

Final

# **Evaluation of the LiteVend Program**

(245C-02)

*Prepared for:*  
Ecos Consulting

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***Prepared by:***  
Brian Hedman  
Doug Bruchs  
Quantec, LLC

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**Quantec Offices**

6229 SE Milwaukie Ave.  
Portland, OR 97202  
503 228-2992  
503 228-3696 fax  
[www.quantecllc.com](http://www.quantecllc.com)

1722 14th St., Suite 230  
Boulder, CO 80302  
303 998-0102  
303 998-1007 fax

6 Ridgeland Rd  
Barrington, RI 02806  
(401) 289-0059  
(401) 289-0287 fax

212 E Main St., Suite G  
Reedsburg, WI 53959  
(608) 524-4844  
(608) 524-6361 fax

20022 Cove Circle  
Huntington Beach, CA 92646  
(714) 287-6521



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# Table of Contents

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<b>Executive Summary .....</b>	<b>ES-1</b>
<b>I. Measure Installation .....</b>	<b>I-1</b>
Vending Misers.....	I-1
High Efficiency New Machines.....	I-5
<b>II. Program Impact .....</b>	<b>II-1</b>
Methodology .....	II-1
Sampling Plan .....	II-2
Analysis of Energy Savings.....	II-3
<b>III. Conclusions &amp; Recommendations .....</b>	<b>III-1</b>



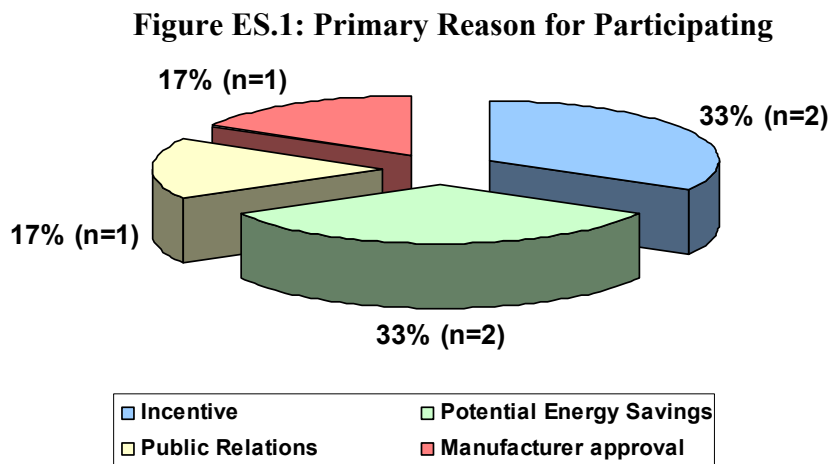
# Executive Summary

Ecos Consulting's LiteVend Program (LiteVend) offered a two-pronged approach to increasing the efficiency of the beverage vending machine market. The Program provided an incentive to help offset the cost of purchasing an efficiency add-on known as a VendingMiser® for existing machines and an incentive to vending machine operators to encourage them to install higher efficiency models when replacing antiquated existing machines.

The program used a comprehensive approach to fully penetrate the vending machine market. Because vending machines are typically owned by the bottler the program targeted both customers directly and players upstream from the customer. Penetration figures indicate that this was a successful approach. The program was able to achieve participation from both Coca-Cola and Pepsi despite a sluggish economy and low replacement machine budgets for both vendors.

## VendingMiser

The VendingMiser portion of the LiteVend Program consisted of seven participants and the procurement of 301 total units, of which 295 have been submitted for rebates. Two participants noted that not all the units had been installed at the time of the survey. The primary reasons for Program participation are illustrated in Figure ES.1.



Each respondent verified that all the machines that had been installed at the time of the survey were still in place and operational –an overall Program retention rate of 100%.

One respondent noted that vandalism of vending machines had dropped noticeably since the VendingMisers were installed. The respondent believes that possibly “when the green light on the sensor comes on, people think that they are either being watched or that security is aware of their presence.”

