

ENERGY STAR®. The simple choice for energy efficiency.



NATIONAL AWARENESS OF ENERGY STAR® FOR 2016

ANALYSIS OF CEE HOUSEHOLD SURVEY

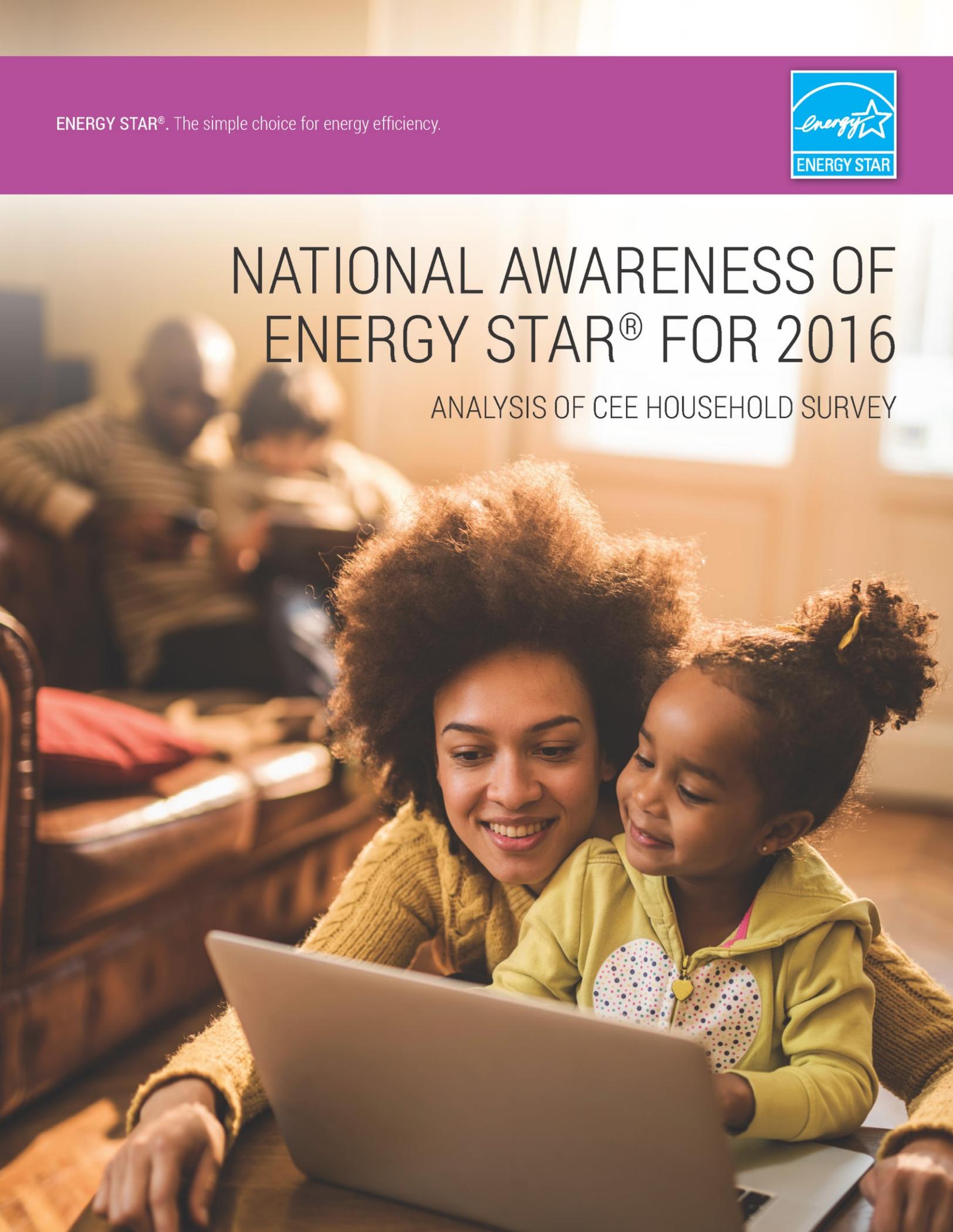


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- DTE Energy
- Northwest Energy Efficiency Alliance
- New Jersey Natural Gas
- Oncor
- Pacific Gas and Electric Company
- South Jersey Gas
- The United Illuminating Company

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EXECUTIVE SUMMARY

In the fall of 2016, members of the Consortium for Energy Efficiency (CEE) sponsored the seventeenth national household survey of consumer awareness of ENERGY STAR. Each year, the survey objectives have largely been the same: to collect national data on consumer recognition, understanding, and purchasing influence of the ENERGY STAR label, as well as data on messaging and product purchases. CEE members may choose to supplement the national sample by adding additional data points in order to assess label awareness in their local service territories.

This report discusses the results of the CEE 2016 ENERGY STAR Household Survey, building on prior years' survey results and focusing on the extent to which consumers recognize the ENERGY STAR label, understand its intended messages, and utilize (or are influenced by) the label in their energy-related purchase decisions. Research questions of interest included:

- Where do consumers see or hear about the ENERGY STAR label?
- How does increased publicity affect recognition, understanding, and influence of the ENERGY STAR label?
- Which key messages about the ENERGY STAR label are consumers retaining?
- Do consumers demonstrate loyalty to the ENERGY STAR label?

Key Findings at the National Level

- Ninety-one percent of households in 2016 compared with 88 percent in 2015 recognized the ENERGY STAR label when shown the label.
- Eighty-five percent of households have seen or heard of the ENERGY STAR label (without visual aid). This is similar to the 83 percent finding in 2015.
- Households continue to show a high understanding of the ENERGY STAR label. Seventy-five percent of households had a high understanding of the ENERGY STAR label in 2016, similar to 76 percent in 2015. Eighty-four percent of households had at least a general understanding of the label in 2016; this result was eighty-five percent in 2015.
- Among all households, 45 percent knowingly purchased an ENERGY STAR-labeled product in the past 12 months.
- Eighty percent of households that recognized the label and purchased a product in a category where ENERGY STAR-labeled products are an option were likely to recommend ENERGY STAR-labeled products to a friend; 27 percent of these households reported that they were "extremely likely" to recommend ENERGY STAR-labeled products. Both findings are similar to 2015.

- In 2016, seventy-six percent of households have seen something about ENERGY STAR on appliance or electronics labels; this is similar to 2015 (72 percent). The proportion informed by the internet increased to 21 percent in 2016 from 17 percent in 2015.
- Respondents were asked to rate their satisfaction on a scale of 1 to 5, where 1 means “very dissatisfied” and 5 means “very satisfied.” Overall customer satisfaction with ENERGY STAR labeled products remained high, 4.2 percent this and last year.
- Of households that recognized the ENERGY STAR label, the proportion that either strongly or somewhat agree with the statement “If I see the ENERGY STAR label, I know I’m getting a more energy-efficient product” was largest this year (65 percent) compared to agreement of other attitudinal statements.

Conclusions

This seventeenth national study of household awareness of the ENERGY STAR label confirms key findings from the previous years’ surveys:

- Substantial portions of U.S. households in the surveyed population recognize, understand, and are influenced by the ENERGY STAR label.
- A large proportion of households consistently associate the label with energy efficiency and saving energy.
- The proportion of households that exhibit only a general understanding of the label is small (9 percent) compared with the proportion of households that exhibit a high understanding (75 percent).

INTRODUCTION

In the fall of 2016, members of the Consortium for Energy Efficiency (CEE) sponsored the seventeenth national household survey of consumer awareness of ENERGY STAR. Each year, the survey objectives have largely been the same: to collect national data on consumer recognition, understanding, and purchasing influence of the ENERGY STAR label, as well as data on messaging and product purchases. CEE members may choose to supplement the national sample in order to assess label awareness in their local service territories. To this end, in 2016 additional surveys were conducted in the United Illuminating service territory (southwestern Connecticut). As in the sixteen previous years, CEE and sponsoring members made the survey data publicly available for this analysis.

This report discusses the results of the CEE 2016 ENERGY STAR Household Survey, building on prior years' survey results and focusing on the extent to which consumers recognize the ENERGY STAR label, understand its intended messages, and utilize (or are influenced by) the label in their energy-related purchase decisions. Research questions of interest included the following:

- Where do consumers see or hear about the ENERGY STAR label?
- How does increased local publicity affect recognition, understanding, and influence of the ENERGY STAR label?
- Which key messages about the ENERGY STAR label are consumers retaining?
- Do consumers demonstrate loyalty to the ENERGY STAR label?

The remainder of this report summarizes the survey and analysis methodology; it provides key findings regarding ENERGY STAR label recognition, understanding, influence, and information sources. It also contains appendices presenting detailed survey methodology (Appendix A), demographic information (Appendix B), additional questions included in the 2016 survey (Appendix C), and a copy of the 2016 questionnaire (Appendix D). In all cases, the results presented in this report were weighted to obtain results applicable at the national level (please refer to Appendix A for details on the weighting methodology).

METHODOLOGY OVERVIEW

During September 2016, CEE fielded a questionnaire to obtain information at the national level on consumer awareness of the ENERGY STAR label (please refer to Appendix A for a more detailed description of the survey methodology). A random sample of households that are members of an Internet panel was surveyed. Both the Internet panel as a whole and the sample of households completing the survey were selected by address-based sampling and recruited by telephone.¹ The panel is designed to be representative of the U.S. population.

This year's questionnaire was similar to the ones CEE fielded in 2000 – 2015. As in previous years, CEE and its sponsoring members made the survey data available to EPA for analysis.

The sampling frame for this national survey included all households in the largest 57 Nielsen Designated Market Areas® (DMAs) that together accounted for about 70 percent of U.S. television households. In addition, some CEE members periodically choose to sponsor more intensive sampling (i.e., an oversample) in selected localities, referred to here as *sponsor areas*. Sponsor areas are not limited to the 57 largest DMAs, however, to facilitate comparisons across years, each year the national results are based only on data collected from respondents from the 57 largest DMAs. Some of the 57 largest DMAs are also included in the sponsor areas and therefore are oversampled. The data from these respondents (as well as from the other respondents in the 57 largest DMAs) receive an appropriate weight in the analysis in order to generate valid national results and facilitate comparison with data from others years.

In 2016, there was one sponsor area: United Illuminating service territory (southwestern Connecticut). United Illuminating service territory is part of two of the largest 57 DMAs (New York DMA and Hartford-New Haven DMA); respondents from United Illuminating oversampling in these DMAs are appropriately weighted and included in the national analysis.

As in previous years' studies, the Top-57 DMAs in the sampling frame were classified by publicity category. The original intent of the classification was to be able to assess the effect of local energy efficiency program publicity on awareness. The majority of these local efficiency programs historically have been supported by utility rate-payer funding.

The historic classification used for publicity analysis was as follows:

- **High publicity:** Active local ENERGY STAR promotion *recently* sponsored by a utility, state agency, or other organization for two or more continuous years. The

¹ In previous years, the panel was recruited via random-digit dial. GfK, formerly Knowledge Networks, the firm that conducts the survey each year, believes that address-based sampling (ABS) offers advantages, including coverage of cell-phone-only households, and analysis of non-response bias. More information is available at <http://www.knowledgenetworks.com/accuracy/fall-winter2010/abs-fall2010.html>.

activities must include *sustained* promotions and publicity from non-federal sources.

- **Low publicity:** Federal campaign activities only and no *significant* regional program sponsor activities.
- **Other:** All other DMAs.

The key working definitions were defined as follows:

- **Recent:** The 2 years of activity must include the time period during which the survey was in the field.
- **Sustained:** The 2 years of activity must be continuous.
- **Significant:** In addition to any direct federal publicity efforts, a DMA's publicity efforts must include a deliberate and multifaceted regional program sponsor investment in ENERGY STAR programming, such as direct marketing efforts or the creation and distribution of promotional material.

In 2009, a decision was made to retain the prior year's publicity classification of the 57 largest DMAs – in essence preserving the historical classification for future study years. *Low publicity* and *other publicity* are combined in the analysis and referenced as *non- high-publicity areas*. One reason to combine these categories in the analysis is that over time, the population of low-publicity DMAs has dropped to about 15 percent, while high-publicity DMAs now account for about half of U.S. television households.

The sample was stratified by area and within an area by publicity category. The United Illuminating service territory sponsor area did not require stratification by large versus non-large DMA. The CEE members who fund the oversample for a sponsor area determine the total number of sampling points allocated to the sponsor area as a whole. This total number of sampling points is then allocated across sponsor area strata proportional to population.

While the dataset has always been appropriately weighted in the national analysis, beginning in 2010, the number of respondents in each stratum was chosen in proportion to that stratum's share of the U.S. population living in DMAs. In 2016, the national sample is comprised of 1,076 respondents from the top 57 DMAs.²

This report presents the 2016 survey results at the national level and by publicity category. Results are presented on consumer recognition and understanding, and purchasing influence of the ENERGY STAR label, as well as on messaging, product purchases, and information sources that consumers use to inform purchasing decisions.

² In a year when CEE members choose not to sponsor an oversample the national sample comprises 1,000 respondents from the top 57 DMAs. In 2016, the national sample included an additional 76 respondents that were part of the oversample and were from the top 57 DMAs.

In this report, the following terminology is used in comparing results across years or sub-categories. (1) The term “significant” implies statistical significance. In other words, differences between proportions that are described as “significant” are at least statistically different at the 10-percent level of significance. In some cases, the p-values are given to provide the exact level of statistical significance. (2) Unless stated otherwise, terms such as “smaller,” “larger,” “increase,” or “decrease” refer to changes that are statistically significant at the 10-percent level or better. (3) The term “similar” implies that there is no statistical difference between the results being compared at the 10-percent level of significance. In other words, the difference between the results is within the bounds that would be expected from chance variation in a random sample.

KEY FINDINGS

RECOGNITION

In 2016, 91 percent of households recognized the ENERGY STAR label when shown the label (i.e., *aided recognition*). Eighty-five percent of households recalled having seen or heard of the ENERGY STAR label without first being shown the label (i.e., *unaided recognition*).

For purposes of this analysis, respondents were said to recognize the ENERGY STAR label if they had seen or heard of the label before the survey. Recognition of the label was explored in two ways. Unaided recognition was measured by asking if the respondent had seen or heard of the ENERGY STAR label without showing the label. Delivery of the survey by Internet made it possible to measure aided recognition. Aided recognition was measured by showing respondents the ENERGY STAR label and then asking if they had seen or heard of the label. Both methods are useful measurements of label recognition, although unaided recognition is the more conservative of the two.

Recognition results for both the 2016 and 2015 surveys are summarized in the following table. Aided recognition of the ENERGY STAR label was significantly higher at the 10-percent level (p-value = 0.0807) in 2016 when compared to 2015. Unaided recognition of the ENERGY STAR label results were similar in 2015 and 2016 (p-value = 0.2072).

Recognition of the ENERGY STAR Label
[Base = All respondents]

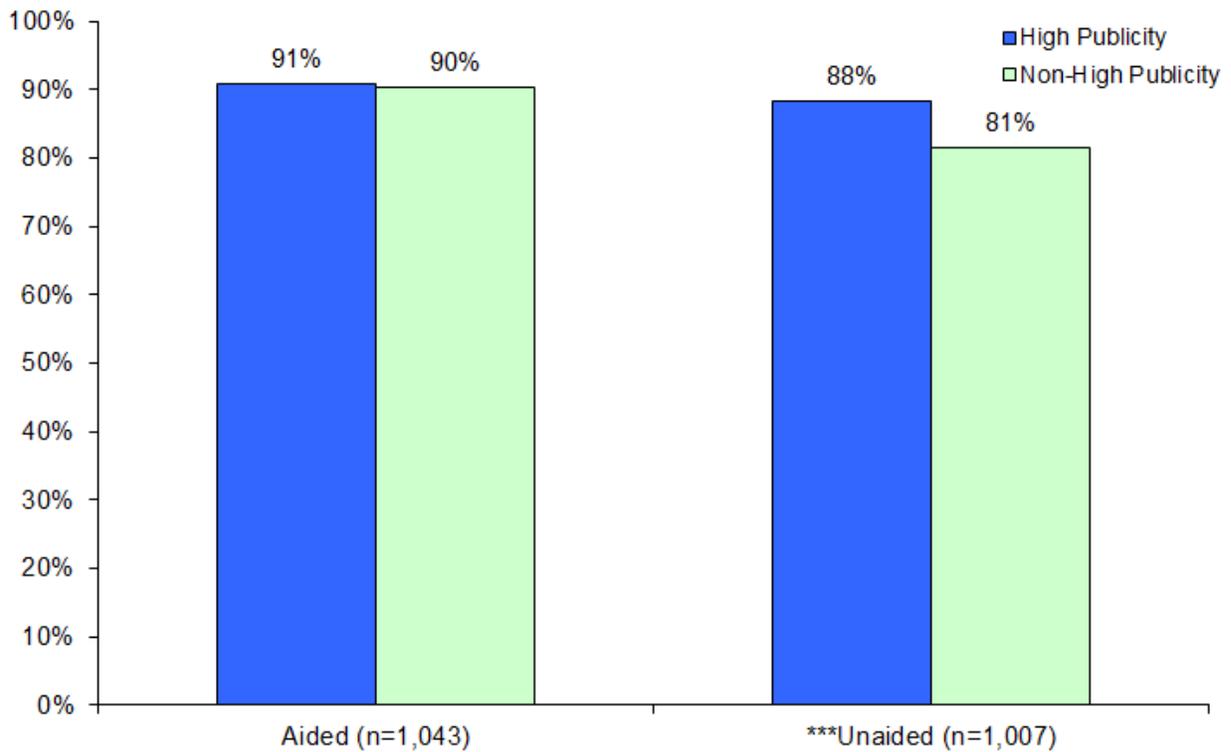
Recognize ENERGY STAR Label	2016		2015	
	Aided (n=1,043)	Unaided (n=1,007)	Aided (n=961)	Unaided (n=943)
Yes	91%	85%	88%	83%
Standard error	1.0%	1.3%	1.2%	1.5%

Note: The unaided recognition results for both years were based on the question ES1: "Have you ever seen or heard of the ENERGY STAR label?" The aided recognition results were based on five questions. (1) ES3A and (2) ES3B were asked if ES1 = "yes." ES3A: "Is this the label you have seen or heard of before?"—whether the old or new label was shown was randomly determined. ES3B: "Have you seen or heard of this version of the ENERGY STAR label?"—where the label shown was the one not shown previously. (3) ES3C and (4) ES3D were asked if ES1 = "no." ES3C: "Please look at the ENERGY STAR label on the left. Have you ever seen or heard of this label?"—whether the old or new label was shown was randomly determined. ES3D: "Have you seen or heard of this version of the ENERGY STAR label?"—where the label shown was the one not shown previously. (5) ES6 was asked if either ES1 = "no" or both ES3A and ES3B = "no." ES6: "Now that you have had the opportunity to see the ENERGY STAR label, do you recall seeing or hearing anything about it before this survey?"—where both the old and new labels were shown.

Recognition by Publicity Category

After being shown the ENERGY STAR label (aided), a similar percent of households in high and non-high-publicity areas recognized the label, 91 percent in high-publicity areas and 90 percent in non-high-publicity areas; for both publicity areas (p-value = 0.8646). Unaided recognition was 88 percent in high-publicity areas and 81 percent in non-high-publicity areas; this difference is statistically significant at the 1-percent level (p-value = 0.0092).

Recognition of the ENERGY STAR Label by Publicity Category
[Base = All respondents]



***High and non-high-publicity area proportions are statistically different from each other at the 1-percent level of significance (p-value ≤ 0.01).

Product Associations

Households that recognized the ENERGY STAR label (aided) indicate strong association between the label and products historically supported by regional energy efficiency programs (refrigerators, washing machines, dishwashers, compact fluorescent light bulbs, etc.).

Survey respondents that recognized the ENERGY STAR label (aided) were asked, “What types of products, goods, and services do you think of when you think of the ENERGY STAR label?” (survey question QA). The figure on the next page presents the results for this question, which indicate *unprompted* product associations.

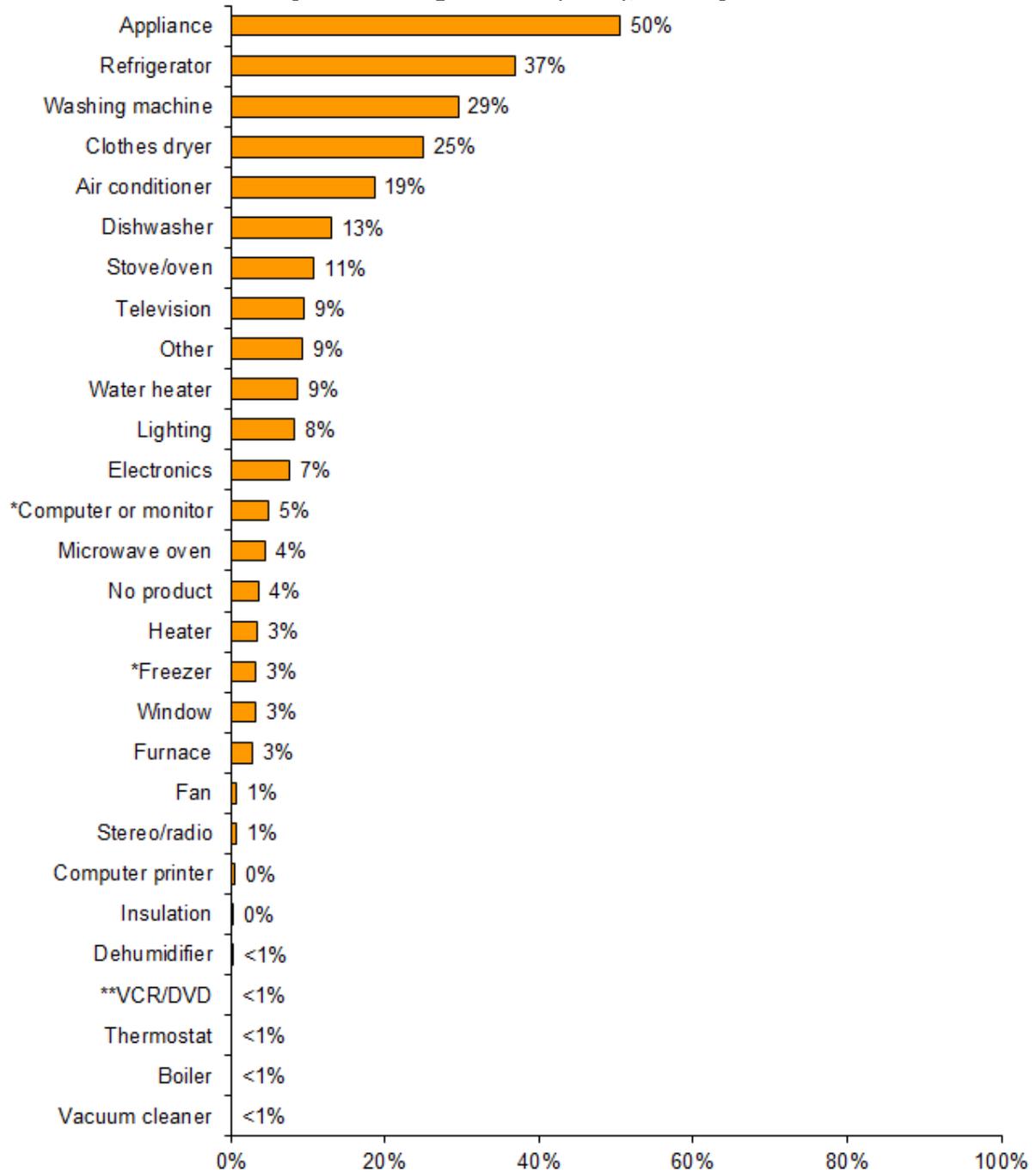
Since at least 2010, appliances, refrigerators, and washing machines have shown the strongest unprompted associations with the label at 50, 37, and 29 percent, respectively. Clothes dryers became eligible to receive the ENERGY STAR certification in 2015, and showed the fourth strongest association with the label at 25 percent.³ (Respondents had previously associated clothes dryers with the ENERGY STAR label before they were eligible for certification, however). The next strongest associated products (unprompted) were air conditioners, dishwashers, and stoves/ovens at 19, 13, and 11 percent, respectively. Stoves/ovens are not eligible for ENERGY STAR certification. Of the top six product associations, none are significantly different from the 2015 results. In addition to stoves/ovens, microwave ovens do not have an ENERGY STAR specification. Computers or monitors, freezers, and VCRs/DVDs all showed decreases in label association from 2015. These products were mentioned by relatively few respondents (5, 3, and less than 1 percent, respectively).

