

# **Leveraging National ENERGY STAR® Survey Data for State-Level Evaluation<sup>1</sup>**

*A Focus on Massachusetts, New Hampshire, and New York*

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## **Abstract**

The primary means of assessing recognition and understanding of the ENERGY STAR® label on a national level for the past several years has been an annual survey conducted by the Consortium for Energy Efficiency (CEE) and analyzed by the U.S. Environmental Protection Agency (EPA). Typically, each national survey effort has been accompanied by “oversamples,” or parallel state or regional partner survey efforts. This paper describes the results of parallel state-level surveys conducted in recent years by the sponsors of ENERGY STAR programs in Massachusetts, New Hampshire, and New York.

One tool for assessing the effects of advertising and publicity has been to compare “high publicity” areas with “low publicity areas.” In the EPA analysis, high publicity areas are defined as those where utility, state or regional program sponsors, in partnership with EPA and DOE, have been actively engaged in promoting ENERGY STAR at the local level for two or more years. The stratification in the national analysis allows the EPA to analyze its investment in local promotions as a way to educate consumers on the benefits of choosing ENERGY STAR-qualifying products and homes, and allows energy efficiency program sponsors to gauge the collective effectiveness of local energy efficiency programming. “Oversampler” organizations can take this logic one step further, and assess the positive differences between their results and those in other “high publicity” areas as a way of demonstrating even greater program effectiveness. Moreover, as other evidence shows, higher recognition is associated with higher penetration of some ENERGY STAR-labeled products.

## **Introduction**

The Consortium for Energy Efficiency (CEE) has for several years commissioned an annual national survey to assess consumer recognition and understanding of the ENERGY STAR label; the Environmental Protection Agency (EPA) has analyzed the survey. Initially administered by mail, beginning in 2002 this survey has been conducted over WebTV by Knowledge Networks, Inc. Knowledge Networks maintains a pre-recruited panel of consumers who have agreed to complete occasional surveys in exchange for having free WebTV in their homes. Because of an extensive recruiting effort, the panel includes a high percentage of those initially targeted, and recruiting quotas have resulted in a panel composition that is demographically similar to that of the United States. High

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<sup>1</sup> The views expressed in this paper are those of the authors and do not necessarily reflect the views of the New York State Energy Research and Development Authority.

cooperation rates, coupled with high rates of recruitment, result in reasonable response rates (effectively 24% for the current survey). Also—unlike telephone surveys—the WebTV format allows respondents to see images (such as the ENERGY STAR logo in the current survey), and—unlike mail surveys—allows complex skip patterns, and can prevent respondents from seeing images until the proper point in the survey. The objectives of this survey are to assess:

- Unaided recognition: whether people remember seeing or hearing of the ENERGY STAR label without a visual representation
- Aided recognition: whether people remember seeing a visual representation of the ENERGY STAR label
- Sources of recognition
- Understanding of what the label means
- Influence of the label on purchase decisions

The national sample was divided into three strata based on the largest Nielsen Designated Market Areas (DMAs) that account for approximately 70% of all U.S. households. These three strata are:

- **High-publicity areas.** Active local ENERGY STAR program recently sponsored by a utility, state, agency, or other organization. These activities must include sustained promotion and publicity for two or more continuous years. In 2004, these areas include DMAs in states with a high degree of utility activity: California, Connecticut, New Jersey, Oregon, Rhode Island, Washington, Wisconsin, and Vermont. DMAs in Massachusetts, New Hampshire, and New York are also high publicity areas, but they were treated as separate groups for purposes of this paper.
- **Low-publicity areas.** Areas in which there have been federal campaign activities only and no significant regional program-sponsored activities.
- **Other.** All other DMAs.

Sample sizes are shown in Table 1. Note that the 2001 survey was conducted by mail, while the 2002, 2003, and 2004 surveys were conducted by WebTV. This makes direct comparisons of 2001 with other years less reliable than other year-to-year comparisons. Also, sponsors in New York did not conduct oversamples in 2002 or 2003, but the state is populous enough that the national samples provided sufficient data points for analysis. Similarly, the Massachusetts sponsors did not conduct an oversample in 2001, but there were (marginally) sufficient responses to include these results. The New Hampshire sponsors did not conduct oversamples in 2002 or 2003, and in this case the sample sizes were too small for inclusion.

**Table 1.** Survey sample sizes

Year	2001	2002	2003	2004
United States	1997	1168	2676	1741
Massachusetts	37	289	84	107
New Hampshire	278	NA	NA	100
New York	1017	63	88	508
Other High Publicity Areas	202	228	736	334

The results shown for New York, because they include the Long Island Power Authority area as well as the **New York Energy Smart<sup>SM</sup>** area, may differ from those published by NYSERDA, which show only the **New York Energy Smart<sup>SM</sup>** area.

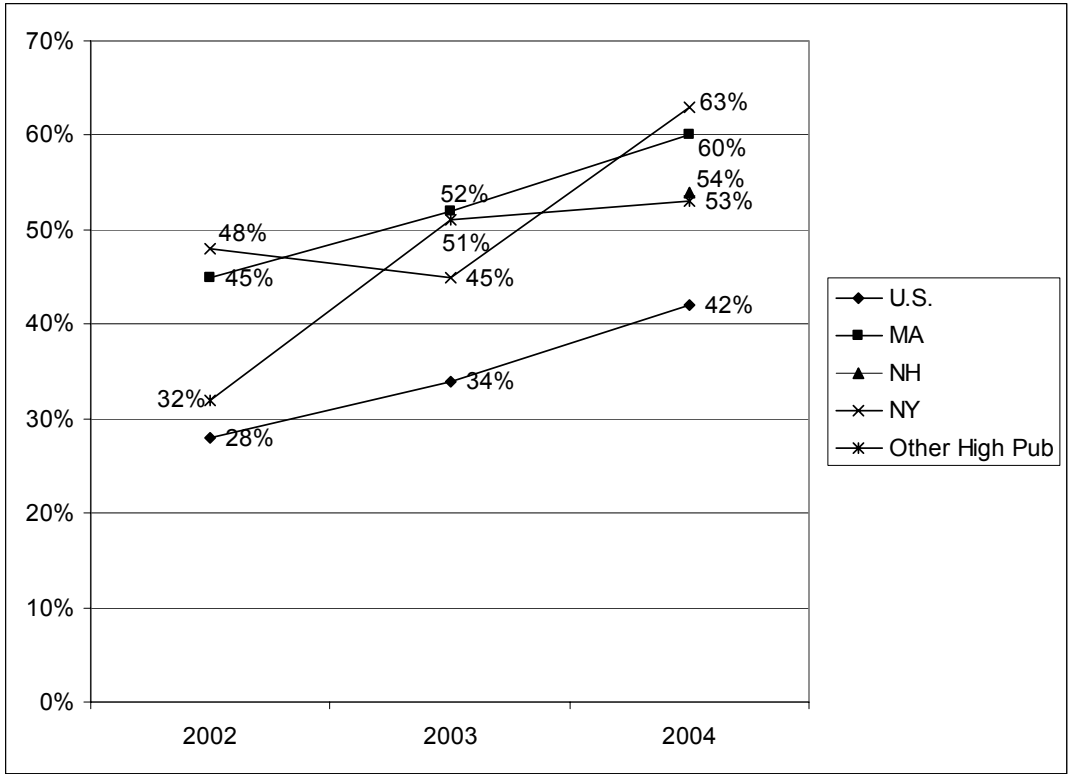
This paper shows unaided and aided recognition calculated in two different ways: with “don’t know” responses excluded from the analysis, and with “don’t know” responses included in the analysis and counted as “does not recognize.” The first method is most similar to the EPA national analysis; however, in the EPA’s national analysis, respondents in oversample areas that fall outside the top 57 designated market areas (largest population centers) are excluded to facilitate year-to-year comparison. It should also be noted that when comparing year-to-year results for a given state, the population varies in years when an oversample is available and when it is not. For those years when an oversample is available, the sample frame includes areas outside of the state’s largest population centers.

