CEE ENERGY STAR® HOUSEHOLD SURVEY REPORT (2000)

Part I - Results

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EXECUTIVE SUMMARY

In the summer/fall of 2000, The Consortium for Energy Efficiency (CEE) sponsored a national household mail survey to ascertain consumer awareness and understanding of the ENERGY STAR label as well as its influence on energy-related purchasing decisions.

CEE is a national nonprofit energy efficiency organization whose membership includes regional, state, and utility administrators of publicly funded energy efficiency programs. As of the summer of 2000, eighty-six such entities, representing approximately 40 percent of U.S. households, had partnered with the national ENERGY STAR program to locally promote (predominantly) ENERGY STAR qualifying lighting and appliances. The majority of these partners are located in states that have enacted restructuring or alternative legislation explicitly funding energy efficiency programming.

In order to facilitate comparison in areas with strong local promotions and areas with little or no local ENERGY STAR-related promotions, the sample frame was drawn from the largest media markets, jointly accounting for about 70 percent of US households. Each media market was assigned one of three publicity levels and then a sample of media markets was randomly selected from each publicity category. In addition, some CEE members also fielded the survey in their local territories to facilitate direct comparison between the effects of the program in their areas and in the country at large. CEE and participating members made the survey data available to the EPA for the national analysis developed in this report.

The study is organized into two parts. Part I includes background information, methods, findings, conclusions, and several appendices. Part II includes detailed cross-tabulations of the survey response data for each question in the questionnaire.

SUMMARY OF KEY FINDINGS

The key findings are as follows:

- Nationwide, 41 percent of households have seen the ENERGY STAR label.

- Nationwide, over one-half of all households, including those that had seen the label previously and those that were reacting to it for the first time, had at least a general understanding of the label's message, and 37 percent registered a high degree of understanding.

- Nationwide, about 50 percent of those who reported that they bought an ENERGY STAR labeled product also reported that they were influenced by the label to buy that product.

- Although the overall response rate for the survey was low (10.2 percent), comparative analyses to U.S. census data and other related studies indicate that the survey data in the present study represent a reasonable characterization of the current state of ENERGY STAR awareness, understanding, and influence. Patterns of response in the present study are similar to other mail surveys, in terms of key comparison statistics such as age and income, and those same key respondent demographic statistics are reasonably similar to the U.S. population. Therefore, non-response effects related to demographics are not likely to have substantially biased estimates. However, non-observable customer attributes, such as concern about the environment, cannot be fully addressed and may have resulted in the over- or under-representation of such customers among the survey respondents.

- Comparisons to four other relevant surveys show reasonably consistent statistics in terms of mail survey response rate, demographic profile, ENERGY STAR awareness level, understanding of the ENERGY STAR label, and purchasing intent based on—or influence of—the ENERGY STAR label. These studies are:

  1. The 1997 Residential Energy Consumption Survey (RECS) conducted by the Energy Information Administration.

  2. The *1998 Home Appliance Buying Trends Survey* conducted by D&R International, Ltd. for the Department of Energy.

  3. The *Pre-Post* ENERGY STAR *Awareness Tracking Study* conducted by XENERGY Inc. for Pacific Gas and Electric Company (PG&E) in 2000.

  4. Surveys conducted in Wisconsin (WI) and the Pacific Northwest (PNW) concurrent with the CEE survey.

- The 1997 RECS shows similar results with respect to the influence of the label. Comparisons with RECS are useful, given the 80 percent response rate.

In addition, there was a statistically valid difference in ENERGY STAR awareness, understanding, and influence between areas that had active supplemental promotions for two or more years by a local or regional energy efficiency program administrator. For those demographics we were able to observe, non-response effects, if any, would be similar in low and high publicity areas, so that the observed difference is likely to be reflected in the population at large.

- Label awareness is much higher in the high-publicity areas than in the low-publicity areas — 52 percent versus 37 percent. The difference between high and low publicity areas was statistically significant at less than a 1 percent significance (better than 99 percent confidence) level.

- In the high-publicity areas, a greater proportion had a high understanding compared to the low-publicity areas (41 percent versus 34 percent) and a lower proportion had no understanding. The difference between high and low publicity areas was statistically significant at the 1 percent significance (99 percent confidence) level.

- The proportion of consumers influenced by the label in purchasing qualifying products was significantly higher in the high-publicity areas compared with the low-publicity areas, 58 percent versus 35 percent. Thus, where publicity is low, the effect of the label on purchasing decisions is significantly reduced. The difference between high and low publicity areas was statistically significant at the 2 percent significance (98 percent confidence) level.

- The study also found some notable differences in label association for products actively promoted by the ENERGY STAR partner programs. These results suggest that utilities, market transformation groups, state administrators, and other organizations involved in administering publicly funded energy-efficiency programs that integrate ENERGY STAR messaging are effective allies in spreading the word about ENERGY STAR, in general, and in promoting these product categories.

CONCLUSIONS

The findings in this study confirm that substantial portions of U.S. consumers are aware of and understand the ENERGY STAR label. Moreover, the label influences purchase decisions, and publicity efforts improve awareness, understanding, and influence of the label.

This questionnaire provides useful data for comparing publicity levels, and information on the relative importance of different purchasing factors. The results are probably most useful as a baseline for future tracking efforts. Future survey efforts that use the same questionnaire will provide a rich base of time-series data, and an important and useful information source for utilities, market transformation groups, state administrators, and other organizations, including EPA and DOE.

The results indicate that the EPA and DOE strategy of partnering with third-party organizations to build momentum for ENERGY STAR is an effective strategy for building awareness, understanding, and influence for the ENERGY STAR label.

1 INTRODUCTION

1.1 THE ENERGY STAR® PROGRAM

ENERGY STAR® is a dynamic government/industry partnership program that makes it easy for businesses and consumers to save money and protect the environment. Currently, the label appears on over 30 product categories, as well as homes, office buildings, and schools. To qualify, products and buildings must meet ENERGY STAR criteria, which vary by category, but generally mean that the product or building ranks in the top 20–30% for energy performance. Regional energy-efficiency program administrators have become increasingly valuable partners in educating their constituents about the financial and environmental benefits of ENERGY STAR, particularly with residential lighting products and appliances. As of the summer of 2000, eighty-six such entities, representing approximately 40 percent of U.S. households, had partnered with the national ENERGY STAR program to locally promote (predominantly) ENERGY STAR qualifying lighting and appliances. The majority of these partners are located in states that have enacted restructuring or alternative legislation explicitly funding energy efficiency programming.

1.2 PURPOSE OF THE SURVEY

The CEE ENERGY STAR Household Survey of 2000 was designed to obtain information at a national level on consumer awareness and understanding of the ENERGY STAR label and of its influence on their energy-related purchase decisions. Research questions of interest included:

- The media and products on which the ENERGY STAR label was seen;
- the effect of higher publicity levels on ENERGY STAR label awareness, understanding, and influence; and,
- the relationship of household demographics and purchases to label awareness, understanding, and influence.

1.3 SURVEY SPONSORSHIP

The Consortium for Energy Efficiency (CEE) and participating members sponsored the survey instrument and data collection. CEE and participating members made the survey data available to the EPA for the analysis developed in this report. In addition to contributing to the national sample, some CEE members also fielded the survey in their local territories to facilitate direct comparison between the effects of the program in their areas and the country at large.

1.4 TIMING

Survey instrument design began in the spring of 2000. Data were collected during the summer and fall.

1.5 REPORT ORGANIZATION

This report is organized in two parts. Part I has four sections, in addition to three appendices, and an Executive Summary. The Introduction (Section 1) is proceeded by Methods (Section 2)—including questionnaire design, sampling, and survey implementation. Findings from the survey data analysis are presented in Section 3. Conclusions from the study are given in Section 4. A copy of the survey instrument is provided in Appendix A. Appendix B contains a list of the 57 DMAs used in the national sample and Appendix C contains details about the weighting and variance procedures used in the data analysis.

Part II provides detailed cross-tabulations of survey responses by level of understanding of the ENERGY STAR label, by awareness of the label prior to the survey, and by demographics. These data tables provide the percent of respondents in each category or the average of numeric responses. In all cases, the results presented are weighted to the national level.

2 METHODS

2.1 GENERAL APPROACH

The mail questionnaire and survey sample design were developed for a national sample of households. In addition, CEE members were invited to field the survey locally to facilitate direct comparison between the effects of the program in their areas with those in the country at large. In the analysis, the national sample and CEE member samples were pooled to provide a richer database for examining the national program. The questionnaire design (Section 2.2) and the sampling and analysis approach (Section 2.3) are described below.