When prompted, 89 percent of households had seen the label on refrigerators. Washing machines (81 percent) and dishwashers (77 percent) were the next products most commonly associated with the ENERGY STAR label. Association with these top three products (prompted) is consistent with 2015 results, 87, 74, and 74 percent, respectively. While the ranking is similar to 2015, there was an increase in label awareness for washing machines at the 1-percent level of significance (p-value = 0.0025). Water heaters, televisions, central A/C, room air conditioners, and microwave ovens followed next in a range of 48 to 61 percent. None of the twenty-eight products had lower levels of association in 2016 than in 2015.

³ The ENERGY STAR clothes dryer specification went into effect in January 2015.

Unprompted Product Association with the ENERGY STAR Label

[Base = Recognize label (aided), n = 848]

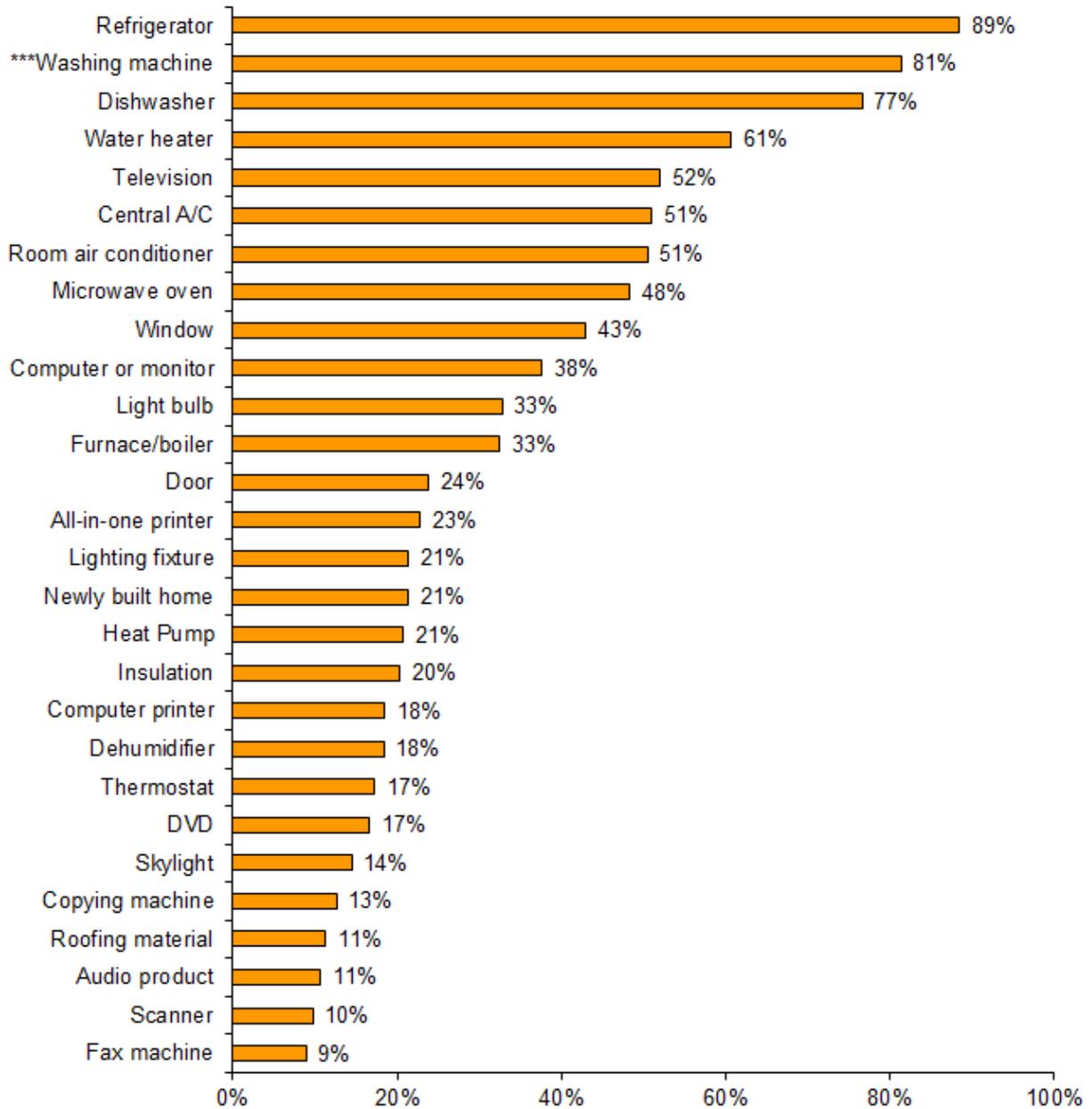


Note: QA: "What types of products, goods, or services do you think of when you think of the ENERGY STAR label? Please write your answers below."

** 2016 and 2015 proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05). The proportion of households in 2016 is smaller than 2015 for VCRs/DVDs.

* 2016 and 2015 proportions are statistically different from each other at the 10-percent level of significance (p-value ≤ 0.10). The proportion of households in 2016 is smaller than 2015 for computers or monitors, and for freezers.

**Prompted Product Association with the ENERGY STAR Label
[Base = Recognize label (aided)⁴]**



Note: Q5 (a, b, and c): “Now we’re going to ask you about several groups of products. As you review the list, please select each of the products, product literature, or packaging on which you have seen the ENERGY STAR label.”

*** 2016 and 2015 proportions are statistically different from each other at the 1-percent level of significance (p-value ≤ 0.01). The proportion of households in 2016 is larger than 2015 for washing machines.

⁴ Respondents were asked about three sets of product groupings: (1)(a) Heating and Cooling Products and Home Office Equipment, (2)(b) Home Appliances/Lighting and Home Electronics, and (3)(c) Building Materials and Buildings. The sample sizes, n, for these sets of product groupings are 872, 873, and 852 respectively.

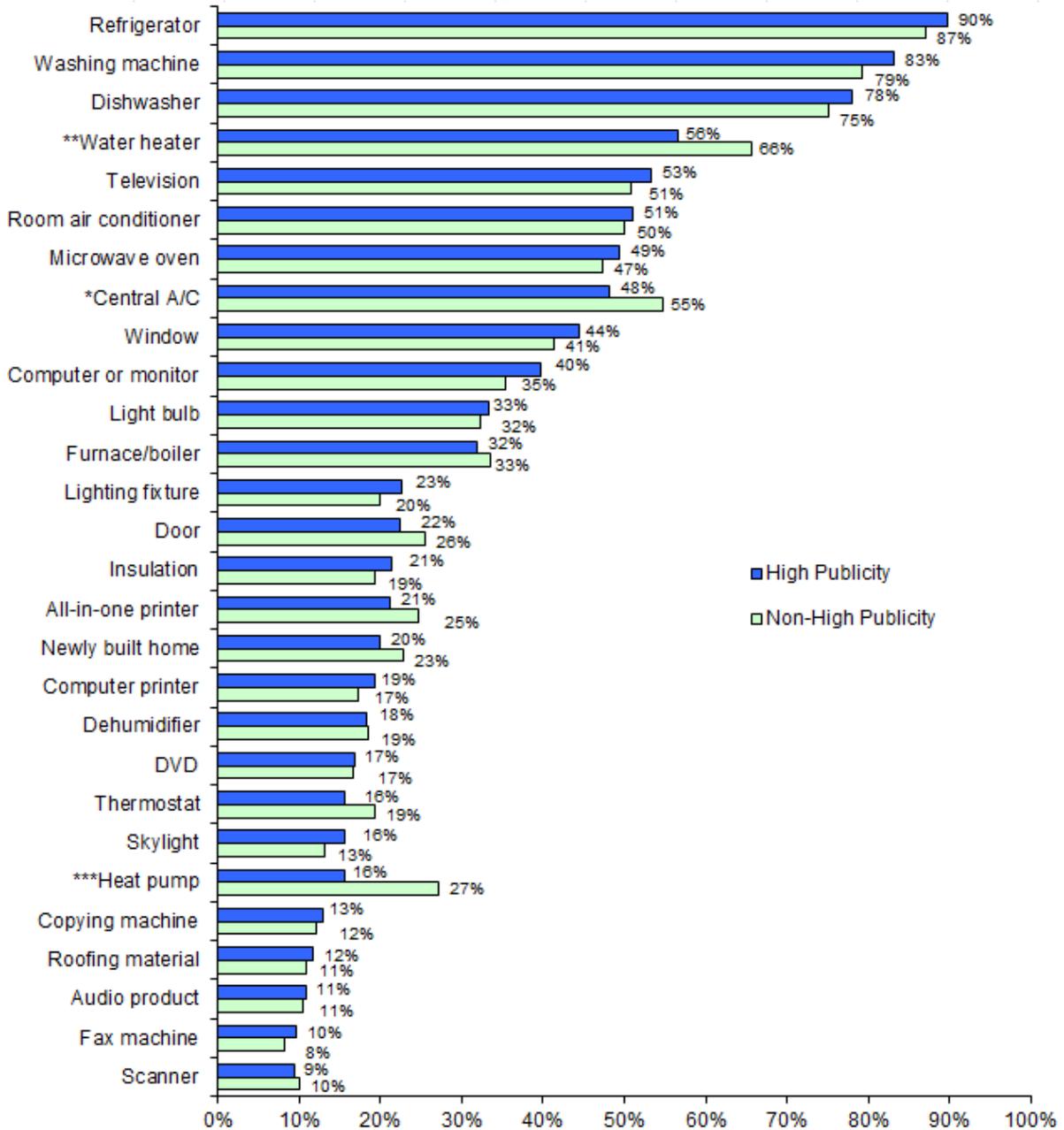
Product Associations by Publicity Category

Regional energy efficiency program sponsors have traditionally focused on promoting ENERGY STAR certified lighting, refrigerators, room air conditioners, washing machines, dishwashers, programmable thermostats⁵, and new homes. More recently, program sponsors have begun to promote ENERGY STAR certified water heaters and TVs in some parts of the country. Key findings from this year's analysis of product association by publicity category include the following.

- A significantly smaller proportion of households in high-publicity areas than non-high-publicity areas associated water heaters (56 percent and 66 percent, respectively), (p-value = 0.0155), central A/C (48 percent and 55 percent, respectively), (p-value = 0.0882), and heat pumps (16 percent and 27 percent, respectively), (p-value = 0.0005) with the ENERGY STAR-label when prompted.

⁵ EPA suspended the use of the ENERGY STAR label for programmable thermostats December 31, 2009. While EPA recognizes the potential for programmable thermostats to save significant amounts of energy, there continue to be questions regarding the net savings and environmental benefits achieved due to variations in consumer understanding and usage of programmable thermostats. EPA is working to develop a related Residential Climate Control specification. For more information, visit: www.energystar.gov/productdevelopment.

Prompted Product Association with the ENERGY STAR Label by Publicity Category
[Base = Recognize label (aided)]⁶7



*** High- and non-high-publicity area proportions are statistically different from each other at the 1-percent level of significance (p-value ≤ 0.01).

** High- and non-high-publicity area proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05).

* High- and non-high-publicity area proportions are statistically different from each other at the 10-percent level of significance (p-value ≤ 0.10).

⁶ As discussed in footnote 3, respondents were asked about three sets of product groupings. In Heating and Cooling Products and Home Office Equipment, the sample sizes for high- and non-high-publicity areas are 479 and 393, respectively. For Home Appliances/Lighting and Home Electronics they are 480 and 393, and for Building Materials and Buildings they are 466 and 386.

⁷ The percent labels on the bars are rounded to the nearest whole number. Therefore, bars with the same label may not be the same length.

UNDERSTANDING

In 2016, 84 percent of households had at least a general understanding of the ENERGY STAR label. Furthermore, the proportion of households that exhibited only a general understanding (9 percent) was small compared with the proportion that exhibited a high understanding (75 percent). The level of understanding was investigated by asking respondents what messages came to mind when they saw the ENERGY STAR label. Based on the reported messages, a respondent's understanding was classified as *high*, *general*, or *no understanding*.

The 2016 and 2015 survey results on the level of understanding of the ENERGY STAR label are provided in the following table. The proportion of respondents with a high understanding of the label remained consistent from 2015 to 2016, 76 percent and 75 percent, respectively (p-value = 0.9682). In addition, the proportion of respondents with at least a general understanding of the label is also consistent from 2015 to 2016, 85 percent and 84 percent, respectively (p-value = 0.7836).

Understanding of the ENERGY STAR Label
[Base = All respondents]

Level of Understanding of the Label	2016 (n=1,075)	2015 (n=1,000)
High understanding	75%	76%
General understanding	9%	9%
No understanding	16%	15%
Total	100%	100%

Note: The level of understanding of the ENERGY STAR label is determined using the open-ended responses to two questions (1) ES2: "What does the ENERGY STAR label mean to you?", and (2) ES4A1: "Please look at the ENERGY STAR labels on the left. Type the messages that come to mind when you see the ENERGY STAR label."

In all years except 2006, all respondents were asked either ES2 or ES4A1, depending on their answers to ES1. Respondents that answered "Yes" to ES1 were then asked ES2, while all other respondents were asked ES4A1.

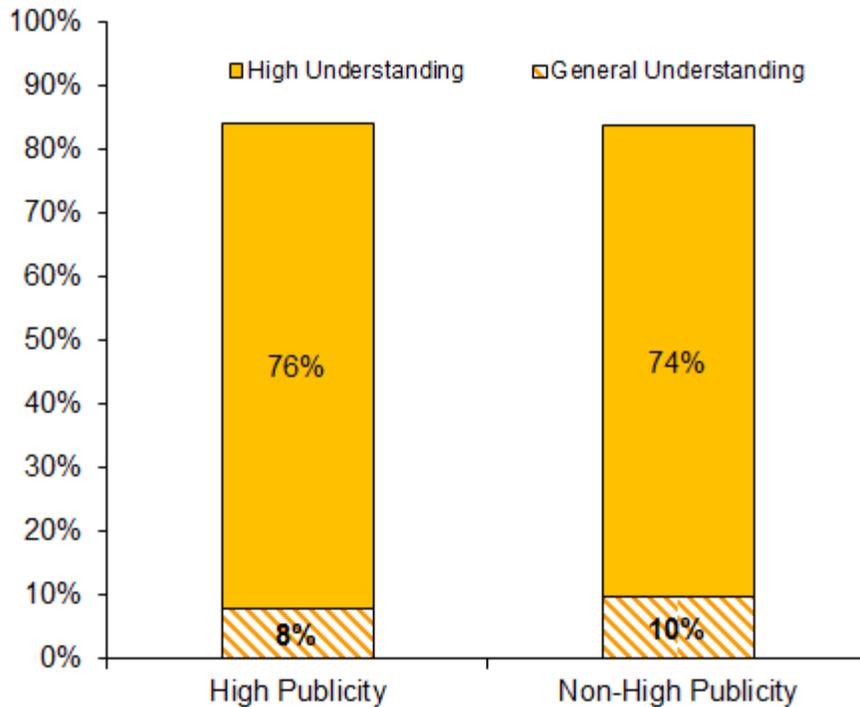
Understanding by Publicity Category

Eighty-four percent of households in high-publicity areas and in non-high-publicity areas had at least a general understanding of the label. Additionally, a large percent of households exhibited a high degree of understanding in both high- (76 percent) and non-high-publicity areas (74 percent). Neither of these differences is significant at the 10-percent level.

Understanding of the ENERGY STAR Label by Publicity Category
[Base = All respondents]

Publicity Category	At Least General Understanding of Label
High	84%
Non-high	84%
Difference (High minus Non-high)	0%
p-value	0.896

Understanding of the ENERGY STAR Label by Publicity Category
[Base = All respondents]



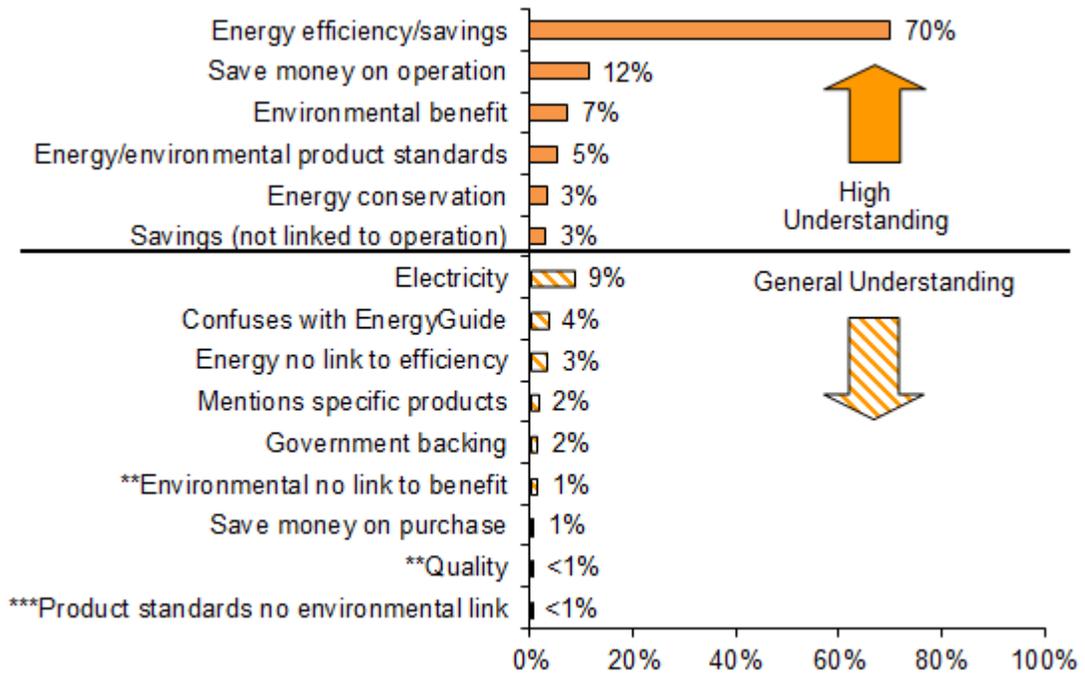
Understanding of Label Messaging

Open-ended responses to the questions on the level of understanding of the ENERGY STAR label are an indicator of how effectively EPA communicates its messages through the label. These responses are used in the analysis of understanding in the previous section. By far, the most common message associated with the label was “energy efficiency or energy savings,” which is considered high understanding of the label. Seventy percent of households surveyed associated the ENERGY STAR label with this message. This is consistent with the 2015 result of 68 percent (p-value = 0.5001).

Between 2015 and 2016, there was a decrease in the percent of households that associated the ENERGY STAR label with messages considered a general understanding of the ENERGY STAR label. These consisted of “Quality” and “Product standards no environmental link.” “Quality” is statistically different from 2015 at the 5-percent level (p-value = 0.0247) and “Product standards no environmental link” is statistically different from 2015 at the 1-percent level (p-value = 0.0067).

Lastly, there was a statistically significant increase in households associating the label with “environmental no link to benefit” from less than 1 percent in 2015 to 1 percent in 2016 at the 5-percent significance level (p-value = 0.0103). This message is also considered a general understanding of the ENERGY STAR label. These results can be viewed in the following chart.

Messages of the ENERGY STAR Label
[Base = All respondents]

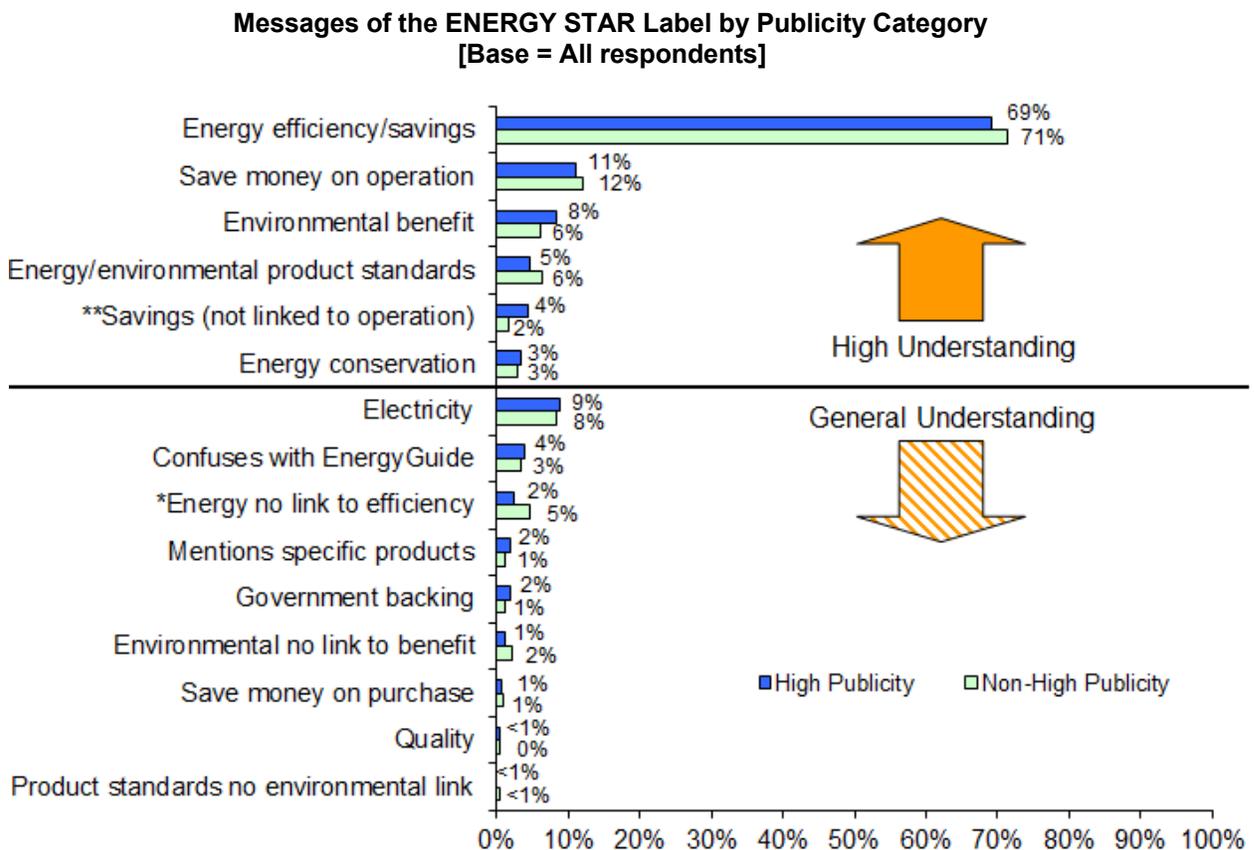


*** 2016 and 2015 proportions are statistically different from each other at the 1-percent level of significance (p-value ≤ 0.01). The proportion of households in 2016 is smaller than 2015 for “Product standards no environmental link.”

