

Interim Findings of an Evaluation of the U.S. EnergyGuide Label

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ABSTRACT

The United States has labeled appliances with the EnergyGuide labels since 1980. Consensus is growing that this label is confusing to consumers and has little impact on purchase decisions. Many researchers have documented that alternative labeling approaches are effective in other countries. The authors comprehensively evaluated the U.S. appliance labeling program for white goods, heating and cooling equipment, and water heaters, with emphasis on products sold through retail outlets.

To date, our research has included consumer focus groups and semi-structured interviews with various market actors to assess how best to communicate energy information. With consumers and retail sales staff, five graphical designs were tested—a European-style, letter-based graphic; an Australian-style star-based graphic; a speedometer-style graphic; a thermometer-style graphic; and the current U.S. style. With manufacturers and contractors, we did not directly test alternate designs. Instead, we asked their opinion of and experience with the current EnergyGuide labeling program.

Background

Many countries use labels to depict the energy use of home appliances as part of national demand-side management and market transformation programs targeted toward reductions in energy consumption. Appliance labels typically fall into one of two categories regarding their approach to information organization—categorical or continuous. A categorical label divides the range of comparative models into distinct groups or segments while a continuous label marks the low and high end of the range of comparative models without explicitly grouping anything in between. Each has its strengths and weaknesses. Categorical labels are often easier for consumers to understand and recall at a later date than are continuous labels. They often connote an intuitive rating system that is easy to grasp quickly. However, categorical labels are typically less detailed than continuous labels, usually without a numerical demarcation of the low and high end of the scale. Categorical labels are in use in Europe, Australia, Brazil, Thailand, and a few other Asian countries. Continuous labels are usually more detailed and more suggestive of a comparative range of models from low to high than are categorical labels. However, this level of detail and the concept of comparison are more analytically complex than a simple categorization and therefore require time and effort from the reader for information processing. Continuous labels are currently in use in the United States and Canada. Over the past several years, the trend internationally has been toward categorical labels.

In the United States, the Energy Policy and Conservation Act of 1975 and the National Energy Conservation Policy Act of 1979 directed the U.S. Federal Trade Commission (FTC) to develop a labeling program for certain home appliances and energy-using equipment. The

program was actually implemented in 1980. The legislation suggests two goals for the program: the label was intended as a means of improving energy efficiency and to assist consumers in making purchase decisions via information provision. In fact, the ability or inability to assist consumers is listed as a primary criterion for deciding to label specific products. Prior researchers have found that the U.S. label in its current form (see Figure 1) may not be living up to this legislative mandate. For example, du Pont (1988) found significant comprehension problems with the U.S. labels and a low level of reported use. In addition, over the last five years, alternative approaches to appliance labeling have been developed and implemented elsewhere in the world with impressive results in terms of consumer awareness, market impacts, and energy savings (Boardman et al. 1997; du Pont 1998; Harrington 1998; Sulyma et al. 2000; Waide 1997; Wilkenfield 1997).

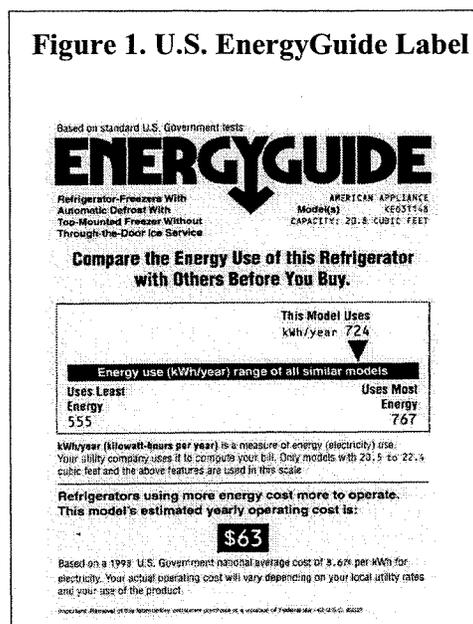
In this context, ACEEE, with input from other organizations, decided it would be useful to evaluate the efficacy of the EnergyGuide label and determine the best label for U.S. consumers.¹

Introduction

The goal of ACEEE's appliance labeling project is to evaluate the efficacy of the current EnergyGuide label (i.e., the extent to which it is living up to its legislative goals) and determine the best label format (e.g., bars versus letters) and critical informational elements for U.S. consumers (e.g., operating cost and/or annual kWh). A secondary goal is to uncover the opinions of other market actors (i.e., retail sales staff, manufacturers, and contractors) who come into contact with the label regarding the program efficacy and optimal label format.

The project addresses white goods, heating and cooling equipment, and water heaters. However, we focus on products sold through retail outlets where the label can be seen during the shopping experience. Our research to date has included consumer focus groups² and semi-structured

Figure 1. U.S. EnergyGuide Label



¹ The project is supported by an array of national and regional entities including the Iowa Energy Center, National Grid USA, Northeast Utilities, Northwest Energy Efficiency Alliance, NYSERDA, Ohio Department of Development, PG&E, Southern California Edison, U.S. DOE, U.S. EPA, and Wisconsin Energy Conservation Corporation. In addition, various experts have served as advisors, including Willett Kempton, Shel Feldman, Merrilee Harrigan, Peter du Pont, and Jeff Harris, among others.

