

# The Impact of Regional Incentive and Promotion Programs on the Market Share of ENERGY STAR® Appliances

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## ABSTRACT

This paper reports the results of a recently completed evaluation of the net impacts on efficient appliance sales of Efficiency Vermont's Efficient Products Program (EPP). The EPP promoted purchase of ENERGY STAR® qualified clothes washers through the provision of a financial incentive to purchasers, as well as support to retailers in point-of-purchase marketing and personal sales. The program also provided promotional and sales training support to retailers for ENERGY STAR refrigerators, dishwashers, and room air conditioners. To assess program influence, a regression model of ENERGY STAR appliance market share at the state level was developed, using the DOE market share database and state-level demographic information from the U. S. Census. The model resulted in plausible estimates of program effect in Vermont and yielded additional insights into the workings of the appliance markets.

## Introduction

This paper presents the methods and key results of an evaluation of the appliance component of the Efficient Products Program (EPP) operated by Efficiency Vermont. Efficiency Vermont (EVT) is a non-profit "energy efficiency utility" that designs and manages statewide energy efficiency programs overseen by Vermont's Department of Public Service (DPS). The EPP promotes purchase of ENERGY STAR-qualifying clothes washers by providing financial incentives to purchasers, as well as support to retailers in point-of-purchase marketing and personal sales. The program also provides promotional support and sales training support to retailers for the sale of ENERGY STAR-qualifying refrigerators, dishwashers, and room air conditioners. The program does not offer financial incentives to customers or retailers for the purchase or sale of these three appliances. The evaluation reported in this paper analyzed the program's operation and results from its inception in March 2000 through December 2001.<sup>1</sup>

The primary objective for the evaluation of the appliance component of the EPP was to estimate the impact of the program on sales and market share of the four major household appliances covered by the ENERGY STAR labeling initiative. The first step in this analysis was to develop reasonably accurate estimates of the ENERGY STAR market share for each of the appliances in Vermont for the program years covered by the evaluation, as well as for earlier "baseline" periods. The second step was to develop and execute analyses that could quantify the effects of the program on ENERGY STAR appliance sales and statistically isolate them from those of other influences, of which there were many. They included:

- **Predecessor programs.** Utilities serving most of Vermont's electric customers had been offering cash rebates for the purchase of ENERGY STAR-qualified clothes washers since 1997. In 1999, all of the state's electric utilities joined in sponsoring a statewide ENERGY STAR appliance program using a program approach developed and facilitated at the regional level by the Northeast Energy Efficiency Partnership (NEEP). The NEEP-facilitated approach was

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<sup>1</sup> The program began offering \$25 incentives to purchasers of ENERGY STAR refrigerators and room air conditioners in the summer of 2002. The results reported here do not reflect that change in program design.

carried forward with few modifications (and the same program contractors) when EVT took over program administration in March 2000.

- ***Programs in nearby states.*** Utilities in Massachusetts, New Hampshire, and Connecticut had operated appliance programs facilitated by NEEP since the late 1990s. Vermont is a small state, and it shares media markets and appliance supply chains with neighboring states.
- ***National ENERGY STAR branding effort.*** The U. S. Environmental Protection Agency (EPA) had operated a national branding effort to increase consumer recognition, understanding, and use of the ENERGY STAR label in purchase decisions.
- ***Changes in federal appliance efficiency standards and ENERGY STAR specifications.*** The efficiency specifications for all of the ENERGY STAR appliances changed during the program period under evaluation. For refrigerators and room air conditioners, the federal efficiency standards also changed. These changes had significant effects on the availability and incremental prices of qualifying models.

The following sections describe the methods used to address the challenges of evaluating this particular program and present estimates of its net contribution to the sales and market share of ENERGY STAR appliances in Vermont. They also discuss some of the more general insights gained from this analysis concerning the operation of local appliance markets and the effectiveness of various program approaches to promoting ENERGY STAR products.