Finally, the paper draws on analysis of state-by-state appliance penetration conducted for the sponsors of the Massachusetts ENERGY STAR Appliances Program to assess how levels of unaided recognition from the CEE ENERGY STAR survey are associated with penetration of ENERGY STAR-labeled clothes washers (Wilson-Wright, Feldman, & Hoefgen 2005).

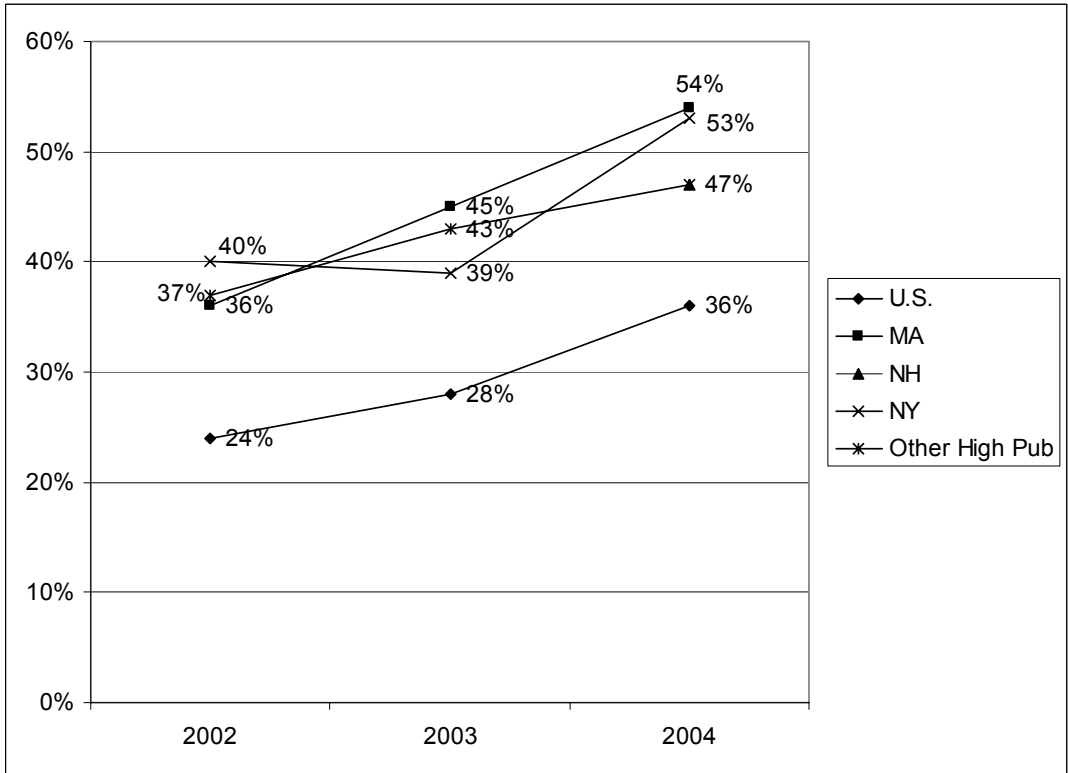
## **Unaided Recognition**

Unaided recognition of the ENERGY STAR label is based on two questions: 1) Whether respondents say they have ever seen or heard of the ENERGY STAR label, and 2) When the label is presented visually, verification that this is the label they were thinking of; note that this is not possible with a mail survey, so 2001 data are not included. As shown in Figure 1a, with “don’t know” responses excluded from the analysis, unaided recognition in 2004 in New York (63%), Massachusetts (60%), and New Hampshire (54%) is higher than in the United States as a whole (42%), and in Massachusetts and New York is higher than in other high publicity areas (53%).

As shown in Figure 1b, with “don’t know” responses included and counted as “do not recognize,” unaided recognition in 2004 in Massachusetts (54%), New York (53%), and New Hampshire (47%) is higher than in the United States as a whole (36%), and in Massachusetts and New York is higher than in other high publicity areas (47%). Moreover, the *increase* in unaided recognition from 2002 to 2004 is greater in Massachusetts (18 percentage points) than in the United States as whole (12 points) and other high publicity areas (10 points). (There was no New Hampshire oversample in either 2002 or 2003.) Note that the population surveyed in New York is inconsistent from year to year, in that only 2004 included an oversample.



**Figure 1a.** Unaided Recognition with “Don’t know” responses excluded. (Note that populations vary, in that states with oversamples include respondents outside the top 57 DMAs.)