² A focus group is a panel discussion with eight to ten participants who are members of some fairly homogenous group or social demographic. Participants are encouraged to relate to each another, share attitudes, express opinions, and generate ideas regarding topics presented to them by a trained moderator. Consensus is not sought. Focus groups are particularly appropriate for gathering in-depth information or reactions to certain products and/or programmatic concepts.

interviews³ with key market actors. With consumers and retail sales staff, five graphical designs were tested including: the current U.S. style; a European-style, letter-based graphic; an Australian-style, star-based graphic; a speedometer-style graphic; and a thermometer-style graphic. The latter two styles tested well with consumers in a Canadian research effort (Patterson 1991). We emphasized comprehension, use, and self-reported preferences. The perceived consumer value of discrete informational elements (e.g., annual operating cost, life-cycle-cost, and annual kWh data) were also tested. With manufacturers and heating, ventilating, and air conditioning (HVAC) contractors, the actual labels were not presented or discussed. Instead, we emphasized their opinion of and experience with the current EnergyGuide labeling program. This paper summarizes the task-by-task and overall findings to date as well as lays out the next steps.

Research Methods and Findings by Task

Different methods were used at various points in the research depending upon the specific task objectives, the appropriateness of various tools to the target market actors, and the available budget and time. The research tasks fall into two categories—those conducted with demand-side actors (e.g., consumers) and those conducted with supply-side actors (e.g., manufacturers, retail sales staff, and HVAC contractors). Overall, consumers were the highest priority as they are the primary audience and end-user of the label. Thus, a multi-method and sequential design was constructed to elicit their feedback.

Demand-Side Research Design

An initial round of consumer focus groups was conducted to gather “broad brush” and directional feedback on the current label in a side-by-side comparison with the alternate displays. Overall, we emphasized label preferences and opinions of various informational elements. The groups led to improved graphical designs that were then tested in semi-structured interviews, which focused upon testing comprehension and interpretation of the various labels and specific informational elements along with the reasons behind preference-related statements. Various interpretive enhancements to the labels emerged from the interviews, which were incorporated in the graphics used for another round of focus group testing. This second round of focus groups was intended to select the optimal designs for testing in quantitative research. All of the tasks mentioned thus far have been completed as of the writing of this paper and results are discussed in their sections. The remaining tasks, which are primarily intended to quantitatively verify the results to date, are discussed in the section on Conclusions and Next Steps.

Consumer Focus Groups—Round One

ACEEE contracted for an initial round of six consumer focus groups (four with white-good shoppers and two with larger household equipment shoppers) to examine consumer

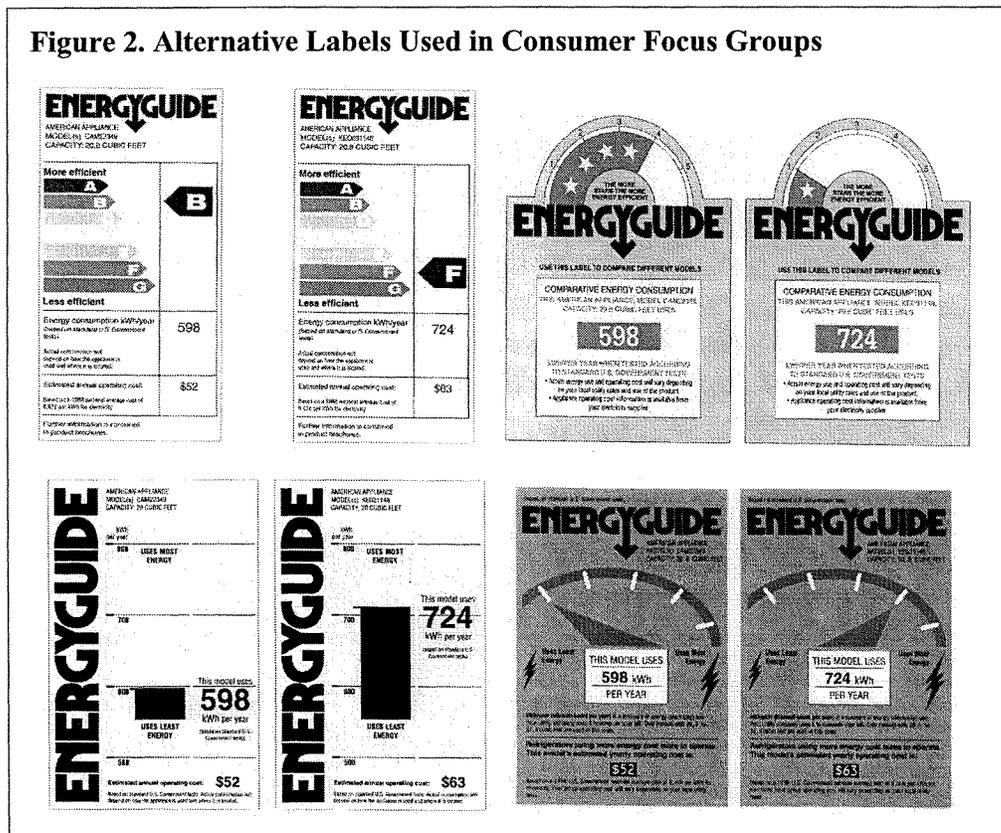
³ Semi-structured interviewing is a method that provides for a specific and guided topic of discussion, yet allows the interviewer and interviewee to shape the discussion to follow new leads revealed by the process. Semi-structured interviewing is particularly appropriate in research that attempts to understand decision processes or behaviors within certain social groups.

