

# **A Comparison of the Practices Used to Track ENERGY STAR<sup>®</sup> Market Share**

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## **ABSTRACT**

Investor-owned utilities and energy efficiency organizations nationwide have increasingly implemented market transformation programs designed to promote the purchase of ENERGY STAR<sup>®</sup> appliances and lighting products. As one key measurement of the efficacy of these efforts, program implementers rely largely on the market share of ENERGY STAR products. However, implementers often encounter problems collecting reliable market share data. Although many have used sales data collected on behalf of the EPA/DOE ENERGY STAR program, the data only covers national big box retailers and there are often delays in receiving the data. Other program implementers have had varying degrees of success obtaining data from disparate local retailers.

This “white paper” examines the market share monitoring practices for residential appliance and lighting programs throughout the United States. Our initial findings indicate that market transformation programs have applied a myriad of approaches to estimating market share for residential and commercial efficiency measures. Some approaches are extremely rigorous, using multiple data sources to triangulate estimates and conduct comprehensive “gap analyses,” while others rely solely on secondary data that are readily available (e.g., National ENERGY STAR partner sales data) as a proxy for total market penetration.

## **State-by-State Comparison**

For the purposes of this paper, it is necessary to establish an understanding and comparison of the active areas where tracking currently occurs. The geographical areas focused on are California, Massachusetts, New York, the Northwest (WA, OR, ID, and MT), Vermont, and Wisconsin. These areas all have active energy efficiency programs that use the national ENERGY STAR<sup>®</sup> program and criteria as a tool to identify highly efficient products. Therefore, the ability to accurately assess the market share of ENERGY STAR products is a key component of any measurement and evaluation effort.

Table 1 summarizes the variety of approaches currently used to estimate residential appliance ENERGY STAR market share by geographical area.

**Table 1. Summary of Approaches to Estimating Market Share for Refrigerators, Dishwashers, Clothes Washers, and Room Air Conditioners**

	Use of . . .			Additional Data	Most Recent Evaluation Reviewed
	EPA National Partner Sales Data Collected by D&R	AHAM Shipment Data*	Supplemental Sales Data from Local Partners		
<b>California</b>	Yes	Yes	Yes, 13 retailers representing 23 storefronts	No	PY 2004
<b>Massachusetts</b>	Yes	Yes	Yes	RDD phone survey of appliance purchasers: <i>make/model for refrigerators and dishwashers</i> Retailer site visits: <i>use of stocking practices as proxy for sales for RAC</i>	PY 2004
<b>New York (NYSERDA)</b>	Yes	Yes	Yes, from approximately 250 partner retailers	Conducted mail survey and telephone survey to triangulate results	PY 2005
<b>Northwest (ID, MT, OR, WA)</b>	Yes	Yes	No	No	PY through May 2005
<b>Vermont</b>	Yes	Yes	Yes, over 50 retailers for clothes washers, but only five dealers for other appliances	No	PY 2002
<b>Wisconsin</b>	Yes	Yes	Yes	No	PY 2004

\* Association of Home Appliance Manufacturers

## National Retailer Partner Sales Data

Clearly, sales data are helpful in determining the trends in market share. The most readily available data for all states are from the National ENERGY STAR Partners, collected annually by D&R International. D&R combines all partner data (removing retailer names) and publishes the data on the Internet in publicly available datasets. These data are extremely detailed, providing ENERGY STAR market share for four appliance types (refrigerators, clothes washers, dishwashers, and room ACs) by state, region, and quarter. The primary caveat to using these data, is that the data only account for national big box retailers and there is sometimes a delay in receipt.

Their easy availability have made these data the “common denominator” for ENERGY STAR market share tracking. In addition, as the predominance of the “big box” retailers grows, the percentage of all products (efficient and standard) sold by the National ENERGY STAR partners continues to increase. These data, therefore, represent an increasingly high percentage of all product sales, and thus are an important indicator of market share. Some regions, such as the Northwest, have chosen to rely primarily on this national data source to estimate market share.

The National Retailer Partner data also offer the ability to conduct state or regional comparisons and are, therefore, popular for attribution analysis. This is typically conducted through two techniques. Some states, such as Wisconsin and New York, select a comparison group of states – based on income and education levels – that do not run local ENERGY STAR programs. Attribution is then assessed by looking at the change in ENERGY STAR market share, over time, for the program state versus the comparison states. The second technique, used in Massachusetts, is to run a regression model that accounts for a more comprehensive list of explanatory variables, including energy prices, climate zone, population center distribution (urban/suburban/rural), and precipitation/drought. The incremental market share assigned to the program can then be estimated.

## **Supplemental Sales Data**

Many states and regions have teamed with retailers as part their ENERGY STAR programs, offering point-of-sale displays, brochures, and cooperative advertising opportunities. These retailers may include national partners, but also typically include smaller, state or regional retailers. In an effort to track ENERGY STAR market share some programs, like the national program, have requested that partners provide sales data to the program manager.

The primary difficulty with relying on supplemental sales data is that compliance levels can vary sharply. Some states, such as New York, have made reporting a requirement for retailer participation, with nearly 100% compliance. Other states, however, have no enforcement, and thus have far fewer retailers providing sales data.