2.2 QUESTIONNAIRE DESIGN

The survey was designed to provide information on respondents' awareness of the ENERGY STAR label, their purchases of ENERGY STAR products, and the influence of the label on those purchase decisions. The questionnaire also collected data on demographics and sources of information used when considering energy-related purchases for the home.

An important question in assessing awareness and influence of the label was how the message of the label was understood, both by those who had been aware of it previously and those who had not. To gauge understanding, without the filter of previous questions, the questionnaire began with open-ended questions asking the respondent to look at the label and write down what message(s) they thought it gave. The remaining questions were closed-ended, requiring simple yes/no answers, multiple-choice responses, or a selection of all applicable items from a list.

A copy of the survey instrument is included in Appendix A.

2.3 SAMPLING

2.3.1 National Sample

The national sample was a two-stage sample. In the first stage, Nielsen Designated Marketing Areas (DMAs) were randomly selected. Nielsen developed DMAs for planning and analyzing the results of publicity and advertising campaigns. A DMA consists of all counties in which the largest television viewing share is assigned to stations in that same area. Nielsen uses U.S. Census statistics for household data within each DMA. These non-overlapping DMAs cover the entire continental United States, Hawaii and parts of Alaska. There are currently 210 DMAs throughout the U.S. Only the largest 57 DMAs in the country, accounting for approximately 70

percent of U.S. households, were included in the first-stage sampling frame for this survey. In the second stage, a random selection was made from household data for each selected DMA.

The national sample was designed to facilitate comparisons between areas with high levels of publicity and areas with low levels of publicity. For this purpose, the largest 57 DMAs were classified into one of three publicity levels in the first stage as follows:

- ***High message saturation:*** Areas in which utilities or other third party organizations (e.g., utility, state, or regional energy-efficiency systems benefit charge administrator) based a publicity and/or rebate program on the ENERGY STAR label. This third party publicity had to include at least 2 of the following: bill inserts, paid ads, retailer promotion/programs, or rebates resulting in over 500 Gross Rating Points[1] (GRPs) for more than 2 years.

- ***Low message saturation:*** Areas that received only the national-level ENERGY STAR promotions from EPA and/or DOE.

- ***Other:*** Areas in which national-level efforts were supplemented by additional EPA/DOE targeted market outreach (PSAs and media outreach) that achieved at least 500 GRPs.

Within each of these publicity strata, a simple random sample of four DMAs was initially selected. A list of the 57 DMAs by publicity level is provided in Appendix B.

The initial mailing of the survey began in June 2000 to 7,500 households. This mailing was followed by a reminder postcard two weeks later, then by a subsequent mailing of the survey to the same sample one week after the postcards were mailed.

Due to low response rates, the CEE committee considered its options for increasing sample size. A decision was made to combine member sample data with the national data set using appropriate statistical weighting methods. This combined sample approach is described below in Section 2.3.2.

The CEE committee also made decision to conduct another survey mailing effort. For this survey effort, a fresh sample of DMAs was selected only from the other- and low-publicity strata, excluding areas already covered by the national and member samples. Additional DMAs were not selected in the high-publicity stratum because all DMAs in that stratum were already included in either the member or national samples with the exception of the City of Los Angeles. Additional sample was not selected in the member areas because these already had relatively large sample sizes compared to the national frame in the combined sample.

[1] A gross rating point is an industry standard unit of measurement of advertising audience size, and is equal to one percent of the total potential audience universe. It is used to measure the exposure of one or more programs or commercials without regard to multiple exposure of the same advertising to individuals.

Selecting a fresh sample was considered superior to an additional follow-up effort with the original sample for two reasons. First, response rates would likely remain low even with some increase in returns from the additional follow-up. A mailing to a new sample of respondents was expected to yield a greater increase in sample size than another mailing to the original sample. Second, drawing a fresh sample of households from additional DMAs would provide data from a wider set of areas of the national sample and reduce inefficiencies that may have resulted from clustering. The second survey effort did not include a follow up postcard or survey mailing. As a result, response rates to the second effort were slightly lower than those for the first sample.

2.3.2 Member Samples

Samples sponsored by CEE members in their own regions were fielded for the following areas:

- California, excluding the City of Los Angeles
- Connecticut, excluding Hartford
- Massachusetts
- Vermont
- Wisconsin

In each of these five areas, a simple random sample was drawn from the full set of households. Unlike the national sample, these surveys included a cover letter. They were mailed simultaneously with the first national sample.

2.3.3 Combined Sample

Ideally, the CEE member frame would have been identified in advance and the national frame restricted to areas outside the member frame. However, some of the member surveys were not planned until after the national effort was underway, and the combination of the national and member samples was not agreed to until after the first wave of data collection was complete. Thus, the adjustment for overlap between the two frames was made after the fact.

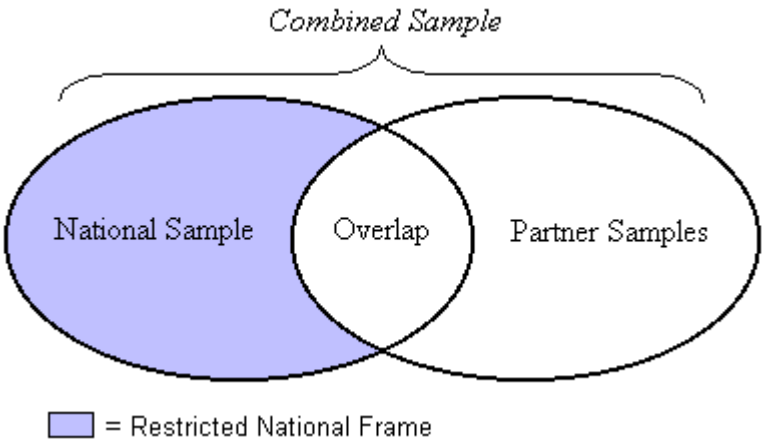
The combined analysis required the merger of the two data sets: the national and the CEE member samples. In both the national and CEE member samples, a simple random sample was selected within a geographic area. Geographic areas were selected by one of two means:

- In the national sample, DMAs were selected within each publicity stratum.
- In the member sample, each area was the member's own geographic area.

Together, the national and member samples represent all areas that are either in large DMAs or are part of one of the five member samples. Some DMAs are in both sample frames. This overlap is handled by dividing the total represented area into two distinct pieces. The first is the member frame in its entirety. The second is that portion of the national frame not included in the

member frame—the national frame minus the member frame. We refer to this second portion as the "restricted national frame." The Venn Diagram below illustrates the combined sample classification approach.

Exhibit 2-1
Venn Diagram of Combined Sample



The restricted national frame excludes any zip code area that was part of the CEE member frame. That is, instead of an entire DMA, we consider only the "restricted DMA," excluding any zip codes that were designated for the member sample. If an entire DMA selected for the national sample was also part of the CEE member frame, the DMA would be considered only as a part of the member sample and would be excluded from the restricted national sample. The frames and samples are summarized in Table 2-1 below.

Table 2-1
Distribution of Frames and Samples

	National Alone	Member Alone	Combined
# of DMAs	57	27	74*
# households (millions)	69.9	13.5	72.8*
% U.S. households	69.2%	13.4%	72%*
% of combined frame	96%	18.5%	100%
Sample			
# households	780	2,176	3,496
% of sample	22.3%	77.7%	100%

Note: National Alone and Member Alone do not add due to overlap

2.4 ANALYSIS

The primary analysis consists of calculating means and proportions for various subgroups of interest and determining the standard errors of these estimates. Means and proportions are calculated using the expansion weights, which reflect the sampling rates for each portion of the sample. Standard errors reflect the two-stage structure for the national sample and the stratification of the CEE members' sample into member areas. The standard errors were calculated using special-purpose software designed for the analysis of complex survey data called SUDAAN®. The weighting and standard error calculations are described in Appendix C.

2.5 RESPONSE RATES

In the combined sample, the final response rate was 10.2 percent. After a first wave of mailings and follow-up, response rates of approximately 6 percent were obtained for the national sample and approximately 13.3 percent for the member samples. The response rate in the second mailing was 4.5 percent.

Survey response rates for the initial and additional samples are summarized in Table 2-2.