perceptions of the EnergyGuide label and responses to alternative label designs. Pairs of labels were shown side-by-side, one representing a case of low energy use and one a high. Examples of the alternatives to the current label are shown in Figure 2. The labels used in the focus groups were left very close to their original format. The groups were not expected to come up with final designs, rather they were intended to uncover trends and general directions for additional qualitative and quantitative analysis.

The focus groups began with an introductory conversation about appliance purchasing and the importance of energy efficiency. The results verified other studies in finding that energy efficiency is not reported as a major factor in consumer purchasing of appliances. Moreover, the results indicated that consumers believe: (1) energy efficient equipment is too expensive and it takes too long to recoup energy savings; (2) everything made today is energy efficient, particularly as compared to older products being replaced; (3) the differences in the energy efficiency of the models available on the market are small within product categories; and (4) white goods (versus HVAC and larger equipment) are not seen as using very much energy, with refrigerators being the most common of white appliances for which energy efficiency is seen as relevant.

The groups found that the label, though familiar, was not always read or used in making appliance purchase decisions. Improvements suggested by interviewees included: (1) reducing the amount of unnecessary text; (2) improving the graph so that it more clearly conveys the

Figure 2. Alternative Labels Used in Consumer Focus Groups



model in question's annual kWh usage; and (3) more clearly labeling and highlighting the operating cost figure, which was considered to be among the most important informational elements on the label.

The alternate labels also needed improvement, in particular to their graphical elements. The letters and stars labels needed improvements in the explanatory text integrated in the graphic. For the letters, the interviewees found it difficult to make sense of the fact that the shorter bar (labeled "A") was on top with a label "most efficient," while the longer bar (labeled "F") on the bottom was labeled "least efficient." Longer bars relating to less and shorter bars relating to more was confusing and counter-intuitive and only exacerbated an existing problem in comprehending the inverse relationship between energy use and energy efficiency. To avoid misinterpretation, the stars label needed a clearer statement that the scale was based on energy efficiency, not energy usage. Also, the stars label was the only label not to include an operating cost figure. The participants were adamant that this information needed to be added to the label. Finally, it was recommended the label be replaced by the expected bright yellow color. The thermometer and speedometer label needed graphical design work. In the case of the thermometer, the EnergyGuide logo that had been running alongside the label vertically needed to be repositioned horizontally, similar to the current label. More importantly, the thermometer needed to be redesigned to look more like a thermometer to ensure that customers focused on the filled-in black space (not the empty white space) as the indicator of energy use. The speedometer needed to be redesigned to make the indicator look more like an arrow and to more equally distribute the interim tick marks along the semi-circle that formed the foundation of the speedometer, and the blue color should be changed to bright yellow.

Overall, the groups suggested that an ideal EnergyGuide label would:

- include and highlight the estimated annual operating so it can be easily seen;
- include and highlight the annual kWh so it can be easily seen;
- use yellow as a background as this is recognized and associated with energy information;
- use a visually appealing graphic that simply and clearly communicates the kWh usage;
- include appliance specifications such as the manufacturer and model number;
- reduce the amount of unnecessary text;
- clearly state that the label is regulated by the U.S. government; and
- be formatted and outlined to communicate its messages using blocked-off spaces and relationally grouped information.