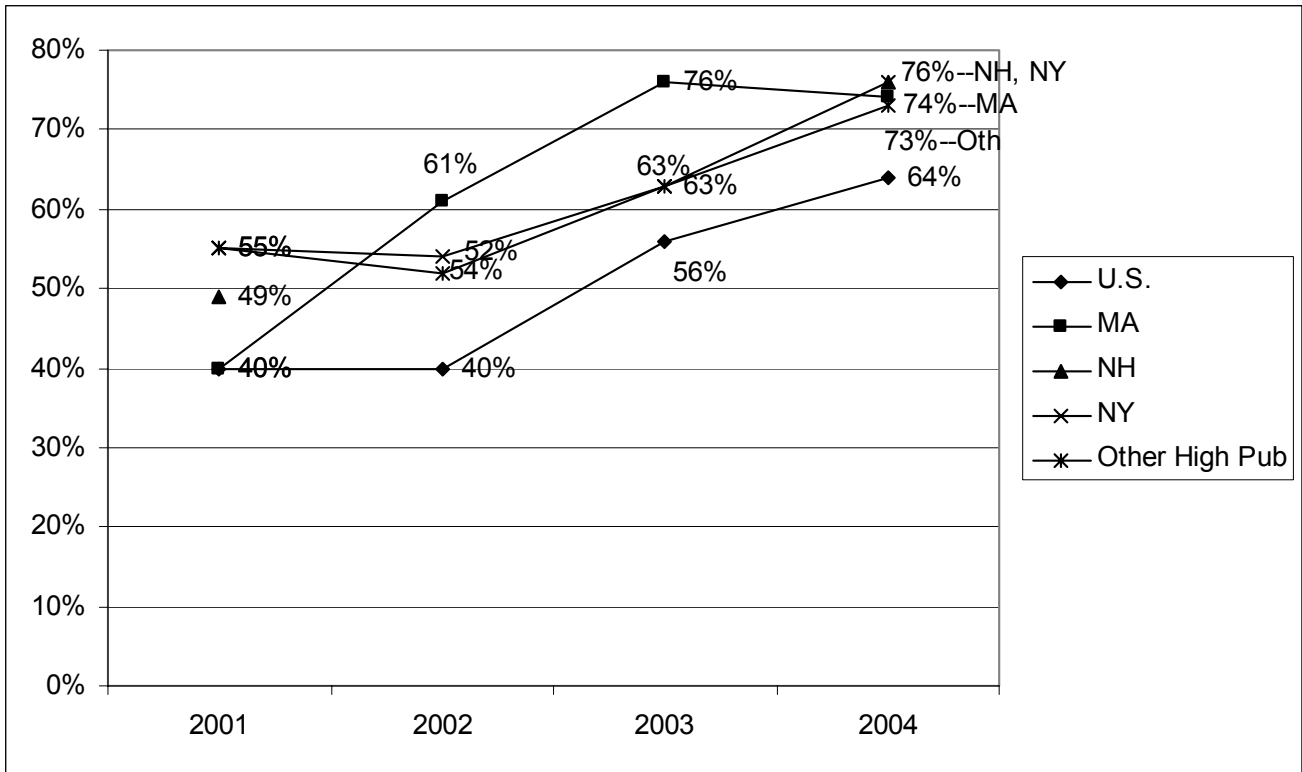


**Figure 1b.** Unaided Recognition with “Don’t know” responses included. (Note that populations vary, in that states with oversamples include respondents outside the top 57 DMAs.)

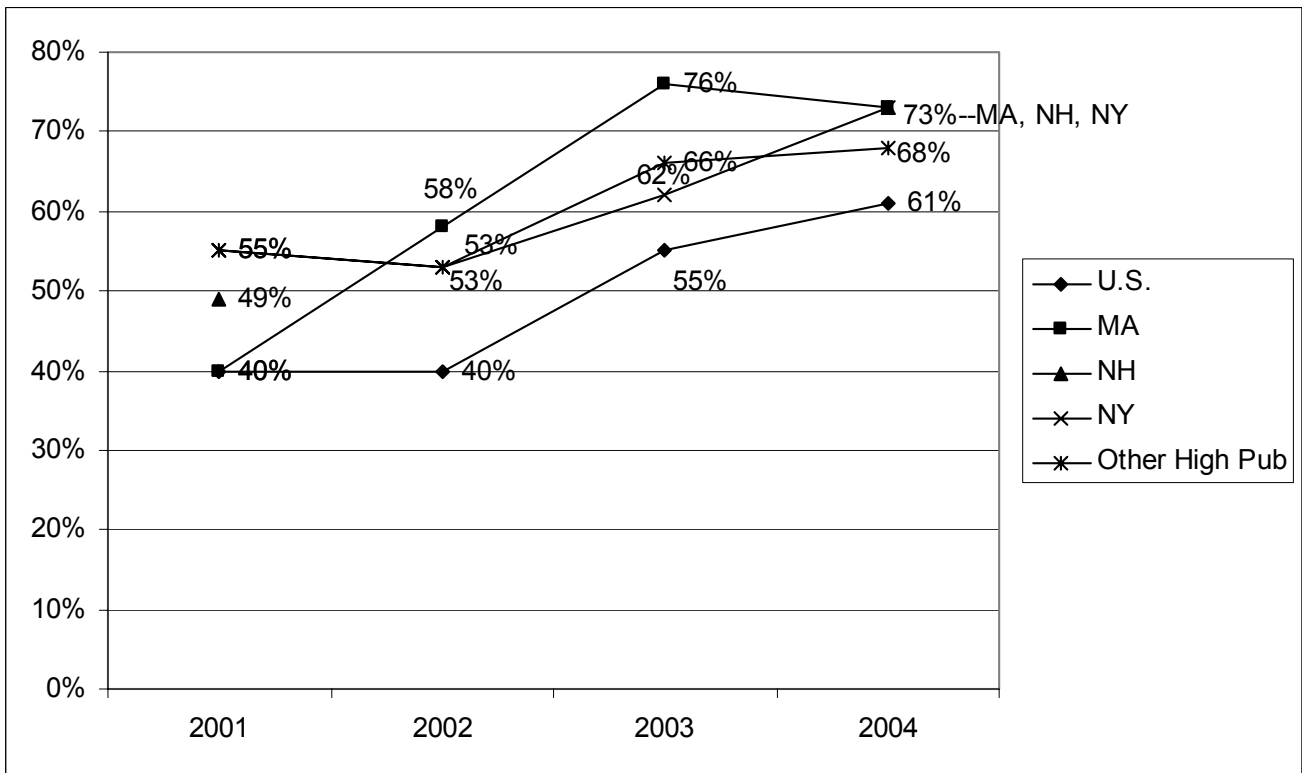
## Aided Recognition

Aided recognition is based on whether respondents recall seeing or hearing anything about the label once they are shown a copy of it in the survey. In 2004, aided recognition with “don’t know” responses excluded from the analysis in New Hampshire (76%), New York (76%), and Massachusetts (74%) is higher than in the U.S. as a whole (64%) and about the same as in other high publicity areas (73%).

Aided recognition with “don’t know” responses included in New Hampshire (73%), New York (73%), and Massachusetts (73%) is higher than in the U.S. as a whole (61%) and slightly higher than in other high publicity areas (68%). The *increase* in aided recognition from 2001 to 2004 is greater in Massachusetts (33 percentage points) than in the U.S. as a whole (24 points) and in Massachusetts, New Hampshire (24 points) and New York (18 points) is greater than in other high publicity areas (13 points). With such high levels of aided recognition and little room to grow, increases in the future should be expected to be modest at best (see Massachusetts from 2003 to 2004), and will tend to converge for all areas; hence unaided recognition, because levels remain lower, may be a more important measure in the next few years. Note that the 2001 survey was conducted by mail, and later surveys were conducted by WebTV; the difference in methodology could account for some of the decreases in aided recognition from 2001 to 2002. Also, the slightly lower numbers in New York in 2002 (Figures 2a and 2b) and 2003 (Figures 1a and 2b) may reflect the lack of oversamples in those years.