Table 2-2
Survey Response Rates

	National Alone		Member Alone	Combined
	Initial	Additional		
Sent	7,500	6,400	20,350	34,250
Returned	491	289	2,716	3,496
Response Rate	6.5%	4.5%	13.3%	10.2%

Possible reasons for the low response rates may include:

- Declining nationwide response rate to surveys in general;
- A survey sponsor (CEE) unfamiliar to most respondents; and,
- The open-ended questions in the beginning require some thought, which could discourage interest in, and the timely completion of, the survey.
- The purchased lists of households used as the sample frame in each DMA or member-sponsored area may have included a large proportion of ineligible or invalid listings. Response rates are calculated as the ratio of surveys returned to survey addresses mailed, not as the ratio of returns to valid or eligible addresses in the sample.
- Poll fatigue due to census and presidential election years.

Potential non-response bias issues, typically associated with similar response rates, are discussed in Section 3.

2.6 PRECISION OF ESTIMATES

As discussed above, standard errors were calculated for all estimates of population variables developed from the sample survey data. Throughout the text we use these standard errors to calculate confidence intervals for population means and proportions. The standard errors are also the basis for calculations of the statistical significance of differences between sample subgroups, such as customers subject to the different levels of ENERGY STAR publicity. The statistical significance indicates the likelihood that the observed differences in the sample reflect actual differences in the population. The statistics characterizing the precision of the estimates used are as follows.

- ***Confidence intervals around sample means and proportions.*** In reporting sample means and proportions, we generally provide the 90 percent confidence interval, indicated as symmetric error bounds around the estimate. For example, 41 percent of households (+/- 2 percent) reported having seen the ENERGY STAR label prior to answering the survey. This statement means that we are 90 percent confident that, if all households in the sampling frame had been surveyed, and assuming no systematic biases

in the sample, the proportion of the full population that would have reported seeing the label prior to the survey would fall between 39 percent and 43 percent. By "90 percent confident," we mean that for 90 percent of the random sample points that might have been drawn, the calculated interval would include the true value. The interval can be more loosely interpreted to mean that there is a 90 percent chance that the true population proportion is between 39 and 43 percent.

Many of the most significant research questions addressed by this study concern differences in the level of ENERGY STAR recognition, understanding, and use among subgroups of the sample defined by publicity level, household attributes, and prior experience with the label. For example, 41 percent of customers in the high-publicity areas recorded a high level of understanding of ENERGY STAR label, and 34 percent in the low publicity areas, for a difference of 7 percent. The precision of estimating differences between subgroups can be characterized two different ways, in terms of confidence intervals, and in terms of statistical significance tests.

- ***Confidence intervals for estimated differences.*** Standard errors calculated from the sample data can be used to examine confidence intervals around the estimate of the difference. In the example just given, the 90 percent confidence interval around the 7 percent difference is 5 percent. This means that, with 90 percent confidence, the population difference between publicity areas in the percentage of households who have a high level of ENERGY STAR understanding is somewhere between 2 and 12 percent.
- ***Statistical significance (p-value) of differences between subgroup sample means and proportions.*** A second way to characterize the precision of estimates of differences between subgroups is to calculate the statistical significance or p-value of the difference. The p-value is the probability that the random sample would have produced a difference as extreme as one observed in the population if the subgroups are not different. That is, a statistical test is conducted of the null hypothesis that the difference in population means is zero, against the alternative hypothesis that the difference is not zero. Continuing the example above, the p-value for the 7 percent difference is 0.02. This means that if there were no difference between high- and low-publicity groups in the population proportions who had previously seen the label, there would be only a 2 percent probability that the sample percentages would be as different as they are. That is, it is very unlikely that the sample would have shown such a large difference if there is not in fact a difference in the population. The smaller the p-value, the more unlikely it is that the sample differences could have been so great just by chance, and the stronger the evidence is that there truly is a difference in the population. As a final note, a difference is considered statistically significant at significance level α if the p-value is less than or equal to α. A common standard in survey research is to specify a significance level of $\alpha = 0.05$. With this standard, any difference with a p-value less than or equal to 0.05 would be called statistically significant.

3 FINDINGS

3.1 DEMOGRAPHICS

As described in Section 2, the national sample was designed to be representative of all households in the United States in the 57 largest DMAs, while the CEE member samples were designed to be representative of each member's area. The procedures used for combining the two samples provided unbiased estimates of the total combined sampling frame—that is, all large DMAs in the country together with any portions of the partner areas that were in smaller DMAs.

The weighting procedures used to combine the samples implicitly assume that the responding sample is a random subset of the random sample selected to receive the survey. However, in any survey effort, individuals who choose to respond to the survey may tend to be different from those who choose not to respond. The effect of these systematic differences is termed "non-response bias." The potential for non-response bias increases as response rates fall. As described in Section 2, response rates for this survey were generally low, making the potential for non-response bias to be a concern.

To assess this potential, the distribution of key demographic characteristics of the responding sample, weighted in the same manner as for the rest of the analysis, were compared with national census data. Age and income distributions are shown in Tables 3-1 and 3-2, respectively.

Table 3-1
Age Distribution for Weighted Sample and National Census Data
(Source: Current Population Statistics for 1998, US Census Bureau)

Percent of Households			
Householder / Respondent Age	Population	Weighted Combined Sample	% Smpl–% Pop
Pop, 15–24; Smpl, 18–24	5.6%	0.7%	-4.9%
25–34	18.1%	10.0%	-8.2%
35–44	23.1%	18.2%	-4.9%
45–54	19.4%	25.5%	6.1%
55–64	13.1%	16.6%	3.5%
65–74	10.9%	16.4%	5.4%
75 or older	9.8%	12.7%	2.9%
Total (%)	100.0%	100.0%	
Total (1,000s)	103,875	63,883	

Table 3-2
Income Distribution for Weighted Sample and National Census Data
(Source: Current Population Statistics for 1998, US Census Bureau)

Total Household Annual Income (before taxes)	Percent of Households		% Smpl–% Pop
	Population	Weighted Combined Sample	
Less than $5,000	3.2%	1.4%	-1.8%
$5,000–$9,999	7.1%	3.0%	-4.1%
$10,000–$14,999	7.8%	3.8%	-4.0%
$15,000–$24,999	14.0%	13.8%	-0.2%
$25,000–$49,999	29.2%	28.9%	-0.3%
$50,000–$74,999	18.6%	24.3%	5.7%
$75,000 and over	20.1%	24.8%	4.7%
Total (%)	100.0%	100.0%	
Total (1,000s)	103,875	56,861	

Although the overall response rate for the survey was low (10.2 percent) raising concerns about non-response bias, a comparative analysis of respondent demographics and other related studies indicates that the findings provide a reasonable characterization of the current state of ENERGY STAR awareness, understanding, and influence. For those demographics we were able to observe, the demographics for the (weighted) responding sample compared with national Census data show reasonably similar demographic profiles. Moreover, patterns of non-response in the present study are similar to residential household mail surveys in general. Younger and lower income households are less likely to respond to the survey than are older and higher income households. These broad characteristics should be considered when interpreting the survey results. Additional demographic detail is provided in the tables in Part II (Questions 14 through 22 in each set of cross-tabs).

A general concern regarding low response rates is whether survey respondents are more likely than non-respondents to be aware of, understand, or be influenced by the ENERGY STAR label. This possibility cannot be assessed from the demographic information. Individuals with a greater interest in energy efficiency might have been more inclined to complete the survey for the following reasons:

- The survey was sponsored by an entity identified as the "Consortium for Energy Efficiency."
- The introduction to the survey identified EPA and DOE as promoting the program being assessed by the CEE survey.
- The first question referred to a picture of the ENERGY STAR label on which "EPA" and "DOE" appear.

For these reasons, the survey results may overstate or understate the levels of awareness, understanding, and influence nationwide. However, a review of other studies indicates the

findings in this study are a reasonable characterization of the current state of ENERGY STAR label awareness, understanding, and influence (See Sections 3.2.4, 3.3.2, and 3.4.3). In addition, the survey provides useful comparisons across publicity levels, giving information on the relative importance of different factors. The results also are useful as a baseline for future tracking efforts, which are likely to have similar non-response effects.

3.2 UNDERSTANDING OF THE ENERGY STAR LABEL

The first two survey questions were used to assess whether the respondent understood the message of the ENERGY STAR label. A respondent might understand the message even if previously unfamiliar with the label. The questions asked the respondent to describe in his/her own words the first, and then any other message(s) that came to mind when looking at the label.