None of the respondents had any negative comments about the VendingMiser technology itself. In fact, several noted that their initial concerns that the efficiency add-on would be detrimental to the machine’s maintenance or lead to dissatisfied customers were unwarranted.

Due to problems obtaining reliable logger data, Quantec conducted a literature review of VendingMiser studies to estimate Program savings. The Program’s deemed value of 1,220 kWh per year falls comfortably within the observed range and appears, based on secondary sources, to be a reasonable estimate. Based on this deemed value, the total savings generated by the 295 Program rebated machines is 359,900 kWh<sup>1</sup>.

### **High Efficiency New Vending Machines**

Through a written response to the survey instrument, Pepsi expressed general satisfaction with the Program and recommended that the most effective way of notifying the organization of similar programs in the future is through the machine’s original manufacturer as they often communicate with Pepsi about such opportunities.

While Coca-Cola did not return the interview guide, Quantec did receive a copy of the letter written by their Southern California Division Service Manager endorsing the LiteVend<sup>®</sup> Program and indicating that Coca-Cola “would welcome the opportunity to continue this work with Ecos Consulting to improve the energy efficiency of new beverage vending machines, in 2004 and 2005.”

Ecos logged a sample of existing machines that could be used to establish a baseline for determining the energy savings generated when a LiteVend rebated new machine replaced a similar existing unit. Based on the logged sample we estimate that new machines rebated by the LiteVend Program used 21.6% less energy than the comparable existing machines<sup>2</sup>.

The program provided rebates for 1,383 new high efficiency vending machines. The total energy impact of the new machine portion of the LiteVend Program is 1,589,067 kWh based on the evaluated energy savings

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<sup>1</sup> By comparison the Express Efficiency program assumes 1,589 kWh per unit and installed 419 units in 2002 statewide.

<sup>2</sup> The ACEEE study “Commercial Packaged Refrigeration: An Untapped Lode for Energy Efficiency”, May 2002, cites potential savings of 50% for EconoCool vending machines. Additional logging is warranted to accurately establish savings.

compared to 3,595,800 based on the Program per unit deemed value. Due to the small sample of logged machines, we recommend additional logging to broaden the sample.





# I. Measure Installation

## VendingMisers

To verify the installation and continued operation of the VendingMiser technology at participating sites, Quantec conducted surveys with each participating location's primary contact. While the survey instrument focused on verifying the number of VendingMisers installed and their current condition, it also included questions regarding Program awareness, non-energy benefits, and free-ridership/spillover.<sup>3</sup>

The VendingMiser portion of the LiteVend Program consisted of seven participants and the procurement of 301 total units. Quantec was able to successfully survey contacts at six of the seven participating locations, comprising 99% of the VendingMiser population (Table I.1).

**Table I.1: VendingMiser Survey Sample**

	No. Participants	No. VendingMiser Units
Sample	6	298
Population	7	301
	<b>85.7%</b>	<b>99.0%</b>

## Verification of Installation

The respondent at each location was asked to confirm that the number of units listed in the Program database for that location had been installed and submitted for incentives. All respondents confirmed this. Two noted, however, that not all the units had been installed at the time of the survey. One location noted that they had purchased more units than they had vending machines, while the other said their in-house maintenance crew had yet to install the final units, although their locations have been identified. The Program administrator is withholding payment of incentives for the uninstalled units until installation is complete and confirmed.

## Program Awareness and Participation Factors

Each respondent was also asked how he or she first heard about the Program. As presented in Table I.2, half of the participants surveyed were contacted directly by Bayview Technology. Two others learned about the Program from their regional energy managers, while an SDG&E representative notified the

<sup>3</sup> A copy of the survey instrument is provided in Appendix A

final respondent. Ecos identified that the last program participant found out about the Program through a combination of direct mail and advertising in the *SD Business Journal* and contacted Bayview/USA Tech.