The forms of supplemental data vary and are typically received in varying degrees of detail. Subsequently, the ways in which these data may be analyzed changes by region. Additionally, the sample’s size relative to the overall market changes by area.

These additional sales data also change when looking at lighting. EPA collects national unit shipment data for lighting fixtures from manufacturers on an annual basis and is working to collect this data at the state-level, as well as to collect sales data from national retailers. However, challenges to collecting and interpreting such data include limited industry cooperation, differences between shipment and sales data, and potential for double counting of manufacturer and retailer units.

At the state/regional level, other than New York, the research team did not find any tracking efforts for ENERGY STAR lighting fixtures (including ceiling fans). All other state and regional tracking efforts underway attempt to estimate the market share of ENERGY STAR qualifying compact fluorescent bulbs (CFLs). Often, CFLs are rebated; therefore, the program entities are able to measure market share based on how many rebates were received. This method, however, does not account for any ENERGY STAR lamp purchases that were made without a rebate or, if applicable, when the consumer did not submit the rebate.

Therefore, supplemental sales data are vital to accurately estimate ENERGY STAR lighting market share. Only California, Wisconsin, New York, and the four-state region in the Northwest have supplemental lighting sales data. In the case of CA and WI, the data are point-of-sale data purchased from market research firms. In New York, the participating retailers are required to provide sales data, and in the Northwest some of the participating retailers provide sales data from periods when the program is active. These data are then evaluated in order to estimate year-round market share. Table 2 illustrates these differences.

**Table 2. Summary of Supplemental Lighting Data to Estimate ENERGY STAR Market Share**

State/Region for Evaluation	Sales Data Received	CFLs	Fixtures	Most Recent Evaluation Reviewed
<b>California</b>	Yes- purchased from AC Nielsen & Triad Vista	Yes	No	PY 2004
<b>Massachusetts</b>	No	n/a	n/a	PY 2004
<b>New York (NYSERDA)</b>	Yes – provided by participating retailers	Yes	Yes	PY 2005
<b>Northwest (ID, MT, OR, WA)</b>	Yes – provided by some participating retailers	Yes	No	PY through May 2005
<b>Vermont</b>	No	n/a	n/a	PY 2002
<b>Wisconsin</b>	Yes- purchased from AC Nielsen & Triad Vista	Yes	No	PY through June 2005

## Use of Site Visits, Surveys, and Self-Reported Information

Surveys are often an extremely cost-effective way to obtain more information about the effects of programs promoting ENERGY STAR products. One of the largest challenges with any survey is the potential for or the effect of a low response rate and how this may impact the results. Obviously, the evaluators’ inability to determine the responses of the target audience is of concern. The evaluation teams for all these areas have attempted to compensate for any non-response effect.

Additionally, among the programs that conduct surveys, the types of surveys and the targeted respondents vary by area. Some focus exclusively on appliance purchasers; others incorporate non-purchasers. In general, non-participating retailers and non-purchasers are the most difficult group to survey.

The largest difficulty with surveys and self-reported information is the lack of certainty regarding the actual efficiency of the product. To both investigate and compensate for these potential inaccuracies, some studies are asking respondents to provide the make and model of certain appliances, such as refrigerators and clothes washers, which are then compared against the EPA list of ENERGY STAR-qualified measures. A recent study in New York identified a high margin for error, with nearly 50% of respondents mis-reporting whether or not their appliance was ENERGY STAR (including both false negatives and false positives).

In addition, valuable feedback is often obtained through surveys that is not reflected in reported sales data. This feedback can be vital, especially to regions considering changes to their program. Data such as ENERGY STAR awareness, perceived value, and distribution channels can be helpful in assessing program progress indicators. At the national level, members of the

Consortium for Energy Efficiency annually conduct a survey awareness, understanding, and use of the ENERGY STAR label by U.S. Households. Members are given the option to over-sample households in their area to compare local results to national findings. The latest published report from the survey data can be found at [http://www.cee1.org/eval/2004\\_ES-Survey.php3](http://www.cee1.org/eval/2004_ES-Survey.php3).

## **Cost-Effectiveness of the Various Data Collection Activities**

It is difficult to compare the actual cost effectiveness of the different data collection methods without an assessment of the correlating expenses. Unfortunately, these data are not publicly available. Additionally, cost effectiveness information pertaining to the incurred costs of each program is not always obtainable either. Further complications occur due to the inconsistency between areas, where some pay for point-of-sale data (from companies such as AC Nielsen), while others employ Sales Promotion Incentive Funds (SPIFFs). Also, in regions where large municipals and/or non-profits organizations assist in the promotion of ENERGY STAR appliances, the actual budgets blur. With each additional factor, the ability to accurately estimate the cost-effectiveness of each strategy varies. The widely varying budgets, goals, and coordination of efforts through regional non-profits all impact the methods chosen and their cost-effectiveness.