3.2.1 Coding the Levels of Understanding

The open-ended responses were coded into 28 detailed response categories. For purposes of this analysis, these detailed response categories were initially combined into five levels of understanding, as follows.

High understanding: The respondent mentioned one or more of the following:

- Savings
- Energy efficiency
- Environmental benefit
- Product standards.

General understanding: The respondent mentioned one or more of the following:

- Energy
- Environment
- Quality
- Government backing.

However, the respondent did not specifically mention savings, efficiency, benefits, or standards.

No understanding: No answer, or a response not included in the High or General understanding level.

Mixed General–No Understanding: The detailed response category includes some General understanding responses and some No understanding responses.

Mixed High-General: The detailed response category includes some High understanding responses and some General understanding responses.

The classification of the detailed responses into the five levels of understanding is indicated in Table 3-3.

Table 3-3
Coding of Levels of Understanding

Description	Understanding Level*
Energy savings/efficiency/conservation	High
Energy-saving product	High
Product testing, standards, compliance that is energy/environment related	High
Environment – links environmental attributes to items	High
Saves money on operation – links savings to items	High
Savings – not linked to items	High
Government – general	Mixed H□G
Confusion with yellow Energy Guide label	General
Rebate/refund – savings on purchase, not on operation	General
General environmental	General
Names product	General
Electricity/energy	General
General quality product standards (not energy or environmental)	General
World/planet/globe	Mixed G□N
Being told to do something specific	No
Cooperation	No
Design – positive	No
Design – negative	No
General – positive	No
Government – negative	No
Advertising/marketing – negative	No
Universe/stars	No
Skepticism	No
Never saw	No
No/nothing/none	No
Other	No
Don't know	No
Refused	No

3.2.2 Overall Findings

The proportion of respondents at each level of understanding is shown in Table 3-4, by publicity level and overall. The table shows that, over 50 percent of households had at least a general level of understanding of the ENERGY STAR label. Forty-one percent of consumers in high publicity areas displayed high levels of ENERGY STAR understanding compared to 34 percent in low publicity areas and 38 percent in the "Other" areas. The difference in the proportion with High understanding between respondents in high- and low-publicity categories is statistically significant ($p = 0.02$). We also note that the distribution of sample consumers by level of understanding is heavily weighted to the two ends of the scale. Thirty-seven percent of respondents have a high understanding of the label's meaning; 42 percent have no understanding.

Table 3-4
Distribution of Understanding Levels by Publicity Level

Q1 and Q2: Understanding of ENERGY STAR Label	Publicity Category			Total
	High	Other	Low	
High	41%	38%	34%	37%
High - General	2%	4%	2%	3%
General	10%	8%	11%	9%
General - None	8%	10%	6%	8%
None	39%	40%	46%	42%
Total	100%	100%	100%	100%
# of households (millions)	15.50	27.84	21.90	65.24

3.2.3 Understanding by Subgroup

Significant differences in the level of ENERGY STAR understanding were found among subgroups of consumers defined by demographic and housing characteristics, as well as by previous experience related to ENERGY STAR.

- ***By awareness of the ENERGY STAR label prior to the survey.*** Sixty-four percent of customers who reported having heard of ENERGY STAR prior to the survey displayed high levels of understanding of the label, compared to 19 percent among customers who reported that they had not seen or heard about the label prior to the survey. This is a highly significant difference in level of understanding between the two groups ($p < 0.0005$). This finding suggests that customers who have seen the label in its intended contexts (on products or in publicity materials) are much more likely to have a good understanding of what it means than those encountering it for the first time. Also, it

suggests that the label itself can communicate its intended message to a small but significant portion of the population.

- ***By housing type and tenure.*** Thirty-nine percent of homeowners displayed high levels of understanding of the ENERGY STAR label compared to 27 percent of renters ($p = 0.005$). Similarly, 40 percent of consumers in single-family homes showed a high level of understanding for the ENERGY STAR label versus 30 percent of consumers in multifamily housing ($p = 0.02$). However, there was no significant difference in understanding between consumers who paid their own energy bills and those who did not. This pattern of findings suggests that understanding of ENERGY STAR is more strongly related to customer characteristics such as age and income, which are associated with single-family home ownership, than to the consumers' *perceived* opportunity for financial benefit associated with responsibility for energy bills.
- ***By age of respondent.*** The percentage of consumers with a high level of understanding clusters in the range of 44 to 51 percent for consumers in the age ranges between 18 and 54. The proportion with high understanding drops in every 10-year age group from 51 percent of 35- to 44-year-olds to 27 percent of 65- to 74-year-olds. Among consumers over 75, the percentage of respondents displaying a high level of understanding drops again to 14 percent. Seventy-six percent of these consumers have no understanding whatsoever of the label.
- ***By income.*** The survey findings suggest that understanding of the ENERGY STAR label is strongly associated with income levels. Table 3-5 shows a consistent relationship between income and levels of understanding. Fifty-one percent of customers with annual incomes above $75,000 showed high levels of understanding versus 25 percent for customers reporting annual incomes below $25,000 ($p < 0.0005$).

Table 3-5
Percent of Customers with High Levels of ENERGY STAR Understanding by Income Level

Income Level		% with High Understanding	90% Confidence Bounds (+/-)	P-Value
Total		38%	3%	
Low	< $25,000	25%	6%	
Medium Low	$25,000 - $49,000	36%	6%	
Medium High	$50,000 - $75,000	41%	6%	
High	> $75,000	51%	6%	
Difference High – Low		26%	8%	<.0005

3.2.4 Comparison With Other Studies

Results from the CEE survey were compared with findings from four other studies. These studies are:

- **RECS:** The national Residential Energy Consumption Survey (RECS) conducted by the Energy Information Administration. Most recent data are for 1997. EIA has not published any results from the ENERGY STAR questions on the 1997 RECS, but has made the data available on a public use tape. Results shown here are from analysis of these data conducted by Roper-Starch.

- **D&R:** The *1998 Home Appliance Buying Trends Survey* conducted by D&R International, Ltd. for the Department of Energy.

- **PG&E:** The *Pre-Post ENERGY STAR Awareness Tracking Study* conducted by XENERGY Inc. for Pacific Gas and Electric Company (PG&E) in 2000. Results shown here are from XENERGY's report to PG&E. The results described here are for the residential survey, and unless otherwise noted are for the survey conducted just after the awareness campaign.

- **WI/PNW:** Surveys conducted in Wisconsin (WI) and the Pacific Northwest (PNW) approximately concurrently with the CEE survey. In Wisconsin, three survey modes were used: a mail survey using the CEE instrument, a phone survey, and web TV. In the Pacific Northwest, a web TV survey was used. Results shown here are from a presentation summary prepared by the Energy Center of Wisconsin with assistance from Shel Feldman Management Consulting and the Northwest Energy Efficiency Alliance.

Key features of these four studies are summarized in Table 3-6.

Table 3-6
Summary of Studies Compared

	RECS	D&R	PG&E	WI	WI	WI	PNW	CEE
Survey year	1997	1998	2000	2000	2001	2002	2000	2000
Mode	In-person	Mail	Phone	Mail	Phone	Web TV	Web TV	Mail
Area Covered	National	AZ, CA, FL, MA, TX	PG&E service territory	Wisconsin	Wisconsin	Wisconsin	PNW	National
Sampling Frame	All residential households	Recent appliance purchasers from major chains	PG&E residential customers	Households with listed telephones	Households with listed telephones	Web TV panel	Web TV panel	Households with listed telephones in top 57 DMAs and member areas
Response Rate	81%	11%	-	18%	33%	65%	62%	10%

Comparisons to the present study are described below:

- The RECS survey did not include questions probing respondent understanding of the ENERGY STAR message. The survey is included in the summary above, because it is useful for comparisons of other information collected on the survey, presented below. A strength of the RECS as a benchmark for the present study is that the RECS is national in scope and achieves over 80 percent response. However, these data are three to four years old.

- The D&R study reported that, of those who recognize the label, 48 percent correctly interpreted it. Of those who had not recognized the label, 19 percent gave a correct interpretation. Combined, these findings indicate an overall 32 percent giving a correct interpretation, across those who were and were not aware. The study did not describe what was considered a "correct" interpretation. The study had a similar response rate of 11%.