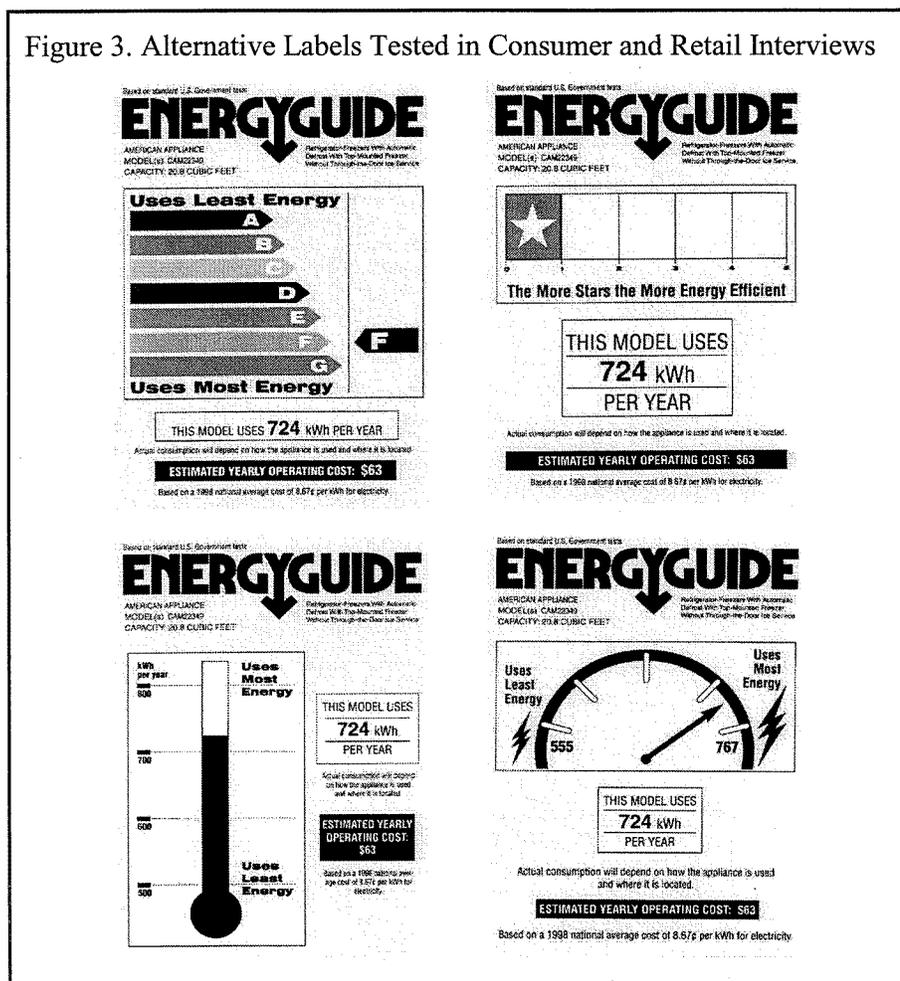
In summary, most of the participants reported a relatively low priority on energy efficiency in appliance sales and a low level of use of the current EnergyGuide label. However, they also indicated that problems with the label limit its usefulness and appeal (i.e., it is too cluttered, poorly organized, and overly technical). The participants made various suggestions to improve the current label as well as the other alternatives. In general, these improvements were geared toward making the labels simpler and more direct in communicating their main message as well as more graphically appealing. No clear winners or losers among the various label designs emerged at this phase.

Consumer Interviews

ACEEE completed a total of 54 semi-structured customer intercept interviews in three cities: Boston (28 interviews), Denver (18 interviews), and Dallas (8 interviews). The interviews

in Boston and Denver were with customers shopping for white-good appliances (refrigerators, freezers, dishwashers, clothes washers, or room air conditioners). The interviews in Dallas were with customers shopping for water heaters. In each of these interviews, the current label and the four improved alternative designs (based on the results of the first set of focus groups) were tested, depicting a high energy consuming model. Examples of the alternative graphics shown are found in Figure 3. The purpose of this set of consumer interviews was to evaluate the current label in-depth and side-by-side with alternative labeling approaches to draw out comprehension and information processing-related issues as well as to examine the reasons behind reported label preferences.

Figure 3. Alternative Labels Tested in Consumer and Retail Interviews



The majority of the interviewees (roughly 75 percent) correctly interpreted the single graph that was presented to them first as a test of comprehension (i.e., they deduced that the model depicted was a high energy using model). The current label had the highest rate of misunderstanding for the one-quarter of respondents that did not understand the initial graph and the speedometer had the lowest level. The star, thermometer, and letters graph fell in the middle. Also, while the majority of participants were able to deduce that the model depicted was not very

energy efficient, fewer could articulate or use the graph's comparative element. Several of the consumers interviewed saw or used only the label's individual model information. In some cases, this meant that the consumer was unable to determine that the model shown was relatively inefficient (this was categorized as non-comprehension). In other cases, the interviewee was able to make that judgement without a clear awareness of the relative nature of the graph (this was categorized as incomplete comprehension). There were also cases where the interviewee who experienced complete understanding expressed a desire for external comparisons (i.e., wanting to walk from model to model comparing label data) to verify their interpretations and the labels themselves. The problem with understanding the comparative nature of the graph appeared to be more common with the current label format than any of the other options. Comprehension also seemed to be complicated by the interviewees' perception that an annual operating cost of \$63 was simply not that much money and therefore could not be associated with an energy inefficient model. Finally, a few of the respondents mistook the operating cost figure for a savings number. However, this previously identified comprehension problem (du Pont 1998) was less frequent than expected, perhaps because modifications were made to all the designs except the current label to more clearly identify the operating cost number.