## **Program Description**

As mentioned above, the appliance component of the EPP built on predecessor utility programs that served most of Vermont's residential electric customers. All of the major Vermont utilities except Washington Electric Coop had offered incentives for the purchase of resource-efficient clothes washers beginning in late 1997. Most joined in the NEEP-facilitated ENERGY STAR appliance program in 1999. The NEEP program design featured customer incentives for the purchase of ENERGY STAR clothes washers plus merchandising support and sales person training for participating retailers. The program contractor that provided incentive processing and retailer support services retained this function when EVT took over program administration in March 2000.

## **Program Design**

The following paragraphs describe the key features of the appliance component of the EPP.

- ***Customer Services and Incentives: Clothes Washers.*** All electric customers are eligible to receive incentives for the purchase of ENERGY Star-qualified clothes washers. Rebates were set at \$75 during the first EVT program year. They were reduced in June 2001 to \$50. Predecessor utility programs offered rebates as high as \$200 and were set at \$100 during 1999.
- ***Retailer Services.*** The program offers a number of services to retailers participating in the program, including installation of point of purchase displays, assistance in ordering and stocking qualifying products, and sales staff training. These services were provided by the firm Advanced Proactive Technologies (APT) under contract to EVT. The program provides marketing support (but no customer incentives) for ENERGY STAR-qualified dishwashers, refrigerators, and room air conditioners.

- **Marketing.** EVT participates in the national ENERGY STAR brand recognition effort, undertakes local advertising, and stages special promotion events to support the program.

## Program Operations through 2002

Table 1 summarizes key indicators of clothes washer program activity for the period 1998 to 2002. Participation in the appliance component has held fairly steady over the life of the program. The number of Energy Star clothes washers rebated each year has ranged from 1,950 to 2,680, or 16 to 22 percent of the total annual sales of clothes washers in Vermont.

**Table 1.** Summary of EPP Appliance Component Activities

Year	# of Stores Enrolled	# of Participants (Rebate Recipients)	# of Rebates Issued	Comments
1998	55	1,950	1,950	Utility-specific programs
1999	60	2,680	2,680	Utilities offer NEEP program
2000	60	2,476	2,476	EVT program begins 3/2000
2001	91	2,563	2,563	Rebate levels reduced
2002	91	2,370	2,370	EVT program continues

## Estimation of ENERGY STAR Appliance Market Share

### Data Sources

The paragraphs below describe the various data sources that were used to support the sales and market share estimates. A wide variety of primary and secondary sources were used in order to make these estimates as accurate and comprehensive as possible.

**Monthly store-level clothes washer sales records.** As part of its contracted program support services, APT collected monthly totals of clothes washer unit sales for ENERGY STAR and conventional models from a practically all of the independent stores participating in the program. These retailers accounted for roughly 40 percent of program rebates during the period covered.

**National ENERGY STAR Appliance Sales Tracking System.** Through its national ENERGY Star Appliance program support contractor, D&R International, the U. S. Department of Energy collects sales information from national appliance and department store chains. Only one of these chains has locations in Vermont. The DOE system only reports the market share for ENERGY STAR appliances and not the total number of units sold. These data have been reported on a quarterly basis since the second quarter of 1998. The retail chains reporting to the DOE system account for a varying portion of total unit sales, depending on appliance and year. In 2001, this share ranged from 13 percent for room air conditioners to 37 percent for clothes washers. For this study D&R International also provided the estimated portion of total unit sales accounted for stores reporting to the DOE system by appliance type and state.

**Association of Home Appliance Manufacturers (AHAM) Distributor Sales Estimates.** AHAM is the industry association of home appliance manufacturers. It collects data on its members' shipments to distributors by appliance type, state, and ENERGY STAR designation. The correspondence between total units shipped and sales at the state level appears to be close, but not exact.

**KEMA-XENERGY analysis of appliance sales data from independent dealers in Vermont and Maine.** As part of the evaluation research, KEMA-XENERGY and APT collected and analyzed sales records for the four ENERGY STAR appliances from five independent dealers in Vermont and from 5 similar locations in Maine. These stores furnished records of over 24,000 transactions dating from 1999 through 2001.

### **Market Share Estimates**

Table 2 shows the estimated market share of ENERGY STAR appliances sold in Vermont by year, appliance type, and retailer type (chain v. independent). The Table also displays the estimated weighted average ENERGY STAR market share for each appliance and year, as well as the United States average ENERGY STAR market share for the chain retailers reporting to the Department of Energy. The following important observations can be drawn from Table 2.