- In the PG&E study, only respondents who were previously aware of ENERGY STAR were asked what it meant. Of these open-ended responses in the post-campaign survey, 56 percent were coded as "saves energy, uses less electricity." The total number corresponding to the present study's definition of "High" understanding is not reported, but based on the (overlapping) categories reported, at least 63 percent of aware respondents would be coded as having high understanding in the context of this study. In the pre-campaign survey, a smaller fraction was aware of the label, but of these at least

72 percent would be coded as having high understanding. In the present study, 57 percent of those who were previously aware of the ENERGY STAR label had high understanding.

- The WI/PNW study used definitions of "knowledge" that match this study's definition of high understanding. In that study, the percent coded as knowledgeable were 35 percent for the WI mail survey, 57 percent for the WI web TV survey after the label was shown, and 53 percent for the PNW web TV after the label was shown.

Table 3-7 summarizes the percent with high understanding from the studies compared. Overall, similar results were found in the Wisconsin mail survey and the D&R study to those in the present study. Why higher proportions of web TV respondents had a high level of understanding is not clear. The PG&E results for those who were aware of the label are also fairly consistent with results for aware respondents in the present study.

Table 3-7
Proportions with High Understanding for Studies Compared

	D&R	PG&E	WI	WI	WI	PNW	CEE
Survey year	1998	2000	2000	2001	2002	2000	2000
Mode	Mail	Phone	Mail	Phone	Web TV	Web TV	Mail
With label not seen or described, all respondents	-	-	-	11%	-	-	-
After label seen or described, aware respondents only	-	63%	-	-	-	-	57%
After label seen, all respondents	32%	-	35%	-	57%	53%	32%

3.3 AWARENESS OF THE ENERGY STAR LABEL

Questions 3 through 5 asked whether the respondent had seen the label before, and if so, where and on what products. Respondents were considered aware of the label if they reported having seen it before.

Table 3-8 shows the proportions of respondents who were aware of the label, by publicity level. The table shows an overall awareness level of 41 percent. Label awareness is much higher in the high-publicity areas than in the low-publicity areas—52 percent versus 37 percent, a statistically highly significant difference.

Table 3-8
Awareness of the ENERGY STAR Label by Publicity Level
(Base = All Respondents)

Q3: Have heard or seen ENERGY STAR label				
Publicity category	**Estimate**	**90% Confidence Bounds (+/-)**	**Sample size**	**P-value**
Overall	41%	2.5%	3,394	
High	52%	3.5%	1,450	
Other	38%	3.8%	1,507	
Low	37%	4.8%	437	
High-Low	15%	5.9%		< 0.0005

Table 3-9 shows the average number of different products on which customers reported having seen the ENERGY STAR label. Among those who were aware of the label, the number of products on which it was seen did not vary significantly by publicity level.

Table 3-9
Number of Products On Which the ENERGY STAR Label Was Seen by Publicity Level
(Base = Aware Respondents)

Q5: Average number of products on which ENERGY STAR label has been seen (Q3=Yes)				
Publicity category	**Estimate**	**90% Confidence Bounds (+/-)**	**Sample size**	**P-value**
Overall	3.97	0.35	1,502	
High	3.86	0.38	728	
Other	4.28	0.64	599	
Low	3.75	0.46	175	
High-Low	0.11	0.60		0.76

3.3.1 Where People Learned about ENERGY STAR

Table 3-10 shows on which products respondents recalled seeing the ENERGY STAR label. Computers and monitors were the most selected product type (52 percent), followed by refrigerators (43 percent), on which aware respondents recall seeing the label. Other common products, mentioned by at least 20 percent or respondents were air conditioners, dishwashers, and washing machines.

Another category mentioned by more than 20 percent of the respondents was the microwave. The questionnaire included this "ringer" on purpose. This result reflects inaccuracies in respondents' recognition of labeled products, as there is no ENERGY STAR label for microwaves. However, the result also indicates a general perception that ENERGY STAR kitchen appliances are available.

Table 3-10
Proportion Seeing the ENERGY STAR Label on ENERGY STAR-Labeled Products
(Base = Aware Respondents)

Q5: Products where ENERGY STAR label was seen (Q3=Yes)	Publicity Category			Total
	High	Other	Low	
Central air conditioner	17%	27%	19%	21%
Furnace or boiler	10%	19%	13%	14%
Heat pump	3%	2%	6%	4%
Thermostat	6%	7%	5%	6%
Room air conditioner	20%	28%	15%	22%
Computer or monitor	51%	51%	55%	52%
Computer printer	14%	22%	21%	19%
Copying machine	8%	10%	11%	10%
Fax machine	6%	8%	9%	8%
Scanner	6%	9%	10%	8%
Dishwasher	31%	28%	17%	25%
Refrigerator	55%	40%	34%	43%
Lighting fixture	16%	14%	9%	13%
Washing machine	34%	22%	21%	25%
CFL	18%	8%	13%	13%
Television	18%	29%	25%	24%
VCR	11%	19%	17%	16%
Audio product	5%	7%	4%	6%
Window	16%	13%	19%	16%
Door	5%	8%	6%	6%
Skylight	1%	5%	3%	4%
Insulation	5%	10%	9%	8%
Roofing material	1%	9%	6%	6%
Newly built home	8%	9%	11%	9%
None of these products	9%	12%	11%	11%
Average	15%	17%	15%	16%
# of households	7,411,478	9,757,661	7,678,135	24,847,275
% of households	30%	39%	31%	100%

Table 3-11 shows the sources where respondents recalled seeing the label. Store displays and direct mail were most common, at 58 and 41 percent, respectively. Print media and television each scored approximately 33 percent.

Table 3-11
Proportion Seeing the ENERGY STAR Label in Particular Sources
(Base = Aware Respondents)

Q4: Places seen/heard about ENERGY STAR label (Q3=Yes)	Publicity Category			Total
	High	Other	Low	
Newspaper/magazine	34%	36%	32%	34%
Television	30%	37%	28%	32%
Mail - direct, utility	44%	40%	36%	40%
Store display	62%	56%	57%	58%
Internet	11%	20%	18%	17%
Salesperson/contractor	6%	7%	6%	6%
Friend/neighbor/etc.	4%	9%	7%	7%
Other	24%	19%	25%	22%
None of these sources	6%	3%	3%	4%
Average	24%	25%	24%	24%
# of households	7,493,123	9,699,910	7,479,054	24,672,088
% of households	30%	39%	30%	100%

3.3.2 Comparison With Other Studies

In the 1998 D&R study, 44 percent of respondents recognized the ENERGY STAR label. This rate is much higher than the national level of 27 percent found a year earlier in the 1997 RECS. For the South and West Census regions (which account for 89 percent of the D&R sample universe), the RECS awareness levels were 29 and 30 percent, respectively. One reason for the higher national awareness in the D&R study may be that the respondents were all recent appliance purchasers.

The 2000 PG&E study after the awareness campaign found an overall awareness of 63 percent after their awareness campaign. This overall total includes those (36 percent) who reported in the phone interview that they had heard of ENERGY STAR before being read a description of the label, as well as those (27 percent) who initially said they had not heard of the label, but changed their response after hearing the description. The study did not probe those who initially said yes to determine if what they had heard of matched a description of the label. The overall awareness level before the campaign was 37 percent, more consistent with the 41 percent found in the present study.

The web TV results for WI and PNW after the label was displayed to the respondent were similar to one another, at 32 percent and 31 percent respectively. On the WI mail survey, awareness was 26 percent, lower than the same survey instrument yielded nationally on the CEE study even for the low publicity level stratum. The WI phone survey had awareness of only 17 percent, lower than the PG&E phone survey before the description was read. However, the PG&E phone survey prior to the awareness campaign had a similar awareness level, 16 percent, without the description read. A probe with a description of the label was not included in the WI phone survey.

Table 3-12 summarizes the awareness levels in the different studies.

Table 3-12
Proportions Aware of ENERGY STAR for Studies Compared

	RECS	D&R	PG&E	PG&E	WI	WI	WI	PNW	CEE
Survey year	1997	1998	2000-pre	2000-post	2000	2001	2002	2000	2000
Mode	In-person	Mail	Phone	Phone	Mail	Phone	Web TV	Web TV	Mail
With label not seen or described (unprobed)	-	-	16%	36%	-	17%	-	-	-
After label seen or described (probed)	27%	32%	37%	63%	26%	-	32%	31%	41%

3.4 INFLUENCE OF THE ENERGY STAR LABEL

Respondents were considered to have purchased an ENERGY STAR product if they reported having seen the ENERGY STAR label on a product they purchased within the past 12 months (Question 7). Table 3-13 shows that about 74 percent of those who were aware of the label and made a purchase within the past 12 months reported buying an ENERGY STAR product.