No clear winners emerged from the analysis of the interviewees' preferences. Given the small sample and qualitative nature of the questioning, the reasons behind interviewees' opinions of the labels are perhaps more significant than their selected preferences. The current label received high marks for being informative and familiar but low marks for being wordy, busy, and graphically unappealing. Interestingly, the most common comment about the current label (that it contained a lot of information) was seen as both a strength and a weakness. However, far more negative comments were made regarding this aspect than positive. The stars graph received high marks for being motivating and quick in conveying its message, but a subset of interviewees gave it low marks for ease of understanding. Often these interviewees had made the mistake of interpreting the stars as an energy consumption scale (less stars equals less energy use and vice versa) rather than as an energy efficiency rating system. For some, another perceived weakness of the stars label was its lack of numeric, kWh range information. The letters graph received high marks for being colorful and attention-grabbing but low marks for being busy and, for some, difficult to understand. For example, a subset found the presence of multiple scales for measuring energy use (varying bar lengths, colors, and letters) confusing. Others commented that the graph was inverted and that higher energy consumption should be on top. As with the stars label, some interviewees felt that a weakness of the letters label was its lack of kWh range information. The thermometer received high marks for the clarity of its visual element but low marks from some for ease of understanding. Many of those who had difficulty understanding the graph felt that the scale was inverted and that the top of the thermometer should be the most efficient product. The speedometer received high marks for its clarity as a graphical indicator but low marks for its visual attractiveness. Several interviewees indicated a grouped preference for the thermometer and speedometer labels. The grouping of these two labels in interviewees' preferences was so strong that in some cases they almost seemed interchangeable and it appeared that some interviewees would be equally satisfied with either option.

As in the consumer focus groups, the interviewees made various suggestions for improving the label designs. Among the overarching comments were a range of suggestions regarding the use and presentation of operating cost data. For example, a few interviewees felt that operating cost should be a part of the comparative graphics. These comments emphasized

the importance of operating costs to the participants. Another area of overarching comment was in the expression of the basis for the comparison. Several participants suggested that at a minimum all of the labels should indicate clearly that the comparison was based upon a range of similar models.

Graph-specific suggestions were made as well. Suggestions for improving the current label included: using less words, using color, using a “real” arrow rather than an upside-down triangle, and marking the bar graph to somehow indicate a progression from left to right (e.g., with tick marks). Suggestions for improving the stars label included: including kWh range information and making the star rating box more noticeable (in particular, the fact that it contains an efficiency-based rating). Suggestions for improving the letters label included: flipping the graph so the most energy use is on top, including a key defining the meaning of each of the bars, making the arrow stand out more, including kWh range information, including the model’s actual kWh in the graphic (not just in a box below the graphic), and decreasing the number of categories. Suggestions for improving the thermometer label included: using color, including the model’s actual kWh in the graphic (not just in a box below the graphic), and using an arrow or some other indicator on the graphic to indicate where along the thermometer the model depicted actually falls. Suggestions for improving the speedometer label included: marking each of the ticks on the speedometer with intermediate kWh amounts, including the model’s actual kWh in the graphic (not just in a box below the graphic), and making the whole graph (but in particular the arrow) more visible (e.g., with thicker lines or color).

In summary, although all the label formats were comprehensible to a majority of the interviewees, the current label appeared to be most difficult for the interviewees to interpret. Furthermore, the interviews support the conclusion that at least from a consumer perspective improvements over the current label are possible. This was evident in the relatively high incidence of comprehension problems with the current label and the relatively low incidence of preferences for the current label over all of the other options. The thermometer and speedometer were promising label options, although the similarity in interviewees’ perceptions of these two designs suggested that they were not different enough to warrant continuing to test them both. The stars label appeared promising because of its intuitive scale as well as its strong motivational potential. The letters label appeared to be the least refined of all the graph designs and needed improvement and continued testing. An overall comprehension problem was that for all of the formats most people did not immediately grasp that the model in question was being compared to other similar models.

Consumer Focus Groups—Round Two

ACEEE contracted for a second round of six focus groups to examine multiple executions of each of the leading label designs with single-family homeowners in the market for household appliances and equipment sold through retail stores. The groups were expected to develop final designs for use in quantitative testing. Four basic graph alternatives were tested⁴—

⁴ The speedometer label was dropped due to its poor testing in the initial round of focus groups and seeming overlap with the thermometer label based upon the consumer interviews. Also, several manufacturer representatives who had seen this version before as part of a Canadian study (Patterson 1991) indicated that it would be very difficult to implement.

the current label, the star-based label, the thermometer-based label, and the letter-based label, all of which included many of the improvements and suggestions drawn from the earlier consumer tasks. In addition, variations on these basic graphs were tested to incorporate additional informational or visual elements. For example, as suggested during the consumer interviews, versions of the star- and letters-based graphs were produced with kWh range information. Versions of the letters were tested with variations on the amount of color used. For all the designs, a version was tested with a high amount of explanatory text (referred to as the high verbiage case) and a version was produced with a low amount of text (referred to as the low verbiage case).

Respondents viewed the star label most favorably. The star graphic was considered consumer-friendly because it was simple to interpret and most consumers were already familiar with the concept of using stars to connote performance. Many respondents noted that the star graphic easily and effectively communicated the energy efficiency concept to consumers. However, although the majority of consumers found the star graphic highly effective at communicating the intended message, many noted that the basic version was not very informative. Thus, most group members preferred executions that increased the amount of information available on the label. Specifically, respondents noted that the kWh range end-points were important pieces of information because the scale anchors gave consumers a context in which to evaluate the meaning of the stars. It seemed that the most desirable star graph would include the kWh range end-points along with most of the information contained in the high verbiage versions.