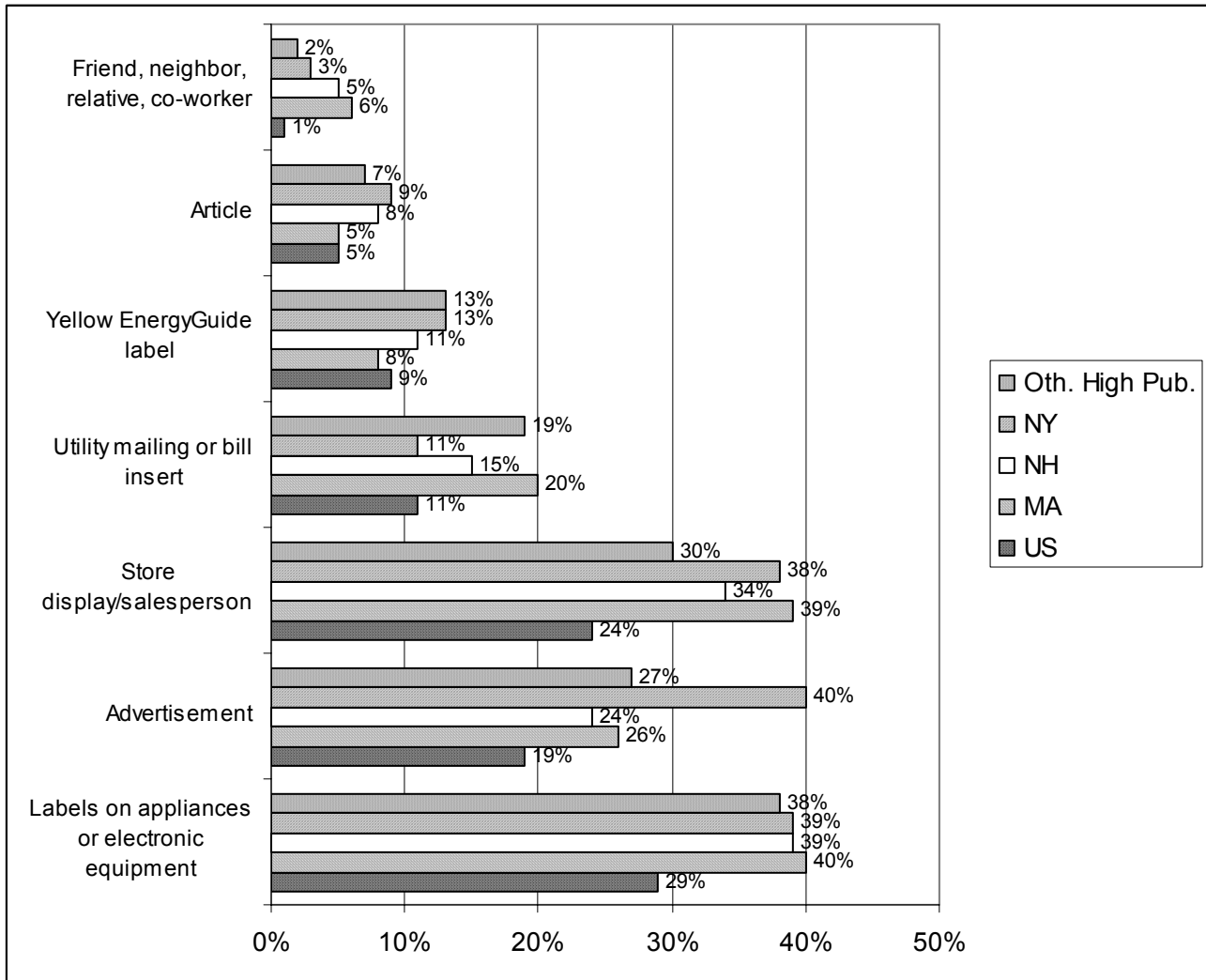
**Figure 2a.** Aided Recognition with “Don’t know” responses excluded. (Note that populations vary, in that states with oversamples include respondents outside the top 57 DMAs.)



**Figure 2b.** Aided Recognition with “Don’t know” responses included. (Note that populations vary, in that states with oversamples include respondents outside the top 57 DMAs.)