No significant difference existed in the proportion of aware respondents making ENERGY STAR purchases across publicity levels. This lack of difference reflects the fact that awareness is, in part, the result of making an ENERGY STAR purchase. The total proportion of ENERGY STAR purchases may be higher in high-publicity areas, but this survey was designed to ask about these purchases only for customers who were already aware of the label.

Table 3-13
Proportion Who Bought an ENERGY STAR Product
(Base =Product Purchasers Aware of ENERGY STAR)

Q7: Saw the ENERGY STAR label on a product recently purchased				
Publicity category	**Estimate**	**90% Confidence Bounds (+/-)**	**Sample size**	**P-value**
Overall	74%	6%	815	
High	77%	6%	379	
Other	70%	12%	338	
Low	78%	8%	98	
High-Low	-0.4%	10%		0.94

No significant difference in ENERGY STAR purchases existed between those with high levels of understanding of the label and those with low levels of understanding (Table Set 2, Q7). One reason for this apparent lack of effect is that a respondent can be classified as having a high level of understanding without having been aware of the label previously. Respondents could be identified as having made an ENERGY STAR purchase only if they were first classified as previously aware of the label.

The reported influence of the label on the decision to purchase a product is indicated in Table 3-14. The table shows that, nationwide, about 50 percent of those who bought an ENERGY STAR product were influenced by the label to buy that product. The proportion influenced was significantly higher in high-publicity areas compared with low-publicity areas, 58 percent versus 35 percent ($p = 0.02$). Thus, where publicity is low, the effect of the label on purchase decisions is significantly reduced, although the purchase of an ENERGY STAR product may itself lead to greater label awareness.

Table 3-14
Proportion Influenced by the ENERGY STAR Label To Buy the Product Purchased
(Base = ENERGY STAR Product Purchasers)

Q8: Presence or absence of ENERGY STAR label influenced purchasing decision				
Publicity category	**Estimate**	**90% Confidence Bounds (+/-)**	**Sample size**	**P-value**
Overall	50%	8%	602	
High	58%	14%	287	
Other	58%	14%	243	
Low	35%	8%	72	
High-Low	23%	16%		0.02

3.4.1 Effect of Rebates

Many ENERGY STAR products are offered with price incentives from manufacturers, from local ENERGY STAR partners, or from unrelated utility efficiency programs. Overall, about one-quarter of those who bought an ENERGY STAR product received a rebate or discount, as shown in Table 3-15. The proportion receiving discounts was twice as high in high-publicity areas compared with low-publicity areas, possibly reflecting the greater level of energy-efficiency promotion in those areas. The difference between high and low publicity areas was statistically significant ($p = 0.05$).

Table 3-15
Proportion Receiving Incentives for ENERGY STAR Purchases
(Base = ENERGY STAR Product Purchasers)

Q9: Received Discount on Purchase of ENERGY STAR Product				
Publicity category	**Estimate**	**90% Confidence Bounds (+/-)**	**Sample size**	**P-value**
Overall	23%	6%	601	
High	30%	7%	285	
Other	25%	9%	245	
Low	15%	10%	71	
High-Low	15%	12%		0.05

Of those who did receive an incentive for ENERGY STAR purchases, 36 percent would have been "very likely" to buy the product without the incentive, as shown in Table 3-16. Another 32 percent would have been "somewhat likely."

The sample proportion "very likely" to buy without the incentive was higher in low-publicity areas than in high-publicity areas. However, the difference was not at all significant statistically ($p = 0.33$). More analysis of the data will be required to assess the relative importance of rebates and the label by itself.

Table 3-16
Likelihood of Buying the ENERGY STAR Product without the Incentive
(Base = ENERGY STAR Product Purchaser Who Received Incentives)

Q10: No product discount, likely purchase ENERGY STAR product	Publicity Category			Total
	High	Other	Low	
Very Likely	24%	43%	41%	36%
Somewhat Likely	29%	33%	36%	32%
Somewhat Unlikely	30%	3%	11%	14%
Very Unlikely	17%	21%	11%	17%
Total	100%	100%	100%	100%
# households (millions)	0.83	1.01	0.64	2.48
% households	33%	41%	26%	100%

3.4.2 Findings by Subgroup

Consumers with a high level of understanding were much more likely than those with no understanding to report that the label had influenced their decision to buy the ENERGY STAR-labeled product, but the difference was not strongly significant (30 percent versus 12 percent, p = 0.14; see Table Set 2 in Part II). No clear pattern by age (Table Set 5 in Part II) or by gender (Table Set 6 in Part II) emerged.

3.4.3 Comparison With Other Studies

The D&R study did not ask explicitly about the influence of the ENERGY STAR label on purchase decisions. The study did find that 78 percent reported that energy efficiency was extremely important or important to appliance purchase decisions.

The PG&E post-campaign survey found somewhat lower levels, in more focused questions. For purchasers of refrigerators and clothes washers, respectively, 66 percent and 60 percent were very or extremely concerned with energy use and operating costs. The importance may have ranked lower on the PG&E survey because the respondents were first asked an open-ended question about what attributes they look for when making a purchase. After mentioning attributes such as size and price as (the most common first mentions) as their first considerations,

respondents would be less likely to identify themselves as very or extremely concerned with another attribute.

The 1997 RECS did ask explicitly about the influence of the ENERGY STAR label on purchases, using a question very similar to that on the CEE questionnaire. Of all those who were aware of the label, 32 percent nationally reported that the label had influenced a purchase decision. In the present study, 37 percent of those who not only were aware of the label but also purchased an energy-related product in the past two years reported being influenced by the label. Therefore, in RECS, the percent influenced would be somewhat lower because the subset of respondents who were asked the question about influence is larger than the subset of respondents in the present study (i.e., as a fraction of all those aware of the label, regardless of whether they had made a recent purchase). Thus, the influence results in the present study are fairly consistent with those from the 1997 RECS.

Influence results are not available for the WI/PNR studies. The Wisconsin mail survey included the same questions as the CEE national survey, but the current report does not discuss the results.

Table 3-17 summarizes the influence findings for the RECS and present study.

Table 3-17
Comparisons of Proportions Influenced by ENERGY STAR

	RECS (1997)	CEE (2000)
Mode of survey	In-person	Mail
Base = Aware ENERGY STAR Purchasers	-	50%
Base = Aware Purchasers	-	37%
Base = Aware Respondents	32 %	-
Base = All Respondents	8%	-

3.5 INFORMATION SOURCES

Table 3-18 shows the sources where respondents reported getting information on heating and cooling products. The most common sources were *Consumer Reports* and friends and neighbors, each at approximately 60 percent. Several sources, including newspaper, television, utility programs, retailers, and Internet, each were used by about 30 percent of respondents in obtaining information about heating and cooling products. Little difference was seen across publicity levels.

Table 3-18
Heating and Cooling Product Information Sources
(Base = All Respondents)

Q12: Heating/cooling information sources	Publicity Category			Total
	High	Other	Low	
e.g. Consumer Reports	61%	62%	52%	59%
Other types of magazines	15%	19%	14%	16%
Newspaper	31%	32%	37%	33%
Radio	11%	17%	15%	15%
Television	28%	30%	31%	30%
Utility program	32%	26%	30%	28%
Retailer	32%	30%	26%	29%
Contractor	27%	30%	27%	28%
Friend/neighbor/etc.	57%	62%	57%	59%
Internet	38%	35%	30%	34%
Other source	5%	5%	7%	6%
Average	31%	32%	30%	31%
# households (millions)	14.01	25.37	19.30	58.68
% households	24%	43%	33%	100%

Table 3-19 shows the sources where respondents reported getting information on home appliances, lighting, and home electronics. The most commonly reported sources were very similar to those reported for heating and cooling equipment. Utility programs were mentioned somewhat less frequently, with approximately 20 percent of respondents, and retailers somewhat more frequently.