** 2016 and 2015 proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05). The proportion of households in 2016 is larger than 2015 for “Environmental no link to benefit”. The proportion of households in 2016 is smaller than 2015 for “Quality”.

Understanding of Label Messaging by Publicity Category

A majority of respondents in high-publicity regions (69 percent) and non-high-publicity regions (71 percent) associated the ENERGY STAR label with “energy efficiency or energy savings.” More respondents (4 percent) in high-publicity regions than in non-high-publicity regions (2 percent) associated the label with “Savings (not linked to operation);” this difference is statistically significant at the 5-percent level (p-value = 0.0327). For the first and all other messages considered to show a high understanding, the proportion of households that associated the message with the ENERGY STAR label was similar for high- and non-high-publicity regions. For messages considered to show a general understanding, fewer respondents in high-publicity regions (2 percent) than non-high-publicity regions (5 percent) associate the label with “energy and no link to efficiency;” this difference is statistically significant at the 10-percent level (p-value = 0.0862). For other messages, the proportion of households that associated the message with the ENERGY STAR label was similar for high- and non-high-publicity categories.



** High- and non-high-publicity area proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05).

* High- and non-high-publicity area proportions are statistically different from each other at the 10-percent level of significance (≤ 0.10).

Understanding of the ENERGY STAR Label by Aided Recognition

Households that recognized the ENERGY STAR label when shown the label were more likely to have at least a general understanding of the label than those that did not recognize the label. In 2016, 89 percent of households that recognized the ENERGY STAR label had at least a general understanding of it; in households that did not recognize the label, 49 percent had at least a general understanding of it. The difference in understanding between households that recognized the label and those that did not is statistically significant at the 1-percent level. The proportion of households that recognized the label and had at least a general understanding of the label in 2016 (89 percent) is not statistically different from the 2015 result (91 percent) at the 10-percent level (p-value = 0.2242).

Among households that did not recognize the label when shown it, the proportion that had at least a general understanding of the label in 2016 (49 percent) is similar to the 2015 result (53 percent), (p-value = 0.5949). The proportion of households that had at least a general understand of the label in 2016 (49 percent) is statistically different from the 2014 result (62 percent) at the 10-percent level (p-value = 0.0879).

Understanding of the ENERGY STAR Label by Aided Recognition
[Base = All respondents]

Recognize ENERGY STAR Label Aided	At Least General Understanding of Label		
	2016	2015	2014
Yes	89%	91%	88%
No	49%	53%	62%
Difference (Yes minus No)	41%	38%	26%
p-value	<0.0001	<0.0001	<0.0001

INFLUENCE

The survey provided some insight into consumers' decisions to purchase ENERGY STAR-labeled products, including the following:

- The proportion of households nationwide that recognized the ENERGY STAR label and knowingly purchased an ENERGY STAR-labeled product.
- The influence of the ENERGY STAR label on purchase decisions.
- The role of rebates or financing in decisions to buy ENERGY STAR-labeled products.
- The loyalty of purchasers to ENERGY STAR-labeled products.

Purchases of ENERGY STAR-labeled Products

In order to estimate the percent of *all* households that knowingly purchased an ENERGY STAR product, the following three proportions were multiplied:

- The proportion of all households that recognized the ENERGY STAR label (aided)
- Of the households that recognized the label (aided), the proportion that purchased a product in a product category that has an ENERGY STAR specification
- Of the households that recognized the label (aided) and purchased a product in a relevant category, the proportion that knowingly purchased an ENERGY STAR-labeled product

For the first proportion, a higher percent of households recognized the ENERGY STAR label when shown the label (i.e., *aided recognition*) in 2016 (91 percent) than in 2015 (88 percent). For the other two proportions, the results for 2016 and 2015 are similar. In 2016, of the households that recognized the label (aided) and purchased a product in a relevant product category, 67 percent purchased an ENERGY STAR-labeled product. Of those that purchased a product in a relevant category, 74 percent knowingly purchased an ENERGY STAR-labeled product.

**National Household Market Penetration of
ENERGY STAR Products by Year**

	Aided Recognition (2015 n=961) (2016 n=1,043)	Purchased Product (2015 n=845) (2016 n=944)	Knowingly Purchased ENERGY STAR product (2015 n=432) (2016 n=471)
2016	91%	67%	74%
2015	88%	68%	77%
Difference	2.7%	-0.5%	-3.4%
p-value	0.081	0.839	0.284

Overall, 45 percent of all households knowingly purchased an ENERGY STAR product in the past 12 months. This is similar to the 2015 result (46 percent).

**Knowingly Purchased ENERGY STAR Product by Year
(Base = All respondents)**

Purchased ENERGY STAR product	2016 (n=1,043)	2015 (n=961)
Estimate (yes)	45%	46%
Standard Error	2.3%	2.5%

Purchases of ENERGY STAR by Publicity Category

The proportion of *all* households that knowingly purchased an ENERGY STAR product in high- versus non-high-publicity areas is 47 and 43 percent, respectively. This difference is not statistically significant (p-value = 0.3800). A similar proportion of *all* households in high-publicity areas (48 percent) also knowingly purchased an ENERGY STAR product in 2015. The proportions of respondents who knowingly purchased ENERGY STAR products in non-high-publicity areas was also similar between 2016 (43 percent) and 2015 (44 percent), p-value = 0.8875.

**Knowingly Purchased ENERGY STAR
Product by Publicity Category and Year
[Base = All respondents]**

Publicity Category	% Households	
	2016	2015
High	47%	48%
Non-High	43%	44%
Difference (High minus Non-High)	4%	5%
p-value	0.3800	0.3353

As noted above, three proportions are used to calculate the proportion of *all* households that knowingly purchased an ENERGY STAR product: aided recognition of the program label, purchase of a product in a relevant product category, and the proportion of those purchasers that knowingly bought ENERGY STAR products. In 2016, high- and non-high-publicity proportions are similar.

**National Household Market Penetration of
ENERGY STAR Products by Publicity Category**

	Aided Recognition (n=1,043)	Purchased Product (n=944)	Knowingly Purchased ENERGY STAR product (n=471)
High Publicity	91%	67%	77%
Non-High Publicity	90%	68%	70%
Difference	0.3%	-0.7%	7.2%
p-value	0.865	0.841	0.118

Influence of the ENERGY STAR Label

In 2016, nearly three quarters (74 percent) of the households that recognized the ENERGY STAR label (aided) and knowingly purchased an ENERGY STAR-labeled product, reported having been influenced “very much” or “somewhat” by the label. This proportion of households was 77 percent in 2015. This difference is not statistically significant (p-value = 0.4870). From 2015 to 2016, all proportions are statistically similar.

Influence of the ENERGY STAR Label on Purchase Decisions⁸ [Base = Recognize label (aided) and ENERGY STAR purchasers]

Influence of the Label on Purchasing Decisions	2016 (n=310) Maximum	2015 (n=303) Maximum
Very much	45%	52%
Somewhat	29%	25%
Slightly	11%	11%
Not at all	15%	12%
Total	100%	100%

Note: Q8: “For each ENERGY STAR-labeled product you purchased, how much did the ENERGY STAR label influence your purchase decision?”

⁸ Respondents that recognize the label (aided) and purchased an ENERGY STAR-labeled product are asked Q8 (“For each ENERGY STAR-labeled product you purchased, how much did the ENERGY STAR label influence your purchase decision?”) for each ENERGY STAR-labeled product they purchased. The results presented in this table use the highest influence rating provided by respondents that purchased more than one ENERGY STAR-labeled product.

Influence of the ENERGY STAR Label by Publicity Category

The purchase decisions of 46 percent of households in high-publicity areas were influenced "very much" by the ENERGY STAR label, compared to 44 percent in non-high-publicity areas; this difference is not significant at the 10-percent level. When these proportions are added to the proportions of households for which the ENERGY STAR label was "somewhat" influential in their purchasing decisions, the high- to non-high-publicity area comparison is 79 to 67 percent, this difference is statistically different at the 5-percent level of significance. The combined "very much, somewhat, or slightly" proportion is 88 percent in high-publicity areas, and 81 percent in non-high-publicity areas; this difference is not significant at the 10-percent level.

Influence of the ENERGY STAR Label on Purchase Decisions by Publicity Category [Base = Recognize label (aided) and ENERGY STAR purchasers, n = 310]

Publicity Category	Very much	Very much or somewhat	Very much, somewhat, or slightly
High	46%	79%	88%
Non-High	44%	67%	81%
Difference (High minus Non-High)	2%	12%	7%
p-value	0.772	0.039	0.148

Rebate and Financing Influence

From 2015 to 2016, the percentage of households that knowingly purchased an ENERGY STAR-labeled product and received rebates or reduced-rate financing was at 14 percent, similar to last year (p-value = 0.5641). Of these households in 2016, 48 percent would have been “very likely” to purchase the ENERGY STAR product if financial incentives had not been available. This is also similar to 2015 at 65 percent (p-value = 0.1837). More respondents in 2016 (10 percent) than 2015 (0 percent) claimed they were “not likely at all” to purchase an ENERGY STAR product without a financial incentive; this difference is statistically significant at the 10-percent level (p-value = 0.0851). All other levels of likelihood to purchase an ENERGY STAR product without a financial incentive were similar from 2015 to 2016.

Received Financial Incentive for an ENERGY STAR Product Purchased [Base = Recognize label (aided) and ENERGY STAR purchaser]

Received Financial Incentive for an ENERGY STAR Product Purchased	% Households	
	2016 (n=290)	2015 (n=282)
Yes	14%	13%
No	86%	87%
Total	100%	100%

Note: Q9: “Did you receive rebates or reduced-rate financing for any ENERGY STAR-labeled product(s) you purchased?”

Influence of Rebates and Financing on Purchasing Decisions [Base = Recognize label (aided), ENERGY STAR purchaser, and received an incentive]

Likelihood Purchase ENERGY STAR Product Without Financial Incentive	% Households	
	2016 (n=44)	2015 (n=38)
Very likely	48%	65%
Somewhat likely	32%	23%
Slightly likely	10%	12%
Not at all likely*	10%	0%
Total	100%	100%

Note: Q10: “If rebates or reduced-rate financing had not been available, how likely is it that you would have purchased the ENERGY STAR-labeled product?”

* 2016 and 2015 proportions are statistically different from each other at the 10-percent level of significance (p-value ≤ 0.10).

Loyalty to ENERGY STAR

Loyalty to ENERGY STAR is investigated by asking respondents who knowingly purchased an ENERGY STAR-labeled product how likely they would be to recommend ENERGY STAR products to a friend. Respondents were asked to report this likelihood on a scale of 0 to 10, where 0 means “extremely unlikely” and 10 means “extremely likely.” As seen in the table below, 27 percent of households who knowingly purchased an ENERGY STAR-labeled product reported they would be “extremely likely” to recommend ENERGY STAR products to a friend. This proportion is similar to the 2015 value (p-value = 0.1589).

The likelihood of recommending ENERGY STAR products to a friend is greater than “5” for 80 percent of these households. This is similar to the previous year’s result of 85 percent (p-value = 0.1321). More households in 2016 (20 percent) than in 2015 (13 percent) give a “9” ranking on the scale; this difference is statistically significant at the 10-percent level (p-value = 0.0932). Fewer households in 2016 (13 percent) than in 2015 (22 percent) gave an “8” ranking; this difference is statistically significant at the 5-percent level (p-value = 0.0476). More households in 2016 (17 percent) than in 2015 (10 percent) gave a “7” ranking; this difference is statistically significant at the 5-percent level (p-value = 0.0458). Fewer households in 2016 (3 percent) than in 2015 (7 percent) gave a “6” ranking; this difference is statistically significant at the 5-percent level (p-value = 0.0395). All other rankings are similar between 2016 and 2015.

Loyalty to ENERGY STAR
[Base = Recognize label (aided) and purchasers]

Likelihood Recommend ENERGY STAR Products	% Households	
	2016 (n=265)	2015 (n=255)
10 - Extremely likely	27%	33%
9*	20%	13%
8**	13%	22%
7**	17%	10%
6**	3%	7%
5	10%	6%
4	6%	5%
3	3%	2%
2	0%	1%
1	1%	1%
0 - Extremely unlikely	0%	0%
Total	100%	100%

Notes: Q11: “How likely are you to recommend ENERGY STAR-labeled products to a friend?” is measured on an 11-point scale, where 0 = “Extremely unlikely” and 10 = “Extremely likely.”

** 2016 and 2015 proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05).

* 2016 and 2015 proportions are statistically different from each other at the 10-percent level of significance (p-value ≤ 0.10).

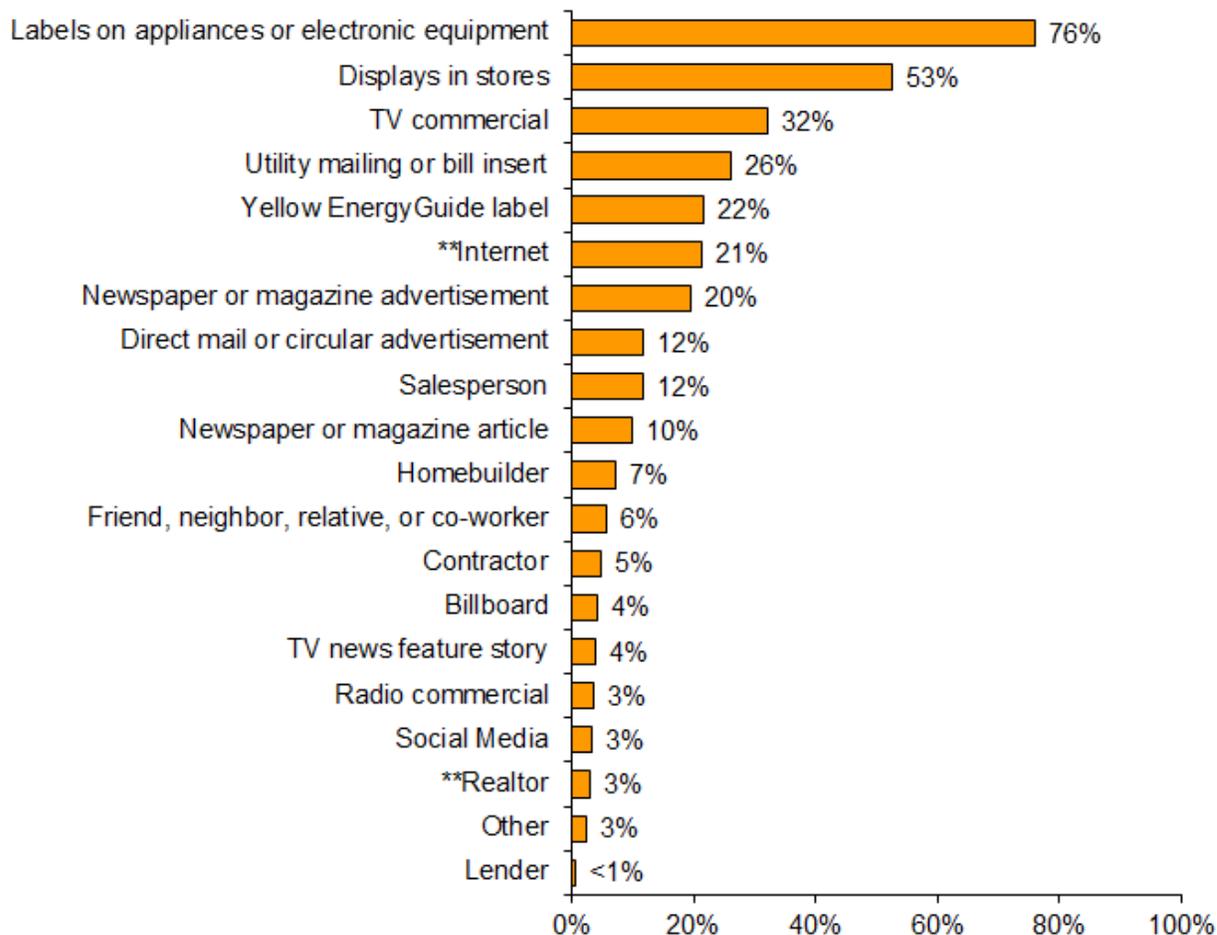
INFORMATION SOURCES

Sources Seen

Seventy-six percent of households have seen something about ENERGY STAR on appliance or electronics labels, and 53 percent of households have seen something about ENERGY STAR in store displays. Thirty-two percent of households heard or saw something about ENERGY STAR on TV commercials. Between 20 and 26 percent of households saw something about ENERGY STAR in utility mailings or bill inserts, on EnergyGuide labels, on the internet, or in newspaper or magazine advertisements.

The proportion informed by the internet increased to 21 percent in 2016 from 17 percent in 2015, and is statistically significant at the 5-percent level (p-value = 0.0434). More households heard about the label from realtors in 2016 (3 percent), compared to 2015 (1 percent). This difference is significant at the 5-percent level (p-value = 0.0492). All other responses were similar to the proportions from the 2015 survey.

Sources Saw or Heard Something About ENERGY STAR
[Base = Recognize label (aided), n = 831]



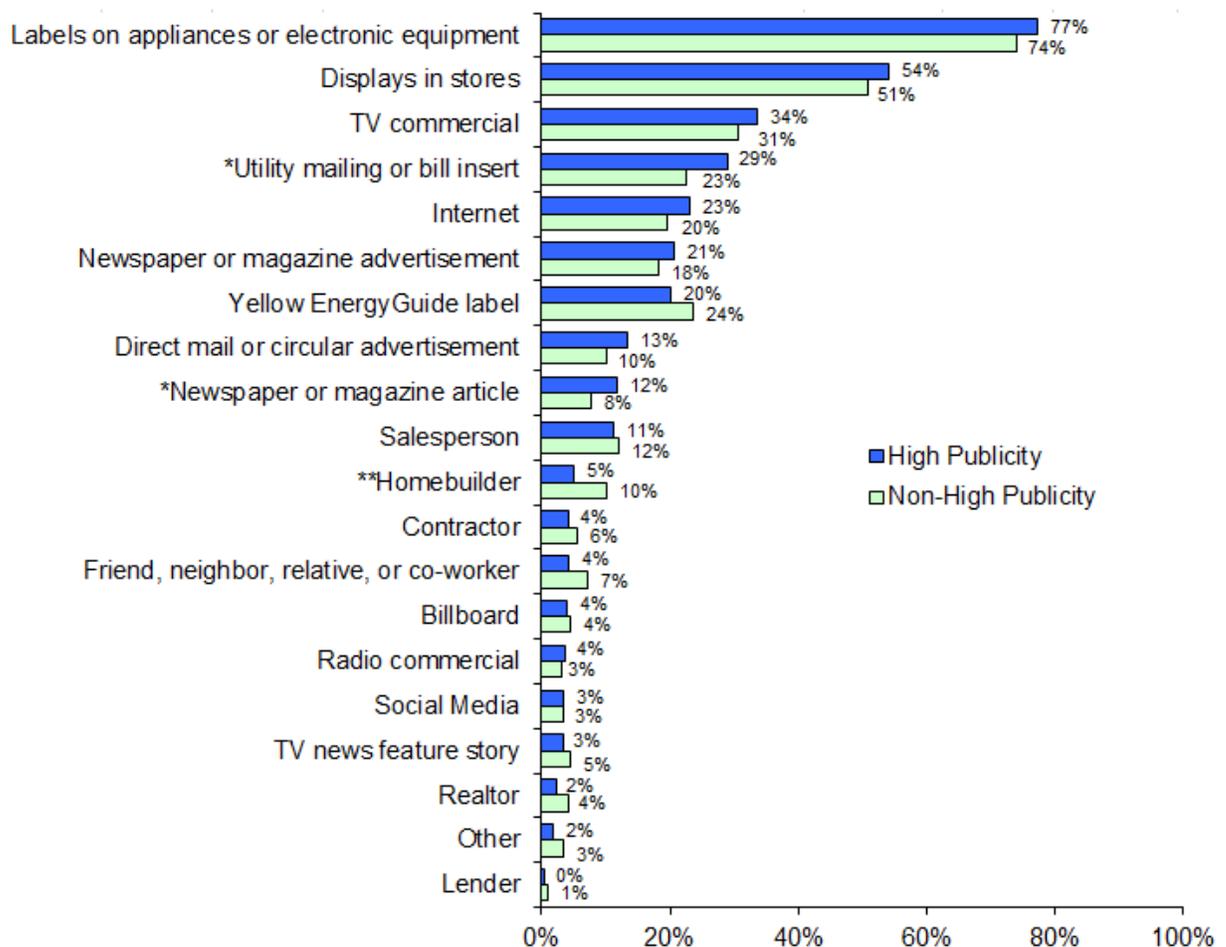
Note: SO1: "Where did you see or hear something about ENERGY STAR? Please mark all that apply."

** 2016 and 2015 proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05). Proportion of households in 2016 is larger than in 2015 for internet and realtors.

Sources Seen by Publicity Category

The proportion of households that heard or saw something about ENERGY STAR from utility mailing or bill inserts was significantly larger in high- than in non-high-publicity areas (29 percent and 23 percent, respectively). This difference is statistically different at the 10-percent level (p-value = 0.0695). More households in high-publicity areas (12 percent) than in non-high-publicity areas (8 percent) have seen something about ENERGY STAR in newspaper or magazine articles; this difference is statistically significant at the 10-percent level (p-value = 0.0926). A smaller proportion of households in high-publicity areas (5 percent) than in non-high-publicity areas (10 percent) heard something about ENERGY STAR from homebuilders; this difference is statistically significant at the 5-percent level (p-value = 0.0204). All remaining sources of information are not significantly different between high- and non-high-publicity areas.