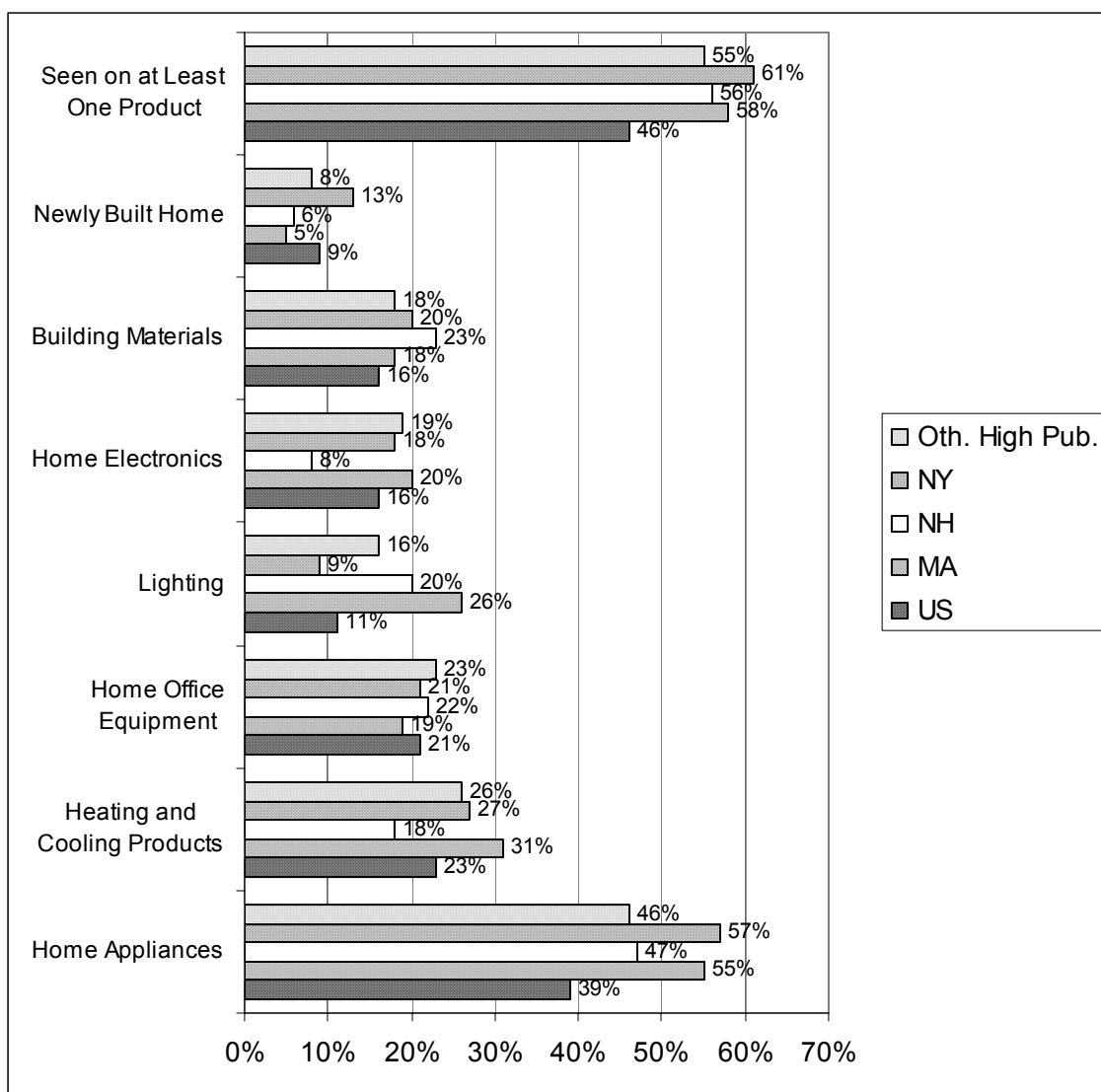
## Sources of Recognition

In 2004, consumers in New York, New Hampshire, and Massachusetts are likelier than people in the U.S. as a whole to have seen or heard about the ENERGY STAR label from a product, in an advertisement, in a store. Consumers in New York are especially likely to have seen or heard about the label in advertisements, possibly reflecting NYSERDA's intensive advertising efforts over the past several years. Consumers in Massachusetts, followed by those in New York and New Hampshire, are likelier than consumers in the U.S. as a whole and those in other high publicity areas to have seen or heard about the label in store displays or from salespersons—an indication of the success of their retailer support efforts in these states. (Figure 3)



**Figure 3.** Source of Recognition (2004 only; all respondents)

Overall, Massachusetts, New Hampshire, and New York residents are likelier than those in the U.S. as a whole, and New York residents are likelier than those in other high publicity areas, to have seen the label on at least one product in 2004. Association of the label with specific product categories may reflect program and promotional emphases. For example, all three states have active appliance programs, and consumers in all three states are likelier than those in the U.S. as a whole, and residents of New York and Massachusetts are likelier than those in other high publicity areas, to have seen the label on appliances. New York residents are especially likely to have heard about ENERGY STAR in relation to newly built homes; while all three states have ENERGY STAR Homes Programs, NYSEERDA's and LIPA's programs place greater emphasis on consumer awareness. Residents of Massachusetts, followed by residents of New Hampshire, are especially likely to have seen the label on lighting products; Massachusetts in particular has had a very active lighting program for many years. The proportions of respondents in all parts of the country who have seen the label on home office equipment are notably similar, likely reflecting the relative lack of special promotions by utilities and other energy efficiency organizations for those product categories. (Figure 4)