Participants indicated that they liked the level of information contained in the current EnergyGuide, in spite of the fact that the graphic is relatively ineffective. Further, they indicated that they were familiar with the current label and believe it is easily recognized by consumers. This suggested the current label has considerable equity with shoppers. However, it is important to acknowledge that while consumers reported that they like having the maximum amount of information, they also said that they did not like its cluttered appearance (in this and other tasks). Some noted that they often ignored the current EnergyGuide altogether because there is too much text. Participants appeared to have conflicting, and perhaps mutually exclusive, demands.

The participants initially evaluated the letters label very favorably due almost solely to its colorfulness and visual appeal. A few respondents also appreciated the symbolism implied by the color of the endpoints (red=warning/overheating, green=conservation). However, the more in-depth discussions of the letters label revealed significant confusion about the interpretation of the label. Furthermore, most respondents continued to find the length of the bars (longer bars means less energy efficient) misleading or counterintuitive.

Respondents' reactions to the thermometer label were unambiguously negative. In particular, consumers found the scaling counterintuitive (better energy performance at the bottom of the scale). Group members were moderately favorable to an execution done for air conditioners and based upon EER. This is because this version was inverted (better energy performance represented at the top of the scale) and seemed more logical. However, participants indicated they were unfamiliar with EER and preferred that kWh be used because that was at least a term they associated with their electric bill. In short, the negatives of this label far outweighed the modestly positive evaluation of some specific executions.

In summary, the participants preferred the stars label over the other graphical options with the current label being the second most preferred. The stars label was strong visually and

from an information-processing perspective was very clear while the current label was strong because of its familiarity and depth of information. Overall, the participants wanted a label that incorporated both a strong graphic and detailed information so designs that combined these features were most preferred.

Supply-Side Research Design

On the supply side, the research tasks were less comprehensive for specific market actors. Instead, an integrated approach was taken to elicit from the various market actors the key informational elements of importance to the overall project goal of evaluating the optimal label format and the current label's efficacy. Semi-structured interviews were conducted with retail sales staff. As with consumers, the actual label designs were shown to test comprehension, interpretation, and preferences. The retailers were shown the actual labels because of the significant impact sales staff can and do have on consumer decision-making. If a label design was particularly difficult for retailers to explain or was ill-suited to the retail store environment, we expected this task would make that evident. Semi-structured interviewing was selected in part for budgetary reasons (i.e., it would have been more expensive to recruit sales staff participants for focus groups) and because we felt it was the most appropriate tool for drawing out aspects of how a sale takes place and the role of the label and energy in that process. With manufacturers and contractors, the various labels were not shown. These interviews were conducted over the phone and so we were unable to present visuals. In addition, we felt that their interpretation and opinions of the alternate label designs were less important to the project than their response to the program as currently implemented because neither of these actor groups are consumers of the label. In the case of manufacturers, this is because their role is as implementors of the program and in the case of contractors because we suspected (and our interviews verified) that the label was not used because of the nature of the sales transactions (i.e., consumers are given product specifications but never see a floor model [and therefore an EnergyGuide label] as part of the sales pitch).

Manufacturer Interviews

ACEEE conducted 16 semi-structured telephone interviews with representatives of white good appliance and heating, air-conditioning, and water heater equipment manufacturers in order to document: (a) how manufacturers perceive the current EnergyGuide label; (b) their thoughts on whether and/or how that label is or isn't working; and (c) their experience in implementing the EnergyGuide label.

Overall, the interviewees were highly experienced with regard to the label, often with a long history of direct work on the program. In general, however, the interviewees emphasized the information and comparative aspects of the labeling rule and to a much lesser degree seemed cognizant of the label's other legislative purpose of "improving energy efficiency," which is the title of the relevant section of enacting legislation. Some respondents felt strongly and absolutely that the program was not achieving its intended informational goals. This feeling was near unanimous among HVAC manufacturing interviewees who in particular challenged the usefulness of a label for products where the appliance and label typically are not seen at the point of sale. Only one respondent felt strongly that the program was achieving its goals. The

remaining responses indicated that the majority of respondents felt the label had enjoyed some, though not complete, success. However, nearly all the interviewees felt that the program's effect on the market is minimal. Furthermore, the interviewees unanimously believe that energy use is not a primary factor in customers' appliance purchase decisions. They reference internal company studies and their professional experience to support this position.

Respondents enumerated several strengths of the EnergyGuide label, including the label's simplicity (often linked with ease of understanding), accuracy, prominence, consistency from product-to-product, and provision of comparative information. However, the discussions of weaknesses tended to be far more elaborate than those of strengths. Many of the interviewees from HVAC companies indicated that the major weakness was that few customers see the label at the time of their purchase decision. An area of strong negative comments shared by white good and HVAC manufacturers had to do with the label's message. Several respondents indicated that the label was not consumer-friendly. Although the reasons and specific examples of this problem varied, the bottom-line seemed to be that in some way the label was a poor communication tool either because it was overly technical or because it was unattractive. Another significant area of discussion related to the label's weaknesses had to do with its technical accuracy. In particular, respondents challenged the way products are grouped in the categories that form the basis for the comparisons on each label and the use of national average figures.