Table 3-19
Home Appliances, Lighting, and Electronics Product Information Sources
(Base = All Respondents)

Q12: Non-heating/cooling information sources	Publicity Category			Total
	High	Other	Low	
e.g. Consumer Reports	63%	62%	54%	60%
Other types of magazines	21%	26%	21%	23%
Newspaper	29%	35%	38%	34%
Radio	13%	17%	15%	15%
Television	27%	31%	32%	31%
Utility program	25%	18%	22%	21%
Retailer	37%	37%	33%	36%
Contractor	20%	20%	19%	19%
Friend/neighbor/etc.	57%	64%	58%	61%
Internet	36%	37%	32%	35%
Other source	6%	6%	5%	6%
Average	30%	32%	30%	31%
# households (millions)	13.89	24.50	18.90	57.30
% households	24%	43%	33%	100%

4 CONCLUSIONS

ENERGY STAR qualified products are being promoted by a total of 86 utilities, market transformation groups, and state administrators representing one-half of U.S. households. This first national study of the ENERGY STAR label for household products produced several positive findings:

- Nationwide, 41 percent of households are aware of the ENERGY STAR label.
- Over one-half of all households, including those that had seen the label previously and those that were reacting to it for the first time, had at least a general understanding of the label's message.
- Label awareness and understanding are greater in areas with higher promotional activity.
- The influence of the label on purchase decisions is greater in areas with higher promotional activity.
- About one-half of those who purchased ENERGY STAR products were influenced by the label to buy the product.
- Roughly 70 percent of those who received an incentive for the purchase of ENERGY STAR products reported that they would have been somewhat or very likely to have bought the product even without the rebate.

These findings confirm that a substantial portion of U.S. consumers are aware of and understand the ENERGY STAR label and are similar to other regional and/or comparably designed studies. Moreover, the label influences purchase decisions, and local and regional publicity efforts improve both awareness and understanding of the label.

APPENDIX A

Survey Questionnaire

ENERGY STAR® Household Survey

May we have your help? We are a nonprofit association promoting energy efficiency and need your input in conducting a national random survey. We are assessing a national program promoted by the U.S. Environmental Protection Agency, the U.S. Department of Energy, several state governments, and numerous electric and gas utility companies. Your response is very important. Please take a few minutes to fill out this questionnaire, fold it according to the instructions, staple or tape it together, and mail it back (no postage necessary). All responses will be kept confidential. Thanks for your participation.

The Consortium for Energy Efficiency
Boston, MA
http://www.CEEforMT.org

Fold on Dotted Line

Staple or tape here

Household Survey Instructions

Who should complete the survey?
Please pass this questionnaire to the person in your household who makes decisions about major appliance and home electronics purchases.

How to complete the survey?
Please read the questions below. Write your brief response neatly or mark the answers that best fit your situation with an X in the boxes provided. Based on your response, you will be asked to proceed to the next question or instructed to skip to another question.

Where to return the survey?
When you are finished, please refold the questionnaire, staple or tape where indicated, and drop it in any mailbox. No postage is necessary.

Whom to call with questions?
If you have any questions about the study or the questionnaire, please call Opinion Dynamics Corporation at 1-800-966-1254.

1 Please look at the ENERGY STAR Label above. Write the first message that comes to mind when you see the ENERGY STAR Label.

_____

_____

_____

_____

2 Please write any other messages that come to mind when you see the ENERGY STAR Label.

_____

_____

_____

3 Prior to this survey, had you ever heard of or seen this Label? ☐ Yes **(Proceed to Question 4 on page 2)**

☐ No *(Skip to Question 11 on page 3)*

4 Please review the following list and mark with an X all places in which you have seen or heard about the ENERGY STAR Label.

- ☐ In newspapers or magazines
- ☐ On television
- ☐ On utility inserts or by direct mail
- ☐ On displays in stores
- ☐ On the Internet
- ☐ From a sales person or contractor
- ☐ From a friend, neighbor, relative, or coworker
- ☐ Other
- ☐ None of these sources
- ☐ Don't know

5 Please review the following list and mark with an **X** all the products or product literature on which you have seen the ENERGY STAR Label.

Heating and Cooling Products

- ☐ Central air conditioner
- ☐ Furnace or boiler
- ☐ Heat pump
- ☐ Thermostat
- ☐ Room air conditioner

Home Office Equipment

- ☐ Computer or monitor
- ☐ Computer printer
- ☐ Copying machine
- ☐ Fax machine
- ☐ Scanner

Home Appliances/Lighting

- ☐ Dishwasher
- ☐ Refrigerator
- ☐ Lighting fixture
- ☐ Washing machine
- ☐ Compact fluorescent light bulb
- ☐ Microwave

Home Electronics

- ☐ Television
- ☐ VCR
- ☐ Audio product

Building Materials

- ☐ Window
- ☐ Door
- ☐ Skylight
- ☐ Insulation
- ☐ Roofing material

☐ ***Newly Built Home***

☐ ***None of These Products***

6 Have you purchased any of the products listed in Question **5** in the last 12 months?

- ☐ Yes **(Proceed to Question 7)**
- ☐ No *(Skip to Question* **12** *on page 3)*

7 For any of the products you purchased, did you see the ENERGY STAR Label (on the product itself, on the packaging, or on the instructions)?

- ☐ Yes. On which products did you see the ENERGY STAR label? (please list all products)

_____

_____

_____

(Proceed to Question 8)

- ☐ No *(Skip to Question* **11** *on page 3)*
- ☐ Don't Know *(Skip to Question* **11** *on page 3)*

8 For any ENERGY STAR product(s) you purchased, did the presence or absence of the ENERGY STAR Label influence your purchasing decision?

- ☐ Yes **(Proceed to Question 9)**
- ☐ No **(Proceed to Question 9)**
- ☐ Don't Know **(Proceed to Question 9)**

9 If you purchased an ENERGY STAR product, did you receive rebates or reduced-rate financing?

- ☐ Yes **(Proceed to Question 10)**
- ☐ No *(Skip to Question* **11** *on page 3)*
- ☐ Don't Know *(Skip to Question* **11** *on page 3)*

10 If rebates or reduced-rate financing had not been available, how likely is it that you would have purchased the ENERGY STAR product?

☐ Very Likely ☐ Somewhat Likely ☐ Somewhat Unlikely ☐ Very Unlikely ☐ Don't Know

Please continue on the next page

11 Which of the following products have you purchased in the last 12 months? Please mark with an **X** all that apply.

Heating and Cooling Products

- ☐ Central air conditioner
- ☐ Furnace or boiler
- ☐ Heat pump
- ☐ Thermostat
- ☐ Room air conditioner

Home Appliances/Lighting

- ☐ Dishwasher
- ☐ Refrigerator
- ☐ Lighting fixture
- ☐ Washing machine
- ☐ Compact fluorescent light bulb
- ☐ Microwave

Building Materials

- ☐ Window
- ☐ Door
- ☐ Skylight
- ☐ Insulation
- ☐ Roofing material

☐ ***Newly Built Home***

☐ ***None of These Products***

Home Office Equipment

- ☐ Computer or monitor
- ☐ Computer printer
- ☐ Copying machine
- ☐ Fax machine
- ☐ Scanner

Home Electronics

- ☐ Television
- ☐ VCR
- ☐ Audio product

12 Please look at the product types listed below. Please mark with an **X** the source(s) of information you are most likely to use to obtain information about that product type. Mark all that apply.

Heating and Cooling Products

- ☐ *Consumer Reports* and other product-oriented magazines
- ☐ Other magazines
- ☐ Newspapers
- ☐ Radio
- ☐ Television
- ☐ Electric or gas utility program
- ☐ Advice from retailers
- ☐ Advice from contractors
- ☐ Advice from a friend, neighbor, relative, or coworker
- ☐ Internet
- ☐ Other
- ☐ Don't know

Home Appliances/Lighting/Home Electronics

- ☐ *Consumer Reports* and other product-oriented magazines
- ☐ Other magazines
- ☐ Newspapers
- ☐ Radio
- ☐ Television
- ☐ Electric or gas utility program
- ☐ Advice from retailers
- ☐ Advice from contractors
- ☐ Advice from a friend, neighbor, relative, or coworker
- ☐ Internet
- ☐ Other
- ☐ Don't know

Please note: We emphasize that this survey is **strictly confidential.** Your responses will be included with the responses of other survey participants, and your name will not be associated with your responses or be provided to the government or any other party.

13 How many personal computers are in use in your home?

Number of computers:_____

(If your answer is 0, please skip to Question **15***)*

14 Adding together the use of all computers in your home, what is the average number of hours per day that computers are turned on?