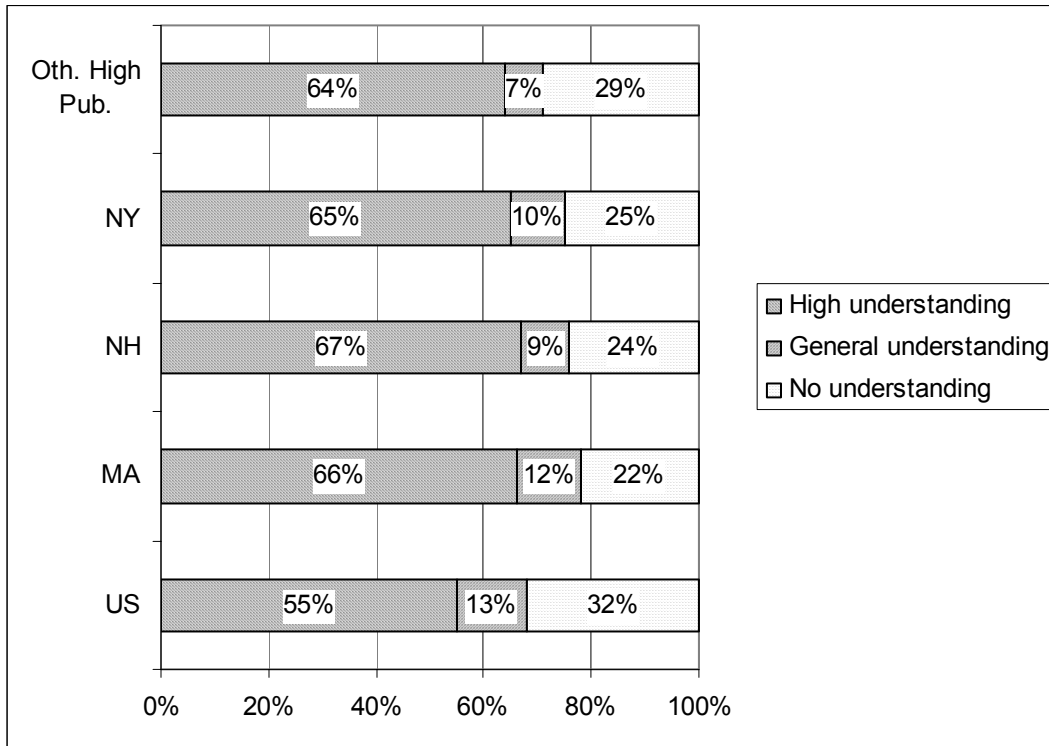


**Figure 4.** Product Associations: Where Seen ENERGY STAR Label (2004 only; all respondents)



## Understanding

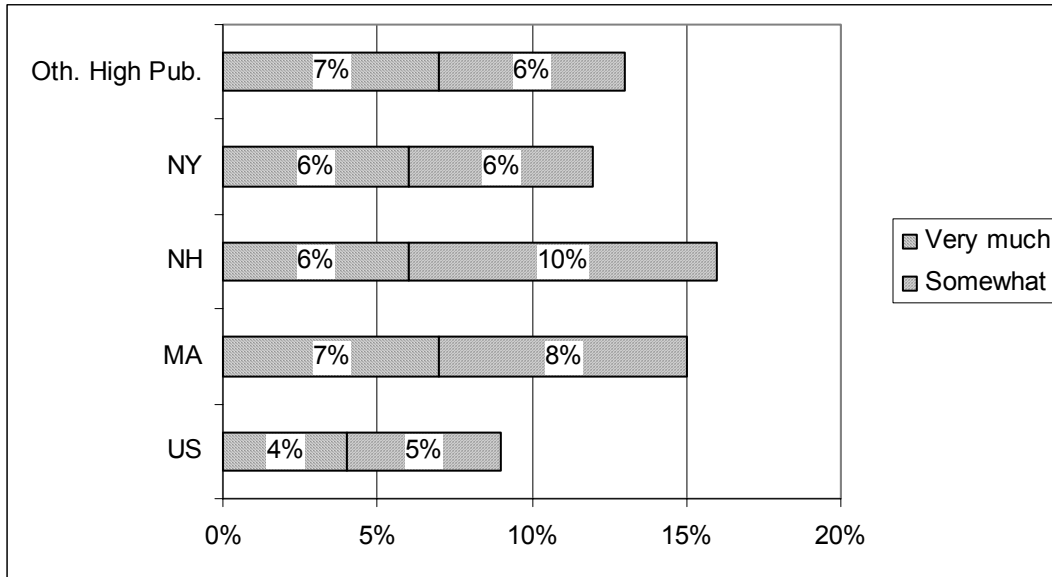
High understanding of the ENERGY STAR label is indicated when a respondent volunteers that the label represents energy efficiency, energy conservation, saving money on operation, environmental benefits, or energy/environmental product standards. In 2004, high understanding was more prevalent in New York, New Hampshire, and Massachusetts than in the U.S. as a whole, and about the same as in other high publicity areas. (Figure 5)



**Figure 5.** Understanding: What Does the ENERGY STAR Label Mean to You *OR* Type the Messages that Come to Mind When You See the ENERGY STAR Label (2004 only; all respondents)

## Influence of the Label

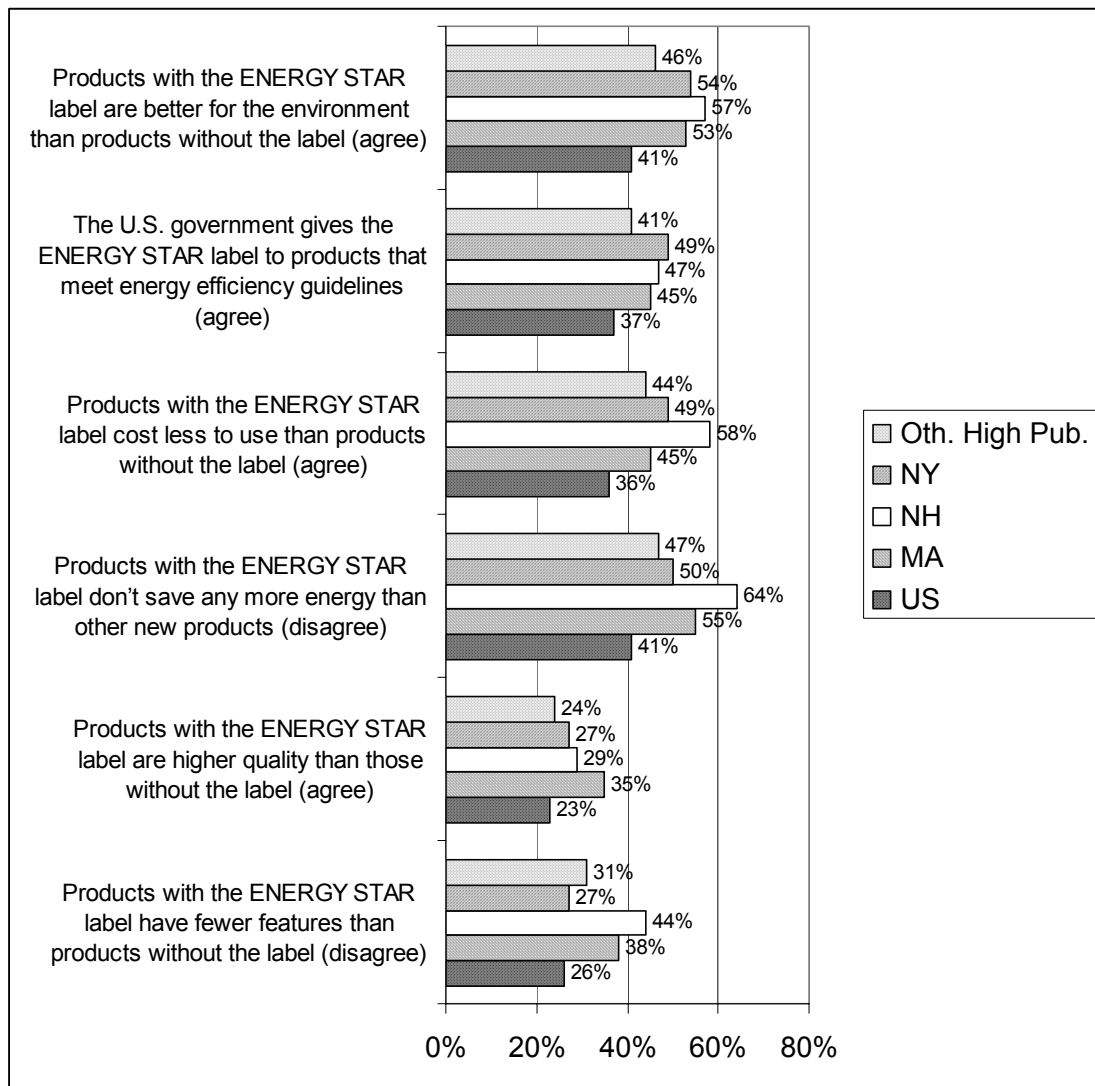
The proportion of consumers who have purchased ENERGY STAR-labeled products and were influenced by the label in the purchase decision is higher in New Hampshire, Massachusetts, and New York than in the United States as a whole. New York is about the same as in other high publicity areas on this indicator. (Figure 6)