Sources Saw or Heard Something About ENERGY STAR by Publicity Category
 [Base = Recognize label (aided), n = 831]



** High- and non-high-publicity area proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05).

* High- and non-high-publicity area proportions are statistically different from each other at the 10-percent level of significance (p-value ≤ 0.10).

APPENDIX A: DETAILED METHODOLOGY

During September 2016, the Consortium for Energy Efficiency (CEE) fielded a questionnaire to obtain information at the national level on consumer awareness and understanding of the ENERGY STAR label, the value accrued to the label in the eyes of consumers, satisfaction with labeled products, and other ENERGY STAR-related information. The questionnaire was similar to the Internet/WebTV-based questionnaires fielded in previous years (2001 through 2015). As in the 16 previous years, CEE and its members sponsoring the survey made the survey data available to the U.S. Environmental Protection Agency (EPA) for analysis. In 2001, a rigorous comparative analysis of the results obtained via a mail survey versus an Internet survey was conducted. The results from the two survey methods were comparable for most major indicators.⁹ Results from that time-frame were also analogous to telephone surveys for aided recognition.¹⁰

This report discusses the results of the 2016 CEE ENERGY STAR Household Survey, building on prior years' survey results and focusing on the extent to which consumers recognized the ENERGY STAR label, understood its intended messages, and utilized (or were influenced by) the label in their energy-related purchase decisions. Research questions of interest included:

- Where do consumers see or hear about the ENERGY STAR label?
- How does increased publicity impact consumer ENERGY STAR label recognition, understanding, and influence?
- Which key messages about the ENERGY STAR label are consumers retaining?
- Do consumers demonstrate loyalty to the ENERGY STAR label?

The survey was fielded from September 13 through September 26, 2016.¹¹

The remainder of Appendix A discusses the questionnaire design, sampling and weighting methodologies, data collection, and the national analysis. See Appendix D for survey questions.

⁹ National Analysis of CEE 2001 ENERGY STAR Household Surveys. U.S. EPA, 2002.

¹⁰ Tannenbaum, Bobbi and Shel Feldman. "ENERGY STAR Awareness as a Function of Survey Method." IEPEC, 2001.

¹¹ This year's survey was fielded 5 to 8 weeks earlier than in prior years and during a more typical timeframe to the 2013 survey. The 2015 survey was fielded from October 21 through November 2, the 2014 survey was fielded from November 11 to November 20, and the 2013 survey was fielded from September 17 to October 1. It is not known whether this shift in timeframe had an influence on 2016 results.

1 QUESTIONNAIRE DESIGN

In 2016, CEE conducted the ENERGY STAR survey using a questionnaire designed to be delivered by Internet/WebTV. The survey was conducted via an interactive Internet format with a random sample of households that are members of an Internet-based panel. Both the panel as a whole and the sample of households completing the survey were selected by address-based sampling (ABS) and recruited by telephone.¹² Participants in this survey were then randomly selected from the panel. Only one member per household in the random sample was contacted. Households selected for previous years' surveys were not eligible to participate in the 2016 survey.

The panel is designed to be representative of the U.S. population. Panel members without their own Internet access are provided with a laptop and an Internet service connection. Households that already have Internet service receive other incentives to participate in the panel. Panel members respond to questionnaires administered to them via the Internet. They receive no more than three to four questionnaires each month, and are expected to respond to a certain percentage of them.

Data collected using the 2016 Internet questionnaire may in most cases be compared with data collected using the Internet questionnaires fielded in previous years, for which CEE was also responsible.

1.1 Survey Objectives

CEE had several broad objectives in designing the 2016 questionnaire including:

- To fine-tune the questionnaire based on lessons learned from prior years' analyses of the CEE survey while maintaining the ability to analyze the results of the 2016 survey against those from the 2015 CEE survey.

¹² In previous years, the panel was recruited via random-digit dial. GfK believes that ABS offers advantages, including coverage of cell-phone-only households, and analysis of non-response bias. More information is available at: <http://www.knowledgenetworks.com/accuracy/fall-winter2010/abs-fall2010.html>.

The 2016 Internet questionnaire addressed the following:

- Respondent recognition and understanding of the ENERGY STAR label.
- Key messages communicated by the ENERGY STAR label.
- Products on which respondents have seen the ENERGY STAR label.
- Products that respondents have shopped for or purchased in the past year.
- Products that respondents have purchased that displayed the ENERGY STAR label on the product, packaging, or instructions.
- Influence of the presence or absence of the ENERGY STAR label on the purchase decision.
- Whether purchases of ENERGY STAR-labeled products involved rebates or reduced-rate financing.
- Likelihood of having purchased ENERGY STAR-labeled products in the absence of rebates or reduced-rate financing.
- Likelihood of recommending ENERGY STAR-labeled products to a friend and other measures of loyalty to the ENERGY STAR label.
- Satisfaction with ENERGY STAR-labeled products versus products without the ENERGY STAR label.
- Demographic questions (most of the demographic questions were not asked in the Internet survey as the demographic characteristics of the respondents were already on file).
- Respondent recognition and understanding of ENERGY STAR Most Efficient and ENERGY STAR “Connected”.

1.2 Internet Questionnaire

The interactive format of an Internet questionnaire allows questions to be asked in a way that is not possible with a printed questionnaire. On printed questionnaires, respondents can see questions in advance and may be tempted to read the entire questionnaire before completing it, potentially educating themselves in a limited way about the subject and affecting their responses.

The Internet questionnaires ask respondents—without showing the ENERGY STAR label—whether they have ever seen or heard of the ENERGY STAR label. Responses to this question should thus be comparable to those obtained through a telephone survey. The Internet questionnaires then show the ENERGY STAR label(s) (which is not possible with a telephone survey) and ask again about recognition and understanding. As a result, responses to these questions should be comparable to those obtained through a mail survey where respondents are shown the label.

Another difference between a mail questionnaire and an Internet questionnaire is that the latter—like a telephone questionnaire using computer-assisted telephone interviewing (CATI)—can program lines of questions based on responses to earlier questions. For example, respondents to an Internet questionnaire who say they bought a given product in the past year can then be asked whether that specific product (or its packaging or instructions) had the ENERGY STAR label.

Thus, the Internet survey is able to combine some of the attributes of both print and telephone surveys.

1.3 Changes to the Questionnaire

The 2016 questionnaire was very similar to the 2015 questionnaire. The only change to the 2016 questionnaire from the previous year was a slight update to the text in Q20.¹³

In 2016, the below question was updated from “2015” to “2016.”

Q20: Were you aware that products designated ENERGY STAR Most Efficient 2016 represent a subset of ENERGY STAR qualified products within a given product category?

¹³ Appendix D: 2016 Survey Questions and Flow Chart provide a graphical presentation of the survey questions and skip patterns.

1.4 Determination of Aided Recognition

In the 2016 analysis, the determination of *aided* recognition was based on the responses to five questions. This is the same sequence and numbering used in the 2015 survey. Specifically:

ES3A: Is this the label you have seen or heard of before? (Respondents were randomly shown either the old or new ENERGY STAR label. This question was asked to respondents who said they had seen or heard of the ENERGY STAR label.)

ES3B: Have you seen or heard of this version of the ENERGY STAR label? (In this question, asked after ES3A, respondents were shown the label not shown in the previous question.)

ES3C: Please look at the ENERGY STAR label on the left. Have you ever seen or heard of this label? (Respondents were randomly shown either the old or new ENERGY STAR label. This question was asked to respondents who said they had not seen or heard of or didn't know whether they had seen or heard of ENERGY STAR.)

ES3D: Have you seen or heard of this version of the ENERGY STAR label? (In this question, asked after ES3C, respondents were shown the label not shown in the previous question.)

ES6: Now that you had the opportunity to see the ENERGY STAR label, do you recall seeing or hearing anything about it before this survey? (This question was asked to respondents who answered "no" or "don't know" to ES3A and ES3B. It was also asked to all respondents who answered ES3C and ES3D.)

- Respondents who answered ES3A, ES3B, ES3C, ES3D, or ES6 "yes" were categorized as recognizing the ENERGY STAR label (aided).
- Respondents who did not answer ES3A, ES3B, ES3C, or ES3D "yes" and answered ES6 "no," were categorized as not recognizing the label (aided).
- Respondents who did not answer ES3A, ES3B, ES3C, or ES3D "yes" and answered ES6 "don't know" or refused to answer ES6 were not included in the analysis of aided recognition. (Their data were set to missing.)

2 SAMPLING

2.1 Designated Marketing Areas' Publicity Categories

The same publicity classification procedure used in the past 15 years was used in 2016. The original intent of the classification was to be able to assess the effect of local energy efficiency program publicity on awareness. The majority of these local efficiency programs historically have been supported by utility rate-payer funded energy efficiency programming.

The historic classification used for publicity analysis was as follows:

- **High publicity:** Active local ENERGY STAR program *recently* sponsored by a utility, state agency, or other organization for 2 or more continuous years. The activities must include *sustained* promotions and publicity from non-federal sources.
- **Low publicity:** Federal campaign activities only and no *significant* regional program sponsor activities.
- **Other:** All other DMAs.

The key working definitions were:

- **Recent:** The 2 years of activity must include the time period during which the survey was in the field.
- **Sustained:** The 2 years of activity must be continuous.
- **Significant:** In addition to any direct federal publicity efforts, publicity efforts must include a deliberate and multifaceted regional program sponsor investment in ENERGY STAR programming, such as direct marketing efforts or the creation and distribution of promotional material.

In 2009, a decision was made to retain the prior year's publicity classification of the 57 largest DMAs – in essence preserving the historical classification for future study years. Each of the Top 57 DMAs was classified according to these three criteria, and sampled based on that classification. For the purpose of this report, *low publicity* and *other publicity* are combined in the analysis and referenced as *non-high-publicity* areas. One reason for combining these categories in the analysis is that over time, the population of low-publicity DMAs has dropped to about 15 percent, while high- publicity DMAs now account for about half of U.S. television households.

2.2 Sample Design

The sampling frame for this national survey included all households in any DMAs that together accounted for about 70 percent of U.S. television households. As in prior years, to facilitate comparison across years, the national results were based only on data collected from respondents from the 57 largest DMAs.¹⁴ CEE members may choose to sponsor more intensive sampling (i.e., an oversample) in selected localities, referred to here as *sponsor areas*. Sponsor areas are not limited to the 57 largest DMAs, however, to facilitate comparisons across years, each year the national results are based only on data collected from respondents from the 57 largest DMAs. Some of the 57 largest DMAs were also included in the sponsor areas and therefore are oversampled. The data from these respondents (as well as from the other respondents in the 57 largest DMAs) receive an appropriate weight in the analysis in order to generate valid national results and facilitate comparison with data from other years.

In 2016, there was one sponsor area: United Illuminating service territory (southwestern Connecticut). United Illuminating service territory is part of two of the largest 57 DMAs (New York DMA and Hartford-New Haven DMA); respondents from United Illuminating oversampling in these DMAs are appropriately weighted and included in the national analysis.

As in previous years' studies, the Top-57 DMAs in the sampling frame were classified by publicity category, so the effect of local energy-efficiency program publicity on national awareness could be considered. The same publicity classification procedure used in the past 15 years was used this year. Each sponsor area is also further stratified by large versus non-large DMA. The CEE members who fund the oversample for a sponsor area determine the total number of sampling points allocated to the sponsor area as a whole. This total number of sampling points is then allocated across sponsor area strata proportional to population.

Program publicity has expanded over the past sixteen years. Originally, high-publicity, low-publicity, and other groups had similar numbers of households, and so the sample was allocated equally among the three groups. Beginning in 2010, the number of respondents in each stratum was chosen in proportion to that stratum's share of the U.S. population living in DMAs. In 2016, the national sample is comprised of 1,076 respondents from the top 57 DMAs.¹⁵

A list of the large DMAs and their publicity category assignments is provided in the table below. A list of the DMAs included in the sponsor area and their publicity category assignments follows. Lastly, the large DMAs and the DMAs in the sponsor areas are shown on a map along with their publicity categories.

¹⁴ Analysis included in the 2010 report showed no statistical difference for key metrics between the 57 largest DMAs and all 210 DMAs.

¹⁵ In a year when CEE members choose not to sponsor an oversample the national sample comprises 1,000 respondents from the top 57 DMAs. In 2016, the national sample included an additional 76 respondents that were part of the oversample and were from the top 57 DMAs.

Large (Top 57) DMAs¹⁶

Rank	Designated Market Area (DMA)	TV Households 2015-2016		Publicity Category
		Number	% of US	
1	New York	7,368,320	6.503	High
2	Los Angeles	5,489,810	4.845	High
3	Chicago	3,475,220	3.067	High
4	Philadelphia	2,917,920	2.575	Other
5	Dallas-Ft. Worth	2,646,370	2.335	Other
6	San Francisco-Oak-San Jose	2,484,690	2.193	High
7	Washington, DC (Hagrstwn)	2,443,640	2.157	High
8	Boston (Manchester)	2,411,250	2.128	High
9	Atlanta	2,385,730	2.105	High
10	Houston	2,373,700	2.095	Other
11	Tampa-St. Pete (Sarasota)	1,859,820	1.641	Other
12	Phoenix (Prescott)	1,848,850	1.632	High
13	Detroit	1,828,230	1.613	Other
14	Seattle-Tacoma	1,766,070	1.559	High
15	Minneapolis-St. Paul	1,723,210	1.521	High
16	Miami-Ft. Lauderdale	1,660,020	1.465	Other
17	Denver	1,576,090	1.391	Other
18	Cleveland-Akron (Canton)	1,493,160	1.318	Other
19	Orlando-Daytona Bch-Melbrn	1,489,710	1.315	Other
20	Sacramnto-Stkton-Modesto	1,349,990	1.191	High
21	St. Louis	1,217,370	1.074	Other
22	Charlotte	1,168,610	1.031	Other
23	Pittsburgh	1,154,550	1.019	Other
24	Portland, OR	1,136,320	1.003	High
25	Raleigh-Durham (Fayetvll)	1,131,460	0.999	Low
26	Baltimore	1,099,890	0.971	Other
27	Indianapolis	1,073,090	0.947	Other
28	San Diego	1,055,030	0.931	High
29	Nashville	990,150	0.874	Low
30	Hartford & New Haven	945,250	0.834	High
31	Columbus, OH	907,530	0.801	Other
32	San Antonio	907,320	0.801	Low
33	Kansas City	899,020	0.793	Other
34	Salt Lake City	884,900	0.781	High
35	Milwaukee	882,210	0.779	High
36	Cincinnati	868,900	0.767	Low
37	Greenvll-Spart-Ashevll-And	833,910	0.736	Low
38	West Palm Beach-Ft. Pierce	791,090	0.698	Low

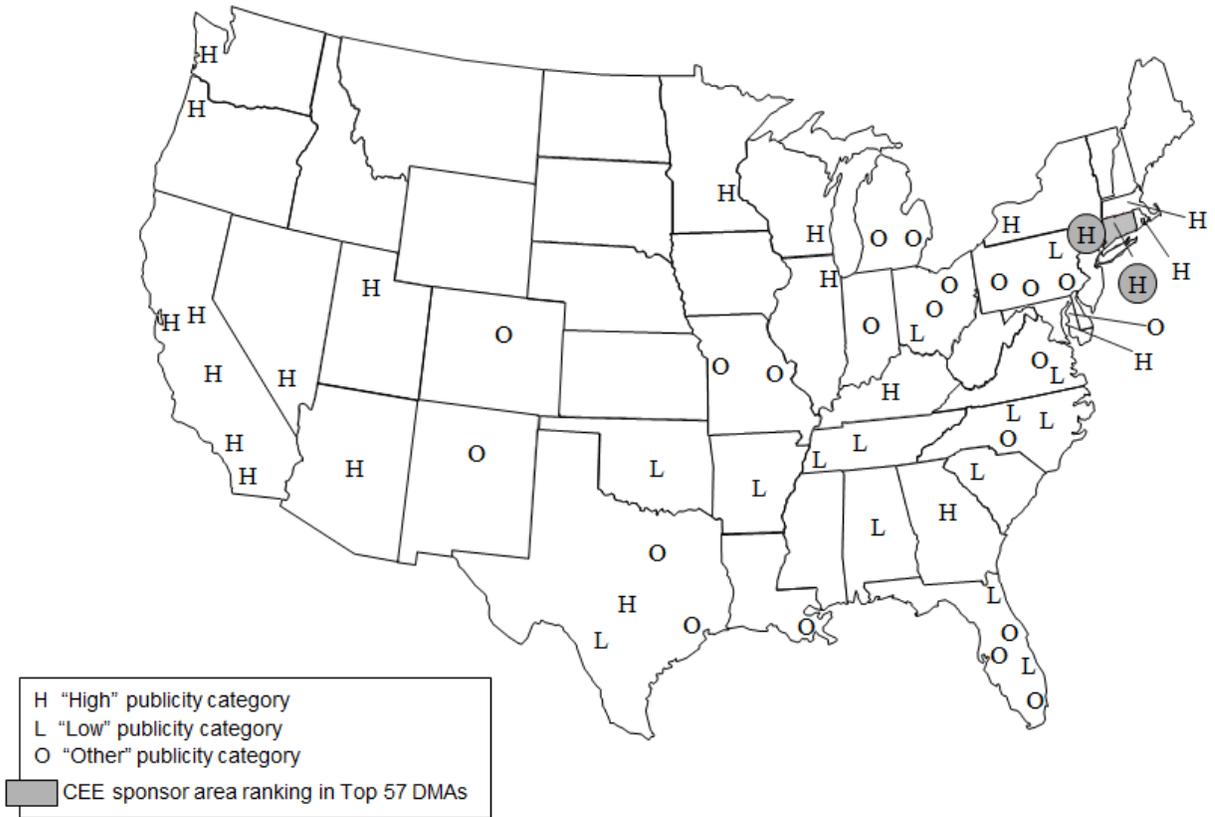
¹⁶ Publicity categories are the same as 2015.

Rank	Designated Market Area (DMA)	TV Households 2015-2016		Publicity Category
		Number	% of US	
39	Austin	745,640	0.658	High
40	Las Vegas	736,700	0.650	High
41	Grand Rapids-Kalmzoo-B.Crk	717,990	0.634	Other
42	Norfolk-Portsmth-Newpt Nws	706,270	0.623	Low
43	Oklahoma City	701,070	0.619	Low
44	Harrisburg-Lncstr-Leb-York	693,370	0.612	Other
45	Birmingham (Ann and Tusc)	686,080	0.605	Low
46	Greensboro-H.Point-W.Salem	679,970	0.600	Low
47	Jacksonville	665,330	0.587	Low
48	Albuquerque-Santa Fe	662,570	0.585	Other
49	Louisville	653,710	0.577	High
50	Memphis	636,140	0.561	Low
51	New Orleans	633,140	0.559	Other
52	Providence-New Bedford	603,420	0.533	High
53	Buffalo	585,350	0.517	High
54	Fresno-Visalia	564,840	0.498	High
55	Wilkes Barre-Scranton-Hztn	552,230	0.487	Low
56	Richmond-Petersburg	549,730	0.485	Other
57	Little Rock-Pine Bluff	547,650	0.483	Low
Total		80,859,600	71.359	

Sponsor Areas

Sponsor Area	Publicity Category	DMA (Large and Small)
United Illuminating	High	Large: parts of *New York DMA (Rank 1) *Hartford-New Haven DMA (Rank 30)

Large (Top 57) DMAs by Publicity Category¹⁷



¹⁷ There were no large DMAs in either Alaska or Hawaii.

2.3 Weighting Procedures

GfK, the company that provided the Internet survey service, developed the weights used in the analysis. GfK first adjusted its panel members for known disproportions due to the panel's original selection and recruitment design and then proceeded with a post-stratification weighting that accounted for differences between the panel and the U.S. population. The adjustment to this typical sampling weight approach was based on geographic and demographic characteristics known for both the panel and the population (refer to Appendix B). It effectively scales up under-represented population dimensions in the panel and scales down dimensions that are over-represented in the panel. This more closely aligned the panel with the basic demographic characteristics of the U.S. population.

After the field data were collected, GfK further adjusted the sampling weight to account for survey non-response. The correction for survey non-response is analogous to the adjustment for differences between the panel members and the U.S. population. It was based on geographic and demographic characteristics known for both the sample of panel survey completes and the entire sampling frame for the study. The weighting scaled up under-represented population dimensions and scaled down over-represented dimensions in the sample of survey completes. This more closely aligned the sample of survey completes with the basic demographic characteristics of the entire sampling frame for the study.

3 DATA COLLECTION

3.1 Survey Fielding Period

The survey began on September 13 and closed on September 26, 2016.

3.2 Response Rate

The overall response rate was 7 percent for the CEE 2016 ENERGY STAR Household Survey. This level of response is typical for GfK's surveys.

For an Internet survey, the response rate is defined as the product of the *return rate*, which is survey-specific, and the *recruitment rate*. The *return rate* is the ratio of the number of questionnaires completed to the number of panel members asked to complete the questionnaire. For the CEE 2016 ENERGY STAR Household Survey, the return rate was 51 percent. While this number is quite high, it must be adjusted by the *recruitment rate*, which is the number of households that agreed to participate in GfK's panel as a proportion of the number of households asked to participate. The recruitment rate was 13 percent. Thus, the response rate for the CEE 2016 ENERGY STAR Household survey was the product of the survey-specific return rate of 51 percent and the recruitment rate of 13 percent. This product is equivalent to the ratio of the number of questionnaires completed to the number of households that were offered the opportunity to be in the study.

CEE 2016 ENERGY STAR Household Survey Response Rate¹⁸

Response Rate Factors	Number or % of Respondents
Sendout/requested	2,113
Completed	1,076
Return rate	51%
Recruitment rate	13%
Response rate	7%

¹⁸ Only respondents from Top-57 DMAs are included in this table.

4 NATIONAL ANALYSIS

4.1 DMAs Included

To facilitate comparisons across years, the national results were based only on data collected from respondents from the 57 largest DMAs. Similar to 2015, in 2016 data were only collected from respondents in the 57 largest DMAs. Some of the 57 largest DMAs are also included in the sponsor areas and therefore were oversampled. The data from these respondents, as well as from the other respondents in the 57 largest DMAs, received an appropriate weight in the analysis in order to generate valid national results and comparison with data from other years.

4.2 Treatment of “Don’t Know” Responses and Refusals

For most questions, how “don’t know” responses or refusals are handled has a negligible effect on the results. Still, it is necessary to make a decision as to how they should be handled. The results presented in this report for a given question do not include “don’t know” responses or refusal to answer (i.e., the results for a given question were calculated after any “don’t know” responses to that question or refusals to answer that question were set to missing).

APPENDIX B: DEMOGRAPHICS

This appendix presents the relationship between the demographic characteristics found in the weighted survey data and the corresponding characteristics in the study population of all U.S. households. Professional survey and data collection firms make significant efforts to ensure the rigor of their methods and to produce the highest quality results. Each year, GfK—the company that maintains the Internet-based survey panel used in this analysis—strives to create a panel that is representative of the U.S. population. However, as in any survey effort, those who respond to surveys tend to be different from those who do not. In this case, the panel used for this survey may contain subjects that are receptive to the incentive-for-service tradeoff and introduce associated biases.

