efficient appliances in household energy savings. Still, among builders who are experienced with

energy efficiency, that leaves a notable minority who are not convinced. The majority believe appliances consume a lot of energy and that homeowners can save on bills if they buy more efficient appliances. Those who are not convinced believe other actions to reduce energy use are more important, that energy efficient appliances are not cost effective and that consumer awareness is low.

When all builders rated barriers to installing efficient appliances, two types of important factors emerged, as shown in Table 2 (on the next page).

One major barrier is the perception that efficient appliances have high price tags (81 percent very or somewhat important). A second major barrier relates to a lack of good information about where to buy efficient models and how to identify which models are efficient. Notably, 58 percent don't know if their supplier carries high efficiency models.

When asked what utilities could do to encourage builders to purchase efficient appliances, builders advised strategies consistent with barriers above: incentives and better information. While specific incentives were not explored, we asked builders more about their information source. When asked to rate various sources of information about appliance efficiency, the Yellow Energy Guide Label had the highest "very useful" marks (54%), but Table 3 shows that builders are not satisfied with the information they have available, especially from the Blue Clue Brochure and from salespeople. Almost all (87 percent) of builders said they wanted more information about energy efficient appliances. The majority (69 percent) wanted information sent directly to their companies, but others suggested suppliers, utilities, and professional organization as distribution points.

THE REFRIGERATOR PURCHASE DECISION

Builders do not typically install refrigerators but they may advise home buyers on what refrigerator to buy and actually do the purchasing. Only 30 percent of these builders report they routinely install refrigerators in the homes they build. They also report that when they do install refrigerators, home

buyers decide on the type and model most (74 percent) of the time. Builders say they decide 12 percent of the time and that it's a joint decision 14 percent of the time.

Still, in the majority of cases when they don't install the refrigerator, the builder may recommend to the homeowner what refrigerator to buy (59 percent often or sometimes), and the home buyer may purchase the refrigerator through the builder (39 percent). When builders are asked to purchase a refrigerator, however, they say energy efficiency is not a frequent consideration of home buyers.

For the 30 percent of the homes in which builders do install refrigerators, energy efficiency is not one of the top factors they consider (46 percent very important). Price (75 percent), durability (66 percent), builder discount (58 percent), and color/finish (56 percent) top the list. These builders buy their refrigerators at appliances stores (48 percent), wholesale outlets (33 percent) or building supply stores (14 percent).

Thus while these builders may be in a position to influence home buyers about their refrigerator's energy efficiency, they do not currently tend to do so.

THE WATER HEATER MARKET

Water heaters, unlike refrigerators, are provided in almost every new home as part of the basic building package. Plumbers buy the water heaters most of the time (70 percent) and they almost always install them (95 percent of the time). However, as shown in Table 4, builders may be more involved in hot water heater decisions than with refrigerator decisions.

These data suggest that builders and plumbers share in water heater decisions and that builders could influence plumbers insofar as energy efficiency levels are concerned. And, unlike refrigerators, high energy efficiency ratings received the largest share of very important ratings (71 percent), followed closely by durability (65 percent). Still, 47 percent of builders, when asked to indicate what efficiency standard they use, could not do so. According to

Table 2. Barriers to Installing Efficient Appliances

	Very %	Somewhat %	Not %	Don't Know %
Cost too high	34	47	12	7
Don't know where to buy	22	35	33	10
Can't identify efficiency levels	22	35	33	10
Don't have good info	20	33	36	12
Brand not available	19	30	39	12
Appliance too noisy	14	34	41	11
Home buyers don't want	9	25	54	12
Supplier doesn't carry	7	17	18	58

Table 3. Usefulness of Information Sources About Appliance Efficiency

	Very %	Somewhat %	Not %	Don't Know %
Blue Clue Brochure*	1	21	2	65
Yellow Energy Guide	54	31	2	13
Industry Specs	35	46	7	12
Salesperson	17	45	28	10
Utility	42	40	6	12

* A guide that compares refrigerator efficiency levels, geared to end use consumers.

Table 4. Who Decides What Type of Water Heater to Buy?