**Figure 6.** Influence of ENERGY STAR Label on Decision to Purchase ENERGY STAR Product (2004 only; all respondents).

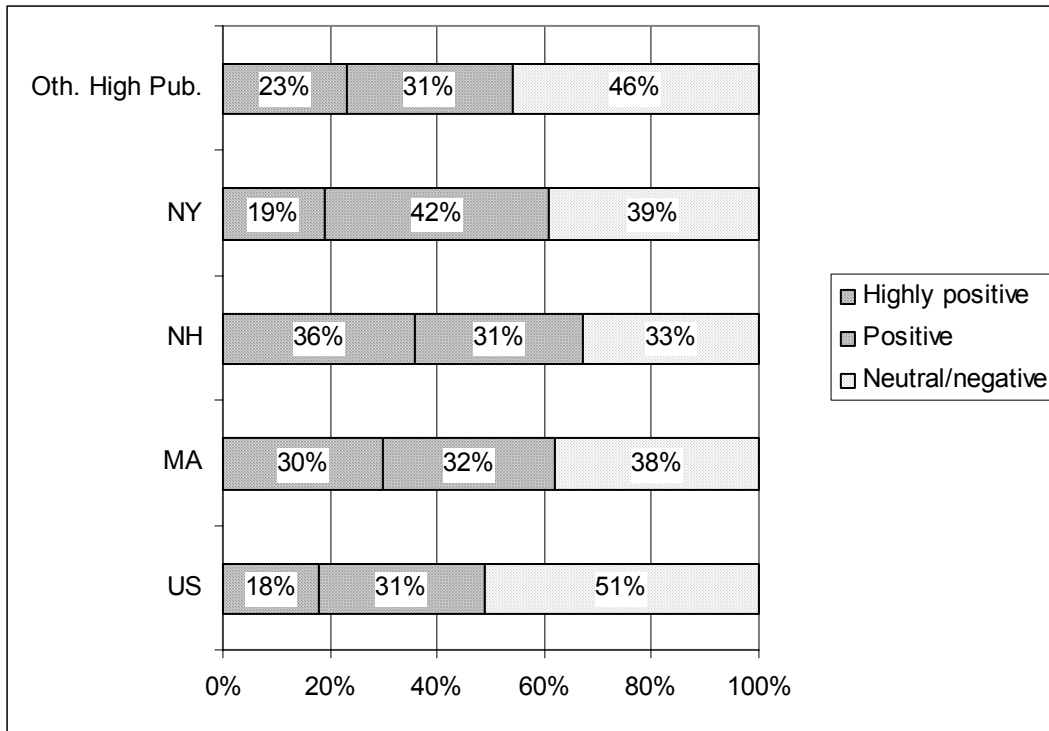
## Attitudes toward Products with the ENERGY STAR Label

CEE's 2004 WebTV survey included a series of agree/disagree statements about ENERGY STAR products—some positive and some negative. As Figure 7 shows, respondents in New Hampshire, Massachusetts, and New York tend to agree more with positive statements and disagree more with negative statements than do respondents in the U.S. as a whole, and to some extent respondents in other high publicity areas.



**Figure 7.** Agreement with Statements Concerning ENERGY STAR Products (2004 only; all respondents)

Figure 8 below shows the distribution of a simple additive index made up of the responses depicted in Figure 7 (with responses to negative statements reversed). Respondents in all three states, and especially in New Hampshire, are more positive than residents of the U.S. as a whole and other high publicity areas.



**Figure 8.** Index of Attitudes toward ENERGY STAR Products (2004 only; all respondents)

## The Relation of Recognition to Sales

Of course, increased recognition of the ENERGY STAR label is not the ultimate goal of regional and state energy-efficiency programs; rather, the goal is increased penetration of ENERGY STAR-qualifying equipment and the consequent energy savings. And there is evidence that recognition of the ENERGY STAR label is related to sales: regression analysis of state-level market penetration data conducted for the Massachusetts sponsors by Wilson-Wright, Feldman, & Hoefgen (2005) shows that the level of unaided recognition (derived from the CEE ENERGY STAR survey) in a given state is highly correlated with penetration of ENERGY STAR-labeled clothes washers, even when controlling for current program efforts, demographics, electricity prices, and other factors. Moreover, this relation between recognition and penetration has held over the past several years. (See Table 2.)

**Table 2.** Clothes Washer Penetration Models

	2001	2002	2003
R <sup>2</sup>	<b>86.7%</b>	<b>85.8%</b>	<b>88.0%</b>
Constant <sup>a</sup>	-.336 (-.626)	-.854 (.132)	-.274 (-.401)
CW Program Support <sup>b</sup>	<b>.005</b> <b>(3.641)</b>	<b>.005</b> <b>(2.946)</b>	<b>.07</b> <b>(4.148)</b>
Electricity Price Proxy <sup>c</sup>	-.002 (-.546)	1.17E-04 (.083)	.004 (.667)
ENERGY STAR Recognition <sup>d</sup>	<b>.220</b> <b>(2.410)</b>	<b>.289</b> <b>(2.835)</b>	<b>.255</b> <b>(2.125)</b>
Composite Income/Education	<b>.019</b> <b>(4.098)</b>	<b>.021</b> <b>(4.571)</b>	<b>.030</b> <b>(5.179)</b>
% Population that is White	<b>.237</b> <b>(.003)</b>	<b>.307</b> <b>(3.866)</b>	<b>.427</b> <b>(4.285)</b>
% Householders Aged 45-54	.287 (.406)	NA	NA
% Householders Aged 25-34	-.077 (-.157)	-.445 (-.850)	NA
% Population in Urban Areas	-.042 (-.742)	-.054 (-.902)	<b>-.177</b> <b>(-2.441)</b>
Change in Housing Units	.477 (1.013)	<b>1.109</b> <b>(2.013)</b>	.555 (.851)
Concentration of Box stores	NA	NA	-.001 (-.049)
Interaction of Precipitation/Drought	<b>-3.97E-04</b> <b>(-3.731)</b>	<b>-4.31E-04</b> <b>(-3.542)</b>	<b>-.001</b> <b>(-3.279)</b>

<sup>a</sup> B-statistic presented on first line, t on second line in parentheses, bolded results are statistically significant at .10.

<sup>b</sup> An index of state-level support for ENERGY STAR-labeled clothes washers, including field support for retailers, direct mail marketing, in-store point-of-purchase materials, mass media advertising, cash incentives, and cumulative effects of past programs.

<sup>c</sup> Average revenue per kilowatt-hour, from the Energy Information Administration

<sup>d</sup> Unaided recognition from each state's Census division, from the CEE ENERGY STAR survey

## Discussion

Responses to a wide range of questions in CEE's ENERGY STAR Survey show that residents of New Hampshire, New York, and Massachusetts are generally more aware of the ENERGY STAR label than are residents of the U.S. as a whole, understand it better, are more likely to be influenced by it to purchase products with the label, have more positive attitudes toward it, and associate it with the product categories where promotions have been targeted. Compared to those in other high publicity areas, residents of these three states also show some positive differences: residents of Massachusetts and New York are likelier to show unaided recognition of the label; residents of all three states are likelier to show aided recognition; residents of New York are likelier to have seen the label in ads and on at least one product; residents of all three states are likelier to have seen or heard about the label in store displays or from salespersons; and residents of all three states, especially New Hampshire, have more positive attitudes toward the label. See Figure 9 for a summary of these key findings.