Weighting used in the analyses of this report is applied to account for differences between the Internet-based panel and the U.S. population. If weighting was accomplished perfectly, the distribution of various demographic characteristics in the weighted survey data would be the same as the distribution of those characteristics in national Census data. For most demographic characteristics, the two distributions are quite similar. This suggests the weighted survey results are a reasonable representation of the study population. A summary of the comparisons of demographic characteristics is provided in the table below. Detailed comparisons are provided in tables presented at the end of this appendix.

Summary of Distribution Comparisons

Demographic Characteristic	Largest Difference (Absolute Value): Survey Estimate Less Census %	
Number of persons in household	One	10.5%
Householder/respondent age	55-64	5.3%
Householder/respondent gender	Gender	+/- 3.5%
Dwelling type	Single-family, attached	4.0%
Own/rent	Own/rent	+/- 6.9%
Household annual income	\$75,000 and over ^a	10.3%

^aCensus, \$50,000-\$80,000 and \$80,000 and over.

The largest differences (in absolute value) between the weighted survey data and national Census data, at 10.5 and 10.3 percentage points, are the proportion of respondents with one person in their household and the proportion of households in the \$75,000 and over income category, respectively. The difference in the proportion of those that own or rent is the third largest, at +/- 6.9 percentage points, and the number of householder/respondent age 55-64 is the fourth largest, at 5.3 percentage points. The over-representation of single-person households and of higher income household respondents is not expected to bias the survey results. Differences between the weighted survey data and Census data for other demographic characteristics of the population—single family attached home dwellings, and gender—are small, at less than four percentage points.

Household Size Distribution

Number of Persons in Household	Census % Dwelling Units ^a	Survey Estimate Minus Census % Dwelling Units
One	28%	-10.5%
Two	34%	5.3%
Three	16%	3.3%
Four	13%	0.4%
Five or more	9%	1.5%
Total (%)	100%	
Total (1,000s)	118,289	

^a U.S. Census Bureau, American Housing Survey, 2015.

Age Distribution

Householder/ Respondent Age	Census % Householders ^a	Survey Estimate Minus Census % Householders
18-24 ^b	4%	1.6%
25-34	15%	-2.4%
35-44	17%	-1.8%
45-54	20%	-3.0%
55-64	20%	5.3%
65 or older	24%	0.3%
Total (%)	100%	
Total (1,000s)	118,290	

^a U.S. Census Bureau, American Housing Survey, 2015.

^b Census, under 25 years; WebTV/Internet, 18-24 years.

Gender Distribution

Householder/ Respondent Gender	Census % Population ^a	Survey Estimate Minus Census % Population
Female	51%	-3.5%
Male	49%	3.5%
Total (%)	100%	

^aU.S. Census Bureau, 2008-2015 American Community Survey 5-Year Estimates.

Dwelling Type Distribution

Dwelling Type	Census % Dwelling Units ^a	Survey Estimate Minus Census % Dwelling Units
Single-family, unattached	63%	4.0%
Single-family, attached	7%	2.4%
Bldg. (>=2 units)	24%	-3.2%
Mobile home	6%	-3.5%
Total (%)	100%	
Total (1,000s)	118,221	

^a U.S. Census Bureau, American Housing Survey, 2015.

Own/Rent Distribution

Own/Rent	Census % Households ^a	Survey Estimate Minus Census % Households
Own	63%	6.9%
Rent	37%	-6.9%
Total (%)	100%	
Total (1,000s)	118,290	

^a U.S. Census Bureau, American Housing Survey, 2015.

Income Distribution

Total Household Annual Income (before taxes)	Census % Households^a	Survey Estimate Minus Census % Households
Less than \$15,000	12%	-4.2%
\$15,000-\$24,999	11%	-4.9%
\$25,000-\$49,999	23%	-2.6%
\$50,000-\$74,999	17%	1.4%
\$75,000 and over	38%	10.3%
Total (%)	100%	
Total (1,000s)	125,819	

^a U.S. Census Bureau, CPS 2016 Annual Social and Economic Supplement, Table HINC-01 Selected Characteristics of Households for All Races.

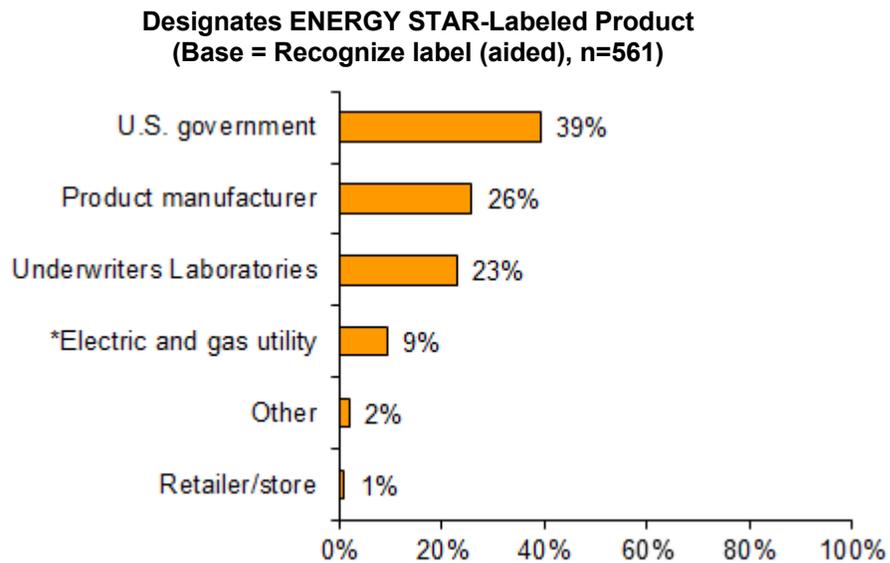
APPENDIX C: ADDITIONAL QUESTIONS FROM 2016 SURVEY

This appendix presents the results of additional ENERGY STAR related questions in the 2016 survey that were added by CEE since 2005; and are not discussed in the main body of the report. Topics included in this appendix include:

- ENERGY STAR Designation
- ENERGY STAR Product Satisfaction
- Consumer Perceptions
- Purchasing Decisions
- Light Bulb Purchaser Questions
- Most Efficient Designation
- ENERGYSTAR.gov Question
- ENERGY STAR “Connected” Questions

1 ENERGY STAR DESIGNATION

Thirty-nine percent of households that recognized the ENERGY STAR label (aided) thought that the U.S. government decides if a product deserves the label, this proportion of households is the same as 2015. Twenty-six percent thought product manufacturers make the decision. Twenty-three percent thought Underwriters Laboratories makes the decision; this was 21 percent in 2015. Nine percent of respondents thought that either an electric or gas utility made this designation; this is lower than the previous year (14 percent) at the 10-percent level (p -value = 0.0507).

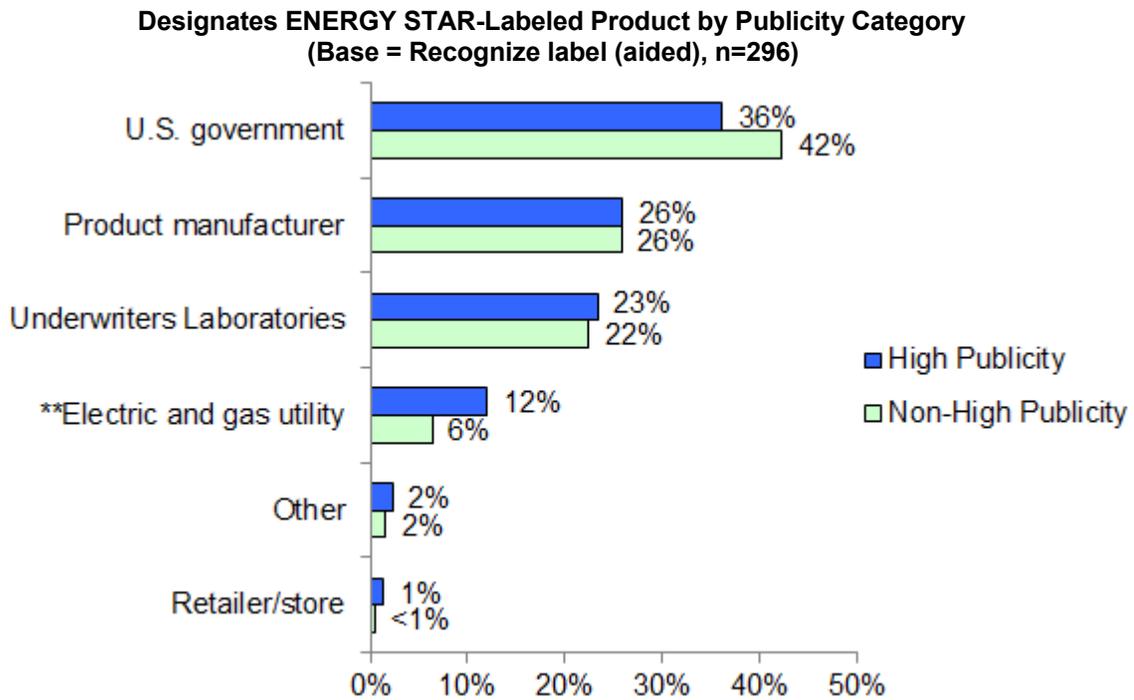


Note: QB: "As far as you know, who decides if a product deserves the ENERGY STAR label?"

* 2016 and 2015 proportions are statistically different from each other at the 10-percent level of significance (p -value ≤ 0.10). The proportion of households in 2016 is smaller than 2015 for electric and gas utility.

2 ENERGY STAR DESIGNATION BY PUBLICITY CATEGORY

In 2016, high-publicity areas and non-high-publicity areas identified the entity they believed designates the ENERGY STAR label in similar proportions in all but one category: electric and gas utility. A higher percent in high-publicity areas (12 percent) than in non-high-publicity areas (6 percent) thought either an electric or gas utility made this designation; this is statistically significant at the 5-percent level (p-value = 0.0434). Thirty-six percent in high-publicity areas identified the “U.S. government” as the entity that designates the ENERGY STAR label. The second most identified entity was “product manufacturers” at 26 percent in high- and non-high-publicity areas.



** High- and non-high-publicity area proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05).

3 ENERGY STAR PRODUCT SATISFACTION

For most products, household satisfaction with a given product in a product category that has an ENERGY STAR specification does not appear to vary based on whether or not the product had an ENERGY STAR label. Respondents were asked to rate their satisfaction on a scale of 1 to 5, where 1 means “very dissatisfied” and 5 means “very satisfied.” ENERGY STAR-labeled light bulbs received higher satisfaction ratings compared with the unlabeled versions. This difference is statistically significant at the 5-percent level (p-value = 0.0111).

In 2016, the below ENERGY STAR-labeled products received lower satisfaction ratings compared with the unlabeled versions.

- At the 10-percent level of significance: insulation (4.5 and 4.9, respectively), (p-value = 0.0741); and windows (4.2 and 4.8, respectively), (p-value = 0.0551).
- At the 1-percent level of significance: roofing materials (3.6 and 4.8, respectively), (p-value = 0.0024).

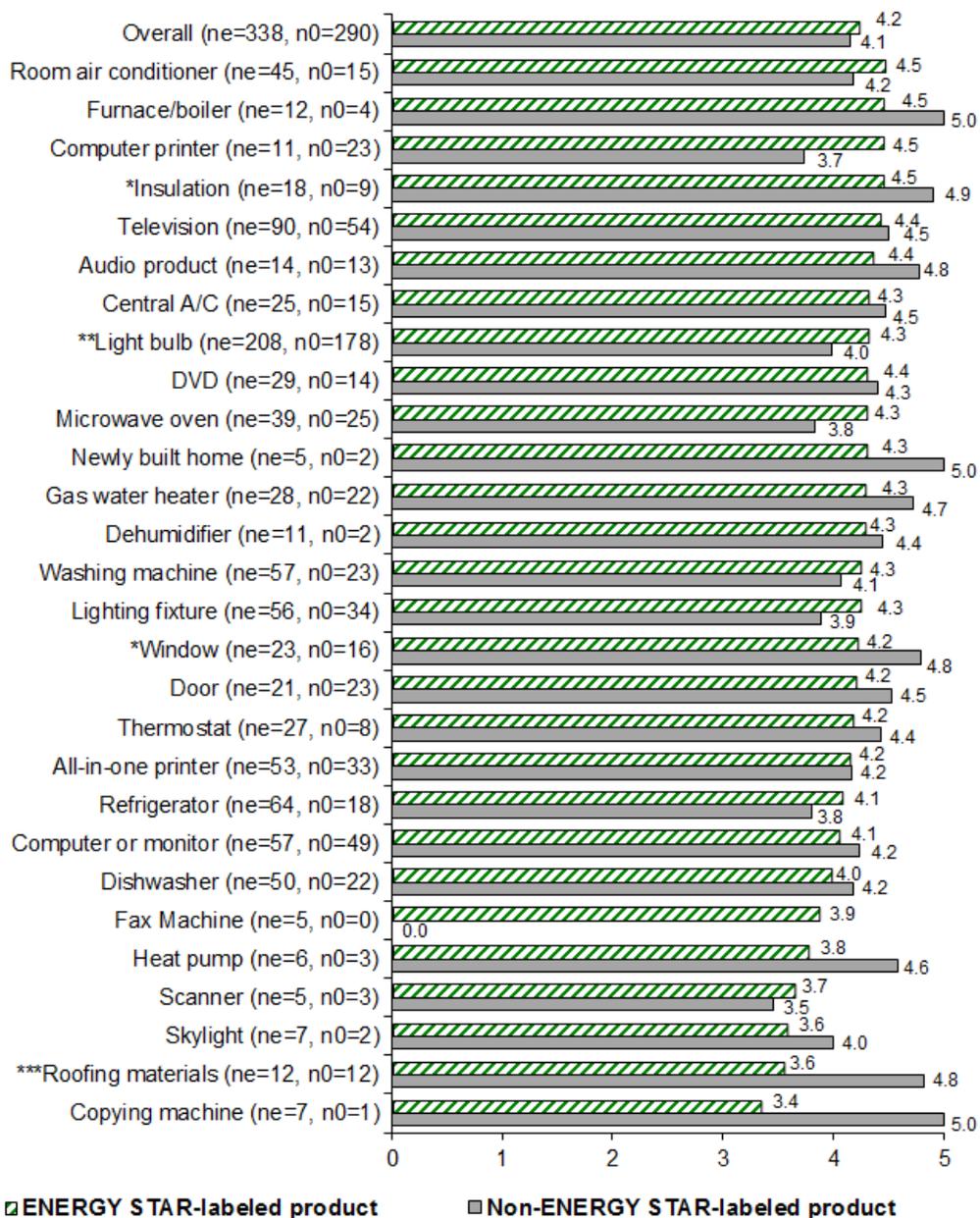
Overall, 2016 customer satisfaction with ENERGY STAR products is the same as 2015, 4.2 for both years, (p-value = 0.8260). Two ENERGY STAR-labeled products showed an increase in customer satisfaction in 2016 from 2015.

- At the 10-percent level of significance: furnaces/boilers (4.5 and 3.8, respectively), (p-value = 0.0640); and dehumidifiers (4.3 and 3.0, respectively), (p-value = 0.0704).

As noted in previous years, two product categories in the following list--thermostats and microwave ovens--were not currently eligible for the ENERGY STAR label during the time of survey fielding. However, EPA recently finalized a specification for Smart Thermostats.

**ENERGY STAR vs. Non-ENERGY STAR-Labeled Product Satisfaction
(Bases = Recognize label (aided) and purchased specified product¹⁹^{20,21})**

Average Satisfaction (1=very dissatisfied, 5=very satisfied)



ENERGY STAR-labeled product
 Non-ENERGY STAR-labeled product

- *** ENERGY STAR and Non-ENERGY STAR product proportions are statistically different from each other at the 1-percent level of significance (p-value ≤ 0.01).
- ** ENERGY STAR and Non-ENERGY STAR product proportions are statistically different from each other at the 5-percent level of significance (p-value ≤ 0.05).
- * ENERGY STAR and Non-ENERGY STAR product proportions are statistically different from each other at the 10-percent level of significance (p-value ≤ 0.10).

¹⁹ ne = number of respondents that recognized the label (aided) and purchased this product with an ENERGY STAR label
 n0 = number of respondents that recognized the label (aided) and purchased this product without an ENERGY STAR label

²⁰ There is no ENERGY STAR designation for microwave ovens or thermostats.

²¹ In 2016, one respondent recognized the ENERGY STAR label (aided) and purchased a copying machine without an ENERGY STAR label; a comparison was not made for this product.

4 CONSUMER PERCEPTIONS

Survey respondents that recognized the ENERGY STAR label (aided) were asked to indicate how strongly they agree or disagree with a number of attitudinal statements about ENERGY STAR-labeled products.²² The statements were shown to respondents in random order.

For purposes of discussion, the statements are grouped into four categories:

- Environmental and social responsibility messaging
- Purchasing preference
- Product attributes and performance
- Technology affinity

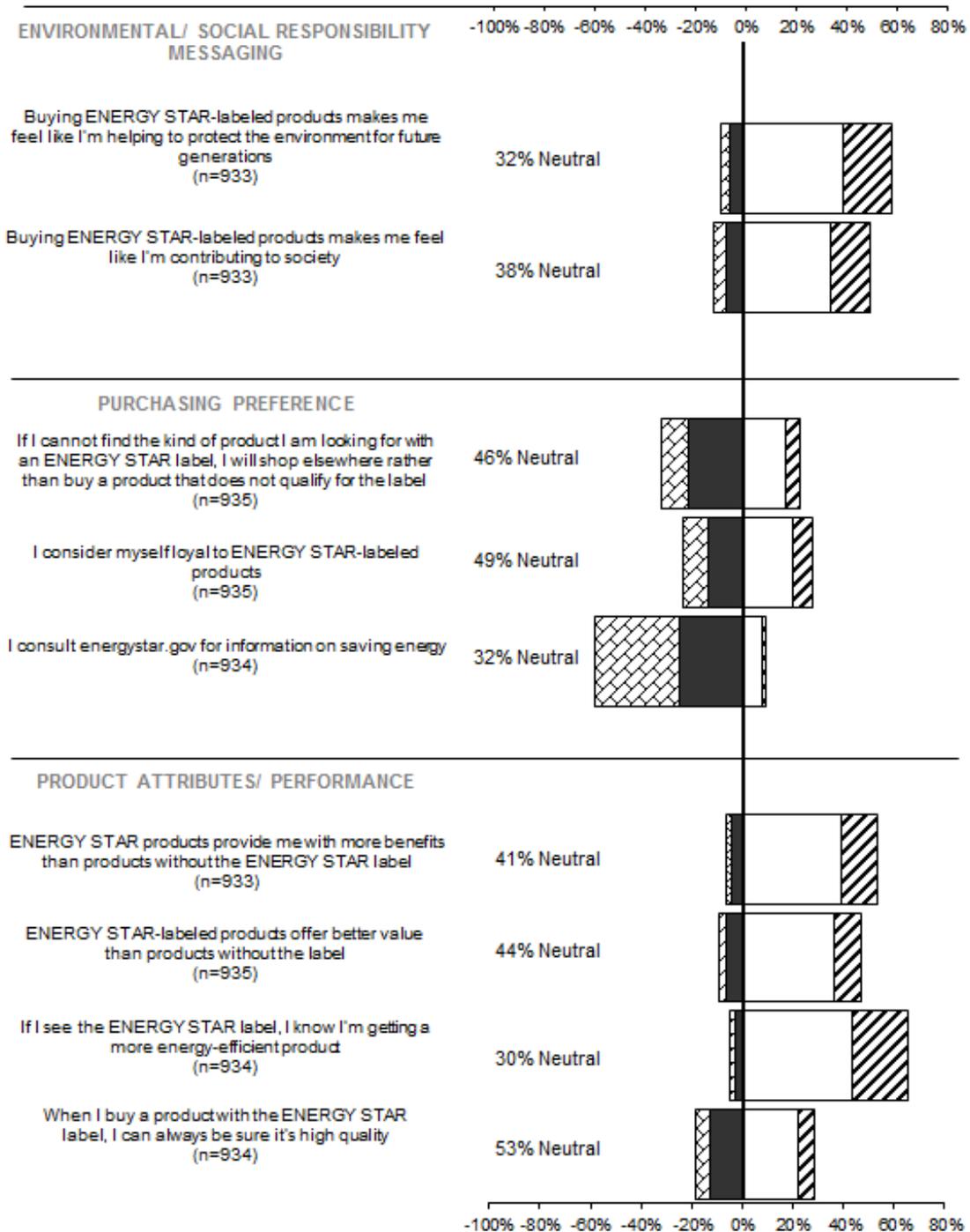
The 2016 survey results indicate that households generally agree with positive statements about the ENERGY STAR label and disagree with negative statements about the label.²³ Similar to 2015 results, few statements elicit strong agreement or strong disagreement among substantial proportions of households. In addition, a number of statements generated neutral responses from a sizeable proportion of households. A more detailed discussion of the findings regarding the attitudinal statements is provided on the following pages.

²² These statements are numbered Q16a through Q16w in the survey.

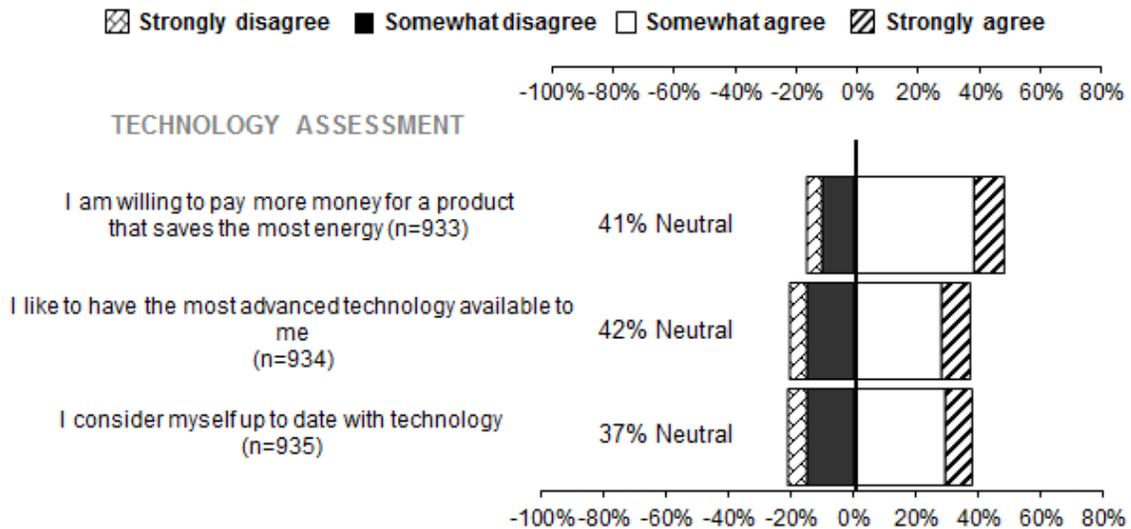
²³ In this discussion, the term “agree” is used to correspond to survey responses of “strongly agree” or “somewhat agree.” Similarly, the term “disagree” corresponds to survey responses of “strongly disagree” or “somewhat disagree.”