	Builder %	Plumber %	Electrician %	Home buyer %	Other %
Capacity	59	19	19	2	-
Price	45	41	13	1	-
Brand	26	67	-	4	2
Energy Efficiency	53	36	-	9	2

builders, most water heaters are bought at plumbing supply stores (63 percent) and much less often at wholesale outlets (26 percent).

MANUFACTURED HOMES AND ENERGY EFFICIENT APPLIANCES

This segment of the appliance study surveyed 14 of the 17 companies that produce manufactured housing in the Pacific Northwest. In each case we interviewed the owner or general manager. The vast majority (90 percent) of the manufactured homes are sited in the Northwest, with 10 of the companies

building homes exclusively for the region. Since manufactured housing produces approximately 30 percent of the new homes built in the region, the appliances chosen for these homes represent a significant portion of appliances purchased for new homes.

For refrigerators and water heater selection, cost is the key factor in the minds of these manufacturers, with 13 of the 14 rating cost as very important. About half of the firms also rated brand name and warranty as very important for refrigerators. For water heaters, about half rated warranty and capacity as very important. Other factors were rated

as less important and *none* of the firms rated energy efficiency as very important for either appliance.

All of these firms offer a standard brand and model of refrigerator and water heater to the home buyer who then may choose particular features to upgrade or improve if they pay an extra amount. For instance, a buyer could select a larger refrigerator. In about half of the firms, the brand of refrigerators was chosen at the national corporate level. For water heaters, this was the case in only half the firms.

While the manufacturers are receptive to more information, responses indicate that appliance energy efficiency is not a high priority nor is it well understood. As mentioned, energy efficiency was never rated as very important in choosing these appliances. When respondents rated whether efficient appliances can save significant amounts of energy, some said yes, some said no. Those who believe efficient appliances are very important for saving energy also believe appliances consume a lot of energy and that energy efficient appliances have good economic benefits. Those who think appliance efficiency is less important think appliances do not consume much energy, and that the economic return is poor.

Only two manufacturers had ever requested or been provided with information about efficient appliances. Half of the respondents said they didn't know about the price, brands, and availability of efficient appliances. None knew the efficiency ratings of their water heaters and said they were confused about appliance efficiency labels, such as the Yellow Energy Guide.

From the home manufacturer's view, another barrier to installing more efficient appliances is a lack of demand from home buyers. Manufacturers report that customers rarely request efficient refrigerators and water heaters.

When asked what would be the most effective means of encouraging the industry to buy more efficient appliances, manufacturers suggested better information, for themselves and consumers, which would tell them about price, brands, availability, and level of energy efficiency in an understandable, up-to-date manner.

NORTHWEST UTILITIES AND APPLIANCE EFFICIENCY

In this portion of the study we interviewed, by phone, 34 representatives of electric utilities who sponsor energy efficient home building programs. In general, these were staff who managed the energy efficient building programs. Somewhat surprisingly, many of the utility representatives are lukewarm about the potential of appliance efficiency as a conservation resource.

Less than half (44 percent) of the utilities surveyed think energy efficient appliances can contribute significantly to saving energy in the region. These utilities said appliances are an important conservation resource and cited their large energy saving potential. The remaining 56 percent of utilities rated appliances as a somewhat important conservation resource. These utilities gave a variety of reasons for their viewpoint. Most frequently, they cited other energy improvements, such as increased insulation, as more effective. They also feel the public does not demand efficient appliances. These two groups could not be distinguished by their size, location, or ownership.

While electric utilities have a good deal of contact with builders about home energy efficiency, most do little to encourage the installation of efficient appliances. Thus, utilities are a potentially valuable point to disseminate information to builders, but this is not a current part of their procedures. In addition, some utilities may not be convinced appliance efficiency is important.

Most utilities agreed that the best strategy to increase the use of energy efficient appliances is to increase demand from general consumers. Currently, 56 percent of these utilities conduct or plan to conduct marketing campaigns to encourage consumers to use energy efficient appliances.

When asked how they could influence builders to install energy efficient appliances in new homes, the response was similar: Influence the homeowners. The utilities surveyed tended to agree that it is consumers--not builders--who must be convinced of the need for efficient appliances. Many do not feel that builders can be persuaded of the need for

appliance efficiency because they are primarily focused upon price, but that consumers will be interested in recovering the extra cost over the lifetime of the appliances.