Rather than trying to improve the EnergyGuide labeling program, about half the respondents felt that the program should either be eliminated or left alone. This response was common among HVAC manufacturers. Of the half that felt improvements could be made, the most common responses were: (1) to couple the program with a consumer education campaign that explained the label and/or created awareness of the importance of energy efficiency; (2) to improve the consumer friendliness of the label's message (e.g., by making the label more attractive and limiting the extent to which unfamiliar technical terms like first hour rating for water heaters are used); and (3) improve its technical and analytical foundations (e.g., the way products are grouped in the categories that form the basis for the comparisons on each label).

In summary, although nearly all of the interviewees felt the label had enjoyed either very little or partial success, direct revision of the label was supported by only a minority of interviewees. Of the half that felt improvements to the program were warranted, many felt that the label itself was acceptable and that what was needed was an education campaign or some other supplemental effort to reach consumers. The lack of enthusiasm for the label and label improvements likely relates to the interviewees' overall opinion that energy efficiency is a low priority issue for consumers in purchasing appliances.

HVAC Contractor Interviews

ACEEE conducted nine semi-structured telephone interviews with HVAC contractors to assess: (a) the role of the EnergyGuide label and energy efficiency in the purchase of installed appliances (i.e., central air conditioners, heat pumps, furnaces, boilers, and water heaters); (b) how contractors perceive the current EnergyGuide label; and (c) their thoughts on whether and/or how that label is or isn't working.

According to most of the interviewees, energy efficiency is a factor in the customer's purchase decision; however, there was wide variation in the relative importance the interviewees felt customers actually placed on efficiency versus other features. All of the interviewees

expressed familiarity with the EnergyGuide label, although some could not remember what specific information the label contained. Most importantly, however, none of the interviewees used the label as a source for energy efficiency data and only one reported actually using the label as an informational tool with customers when selling HVAC equipment. By contrast, all of the respondents indicated that they provided customers with efficiency information from the manufacturers (e.g., brochures). Industry directories, such as the ARI directory, and utilities were also used by the interviewees to obtain information on efficiency and cost savings. Many of the interviewees indicated that they made available to customers their own supplemental efficiency, cost savings, and payback information.

The majority of respondents felt the label was of no use to their customers because the information is presented after the purchase decision is made. Respondents split on whether the label played a useful role as an after-the-fact, third-party source of information or provided credibility to their claims about equipment efficiency. Many suggestions for improving the label were made. In fact, given their negative responses regarding the efficacy of the label as it is currently implemented, the interviewees were surprisingly optimistic regarding the potential of a revised labeling or other information program. In particular, respondents believed the label should be regionalized to enhance its usefulness as a sales tool. For example, they found the use of average energy costs to be irrelevant and somewhat misleading to their customers. Finally, respondents felt the information on the label should be presented at the time of the sale rather than upon product delivery.

In summary, the contractor interviewees did not feel the label was effective as currently implemented, but were surprisingly optimistic regarding the potential of an improved label or of some other, more appropriate consumer information tool. This optimism likely relates to the interviewees' relatively positive attitude toward the role of energy information in the sale of HVAC equipment and overall consumer priority on energy use.

Retail Sales Interviews

ACEEE conducted 16 semi-structured in-person interviews with sales staff of a major retail chain to assess: (a) the importance of energy consumption as a factor in the purchase of labeled appliances; (b) interpretative capabilities of the information presented in one of five appliance labels (four alternatives plus the current); and (c) the preference of label format among the five. In each of these interviews, the same five improved label designs were tested as in the consumer interviews (each depicting a high energy consuming model and incorporating the improvements suggested by the consumer focus groups). Examples of the alternative graphics shown are found in Figure 3.

Energy consumption was mentioned as an issue in appliance sales in many of the interviews. The interviewees felt that concern for energy efficiency was relevant to some subset of customers, particularly those shopping for refrigerators and room air conditioners. While the importance of the issue as a deciding factor for a sale varied widely, most sales staff said they believed the information provided by the EnergyGuide label was useful to consumers as a source of information and/or to the sales person as a selling tool. The interviewees indicated that they particularly used the label in situations where energy efficiency was a deciding variable between two otherwise equivalent products. Furthermore, because energy-efficient models tend to be

more expensive, it was noted that salespeople can actually make more money by selling the more efficient product.

There was substantial variation in the interviewees' approach to interpreting the energy consumption information presented on the EnergyGuide label. This variation seemed to be associated with the label elements on which the salesperson focused, which in turn seemed to relate to sales experience. Respondents with more than a year of experience were more likely to base their recommendation on operating cost, while respondents with less experience were likely to either base their recommendation on the graphical elements of the label or to state that no comparison could easily be made. More experienced sales staff would recommend a refrigerator that used a high amount of energy apparently because they felt that the operating cost of that model was very similar to the operating cost of other models available for sale in the store. When sales staff used other pieces of information from the label shown, they were more likely to identify the labeled appliance as inefficient.