## **Advantages and Disadvantages of these Methods**

Each of these data collection methods has positive and negative qualities. The disadvantage of all ENERGY STAR tracking methods is that, whenever the ENERGY STAR specification levels or mandated Federal standards (NAECA) change market share is affected as are energy savings estimates, since program administrators usually use the difference between energy consumption of the standard model and the ENERGY STAR qualifying model to account for program energy savings and related environmental benefits. During changes the use of market share tracking becomes more complicated, since older previously qualifying models that have already been shipped to retailers may still bear the ENERGY STAR designation. In addition, in advance of a standards change, market share for ENERGY STAR qualifying products can be affected either positively or negatively, with manufacturers either trying to dump products with minimum standard, build additional cheaper standard product at the lower standard level, or gear up for changes in anticipated revisions to the Federal standard or ENERGY STAR qualification levels by being first to market with a new line of product.

Additionally, the increase in efficiency per unit from a new ENERGY STAR specification level despite a possible (and usually temporary) decrease in overall market share cannot be seen through a market share analysis. Therefore, it is imperative that program administrators incorporate an ongoing environmental or direct efficiency conversion to their measurement and evaluation analysis.

Compiling sales data is one of the most accurate ways to assess ENERGY STAR market share. When using actual sales data, a measurement team will know exactly what was sold by the participating retailers. From these data, they can estimate ENERGY STAR market share. However, numbers do not allow for supposition about any other details about the programs in question. As with any tracking effort, this method presents a number of challenges. Due to changes in the ENERGY STAR specifications, savings from sales data is most accurate when the data include the model number of the unit sold (which is subsequently matched to a specific

efficiency) or when the retailer does this work for the analyzer. Evaluators also need to take into account freeriders (participants that would of purchased without the program) and naturally occurring changes in market share. Sales data that do not include this unit efficiency information may not be as useful or as accurate as the evaluators desire. This type of model number-specific data can usually be provided by retailers. But matching units to efficiency levels can be extremely time consuming, since there is not a publicly available long-term source for such efficiency matching data.

The feedback obtained through survey and self-reported data can bring to light any implementation issues occurring in a program. This valuable information can assist in determining whether the program design is functioning as designed. However, survey data are also not entirely accurate: the questions phrasing of any given survey question will restrict the possible answers. Since the different areas/regions have different areas of focus, the surveys are not identical, which poses further comparison challenges. Additionally, when the surveys are conducted with retailers, unless the respondent actually keeps track of the ENERGY STAR units sold, any figure is an estimate. This estimate may easily be higher or lower than the actual share of ENERGY STAR appliances sold.

With all these methods, sample size is a concern. Also, the differences in sampling methodology may affect the results achieved through any of the above-mentioned data collection efforts. Along these lines, the methodology of any weighting of the data will vary by evaluator.

Clearly, all the forms illustrated by the geographical regions in this examination have merit. Each process has pros and cons that impact the results. However, each region also possesses unique ENERGY STAR appliance programs, funding, challenges and evaluation strategies.

## **Challenges and Solutions**

As illustrated, without a consistent form of evaluation across the different geographical regions, it is difficult to accurately compare the results of the individual tracking efforts to one another. Many of these issues, however, may be addressed through the appropriate involvement of a variety of stakeholder groups.

The interested parties stem from widely disparate origins. Companies such as utilities, governmental organizations, non-profit organizations that promote energy efficiency, retailers, manufacturers, and consumers all impact the ability to obtain accurate data for tracking efforts. Clearly, in order to achieve the main goal of tracking ENERGY STAR market share for any product, additional team work and building will have to be accomplished.

All of these groups have specific yet diverse needs and desires. Although many geographical areas of the country want the ability to estimate the ENERGY STAR market share of appliances and lighting with a higher degree of certainty, they also want other types of information that can be used for different types of analysis. These divergent, yet similar, goals have been outlined in this comparison of the methods used to track ENERGY STAR market share.

The comparison of the different methods also highlights areas where certain states and regions can improve their market share tracking and allow higher comparability between different programs. ENERGY STAR Programs should attempt to:

***Collect sales data from regional retailer partners.*** The ability of New York to collect sales data from regional partners shows that high levels of compliance can be achieved without

severe retailer attrition. For New York, these data typically represent an equal, or not greater, number of total units as the National Retailer Partner data. The two sets of sales data can be combined for a relatively low-cost method to assess ongoing, annual market share levels.

**Maximize the use of the EPA National Retailer Partner data.** While there are explicit limitations to the use of these data, the data set provides detailed information on four appliance types sold via national big box retailers and thus represents a large segment of appliance sales. The use of a regression model with multiple explanatory variables is a relatively low-cost way to conduct attribution analysis and assess program impacts on market share.

**Collect make and model, where possible, when conducting surveys.** Self-reported purchases of ENERGY STAR products have proven to be highly unreliable. Where relying on self-reported data (e.g., telephone or mail surveys) researchers should also ask for the make and model number of the unit. While this is not practical for all product types (e.g., room air-conditioners may not have these readily available) it is normally feasible for refrigerators and clothes washers. Collecting these details allows for validation of the efficiency of the product and a more precise estimate of ENERGY STAR market share. In addition, assumed inaccuracies based on model number should be further researched as manufacturers often change or slightly revise model numbers without updating their list of qualifying products for national and regional programs.

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