Average number of hours:_____

15 How many people live in your household, including yourself? *(Please count children as well as adults. Include all members of your household whether or not they are related to you.)*

Number of people in household:_____

16 What is your age?

- ☐ 18 - 24
- ☐ 25 - 34
- ☐ 35 - 44
- ☐ 45 - 54
- ☐ 55 - 64
- ☐ 65 - 74
- ☐ 75 +

17 What is your gender?

- ☐ Male
- ☐ Female

18 Are you the person responsible for paying the energy bill(s) in your household?

- ☐ Yes
- ☐ No

19 Which of the following best describes your home?

- ☐ Single-family home not attached to others
- ☐ Townhouse or row house
- ☐ Duplex or triplex
- ☐ Apartment (in building with 4+ units)
- ☐ Mobile home
- ☐ Other

20 How many bedrooms do you have in your home?

Number of bedrooms:_____

21 Do you or members of your household own or rent your present home?

- ☐ Own
- ☐ Rent
- ☐ Occupy but do not pay rent

22 Please mark the box indicating the total combined income in the last 12 months of all family members living in your household. *(Include income before taxes and deductions from all sources.)*

- ☐ Less than $5,000
- ☐ $5,000 - $9,999
- ☐ $10,000 - $14,999
- ☐ $15,000 - $19,999
- ☐ $20,000 - $24,999
- ☐ $25,000 - $49,999
- ☐ $50,000 - $74,999
- ☐ $75,000 and over

Thank you very much for your assistance

APPENDIX B

Fifty-seven Largest DMAs

Table B-1
The Fifty-seven DMAs in the National Sample

DMA Rank	DMA Market Name	GRPS through 12/99	Publicity Category
2	LOS ANGELES	375	high
5	SAN FRANCISCO-OAK-SAN JOSE	1333	high
6	BOSTON	625	high
12	SEATTLE-TACOMA	1606	high
20	SACRAMNTO-STKTON-MODESTO	126	high
26	SAN DIEGO	2515	high
27	HARTFORD & NEW HAVEN	816	high
7	DALLAS-FT. WORTH	54	low
8	WASHINGTON, DC	0	low
11	HOUSTON	0	low
14	TAMPA-ST. PETE (SARASOTA)	465	low
15	MINNEAPOLIS-ST. PAUL	101	low
22	ORLANDO-DAYTONA BCH-MELBRN	408	low
24	BALTIMORE	463	low
28	CHARLOTTE	0	low
29	RALEIGH-DURHAM	94	low
30	NASHVILLE	0	low
32	CINCINNATI	0	low
34	COLUMBUS, OH	0	low
35	GREENVLL-SPART-ASHEVLLE	0	low
36	SALT LAKE CITY	32	low
37	SAN ANTONIO	0	low
39	BIRMINGHAM (ANN, TUSC)	0	low
40	NORFOLK-PORTSMTH-NEWPT NWS	198	low
41	NEW ORLEANS	0	low
43	MEMPHIS	0	low
44	WEST PALM BEACH-FT. PIERCE	0	low
45	OKLAHOMA CITY	0	low
47	GREENSBORO-H.POINT-W.SALEM	0	low
48	LOUISVILLE	0	low
49	ALBUQUERQUE-SANTA FE	0	low
51	WILKES BARRE-SCRANTON	295	low
52	JACKSONVILLE	0	low
54	DAYTON	0	low
57	LITTLE ROCK-PINE BLUFF	0	low
1	NEW YORK	674	other
3	CHICAGO	1010	other
4	PHILADELPHIA	605	other
9	DETROIT	1517	other
10	ATLANTA	914	other
13	CLEVELAND	968	other
16	MIAMI-FT. LAUDERDALE	1317	other
17	PHOENIX	214	other
18	DENVER	2228	other
19	PITTSBURGH	2016	other
21	ST. LOUIS	1421	other
23	PORTLAND, OR	1098	other
25	INDIANAPOLIS	355	other
31	MILWAUKEE	1259	other
33	KANSAS CITY	688	other
38	GRAND RAPIDS-KALMZOO-B.CRK	0	other
42	BUFFALO	0	other
46	HARRISBURG-LNCSTR-LEB-YORK	1690	other
50	PROVIDENCE-NEW BEDFORD	0	other
53	ALBANY-SCHENECTADY-TROY	0	other
55	FRESNO-VISALIA	0	other
56	LAS VEGAS	375	other

APPENDIX C

Sample Weighting and Variance Estimation Methodology

Sample Weighting and Variance Estimation Methodology

A sampling weight is assigned to each survey respondent. The weight is equal to the number of households represented by the responding household. This number is the inverse of the sample inclusion probability.

For households in the CEE member sample, the inclusion probability for each customer in a member area is the ratio of the number of respondents in the area to the total number of households in the area. The weight is thus the ratio of the total households in the area to the total households in the sample. This weight is the same for all households in a given member area. That is, the weight for member area *a* is given by

$$w_a = 1/p_a = (N_a / n_a),$$

where

$p_a = n_a / N_a$
n_a = number of responding households in member area *a*
N_a = total number households in member area *a*.

For households in the restricted national sample, the inclusion probability is the product of two probabilities. First is the probability that the DMA was selected within the publicity stratum. This probability is the ratio of selected DMAs (or restricted DMAs) to the number of DMAs in the stratum (in the restricted national frame). The second probability is the probability that a household was included given that the DMA was selected. This probability is the ratio of the number of responding households to the number of households in the restricted DMA.

The corresponding expansion weight is simply the inverse of its overall sampling probability. Thus, for all sampled homes in (restricted) DMA *a* from the restricted national sample, the expansion weight is

$$w_a = 1/p_a = (1/p_{1a})\,(1/p_{2a})$$

where

$p_{1a} = n_{1m} / N_{1m}$
n_{1m} = total number of DMAs selected from stratum *m* for the restricted national frame
N_{1m} = total number of DMAs in the restricted national frame in stratum *m*.
$p_{2a} = n_{2a} / N_{2a}$
n_{2a} = number of responding households in the restricted DMA *a*
N_{2a} = total number of households in the restricted DMA *a*.

The mean of any variable *x* of interest over a group *g* is then calculated from the observations x_j over all responding households *j* as

$$X = \Sigma_{j \in g} x_j w_j / \Sigma_{j \in g} w_j.$$

Variance Estimation

The component estimates and variances were estimated using SUDAAN, which is a software package developed by Research Triangle Institute for analysis of complex survey data. The package requires only the specification of the sampling structure, including stratification, nesting, and first-stage selection probabilities.

Following is the overall sample structure for the combined sample:

1. The total population is stratified into the member and restricted national frames.
2. The member frame is further stratified into the five member areas.
3. A simple random sample is selected within each of the member strata.
4. The national restricted frame is stratified by publicity level.
5. First-stage sampling is of (restricted) DMAs within each publicity stratum.
6. A simple random sample is selected within each selected DMA.

Because the member and national frames have a different structure, with the two-stage sampling for the national frame only, estimates and standard errors are calculated separately for these two portions of the combined frame. The estimates and standard errors are then combined outside SUDAAN.

The samples in the member and restricted national frames are independent. Thus, the variance of these two components can be separately estimated. The variance of the overall estimate is calculated from these two components.

To estimate a total, the overall estimate can be expressed as the sum of totals for the two components:

$$X_T = X_{TP} + X_{TR},$$

where subscripts P and R, respectively, denote the member and restricted national samples. The variance of the overall total is then given by

$$V(X_T) = V(X_{TP}) + V(X_{TR}).$$

To estimate a mean, the overall estimate is a weighted average of the component means

$$\bar{X}_T = \frac{N_{TP}\bar{X}_{TP} + N_{TR}\bar{X}_{TR}}{N_{TP} + N_{TR}}$$

where N_{TP} and N_{TR}, respectively, denote the number of homes in the member and restricted national frames. The variance of the overall mean is then

$$V\left(\bar{X}_T\right) = \left(N_{TP} / N_T\right)^2 V\left(\bar{X}_{TP}\right) + \left(N_{TR} / N_T\right)^2 V\left(\bar{X}_{TR}\right),$$

where $N_T = N_{TP} + N_{TR}$ is the total number of homes in the combined frame. These formulas apply also to the variance of an estimated proportion, viewing a proportion as the mean of a 0/1 variable.

Subgroup Estimates

Totals, means, or proportions and corresponding variances for any subgroup of interest can be estimated by using essentially the same formulas given above for overall totals or means. The difference is that for subsets the population counts N_{TP} and N_{TR} used to combine variances for the two sample components are estimated from the data, rather than being taken directly from known totals.