**Differences between chain and independent retailers in ENERGY STAR market share.** There are pronounced differences between chain and independent retailers in ENERGY STAR market share, but these differences are not consistent across the various appliance types. Specifically, independents sold a much higher proportion of clothes washers and dishwashers than chain locations, but the opposite relation held for refrigerators and room air conditioners. Inventories of models on Vermont sales floor conducted for the evaluation found the same pattern of differences between chain and independent stores. The share ENERGY STAR models displayed corresponded closely to their share of sales. A study of appliance sales in California during 1999 and 2000 found much the same set of relationships. (RER 2001)

The close correspondence between the portion of ENERGY STAR models displayed and the portion sold suggests that differences between independents and chain stores in ENERGY Star market share result from the systematic pursuit of different merchandising strategies. Understanding the motivations for the apparent difference in retailing approaches between the two groups may provide some guidance in fashioning more effective strategies for retailer support. According to representatives of manufacturers and other individuals familiar with appliance retailing, chain stores make best use of their size and buying power by attempting to sell to the broad middle of the market. Effectively, this means displaying a large number of units that cover as many price/feature/efficiency combinations as they can, while avoiding very high and very low end products. Independents serve a smaller area and have limited display space. They therefore display (and sell) models that they believe will appeal to their customers, who generally occupy a narrower economic niche (high or low) than chain store customers.

The practical implications of these strategies work out differently for different kinds of appliances.

- **Refrigerators.** Refrigerators differ from dishwashers and clothes washers in that there are feature-laden, expensive models that do not qualify for the ENERGY STAR label. In fact, some very high-end features, such as cabinet depth design, use of two compressors, ice and water dispensers make it difficult for models to meet ENERGY STAR specifications. Thus, retailers who serve very high-end markets may not push ENERGY STAR models. Similarly, independents serving lower income areas will cover much lower-end models, which also do not meet ENERGY STAR standards. Chain stores have more space to stock ENERGY STAR models and do not run the risk of losing sales by doing so.

**Table 2.** Estimated Market Share of ENERGY STAR Appliances in Vermont

	1999	2000	2001
<b>CLOTHES WASHERS</b>			
<b><i>Vermont ENERGY STAR Market Share</i></b>			
Chain (DOE Database)	14.5%	22.6%	22.6%
Independent (Monthly Sales Records)	28.0%	31.0%	37.0%
Weighted Average	26.3%	27.3%	32.3%
<b><i>US Market Share (DOE Database)</i></b>	8.5%	9.3%	10.3%
<b>REFRIGERATORS</b>			
<b><i>Vermont ENERGY STAR Market Share</i></b>			
Chain (DOE Database)	28.1%	31.0%	14.9%
Independent (Qtrly Sales Records: 5 stores)	12.0%	13.0%	8.0%
Weighted Average	19.4%	21.2%	11.2%
<b><i>US Market Share (Chains)</i></b>	24.4%	27.0%	17.3%
<b>DISHWASHERS</b>			
<b><i>Vermont ENERGY STAR Market Share</i></b>			
Chain (DOE Database)	7.5%	8.1%	14.8%
Independent (Qtrly Sales Records: 5 stores)	51.0%	58.0%	64.0%
Weighted Average	34.7%	39.4%	45.6%
<b><i>US Market Share (Chains)</i></b>	12.4%	10.9%	19.9%
<b>ROOM AIR CONDITIONERS</b>			
<b><i>Vermont ENERGY STAR Market Share</i></b>			
Chain (DOE Database)	12.2%	22.0%	19.8%
Independent (Qtrly Sales Records: 5 stores)	12.0%	13.0%	3.0%
Weighted Average	12.1%	17.1%	10.7%
<b><i>US Market Share (Chains)</i></b>	13.3%	18.9%	11.5%