**Table I.2: How did you first learn about the LiteVend?**

	Frequency
Contacted by Bayview	3
Regional Energy Manager	2
SDG&E Service Representative	1
<b>Total</b>	<b>6</b>

The respondents were asked for the reason they chose to participate. Respondents gave a wide range of responses, including a desire to minimize the energy use of vending machines in low traffic areas, the results of on-site VendingMiser tests, and the consent of machine operators. Specific replies include:

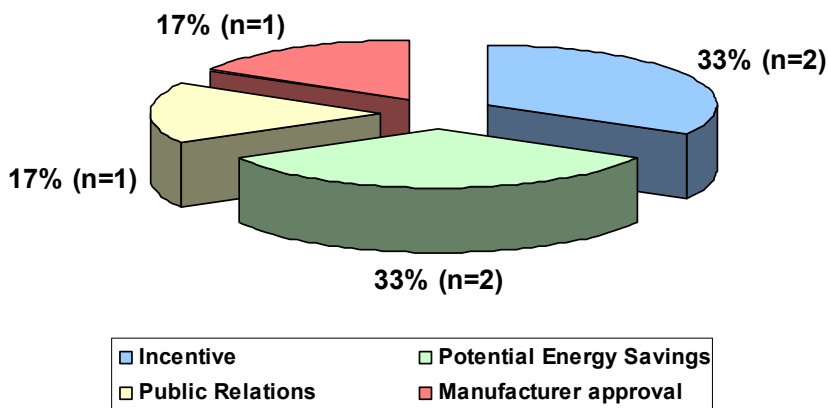
*“Most of the vending machines on campus are inactive about 16 hours a day, and the idea of being able to keep the drinks cool, while limiting the number of cycles and saving energy sounded very appealing.”*

*“First heard about VendingMisers from the San Diego Regional Energy Office. Sounded interesting, so I went to Bayview’s Web site and emailed them for more information. Eventually, we bought one and test it (using a data meter) on several vending machines - finding a savings of between 40%-50%. The salesman later contacted us about the Program, and we decided to install 46 more at 28 different locations within the district.”*

*“After [Bayview] explained the Program, I contacted Pepsi and Coke to ask their opinion of the technology. I was concerned that the VendingMiser might affect the compressor or damage the machine and I can't be responsible for replacing or repairing 16 machines. They said it was ok, and since it was going to save 15%-30%, I decided to participate.”*

As illustrated in Figure I.1, the potential energy savings and the Program incentive were the primary drivers for participation, with the remaining two participants citing the manufacturer’s approval of the VendingMiser technology and the public relations benefits associated with the technology.

**Figure I.1 Primary Reason for Participating**



### **Validating Continued Operation**

Each respondent verified that all the machines that had been installed at the time of the survey were still in place and operational, an overall Program retention rate of 100%. This high retention rate was due to scheduled maintenance of the vending machines and their VendingMisers, typically as part of the weekly facility walk-through.

The only location not employing a set inspection process still claimed to “regularly check the machines as I walk the campus. It’s not a formal process, but I keep an eye on them.” Another respondent, when asked if there had been any problems with outdoor units being vandalized, noted that they “took steps to avoid potential vandalism - particularly on the outside machines – by having small metal cages built to protect the motion sensor.”

### **Program Benefits**

None of the respondents said that they had seen any savings on their energy bill as a result of the Program. This is most likely because the participant sites include significantly larger energy end uses that obscure those generated by the Program.

Several cited meaningful non-energy benefits that had resulted from their participation – most commonly, the public relations benefits associated with the LiteVend Program. Three of the respondents noted a favorable impact on public relations, stating “teachers, students, and parents commented on the technology and praised the school district for attempting to save energy” or that “employees were pleased to see that they were taking steps to conserve energy.”

In addition to public relations benefits, another respondent noted that vandalism of vending machines had dropped noticeably since the

VendingMisers were installed. The respondent believes that possibly “when the green light on the sensor comes on, people think that they are either being watched or that security is aware of their presence.”