**Response to Categorical Statements Regarding Messaging,
Purchasing, and Product Attributes – Agreement with Positive Statements
(Base = Recognize label (aided))**

For each attitudinal statement, respondents were asked whether they strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree. The response of “neither agree nor disagree” is described as “Neutral” in the chart below and the discussion that follows. In the chart, the results for the “Neutral” response category are shown in text and not depicted in the bar graph. The results for the other four response categories are depicted in the bar graph.

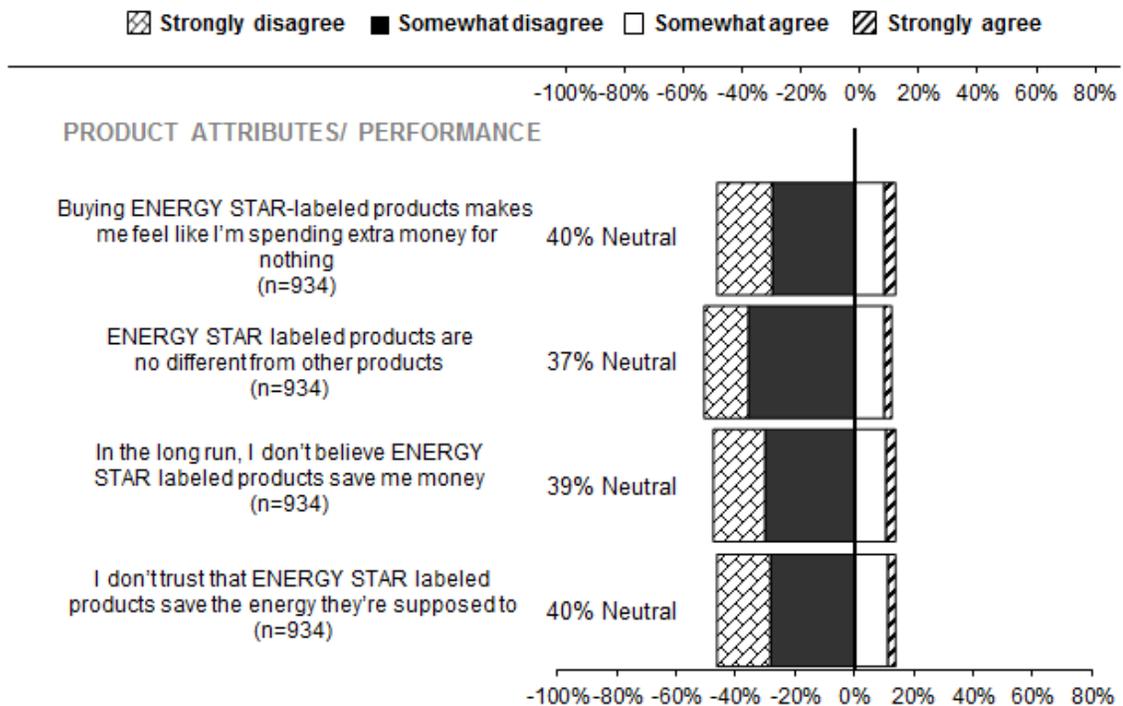


**Response to Categorical Statements Regarding Messaging,
Purchasing, and Product Attributes – Agreement with Positive Statements (Cont.)
(Base = Recognize label (aided))**



**Response to Categorical Statements Regarding Messaging,
Purchasing, and Product Attributes – Disagreement with Negative Statements
(Base = Recognize label (aided))**

For each attitudinal statement, respondents were asked whether they strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, or strongly disagree. The response of “neither agree nor disagree” is described as “Neutral” in the chart below and the discussion that follows. In the chart, the results for the “Neutral” response category are shown in text and not depicted in the bar graph. The results for the other four response categories are depicted in the bar graph.



4.1 Environmental and Social Responsibility Messaging

The development of the environmental and social responsibility messaging of the ENERGY STAR label has been a strong focus of the national ENERGY STAR education campaign. In the 2016 survey, two statements addressed the label's messaging in these areas: "Buying ENERGY STAR-labeled products makes me feel like I'm helping to protect the environment for future generations" and "Buying ENERGY STAR-labeled products makes me feel like I'm contributing to society."

Of households that recognize the ENERGY STAR label, the proportion that either strongly or somewhat agree with the statement that by buying ENERGY STAR-labeled products they feel they are helping protect the environment was similar in 2016 (59 percent) as 2015 (56 percent), (p-value = 0.2610). Thirty-two percent are neutral in their level of agreement or disagreement with this statement, this is a decrease from 2015 (37 percent); this difference is statistically significant at the 10-percent level (p-value = 0.0665). A smaller proportion of households somewhat disagree with this statement "Buying ENERGY STAR-labeled products makes me feel like I'm contributing to society" in 2016 (6 percent) than in 2015 (7 percent); this difference is statistically significant at the 10-percent level (p-value = 0.0698).

4.2 Purchasing Preferences

Increasing consumers' preferences for purchasing ENERGY STAR-labeled products is also an intended outcome of the national education campaign. Three separate statements were included in the 2016 survey to investigate households purchasing preferences with respect to ENERGY STAR-labeled products. In 2016, proportions of agreement, neutrality, and disagreement for each of these three statements are similar to 2015 proportions.

This year, 27 percent of households somewhat or strongly agree with the statement "I consider myself loyal to ENERGY STAR-labeled products." Forty-nine percent of households in 2016 are neutral, and 24 percent somewhat or strongly disagree with the above statement.

Twenty-three percent of households in 2016 agree with the statement, "If I cannot find the kind of product I am looking for with an ENERGY STAR label, I will shop elsewhere rather than buy a product that does not qualify for the label." Forty-six percent of households are neutral, and 32 percent disagree.

Nine percent of households agree with the statement "I consult energystar.gov for information on saving energy." Thirty-two percent of households in 2016 are neutral, and 58 percent disagree with the above statement.

4.3 Technology Affinity

Since 2012, the following questions were asked in order to support research interest related to advanced technologies.

- On a scale by the following statement (1 = Strongly Disagree to 5 = Strongly Agree), please indicate how strongly you agree or disagree with the statement “I am willing to pay more money for a product that saves the most energy.”
- On a scale by the following statement (1 = Strongly Disagree to 5 = Strongly Agree), please indicate how strongly you agree or disagree with the statement “I like to have the most advanced technology available to me.”
- On a scale by the following statement (1 = Strongly Disagree to 5 = Strongly Agree), please indicate how strongly you agree or disagree with the statement “I consider myself up to date with technology.”

In 2016, proportions of agreement, neutrality, and disagreement for each of these statements are similar to 2015 proportions.

Forty-eight percent of households agree either somewhat or strongly with the statement “I am willing to pay more money for a product that saves the most energy.” Thirty-seven percent of households are neutral in their level of agreement or disagreement with this statement, and 15 percent somewhat or strongly disagree. These proportions are similar to the 2015 results, where 45 percent of households agreed, 39 percent were neutral, and 16 percent disagreed with the above statement.

Thirty-seven percent of households agree (either somewhat or strongly) with the statement “I like to have the most advanced technology available to me.” Forty-two percent are neutral, and 21 percent disagree (either somewhat or strongly) with this statement. All of these proportions are similar to the 2015 results with p-values ≥ 0.10 ; the 2015 results were 38 percent, 44 percent and 18 percent, respectively.

Thirty-eight percent of households agree (either somewhat or strongly) with the statement “I consider myself up to date with technology.” Forty-one percent are neutral, and 21 percent disagree (somewhat or strongly disagree) with this statement. These are similar to the 2015 results of 39 percent, 42 percent and 19 percent, respectively.

4.4 Product Attributes and Performance

Another goal of the national ENERGY STAR education campaign has been to inform consumers that ENERGY STAR-labeled products are more energy efficient than non-labeled products. The degree to which this goal is being accomplished is addressed in the 2016 survey by asking respondents their level of agreement or disagreement with the statement “If I see the ENERGY STAR label, I know I’m getting a much more energy-efficient product.” Sixty-five percent of respondents either strongly or somewhat agree with this statement, which is similar to 66 percent in 2015 (p-value = 0.7925). This continues to indicate a perception among consumers that the ENERGY STAR label indicates superior performance with respect to energy efficiency relative to products without the label.

The survey also addressed perceptions of product quality. Survey respondents were asked the level at which they agreed or disagreed with the statement “When I buy a product with the ENERGY STAR label, I can always be sure it’s high quality.” Twenty-nine percent of households either strongly or somewhat agree with this statement, and 53 percent are neutral. These are both similar to the previous year, 32 percent and 53 percent, respectively. More households in 2016 (19 percent) than in 2015 (15 percent) either somewhat or strongly disagreed with the statement, this difference is statistically significant at the 10-percent level (p-value = 0.0616).

A number of attitudinal statements were included in the survey to measure consumers’ perceptions of ENERGY STAR-labeled product value. One of these statements is “ENERGY STAR products provide me with more benefits than products without the ENERGY STAR label.” The results show that 53 percent either strongly or somewhat agree with the statement, and 7 percent either somewhat or strongly disagree. These results are the same as 2015. On another statement regarding product value, “ENERGY STAR-labeled products offer better value than products without the label,” 47 percent of households agreed with the statement and 9 percent disagreed. These were similar to the 2015 values of 47 and 7 percent, respectively.

The results related to the statement “Buying ENERGY STAR-labeled products make me feel like I’m spending extra money for nothing” provide additional information on perceptions of product value. In 2016, 46 percent somewhat or strongly disagree with this statement. Forty percent of households in 2016 are neutral, and 14 percent agree with this statement. These results are similar to the 2015 results.

In 2016, the following negative statements about product performance, added in 2010, were included.

- The statement, “I don’t trust that ENERGY STAR-labeled products save the energy they’re supposed to” had only 13 percent agreement, with most respondents disagreeing (46 percent). The proportions of households that agree and disagree with these statements in 2016 are similar to the 2015 results.

- The statement, “In the long run, I don’t believe ENERGY STAR-labeled products save me money” also had 13 percent agreement, and 48 percent of households somewhat or strongly disagree with this statement. This is similar to 2015 (12 percent and 48 percent, respectively).
- Finally, the statement, “ENERGY STAR products are no different from other products” received only 12 percent agreement and almost four times as much disagreement (51 percent). These results are with the same as the previous years’ results.

Fifty-two percent of respondents either somewhat or strongly agree with the statement “It seems like most products have the ENERGY STAR label these days,²⁴” while 8 percent somewhat or strongly disagreed with the statement. The proportions of households that agree and disagree with these statements in 2016 are similar to the 2015 results.

²⁴ This statement was deemed neither positive nor negative so it does not appear in the previous chart.

4.5 Consumer Perceptions by Publicity Category

The 2016 results also suggest that local and regional efforts to publicize ENERGY STAR have been successful in affecting consumer perception and recognition of the label. A smaller proportion of households in high-publicity areas than non-high-publicity areas *disagree* with the following statements that communicate a positive perception of ENERGY STAR:

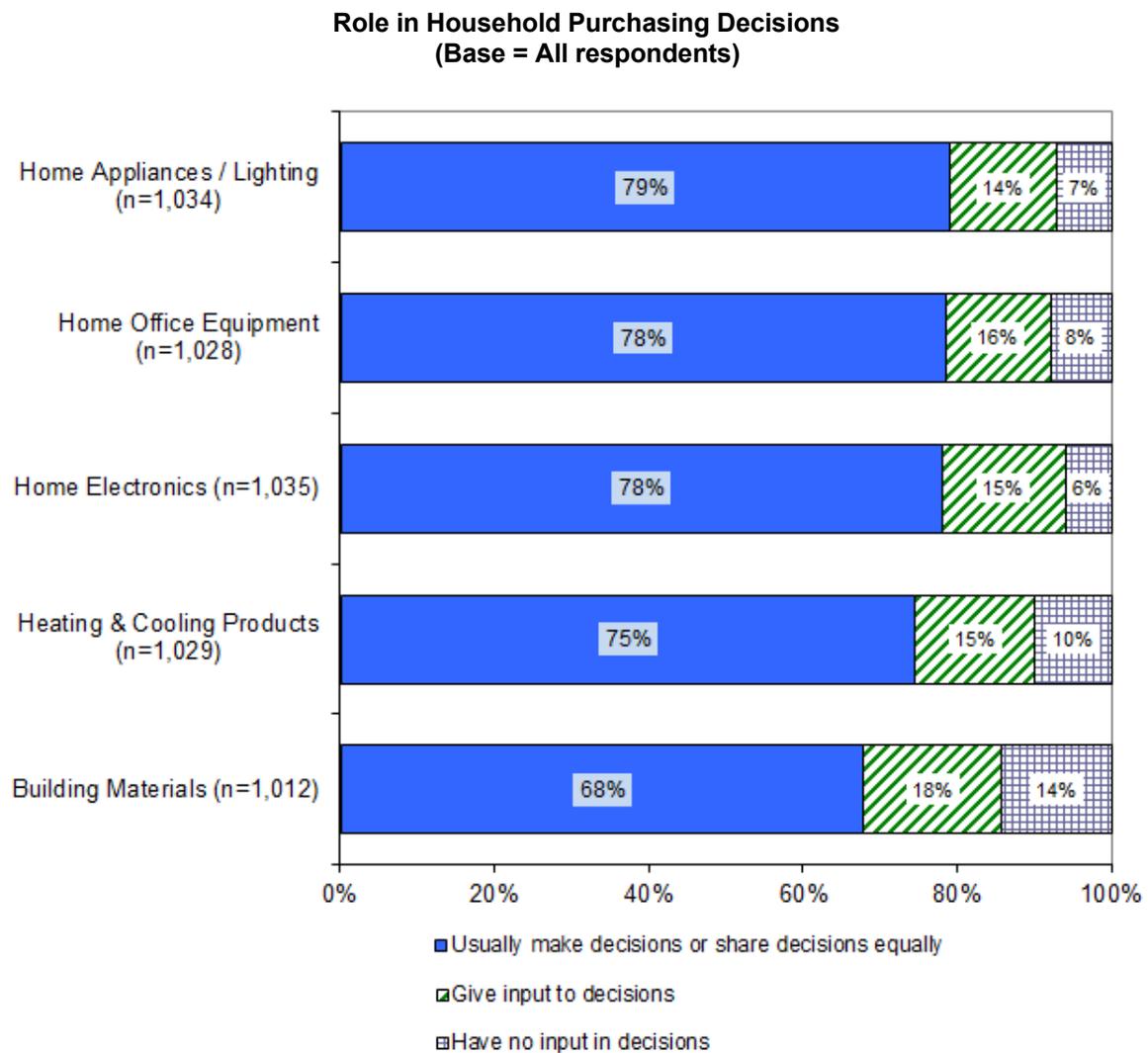
- “If I cannot find the kind of product I am looking for with an ENERGY STAR label, I will shop elsewhere rather than buy a product that does not qualify for the label” (29 percent compared to 35 percent).
- “I consider myself loyal to ENERGY STAR-labeled products” (21 percent compared to 27 percent).

A larger proportion of households in high-publicity areas than non-high-publicity areas are neutral in their level of agreement or disagreement with the following statements:

- “I like to have the most advanced technology available to me” (46 percent compared to 38 percent).
- “I consult energystar.gov for information on saving energy” (35 percent compared to 29 percent).

5 PURCHASING DECISIONS

At the end of the survey, respondents were asked to characterize their role in the household purchasing decisions. The results indicate that the vast majority of those represented are primary decision makers, meaning they usually make household purchasing decisions alone or share equally in these decisions. As can be seen below, this varies little across product categories. Seventy-nine percent of survey respondents were primary decision makers for their household's home appliance/lighting purchases.



6 LIGHT BULB PURCHASER QUESTIONS

In 2016, 41 percent of all households purchased a light bulb(s). Ninety-two percent of households that recognized the label and purchased a light bulb saw the ENERGY STAR label on the bulb, packaging, or product literature of the purchased bulb. These results did not vary based on publicity category. All respondents who indicated they had purchased a light bulb(s) in the past 12 months were asked:

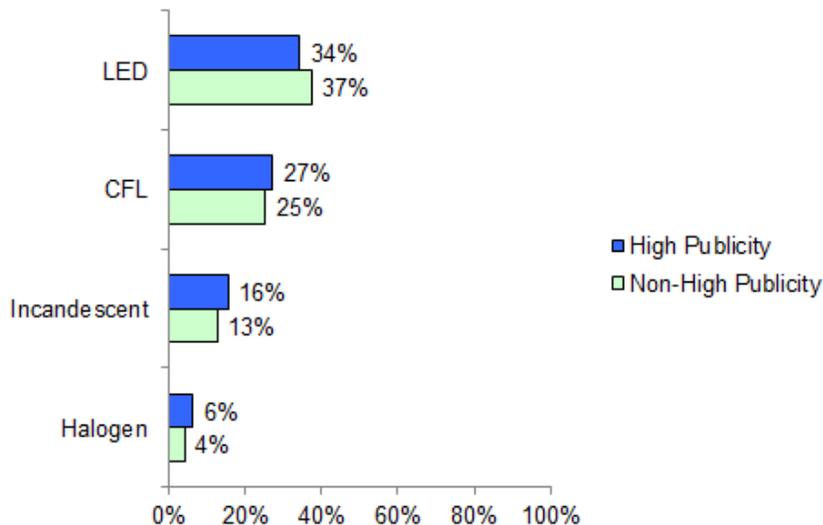
- “Did you install the light bulb(s) you purchased in a light fixture?”

If yes, they’re asked:

- “What kind of bulb(s) did you purchase?” (Please indicate the primary type purchased).
- “What kind of bulb(s) did you replace?” (Check the answer that best describes most of the replacements you made).

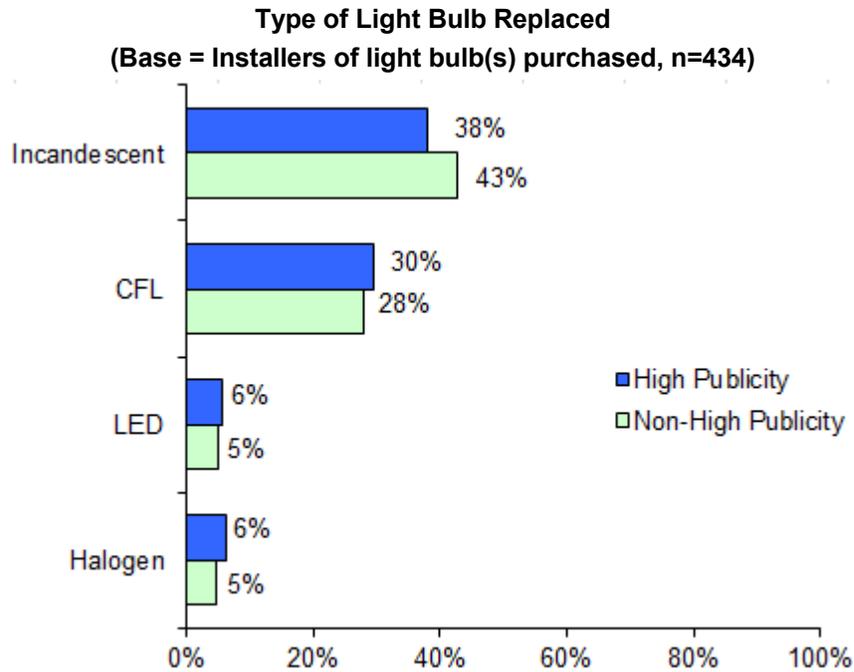
Ninety-two percent of light bulb purchasers indicated they installed the purchased light bulb. Of these respondents, 36 percent purchased an LED(s); this is an increase from 27 percent in 2015 (p-value = 0.0122). In 2016, fewer (26 percent) purchased a CFL(s) than in 2015 (35 percent); this difference is statistically different at the 5-percent level (p-value = 0.0156). Fourteen percent purchased an incandescent bulb(s) and 5 percent purchased a halogen(s); this is similar to 2015 (15 percent and 7 percent, respectively). As shown below, in 2016 there were no differences across publicity categories.

Type of Light Bulb Purchased and Installed by Publicity Category
(Base = Installers of light bulb(s) purchased, n=434)



Note: Q12(d_1) “Which type of bulb(s) did you purchase?”

In 2016, forty percent of respondents replaced an incandescent bulb(s), 29 percent replaced a CFL(s), 6 percent replaced a LED(s) and 5 percent replaced a halogen(s). These proportions are similar to 2015, which are 41 percent, 27 percent, 6 percent and 5 percent, respectively. Results by publicity category are also similar and are shown below.



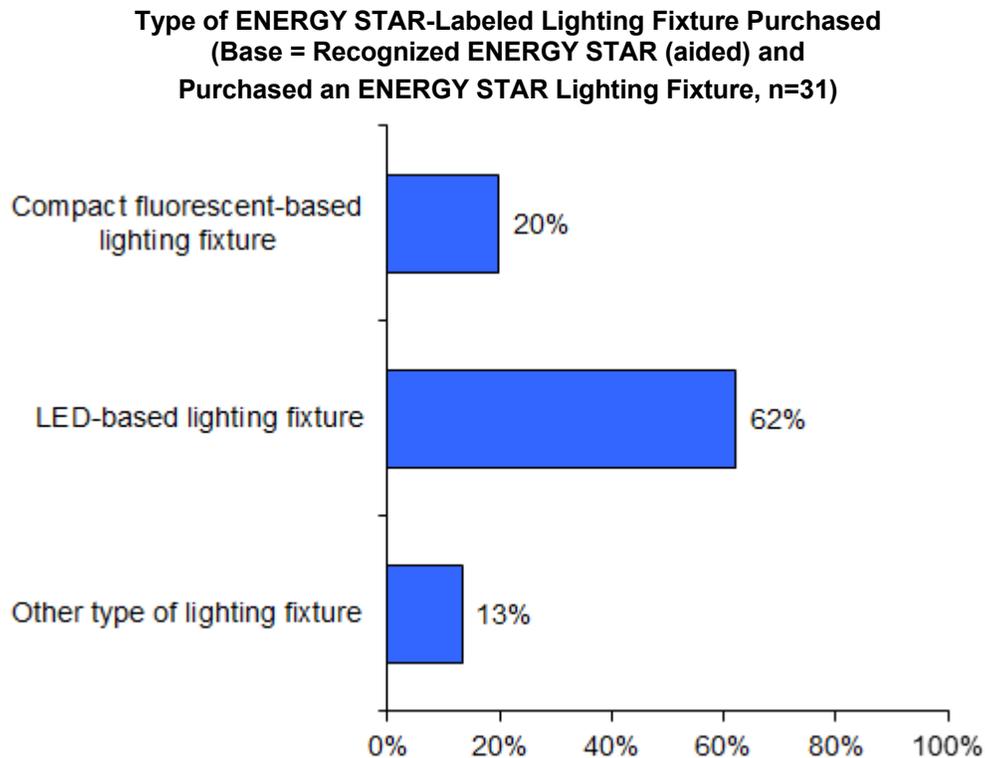
Note: Q12(e) "Which type of bulb(s) did you replace?"