- **Dishwashers.** Virtually all high-end dishwashers currently on the market qualify for the ENERGY STAR label. Moreover, dishwashers remain something of a luxury item in Vermont. Only 54 percent of the customers in an on-site survey conducted for the evaluation had dishwashers installed. Independent retailers serving low-income areas will carry only a few models of dishwashers since they do not sell many units. Independents in more affluent areas will stock higher-end models, virtually all of which qualify for ENERGY STAR.
- **Clothes washers.** Both product managers and the APT program manager reported that manufacturers have offered incentives to dealers to sell ENERGY STAR clothes washers. These products command a high price premium due to a variety of factors, including enhanced cleaning performance, reduced water usage, and appearance. They have been very profitable for manufacturers on a unit basis once product development and line set-up costs were amortized. Generally, appliance sales personnel in large chain stores cannot personally accept incentives from manufacturers. Proprietors of independent stores who also serve as the sales staff can do so more easily. Thus, independents may have a stronger incentive to sell ENERGY STAR clothes washers.

**Changes in appliance markets over time.** Table 3 summarizes changes over time in key market indicators for the appliances discussed in this paper: number of ENERGY STAR-qualifying models, the portion of displayed stock accounted for by ENERGY STAR models, and average incremental cost of ENERGY STAR models in Vermont.

**Table 3. Key Market Indicators for ENERGY STAR Appliances**

	1999	2000	2001
<b>CLOTHES WASHERS</b>			
Number of ENERGY STAR Models Available	35	64	84
Percentage of Models Displayed: Vermont	22%	25%	28%
Average Incremental Cost: Vermont	\$375	\$432	\$474
<b>REFRIGERATORS</b>			
Number of ENERGY STAR Models Available	331	301	58*
Percentage of Models Displayed: Vermont	21%	30%	20%
Average Incremental Cost: Vermont	\$278	\$344	\$453
<b>DISHWASHERS</b>			
Number of ENERGY STAR Models Available	173	265	158**
Percentage of Models Displayed: Vermont	31%	41%	41%
Average Incremental Cost: Vermont	\$69	\$124	\$118

\* New federal minimum efficiency standards and ENERGY STAR specifications go into effect.

\*\* New ENERGY STAR specifications go into effect.

Table 3 illustrates a number of key developments that that we will come back to later in interpreting the results of the analysis of program effects. First, for refrigerators and dishwashers, the number of qualifying models available was extremely volatile in the period covered, largely due to the time it took manufacturers to respond to new federal efficiency standards and ENERGY STAR specifications. In the case of refrigerators, sell-offs of models that did not meet new minimum standards

and shortages of models that met the new ENERGY STAR specifications were associated with a large increase in the average incremental price of a qualifying unit between 2000 and 2001. One effect of the new federal standards was to reduce the average savings associated with purchasing an ENERGY STAR refrigerator to 80 – 120 kWh per year, depending on model configuration. Thus, purchase of an ENERGY STAR refrigerator was not particularly attractive from a purely economic viewpoint in 2001. By contrast, the number of ENERGY STAR clothes washer models available increased steadily from 1998 through 2001, as did their incremental price, and presence on showroom floors. This result may reflect not only the significant consumer benefits these appliances provide, but the results of a decade of regional and national market transformation efforts (Feldman et al. 2001). In 2002, the national market share for ENERGY STAR clothes washers climbed steadily to 15.8 percent in the second quarter versus 10.3 percent for the preceding year. Finally, it should be noted that the percentage of ENERGY STAR models on display remained relatively stable compared to the wide fluctuations in the availability of qualifying models. This reflects the high level of discretion that retailers exercise over the stock they display and sell, as discussed above.

## Estimation of Net Program Effects on ENERGY STAR Appliance Market Share

### Methods

To assess the net effect of the EPP on the market share ENERGY STAR appliances in Vermont, XENERGY estimated regression model of market share of an ENERGY STAR appliance in state  $s$  for each appliance and year for which complete state-by-state market share information was available from the DOE tracking system. The form of the model was:

$$MS_{ays} = \alpha + \beta_1 ED_s + \beta_2 MI_s + \beta_3 PR$$

where:

$MS_{ays}$  = the ENERGY STAR market share of appliance  $a$  in state  $s$  in year  $y$  as measured for chain outlets reporting to the DOE tracking system.