The retail sales staff were the only group on the supply side that were shown the current EnergyGuide and the alternate labels for interpretation and side-by-side comparison of preferences. All of the labels were understandable to the interviewees. Interestingly, the majority of the sales people interviewed preferred a categorical label as the best display of the five alternatives. These respondents thought that the categorical style would allow consumers to interpret the label more easily. There was no clear preference, however, among the two categorical label options. Moreover, specific components of the categorical labels brought up strong negative reactions. The colors of the letters label were both "eye-catching" and "too busy." The stars label was both "easy to read" and looked "like a jackpot." In almost all cases, though, one of the two categorical systems was seen as acceptable and often that acceptable label was viewed as an improvement over the current label design.

In summary, the retail sales staff indicated that they made use of the current label in at least some of their sales, particularly with customers interested in energy efficiency and in cases where energy use helped to differentiate among products. The interviewees were very open to further improvements to the label and a majority felt that a categorical style would be easier than the current option for consumers.

Overall Findings to Date

A common theme that has emerged from nearly every research task to date is that while energy efficiency receives some attention from the various audiences, it is not typically a primary driver. In addition, although all of the market players are used to and familiar with the current label, there appears to be a low level of use (and on the supply side) perceived value. Most importantly, the current label also appears to be having minimal impact on consumer, manufacturer, and contractor comparisons and choices. Manufacturers were the most skeptical of the supply-side actors interviewed about both the label and the overall importance of energy efficiency to consumers. Perhaps this is because producing/applying labels directly impacts manufacturers. Those closer in the supply chain to consumers and with less direct responsibility for program implementation (contractors and retail sales staff) were more optimistic about the label's potential.

There were some interesting contrasts in the way different stakeholders interpreted the labels, particularly the relative priority placed on specific informational elements of the label.

For example, many of the manufacturer interviewees indicated that a strength of the current label is its accuracy and ease of understanding. On a related note, many of the manufacturer interviews found annual kWh to be a particularly useful and accurate element of the label. These manufacturer responses on the simplicity of the label and in particular kWh as a measure of energy use are in conflict with much of what we heard from consumers and from the retail sales interviews. Many consumers felt that the current label was wordy and complex. They emphasized the importance of dollars over kWh to their analysis. The importance salespeople placed on operating cost and the appeal of categorical labels as simplifying the explanation of energy use in the sale echoes the views of consumers.

Another interesting finding is that energy efficiency is an analytically complex concept for many consumers. The problem is that more of something (energy efficiency) is caused by less of something (energy use). The inverse nature of this relationship makes it challenging to devise a graph that clearly and quickly explains the issue to everyone. In particular, it seemed that vertical scales such as the thermometer and the letters were difficult. Interestingly, in one of these labels, the best product was on top while in the other the worst product was on top. Yet in both cases we received feedback from some consumers that the scales should be reversed.

Overall, consumers and retailers found the current label complex and/or overly technical. Furthermore, a significant proportion of consumers had difficulty understanding it. Although some consumers liked the detailed nature of the label, many indicated that they don't usually read all of the text and furthermore that they don't necessarily use the label at all. Retailers' responses support this in that they acknowledge that only a subset of consumers consider the label. This is likely due to a combination of the low overall priority on energy efficiency and some of the visual weaknesses of the current label. However, a major strength of the current label is its familiarity to many consumers. This reflects the equity that the program has built over its 20 years of implementation.

Conclusions and Next Steps

Taking into account all of the tasks where the various labels were tested, there appears to be strong evidence that improvements to the current label are possible. In particular, a categorical system based upon stars is most promising. Another option is a re-design of the current label to enhance its visual appeal, message communication, and information organization. The remaining designs (letters, thermometer, and speedometer) do not appear to warrant continued testing. A change in the EnergyGuide label would have to offer substantial enough savings to outweigh the impacts on the various supply-side actors in implementing the changed program as well as to overcome the equity the current label has in its familiarity to consumers. In combination with some of the additional information (e.g., kWh range endpoints) that consumers and retailers suggested and that the current label already contains, the stars label may well meet these requirements. However, this will be determined more fully during the remaining research.

Three research tasks remain in this project: a third round of consumer focus groups, a quantitative survey, and a field test. The focus groups will address concerns raised by some of the project advisors over how a categorical system will interact with the Energy Star logo given a recent ruling by the FTC that allows manufacturers to add the Energy Star logo to the EnergyGuide label. No research was conducted by the FTC prior to this decision so little is

known about how consumers will respond. Thus, the focus groups will also examine the interaction of the current EnergyGuide label and the Energy Star logo. The next phase of the research will quantitatively test consumer comprehension of the lead designs along with the impact of those lead designs versus the current label on attention to energy use and purchasing of energy-efficient equipment. A survey will be implemented to determine (with statistical certainty) which among the lead label concepts has the highest rate of comprehension. The analysis of comprehension will include participants' ability to decipher the main label message (i.e., that a model is or isn't energy efficient) as well as the label's secondary messages (e.g., that the comparison is based on like models within certain product categories). Finally, a field test will be conducted as a pilot study of the impacts of the lead label design(s) on the sale of appliances. At least two stores will be asked to place labels of the leading design(s) on display models for between three and six weeks. Data will also be collected in another store that does not receive a redesigned label. Once all of the research has been completed (likely in January 2001), a petition will be drafted to request that the FTC incorporate the project findings.

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