LIGHTING FIXTURE PURCHASER QUESTIONS

In 2016, nine percent of all households purchased fixtures. This is similar to the 2015 proportion (11 percent). Consistent with previous years, purchasers that recognized the ENERGY STAR label were asked if they saw the label on the product(s) they purchased. Respondents that reported purchasing an ENERGY STAR-labeled lighting fixture were asked:

- “Which kind of ENERGY STAR-labeled lighting fixture did you purchase?”

In 2016, 20 percent of ENERGY STAR-labeled lighting fixture purchasers report purchasing a compact fluorescent-based lighting fixture, 62 percent purchased a LED lighting fixture and 13 percent purchased some other type of lighting fixture. These are all similar to 2015 at 23 percent, 41 percent and 18 percent, respectively. For all types of ENERGY STAR-labeled lighting fixtures purchased, there were no differences between high- and non-high-publicity areas.



Note: Q8A 1-4. Which kind of ENERGY STAR-labeled lighting fixture did you purchase?
QBA 1-4 is a multiple response question and therefore does not always sum to 100 percent. In 2015, 21 percent of respondents reported they “Don’t know” the type of ENERGY STAR lighting fixture purchased.

7 ENERGY STAR MOST EFFICIENT QUESTIONS

The 2011 questionnaire added a brief series of questions²⁵ to collect information on recognition and influence of the ENERGY STAR Most Efficient marketing designation. Only respondents that recognize the ENERGY STAR label (aided) were asked the ENERGY STAR Most Efficient questions. These questions were continued in the 2016 survey.

In 2016, 23 percent of households that recognized the ENERGY STAR label (aided) indicated they had seen or heard of ENERGY STAR Most Efficient. This is similar to 26 percent of households in 2015 (p-value = 0.2348). Among households that had seen or heard of ENERGY STAR Most Efficient:

- Thirty-eight percent were aware that products designated ENERGY STAR Most Efficient 2016 represent a subset of ENERGY STAR qualified products within a given product category.²⁶ This is similar to 32 percent in 2015 (p-value = 0.4392).
- Just under half (46 percent) recognized the ENERGY STAR Most Efficient marketing graphic when it was shown to them; this is also similar to 47 percent in 2015 (p-value = 0.8782).
- Fifty-one percent of households agreed (either somewhat or strongly) with the statement that “All other things equal, I would buy a product because it is designated as ENERGY STAR Most Efficient;” this is a decrease from last year (63 percent), (p-value = 0.0904).

Response to Statement Regarding Purchase of ENERGY STAR Most Efficient Product [Base = Recognized ENERGY STAR (aided)]

Would buy a product because it is ENERGY STAR Most Efficient	2016 (n=135)	2015 (n=107)
Strongly disagree	6%	1%
Somewhat disagree	4%	3%
Neither agree nor disagree	39%	33%
Somewhat agree	32%	42%
Strongly agree	19%	21%
Total	100%	100%

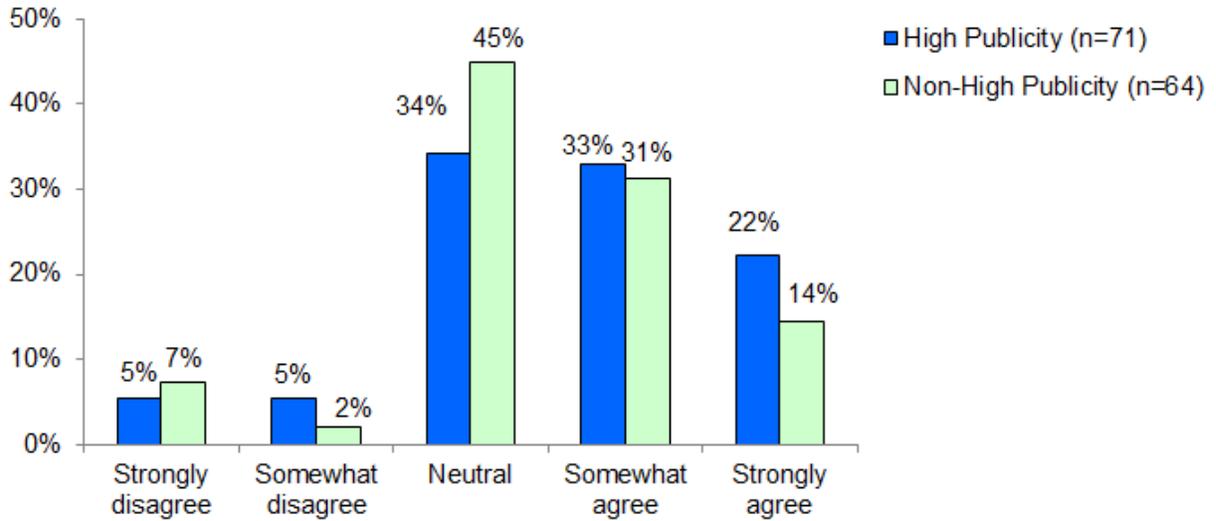
Fifty-five percent of households in high-publicity areas and 46 percent of households in non-high-publicity areas somewhat or strongly agree

²⁵ The ENERGY STAR Most Efficient questions, Q18 – Q22, are shown in Appendix D: 2015 Survey Questions and Flow Chart on page D-9.

²⁶ This question was added to the survey in 2013 (Q20: “Were you aware that products designated ENERGY STAR Most Efficient 2016 represent a subset of ENERGY STAR qualified products within a given product category?”).

with this statement: “All other things equal, I would buy a product because it is designated as ENERGY STAR Most Efficient.” There are no statistical differences at the 10-percent level between high-publicity areas and non-high-publicity areas.

**Response to Statement Regarding Purchase of ENERGY STAR Most Efficient Product
by Publicity Category**
[Base = Recognized ENERGY STAR (aided) and
Recognized ENERGY STAR Most Efficient (unaided)]



7.1 ENERGY STAR Most Efficient Influenced (MEI)

The survey results were analyzed by Most Efficient Influenced (MEI) households and non-Most Efficient Influenced (non-MEI) households to learn about potential demographic or attitudinal differences. This was done in order to understand the customer segment that would likely be influenced by the marketing designation regardless of whether they had been exposed to it or not. MEI households report having seen or heard of the ENERGY STAR label and the ENERGY STAR Most Efficient label, and report that they would be influenced by the Most Efficient label.²⁷ MEI households somewhat or strongly agree with the statement “All other things equal, I would buy a product because it is designated ENERGY STAR Most Efficient.”

Demographics

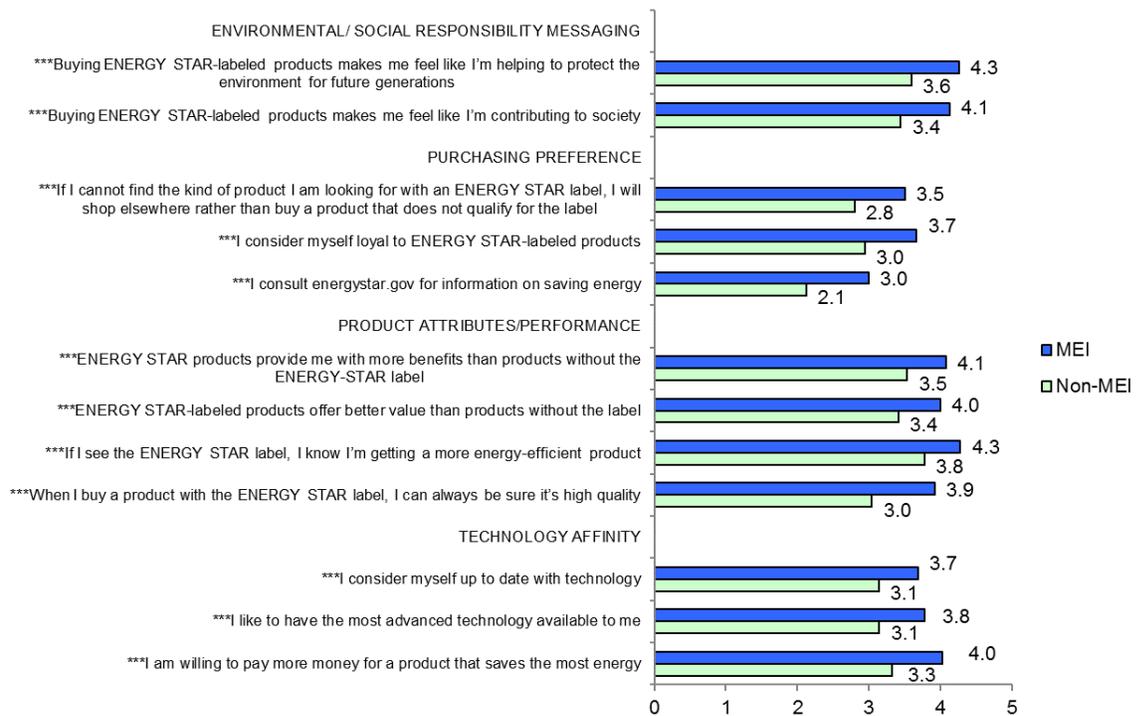
Consistent with previous years, the 2016 demographic characteristics of MEI and non-MEI households were similar. However, a smaller proportion of MEI households (55 percent) than non-MEI households (71 percent) identified as white (non-Hispanic) (p-value = 0.0397).

²⁷ Most Efficient Influenced (MEI) households are those who are aware of the ENERGY STAR label; have indicated awareness of ENERGY STAR Most Efficient (unaided recognition, Q18. Have you ever seen or heard of ENERGY STAR Most Efficient?) and report they would buy a product because it is ENERGY STAR Most Efficient (somewhat or strongly agree with Q22. All other things equal, I would buy a product because it is designated as ENERGY STAR Most Efficient).

CONSUMER PERCEPTIONS

MEI households are very likely to associate ENERGY STAR with environmental and social benefits. They are very likely to shop where they can find the ENERGY STAR label, perceive ENERGY STAR products to have superior performance, and are willing to pay more money for a product that saves the most energy. Consistent with previous years, MEI households had higher agreement than non-MEI households for all twelve positive attitudinal statements shown below. Furthermore, all twelve positive statements in the table below are statistically significant at the 1-percent level ($p\text{-value} \leq 0.01$).

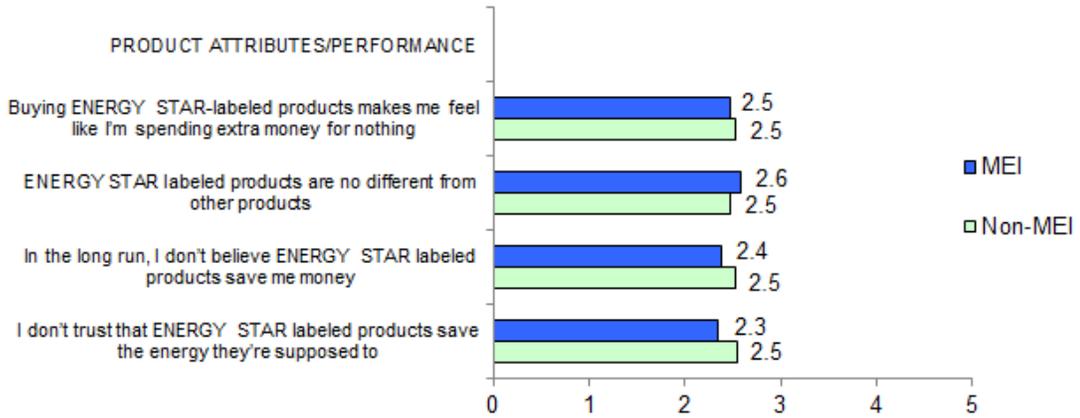
Response to Categorical Statements Regarding Messaging, Purchasing, and Product Attributes – Average Response Positive Statements (Base = Recognize label (aided))



*** MEI and non-MEI averages are statistically different from each other at the 1-percent level of significance ($p\text{-value} \leq 0.01$).

MEI and non-MEI averages are statistically similar for the negative statements presented in the table below (p-value > 0.10).

Response to Categorical Statements Regarding Messaging, Purchasing, and Product Attributes – Average Response to Negative Statements (Base = Recognize label (aided))



8 ENERGY STAR “CONNECTED” QUESTIONS

Consistent with 2015, this year questions were also included at the end of the survey to assess awareness and understanding of ENERGY STAR “Connected” products. ENERGY STAR “Connected” products contain a set of advanced energy saving features such as the following:

- Demand Response (DR) status (e.g., normal operation, delay appliance load, temporary appliance load reduction)
- Remote access to product
- Energy consumption reporting and feedback
- Peak period avoidance
- Smart grid capability
- Product connectivity

ENERGY STAR “Connected” Recognition

In 2016, survey respondents that recognized the ENERGY STAR label (aided) were asked “Have you ever heard the term “connected” in relation to ENERGY STAR products” (survey question Q30). Four percent of households that recognize the ENERGY STAR label have heard of the term “connected” in relation to ENERGY STAR products. This is a significant decrease from 9 percent in 2015 at the 1-percent significance level (p-value = 0.0062). Results for recognition of ENERGY STAR “Connected” by publicity category are provided in the following table.

Recognition of the ENERGY STAR “Connected” Label by Publicity Category
[Base = Recognize label (aided)]

Publicity Category	Recognized ENERGY STAR “Connected” (n=35)
High	4.2%
Non-high	4.0%
Difference (High minus Non-high)	0.20%
p-value	0.8959

Respondents that indicated they heard of the term “connected” in relation to ENERGY STAR products were asked, “What does ENERGY STAR “Connected” mean to you?” (survey question Q31). Twenty-two of the 23 respondents were able to articulate what ENERGY STAR Connected meant to them.²⁸ Fifteen respondents provided responses relating to products capable of connecting to additional (smart) technology devices, such as phones, Bluetooth, or internet. Four answers pertained to benefits with either a positive perception or an awareness of being connected to the product, and 3 respondents reported something relating to technology or money.

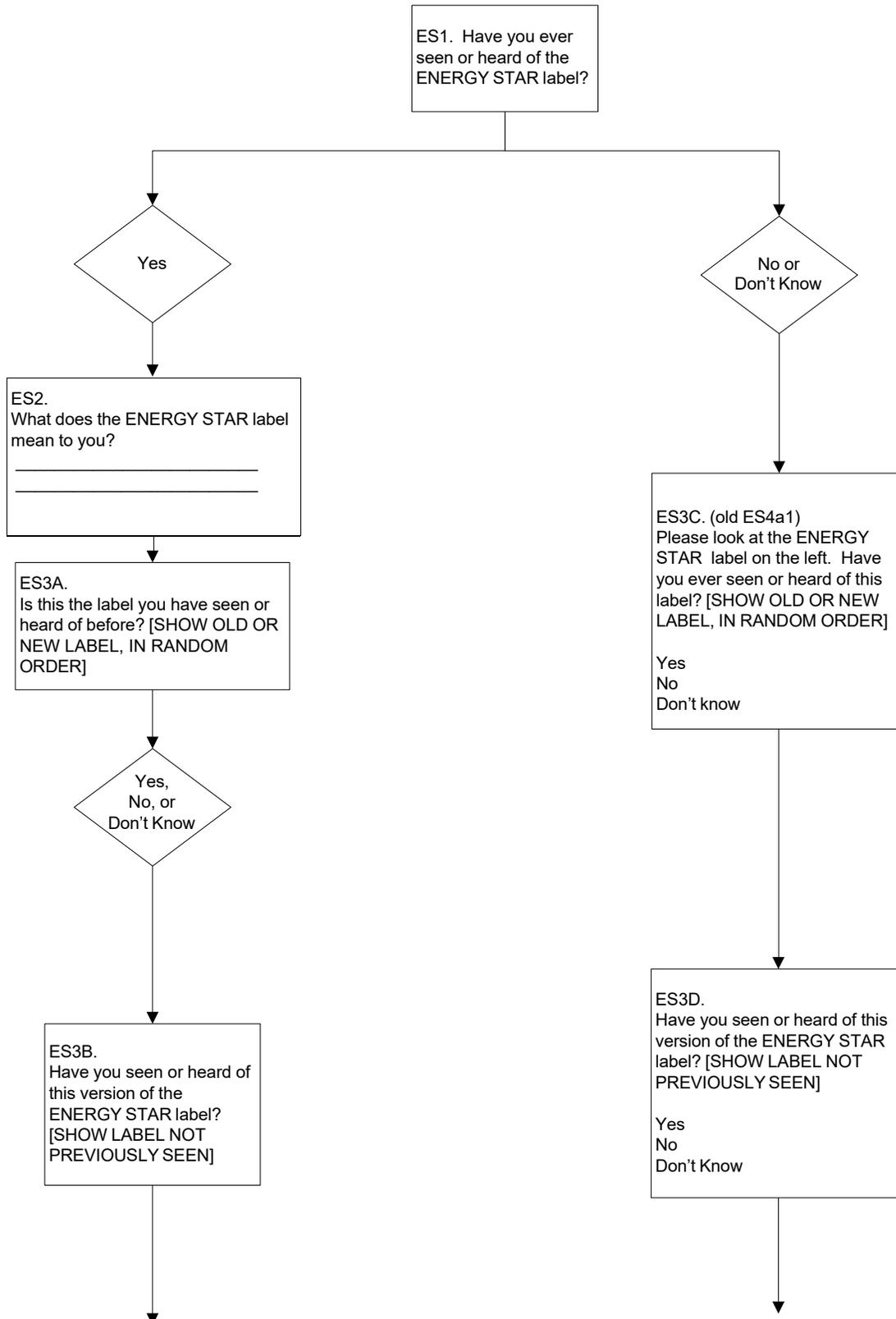
²⁸ One respondent answered “very much;” no respondents answered “Not sure”/” Not much” nor “Nothing.”

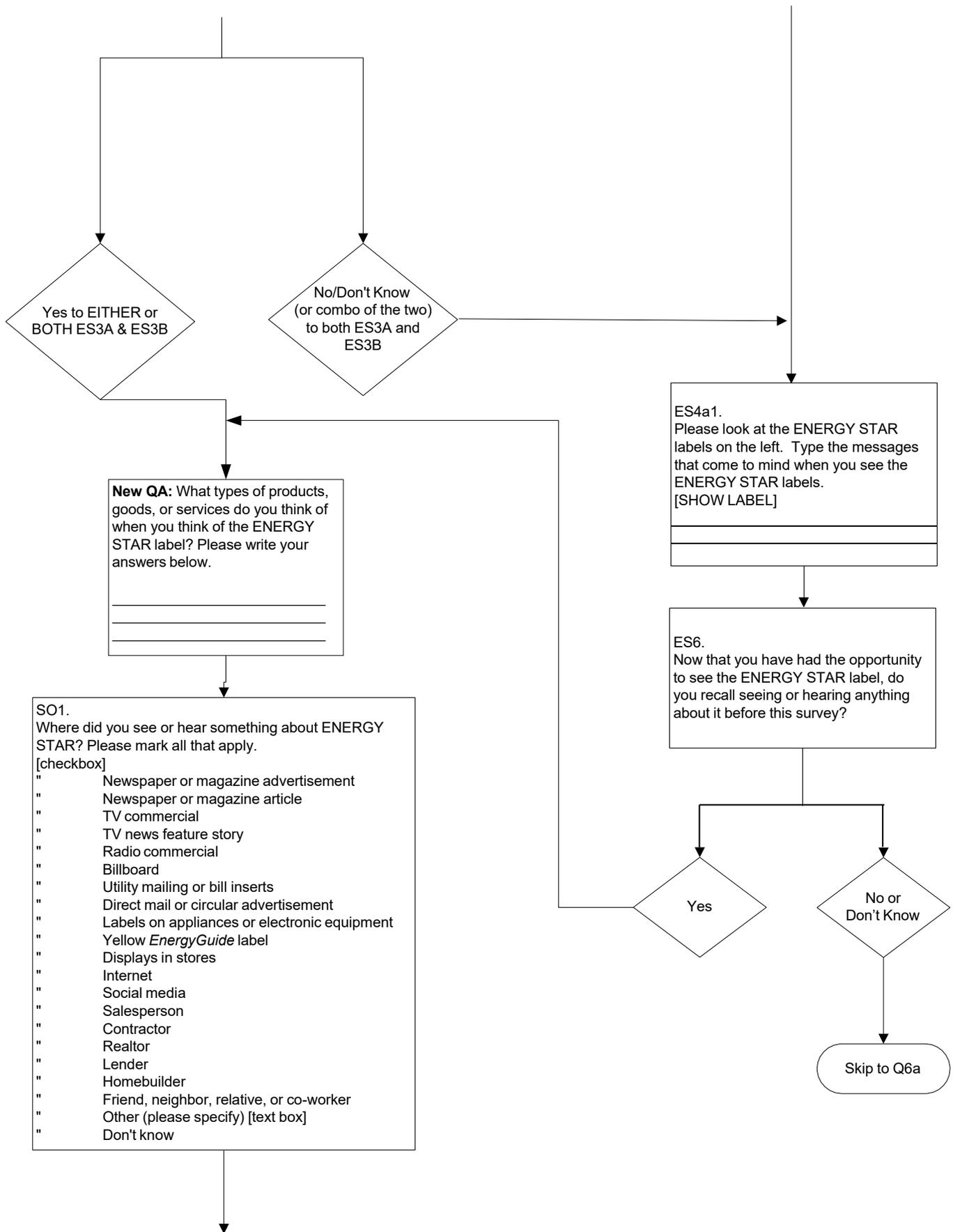
APPENDIX D: 2016 SURVEY QUESTIONS AND FLOW CHART

2016 ENERGY STAR SURVEY

August 22, 2016

Changes since 2015 highlighted in red.





SO2.
What did you see or hear about ENERGY STAR? Please be specific.

New QB. As far as you know, who decides if a product deserves the ENERGY STAR label? Select one answer only.

Product manufacturers
Retailers/stores
US Government
Underwriters Laboratories
Electric & gas utilities
Other: _____
Don't know

Q5(b). Please continue reviewing the lists of products below, and select each of the products, product literature, or packaging on which you have seen the ENERGY STAR label.

<u>Home Appliances/Lighting</u> Dishwasher Refrigerator Lighting fixture Washing machine Light bulb Microwave oven Dehumidifier	<u>Home Electronics</u> Television DVD product (including TV/DVD) Audio product
None of these products	

Q5(a). Now we're going to ask you about several groups of products. As you review the list, please select each of the products, product literature, or packaging on which you have seen the ENERGY STAR label.

<u>Heating and Cooling Products</u> Central air conditioner Furnace or boiler Heat pump Thermostat Room air conditioner Water heater	<u>Home Office Equipment</u> Computer or monitor Computer printer Copying machine Fax machine Scanner All-in-one printer (includes copier/scanner/fax)
None of these products	

Q5(c). Finally, please review the last of the product lists below and select each of the products, product literature, or packaging on which you have seen the ENERGY STAR label.