$ED_s$  = the percentage of persons over 25 with a bachelor's degree or further educational attainment, as estimated by the 2000 United States Census.

$MI_s$  = the median income of households in the state, as estimated by the 2000 United States Census.

$PR$  = an indicator variable that took the value 1 if there had been active utility or regional incentive programs available to most consumers in the state for at least 2 years during the period from 1999 to 2001. The sources for this characterization were ENERGY STAR appliance program overviews available from the Consortium for Energy Efficiency (CEE), the Northeast Energy Efficiency Partnerships (NEEP), the Northwest Energy Efficiency Alliance, and the ENERGY STAR partner web site.

In developing the model we also examined the effect of including other variables that other studies have identified as being associated with adoption of energy efficient products. These included:

- the price of electricity, as measured by the average revenue per kWh sales to residential customers in the state (Energy Information Administration);
- the percentage of the population in the age group 45 – 54 (U. S. Census), a group that is typically overrepresented among participants in energy efficiency programs; and,
- the presence of utility or state agency programs that promote ENERGY STAR appliances without providing incentives.

None of these variables entered the model with significant coefficients, and none contributed significantly to the ability of the model to explain state-to-state variation in ENERGY STAR market share for any appliance or year. They were therefore not included in the model.

We estimated the model for each appliance in each year 1999 – 2001 for which complete data were available ENERGY STAR market share. We then took the following steps to generate estimates of the net effect of the Vermont EPP on ENERGY STAR market share for each appliance and year.

1. Examine the model results to assess its suitability for estimating ENERGY STAR market share. This involved examining the sign and statistical significance of the coefficients and the portion of total variation in ENERGY STAR market share that the model accounted for. The model was accepted for further use in the analysis if the coefficients were statistically significant at the 10 percent probability level, and if the *F* statistic for the model exceeded the critical value. This latter condition means that the observed relationship between the variables is very unlikely to have occurred by chance. In some cases, applying these criteria led us to drop either the income or education variables.. For some years and appliances, the model did not meet the criteria for use in further analyses. In none of the three years examined did the model yield significant results for refrigerators. The dishwasher model for 1999 also did not meet the criteria for use in further analysis.
2. Apply the model results to estimate Vermont’s ENERGY STAR market share with and without the presence of the program. This involved enumerating the model with Vermont’s demographic variables with the indicator variable for the presence of the program set at 1, then at 0.
3. Estimate the net effect of the program on the market share of ENERGY STAR appliances sold by retailers reporting to the DOE sales tracking system. This effect was estimated by the difference between the actual market share and the estimated share with the program indicator variable set to 0. We present this result with a 90 percent confidence interval based on the standard error of  $MS_{dys}$  (the ENERGY STAR market share variable).
4. Adjust the net program effect on market share to account for differences in Vermont between the chain retailers represented in the DOE database and independents in the percentage of ENERGY STAR appliances sold, by appliance type and year. This was accomplished by multiplying the result of Step 3 by the ratio of the weighted average market share for the state as a whole to the market share achieved by retailers reporting to the DOE sales tracking system.



## Summary Results of the Net Effects Analysis

Table 4 summarizes the results of the modeling effort described above. The first column shows the portion of total variation in the state level ENERGY STAR market share accounted for by the model ( $R^2$ ). The next two columns show the results of the model enumeration for Vermont with and without the program variable set to 1. The next column shows the actual ENERGY STAR market share for the specified appliance and year, taken from the DOE database. This is followed by the difference between the actual market share and the model estimate with the program variable set to 0, which represents the net effect of the program on the ENERGY STAR market share in stores reporting to DOE. We have also included the 90 percent confidence interval for the estimate of program impact on market share. The last column shows the estimate of program effect adjusted for the difference in market share between chains and independents for the specified year and appliance. The following paragraphs discuss the results shown in Table 4.