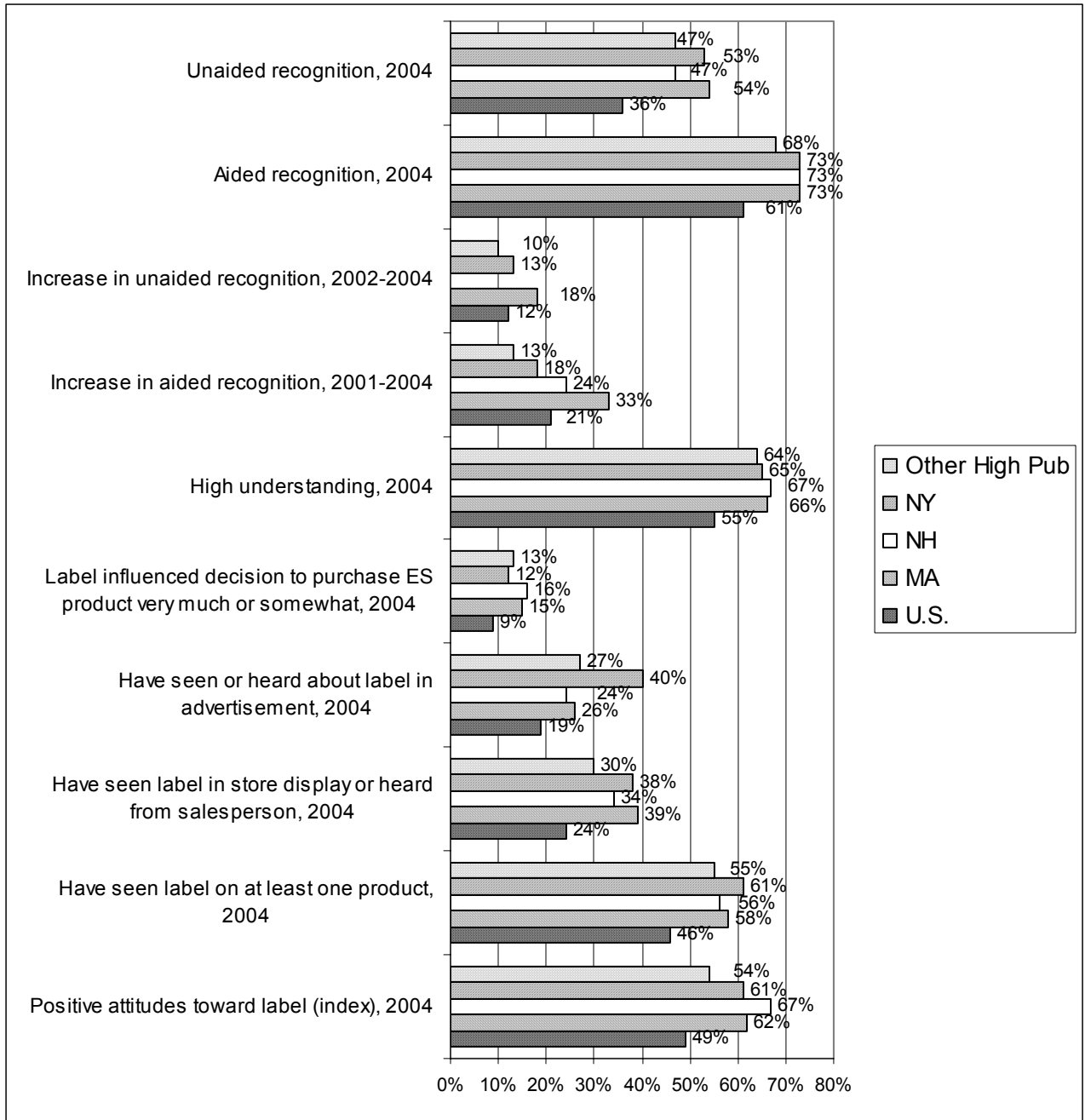
However, inconsistencies in the populations sampled from year to year in individual states—the whole state being represented when there is an oversample, but only large DMAs being represented when there is no oversample—limit the usefulness of the results. (Note that this limitation does not apply to 2004 results.) A way around this problem is to do what the Massachusetts sponsors have done: conduct an oversample every year, and thus allow comparisons of consistent samples across time and space. Unfortunately, because of the limited availability of WebTV sample, this is not possible in a small state like New Hampshire, where sponsors might have to settle for one survey every three years.

As discussed elsewhere (Hoefgen et al. 2004; Titus & Feldman 2003; Titus et al. 2002), two key tools for establishing attribution are 1) assessing changes over time, and 2) assessing geographic differences. Increases over time in positive measures indicate program success, as do higher levels of those measures in the target area compared to other areas. However, data over time without data over space does not allow one to discount the possibility that the increases are also occurring in other areas, including areas without programs; data over space without data over time does not indicate whether the higher levels are due to the program or to some other factor. Hence, attribution of market effects requires data over *both* time and space. The pattern that would allow one to attribute market effects to a program is one that shows *a higher rate of increase* in key positive measures in areas with programs than in areas without programs, or even in some areas with programs compared to other areas without programs.

This is indeed the pattern observed in the CEE ENERGY STAR Survey with respect to New Hampshire, Massachusetts, and New York. The increase in unaided recognition (with “don't know” responses included in the calculations) in Massachusetts from 2002 to 2004 is greater than in the U.S. as a whole, and greater than in other high publicity areas. The increase in aided recognition from 2001 to 2004 (again, with “don't know” responses included in the calculations) is greater in Massachusetts than in the U.S. as a whole; the increase in all three states is greater than in other high publicity areas.

Moreover, recognition of the ENERGY STAR label is associated with increased penetration of ENERGY STAR-labeled products. This indicates the success of ENERGY STAR as an overarching symbol of energy efficiency, and shows the importance of maintaining marketing and communications.

The CEE ENERGY STAR survey is one of the few publicly available data sources allowing comparison over both time and space; the only others that come readily to mind are market penetration data for appliances (Hoefgen, Feldman & Wilson-Wright 2004; Rosenberg 2003) and CFLs (Fields et al. 2003; Feldman 2003). The latter data source—market penetration data for CFLs—has ceased to be available. Hence the importance of the CEE ENERGY STAR survey for program partners cannot easily be exaggerated, and in fact suggests that partners should seek to develop other such sources of data allowing cross-state and cross-time comparisons.



**Figure 9.** Summary of Key Differences. (Note that populations vary, in that states with oversamples include respondents outside the top 57 DMAs.)

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