<u>Building Materials</u> Window Door Skylight Insulation Roofing material	<u>Buildings</u> Newly built home
---	--------------------------------------

Q6a1.
Have you or someone else in your household been shopping in a store in the last 12 months for any products listed below?

<u>Heating and Cooling Products</u>				
Room air conditioner	Yes	No	Don't know	
<u>Home Appliances/Lighting</u>				
Dishwasher	Yes	No	Don't know	
Refrigerator	Yes	No	Don't know	
Lighting fixture	Yes	No	Don't know	
Washing machine	Yes	No	Don't know	
Light bulb	Yes	No	Don't know	
<u>Home Electronics</u>				
Television	Yes	No	Don't know	
DVD product (including TV/DVD)	Yes	No	Don't know	
Audio product	Yes	No	Don't know	

Q6a2.
Have you or someone else in your household been shopping in a store in the last 12 months for any of these other products listed below?

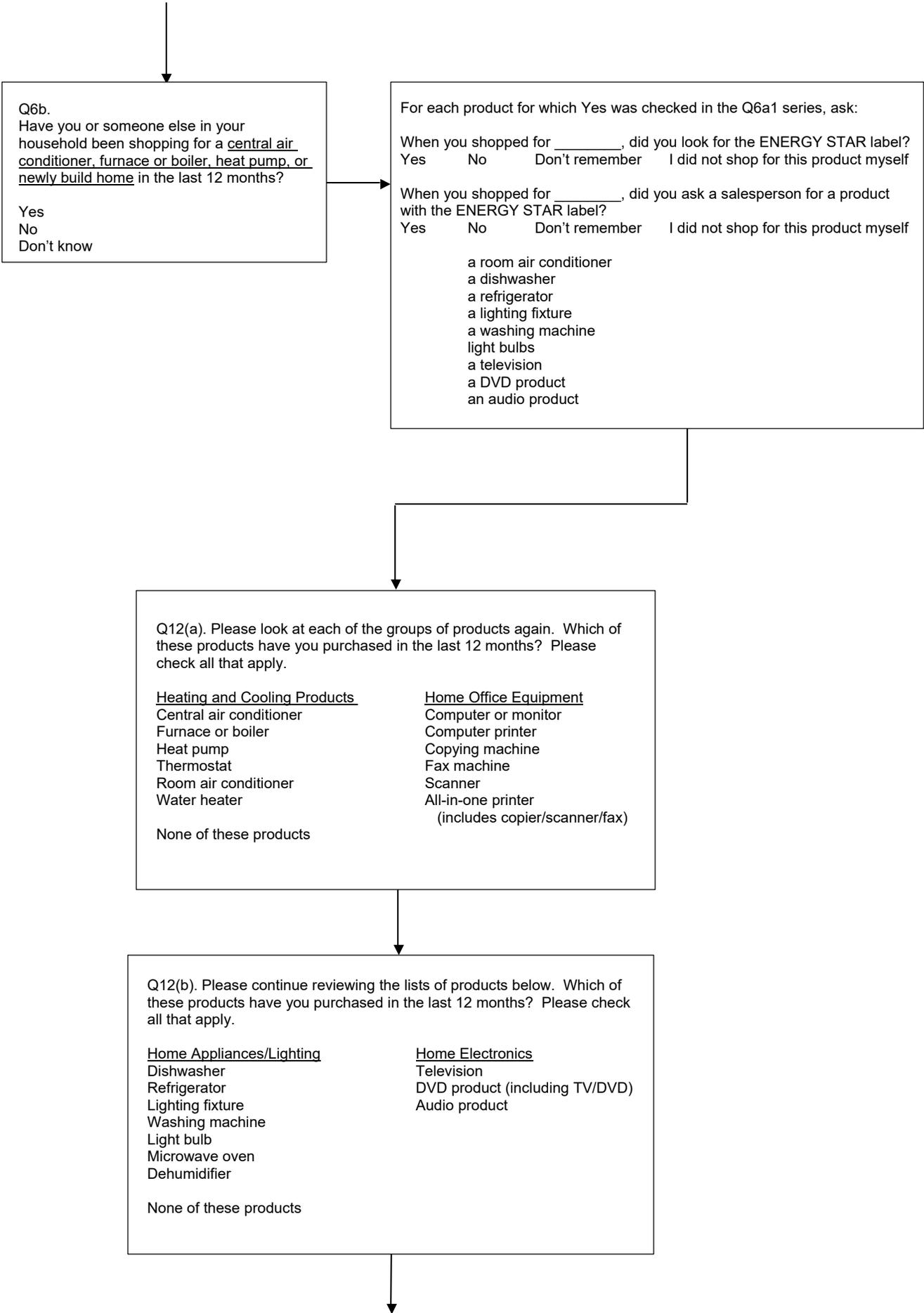
Yes
No
Don't know

Heating and Cooling Products
Thermostat
Water heater

Home Office Equipment
Computer or monitor
Computer printer
Copying machine
Fax machine
Scanner
All-in-one printer (includes copier/scanner/fax)

Home Appliances/Lighting
Microwave oven
Dehumidifier

Building Materials
Window
Door
Skylight
Insulation
Roofing material



Q6b.
 Have you or someone else in your household been shopping for a central air conditioner, furnace or boiler, heat pump, or newly build home in the last 12 months?

Yes
 No
 Don't know

For each product for which Yes was checked in the Q6a1 series, ask:

When you shopped for _____, did you look for the ENERGY STAR label?
 Yes No Don't remember I did not shop for this product myself

When you shopped for _____, did you ask a salesperson for a product with the ENERGY STAR label?
 Yes No Don't remember I did not shop for this product myself

a room air conditioner
 a dishwasher
 a refrigerator
 a lighting fixture
 a washing machine
 light bulbs
 a television
 a DVD product
 an audio product

Q12(a). Please look at each of the groups of products again. Which of these products have you purchased in the last 12 months? Please check all that apply.

<u>Heating and Cooling Products</u>	<u>Home Office Equipment</u>
Central air conditioner	Computer or monitor
Furnace or boiler	Computer printer
Heat pump	Copying machine
Thermostat	Fax machine
Room air conditioner	Scanner
Water heater	All-in-one printer (includes copier/scanner/fax)
None of these products	

Q12(b). Please continue reviewing the lists of products below. Which of these products have you purchased in the last 12 months? Please check all that apply.

<u>Home Appliances/Lighting</u>	<u>Home Electronics</u>
Dishwasher	Television
Refrigerator	DVD product (including TV/DVD)
Lighting fixture	Audio product
Washing machine	
Light bulb	
Microwave oven	
Dehumidifier	
None of these products	

Q12(c). Finally, please review the last of the product lists below. Which of these products have you purchased in the last 12 months? Please check all that apply.

<u>Building Materials</u>	<u>Buildings</u>
Window	Newly built home
Door	
Skylight	
Insulation	
Roofing material	
None of these products	

Did you install the light bulb(s) you purchased in a light fixture?

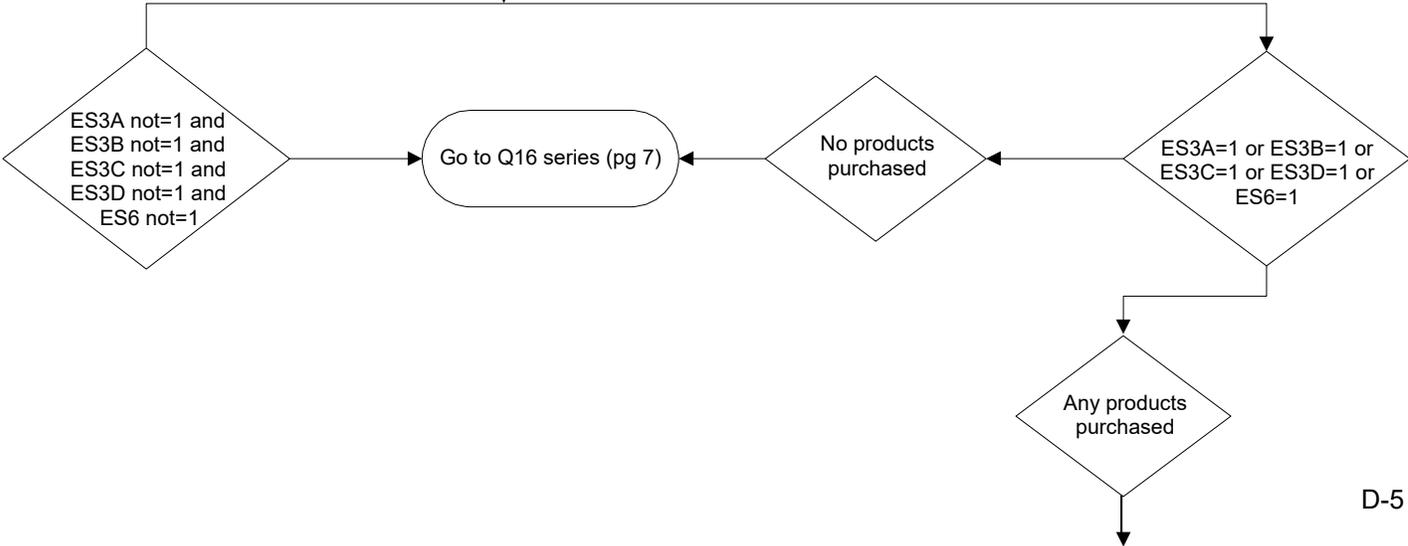
Yes
No
Don't know

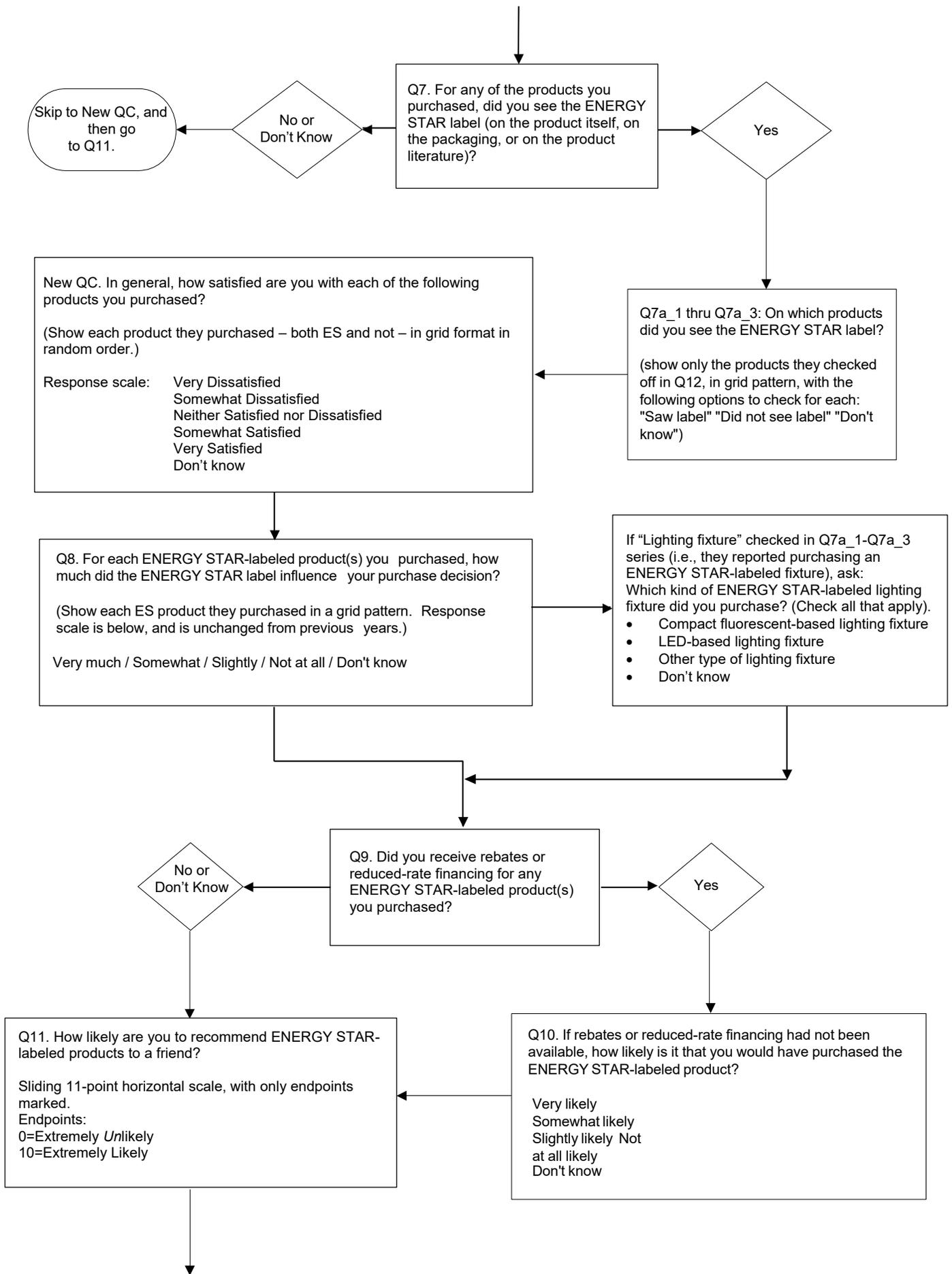
What kind of bulb(s) did you purchase? Please indicate the primary type purchased:

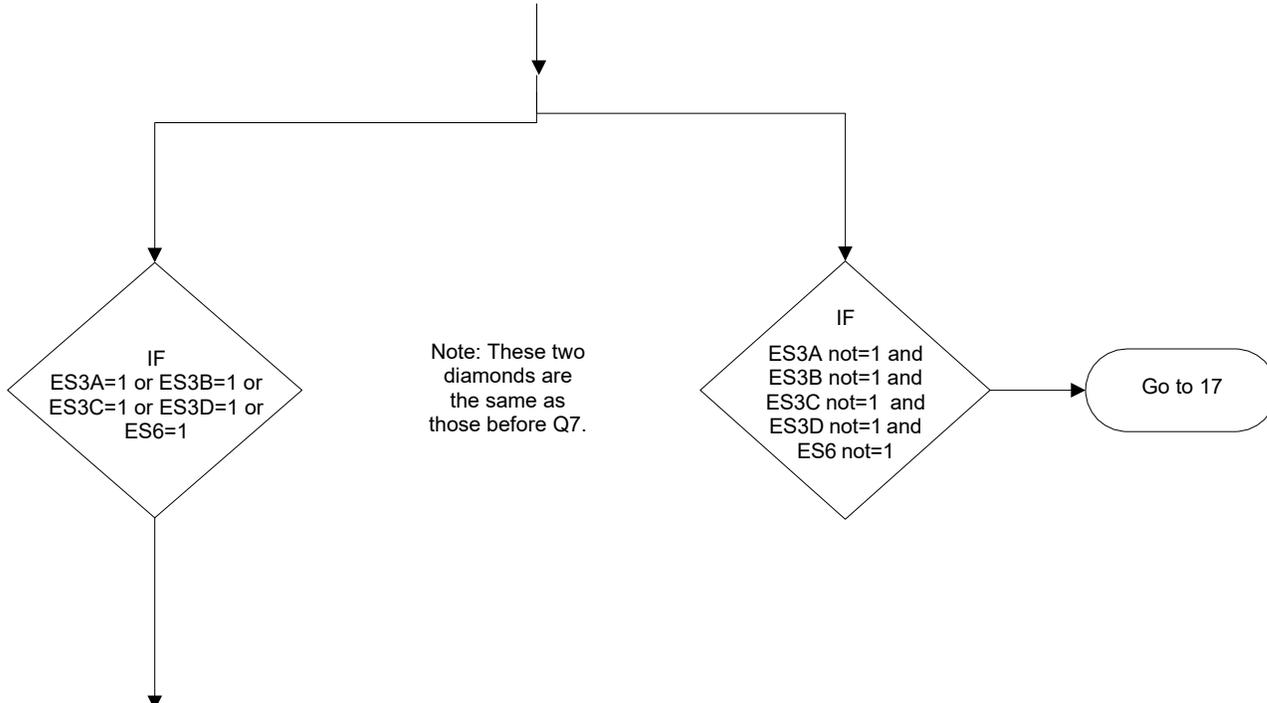
- Compact fluorescent light bulb (CFL)
- Incandescent light bulb
- Halogen light bulb
- Light-emitting diode (LED)
- Don't know

What kind of bulb(s) did you replace? (Check the answer that best describes most of the replacements you made.)

- Compact fluorescent light bulb (CFL)
- Incandescent light bulb
- Halogen light bulb
- Light-emitting diode (LED)
- Don't know







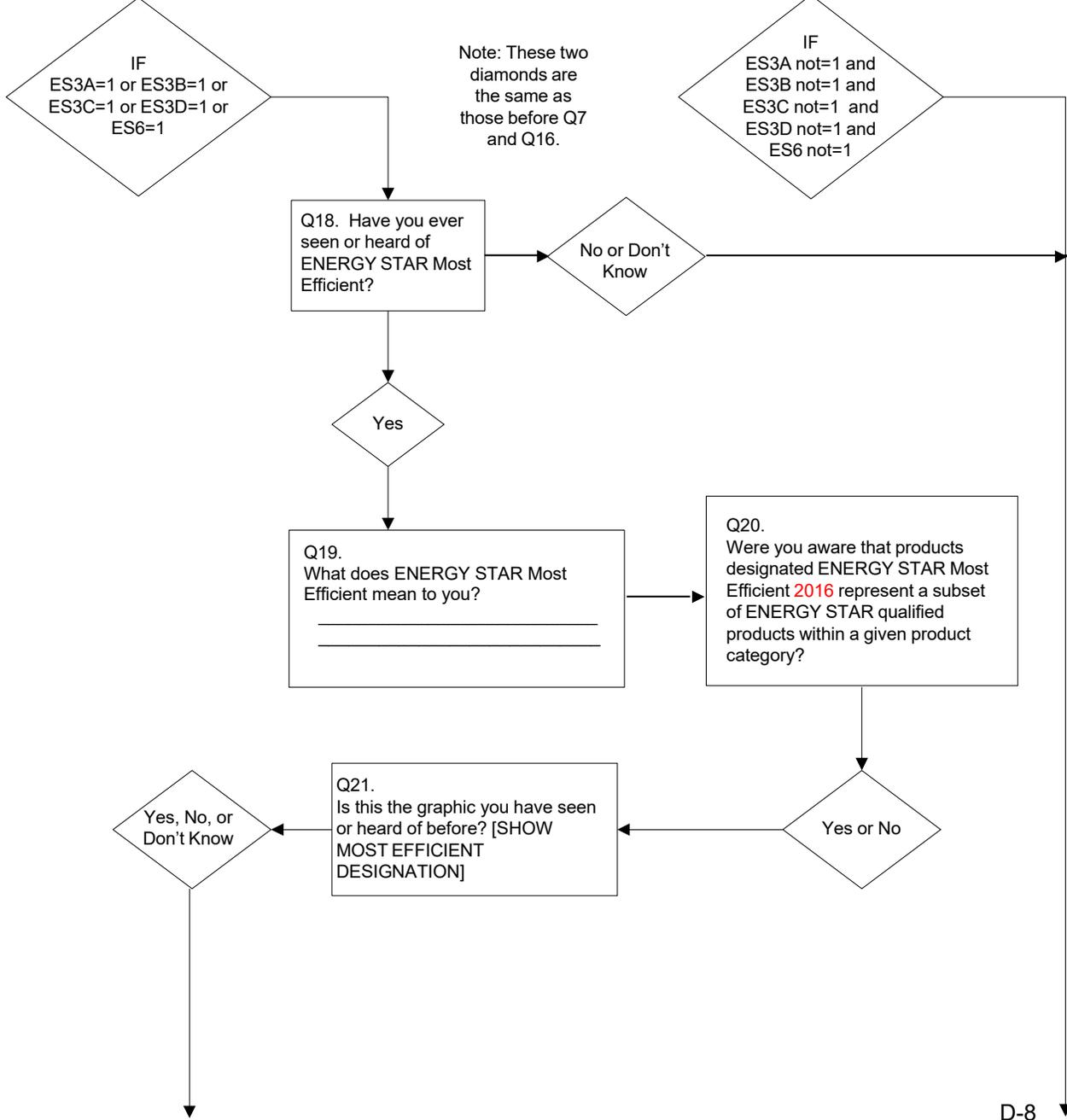
On the scale by each statement, please indicate how strongly you agree or disagree with the statement.

(Note to programmer: present Q16a through Q16s in random order for each respondent.)

	Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
Q16a. ENERGY STAR-labeled products provide me with more benefits than products without the ENERGY STAR label.	1	2	3	4	5
Q16c. ENERGY STAR-labeled products offer better value than products without the label.	1	2	3	4	5
Q16d. If I cannot find the kind of product I am looking for with an ENERGY STAR label, I will shop elsewhere rather than buy a product that does not qualify for the label.	1	2	3	4	5
Q16f. Buying ENERGY STAR-labeled products makes me feel like I'm helping to protect the environment for future generations.	1	2	3	4	5
Q16h. Buying ENERGY STAR-labeled products makes me feel like I'm contributing to society.	1	2	3	4	5
Q16i. Buying ENERGY STAR-labeled products makes me feel like I'm spending extra money for nothing.	1	2	3	4	5
Q16l. I consider myself loyal to ENERGY STAR-labeled products.	1	2	3	4	5
Q16n. It seems like most products have the ENERGY STAR label these days.	1	2	3	4	5
Q16o. If I see the ENERGY STAR label, I know I'm getting a more energy-efficient product.	1	2	3	4	5
Q16p. When I buy a product with the ENERGY STAR label, I can always be sure it's high quality.	1	2	3	4	5
Q16q. ENERGY STAR-labeled products are no different from other products.	1	2	3	4	5
Q16r. In the long run, I don't believe ENERGY STAR-labeled products save me money.	1	2	3	4	5
Q16s. I don't trust that ENERGY STAR-labeled products save the energy they're supposed to.	1	2	3	4	5
Q16t. I am willing to pay more money for a product that saves the most energy.	1	2	3	4	5
Q16u. I like to have the most advanced technology available to me.	1	2	3	4	5
Q16v. I consider myself up to date with technology.	1	2	3	4	5
Q16w. I consult energystar.gov for information on saving energy.	1	2	3	4	5

Q17. Please tell us about your role in your household's purchasing decisions. For each of the product groups listed below, do you usually make the purchasing decisions, do you share the decision-making equally with another household member, does someone else usually make the decisions but you have some input, or do you have no input in the decision-making?

	I usually make the decisions	I share the decision-making equally	Someone else usually makes the decisions, but I have some input	I have no input in decision-making	I'm not sure
Heating and Cooling Products	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home Office Equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home Appliances/Lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Home Electronics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Building Materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



On the scale by the following statement, please indicate how strongly you agree or disagree with the statement.

Strongly Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Strongly Agree
1	2	3	4	5

Q22. All other things equal, I would buy a product because it is designated as ENERGY STAR Most Efficient.