**Table 4.** Estimates of Program Net Effects on ENERGY STAR Appliance Market Share

Appliance/Year	Model $R^2$	ENERGY STAR Market Share in Vermont Chains				Adjusted Difference	
		Model Estimates		Actual	Difference Actual - Model w/o Prog		90% Conf Interval (+/-)
		w/ Prog	wo/ Prog				
<b>Clothes Washers</b>							
1999	0.722	15.2%	9.0%	14.5%	5.5%	3.4%	10.0%
2000	0.685	16.5%	10.1%	22.6%	12.5%	4.2%	15.1%
2001	0.668	20.1%	12.9%	22.6%	9.7%	5.2%	13.9%
<b>Dishwashers</b>							
2000	0.212	9.5%	9.3%	8.1%	-1.2%	4.4%	0.0%
2001	0.386	15.3%	12.5%	14.8%	2.4%	4.6%	7.3%
<b>Room AC</b>							
2000	0.269	20.7%	18.8%	22.0%	3.2%	5.0%	2.5%
2001	0.472	21.1%	19.4%	19.8%	0.4%	5.2%	0.2%

**Clothes washers.** The clothes washer model explained a significantly greater portion of state-to-state variation in Energy Star market share than the models for the other appliances. This was expected since, with a few small exceptions, the appliance programs paid financial incentives only for clothes washers. After adjusting the model results to account for the differences in market share for chains and independent stores, we estimated the net market share attributable to the programs at 10.0 percent in 1999, 15.1 percent in 2000, and 13.9 percent in 2001. These results suggest that the predecessor program did have an effect on sales of ENERGY STAR clothes washers in that their market share was considerably higher than it would have been in the absence of the program. In both 2000 and 2001, the actual market share for ENERGY STAR clothes washers among Vermont chains exceeded the model prediction – in 2000 by a considerable margin. Given that clothes washer incentives in other states had

as much or more operating history as Vermont's, these results could be interpreted to mean that the Vermont program was particularly effective in building on the accomplishments of its predecessors.

**Dishwashers.** The dishwasher model included only the income and program variables. The t-statistic for the education variable was very low and it entered with a negative sign. It was therefore dropped from the model. The model did a good job of predicting the actual market share for Energy Star dishwashers in Vermont. The model estimate for 2000 was 9.5 percent v. the actual 8.1 percent; 15.3 v. 14.8 percent in 2001. We concluded that the comparison of the actual market share to the model estimate without the program was a reasonable estimate of net market effects. In 2000, this difference was – 1.4 percent. We therefore set the net program effect on Energy Star washer sales to zero for 2000. One could argue that the high market share among independents in 2000 (39.4 percent -- See Table 2.) provides an indication of positive program effects. However, the national average market share for dishwashers among chain retailers reporting to DOE in 2000 was 10.9 percent versus 8.1 percent in Vermont. We believe the estimate of zero effect is justified for that year. In 2001, after making adjustments for sales by independents, the net contribution of the EPP to Energy Star dishwasher market share was 7.3 percent.

**Room Air Conditioners.** The room air conditioner models did a good job of predicting actual ENERGY STAR market share in 2000 and 2001. The model estimated small, but discernible contributions to market share in both years. We concluded that our approach was reasonable for room air conditioners and estimated net contributions to ENERGY STAR market share of 2.5 percent in 2000 and 0.5 percent in 2001.

**Refrigerators.** As shown in Table 2, Vermont's ENERGY STAR market share for refrigerators has been highly erratic, both in absolute level and in relationship to the national and regional figures. In 1999 and 2000, Vermont's market share was relatively high – 28 to 31 percent. This was slightly higher than the national average and 50 to 70 percent higher than the share in other states in which the NEEP program was operating. In 2001, however, Vermont's market share plummeted to 14.9 percent, below the national average and well below the levels in neighboring states. Early returns for 2002 suggest that the market share in Vermont is rising more steeply than in the nation as a whole. Given this volatility and our inability to develop a useful cross sectional model, it is difficult to come up with a convincing approach for estimating net program market effects for refrigerators.

## Limitations on Interpretation of Results

The following caveats must be kept in mind in interpreting the results of the modeling effort.