CONCLUSIONS AND RECOMMENDATIONS

While all three groups surveyed for this study tend to blame "lack of consumer (end-user) demand" as the reason why highly efficient refrigerators and water heaters are not installed in Northwest homes, it is clear from this research that others influence these purchases.

The findings from this study clearly suggest three types of activities:

1. Target and understand influential groups for each appliance.
2. Provide target groups with good information, geared to their points of view and using appropriate avenues of communication.
3. Provide financial incentives.

Target Influential Groups

Further thinking and research to clarify how purchase decisions are made about refrigerators and water heaters is probably needed, at least for stick-built new housing. For each appliance, the most influential audiences need to be well defined. This is clearest with the manufactured housing producers who virtually control what type of refrigerator and water heater will be installed in their homes.

Qualitative research with builders may be useful to understand the rather complex relationships they have with home buyers and plumbers. For refrigerators, we need to know more about the general consumers' view of energy efficient refrigerators, their relationship to builders when choosing refrigerators, and what types of factors might motivate them to demand efficient refrigerators more often. For water heaters, this means further investigation of the role of plumbers and plumbing suppliers (currently underway).

Utilities also are a target group, especially since most utility spokespeople tend to believe that the end user is the group that needs to be persuaded about efficient appliances and that other groups, such as builders and plumbers, are much less important.

As programs are planned, the pertinent motivations, characteristics, and preferences of each group should be used to develop appealing and individualized (by group) information, incentives, and delivery systems.

Provide Good Information

The three groups surveyed were not very well informed about what constitutes an energy efficient refrigerator or water heater, do little to promote more efficient units, and believe that efficient appliances are more expensive and may not be cost effective. General consumers, too, sound uninformed and uninterested. Finally, utilities need to be informed about how who buys and installs appliances and how they can be influenced through utility activities. (Currently, the newly formed Northwest Appliance Efficiency Group (NAEG) is informing utilities and is pursuing how to make sure high efficiency appliances are more available in the region.)

Good information for influential groups must be a component of any refrigerator or water heater program. That is easy to say and harder to carry out. Such information should include basic reasons for buying efficient units (which may differ depending upon the target group). The information should establish clear, understandable efficiency levels which are able to be compared across brands and models and which are timely. The energy and dollar savings of buying more efficient units should be well demonstrated, individually and, if appropriate, for the region. Sources for easy purchase of energy efficient units should be provided. Any problems with buying or installing such units needs to be minimized. Rebate or incentive programs should also be well publicized.

A variety of avenues should be used to reach target groups. Builders and home manufacturers want information sent directly to them. Professional

organizations, suppliers, home shows, news coverage, and advertising may all be appropriate. Utilities should be encouraged to help in the active dissemination of this appliance efficiency information to target groups.

Special consideration should be given to determining when in the building process this appliance information will be most useful and influential. Utilities could be an effective information provider to both consumers and builders, through bill stuffers and other ongoing communication. Utilities also can encourage builders through the energy efficient home building programs especially by incorporating information on refrigerator and water heater efficiency into training and plan review sessions.

Provide Financial Incentives

While lack of good information is a barrier to buying and installing energy efficient refrigerators and water heaters, all groups feel financial incentives are needed to increase demand and to make efficient units more available. This low awareness and demand is a substantial barrier to the widespread use of more efficient units.

Incentives will probably be needed to push high efficiency appliances into greater demand and should be implemented as part of any refrigerator or water heater program. Incentives should go to those parties who have the greatest influence over purchase decisions, since this would provide the greatest exposure and encourage buying habits over time.

From current information, home buyers should be the primary focus of an energy efficiency refrigerator program, with builders a secondary focus. For water heaters, incentives may be most effective if targeted at the plumbing distributor level, rather than the consumer or plumber. Current research with plumbers and distributors should be examined before deciding who should be provided with an incentive.

Although specific incentives were not researched, past experience with energy efficiency programs

suggests that the incentive should be in the form of a simple rebate or discount and should cover the incremental cost difference between a standard unit and a high efficiency unit.

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