- **Market coverage of the DOE market share estimates.** As discussed above, DOE data series is at best an imperfect measure of market share. It collects information only from national chains, and only one of the reporting companies has locations in Vermont. The adjustment to the model results after estimating net program effects based on the DOE series was clearly a “work-around” the absence of comprehensive market share data for all states, but we believe it is justified based on the strength of the evidence of differences between store types and the estimated size of those differences.
- **Uniformity of programs.** The model contains an implicit assumption that the appliance incentive promotions in the various states are uniform in terms of design, incentives, portion of the state in which program is available, and so forth. This is pretty much the case for the states

that hosted NEEP-designed programs. Other states such as California, Oregon, and Washington had differing incentive structures, as well as timing of implementation.

### Estimates of Net ENERGY STAR Unit Sales due to the Program

Table 5 shows annual shipments per AHAM of the three appliances for which net program effects were estimated, the ENERGY STAR market share attributed to the program, the number of unit sales attributable to the program, and the MHW electric savings associated with those sales. The shipment figures for 2000 are adjusted to reflect the start-up of the EPP in March of that year.

**Table 5.** Net Impacts of the EPP: Unit Sales and Energy Savings

Appliance/Year	Shipments (AHAM)	Net Share Attributable to EPP		Energy Savings MWH/Year
		Percent	Units	
<b>Clothes Washers</b>				
2000	10,417	15.1%	1,577	946
2001	12,500	13.9%	1,741	1,045
<b>Dishwashers</b>				
2000	7,750	0.0%	-	
2001	8,500	7.3%	620	90
<b>Room Air Conditioners</b>				
2000	7,167	2.5%	178	13
2001	6,100	0.2%	14	1

## Conclusions

The results of the Vermont Efficient Products Program evaluation provide much food for thought about the design and evaluation of programs to promote ENERGY STAR appliances. Despite their limitations, the historical cross-sectional data series compiled by the Department of Energy and AHAM provide a rich foundation for analysis of program effects, especially when they are combined with results of the many national and regional market assessments and program evaluations carried out over the past few years. Full review of this material is beyond the scope of this paper. However, it is possible to use the results of the market share models to explore in more general terms the impact of rebates on ENERGY STAR appliance market share.

Clearly, rebates boost market share for the appliance and in the year in which they are offered. The coefficient on the program variable for clothes washers (that is the marginal market share accounted for by the presence of a rebate program for clothes washers was 6.2 percent in 1999, 6.4 percent in 2000, and 7.3 percent in 2001. Beyond this predictable result, it appears that rebates play an important role – in combination with retailer support – for jumpstarting local market share growth. The rapid uptake of resource-efficient washing machines in the Northwest upon implementation of a regional incentive program in 1997 has been well documented. (Hewitt et al. 2001) In 1998, the regional incentive program was eliminated and retailer support elements of the program were built up over a period of

eighteen months. Table 6 shows the annual market share of ENERGY STAR clothes washers among Idaho stores reporting to DOE along with the model predictions with the program variable set to 1 and set to 0. (Idaho was selected from among the Northeast states because few utility programs were established there to replace the rebates offered by the regional program.) The results summarized in Table 6 suggest that most of the increase in market share expected from a rebate program was sustained through the period when the Northwest Alliance operated a retailer support and consumer information-oriented program.

**Table 6.** Actual and Estimated ENERGY STAR Clothes Washer Market Share in Stores Reporting to DOE: Idaho

	Year		
	1999	2000	2001
Actual	11.4%	13.3%	16.6%
Model Estimate/ no program	7.9%	8.7%	11.1%
Model Estimate/with program	14.1%	15.1%	18.4%

Finally, the small but significant coefficient for the variable representing availability of incentives for washing machines in the *dishwasher* and *room air conditioner* models suggests that rebates for one appliance may help consumers focus their attention on the ENERGY STAR label in general, while providing retailers with a motivation for learning more about the benefits of efficient appliances and how to sell them.

Although the tentative conclusions discussed above are interesting from a program standpoint, one needs to resist the temptation to push them too far. Material presented in the first part of this paper shows that the markets for the four ENERGY STAR home appliances vary greatly in terms of product standards, consumer costs and benefits, and retailer motivation. Moreover, these factors change drastically over time. The methods presented above offer one way to keep all these moving parts in view when analyzing the effects of one local program.

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