### Free-Ridership and Spillover

In an effort to gauge free-ridership, each respondent was asked the likelihood that they would have installed the VendingMisers within the next year had the Program not been available. As evident in Table I.3, three of the six respondents answered “*Not At All Likely*,” while two responded “*Very Likely*” and one, “*Somewhat Likely*.” One of the two respondents answering “*Very Likely*” said they had been seriously considering purchasing the units prior to the Program, but that the incentive “closed the deal.” The other respondent who identified their location as “*Very Likely*” to have independently installed the VendingMisers, cited a previous awareness of the inefficiencies of vending machines in low traffic areas, parking garages in that case, as evidence.

**Table I.3: Likelihood of Independent Installation**

	Frequency
Not At All Likely	3
Very Likely	2
Somewhat Likely	1
<b>Total</b>	<b>6</b>

Two of the contacts also mentioned that their organizations were considering installing VendingMisers at locations outside of the Program’s service territory. One respondent noted that their “corporate office has been in contact with us to learn more about it” and are “actually considering implementing VendingMisers at the national level as a result of our experience.” The other respondent remarked that “[the corporate offices] are trying to get them in all the West Coast locations, and maybe nationwide.”

Quantec did not attempt to quantify the net-to-gross impacts due to the relatively few survey participants; however, there is sufficient anecdotal evidence that substantial spillover may occur, thereby offsetting any free-ridership.

### Program Administration

The majority of the respondents noted that Bayview/USA Technologies had handled the interaction with the Program and simply included the reduced cost of the subsidized VendingMiser on the invoice. One respondent noted that he was unhappy with the requirement that the incentives for each location had to be filled out separately and commented that it “took a secretary half a day just

to fill out all the forms.”<sup>4</sup> The respondent recommended that future versions of the Program streamline the application process thereby reducing the administrative burden on participants.

### **General Comments**

None of the respondents had any negative comments about the VendingMiser technology itself. In fact, several noted that their initial concerns that the efficiency add-on would be detrimental to the machine’s maintenance or lead to dissatisfied customers were unwarranted. A few of the specific comments offered by respondents in this regard are provided below.

*“Everything works fine. I haven't heard any complaints, which is the number one thing right there. Had them for almost a year and there has not been any negative impact on guest satisfaction at all.”*

*“There was no compromise in the product - even after the weekend, you could come in Monday morning and get a cold soda.”*

Respondents also had positive things to say about their experience working with Bayview/USA Technologies. In addition to the pre-Program data logging provided for some participants, Bayview/USA Technologies was described as being “helpful” and “accommodating.” Again, a few of the specific comments provided during the survey are below:

*“Originally, I ordered all indoor units, but Bayview (now USA Technologies) was excellent about trading us for the proper number of outdoor units.”*

*“USA Technologies was great - very easy to work with”*

Several other respondents expressed appreciation for the Program. One noted that, although the data logging was “successful in proving that the technology saved energy, the powers that be were not convinced and could not justify the expense.” However, once they were contacted about the Program and learned of the incentive “the decision was a slam dunk.” Overall, respondents were pleased with their experience with the Program and the performance of the VendingMiser units themselves.

### **High Efficiency New Machines**

Quantec originally proposed to survey a sample of participants who had received more-efficient vending machines, to ensure that the unit was installed, was still in place and operational, and to explore the participants’

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<sup>4</sup> This was due to the large number of locations installed within the school district.

reasons for acquiring an energy-efficient model. However, Quantec later learned that the decision to install new high efficiency models instead of a standard efficiency model was made by the vending machine operator – Coca-Cola and Pepsi – not the participant. Furthermore, Coca-Cola and Pepsi requested that Quantec not contact participants to discuss their energy-efficient models to avoid issues with customers that had not received the more efficient unit at their location.

Consequently, Quantec dropped its participant survey and developed an interview guide for discussions with Coca-Cola and Pepsi directly. The guide focused on the effectiveness of LiteVend’s marketing efforts, the vending machine operators’ reasons for participating, and the benefits derived from participating, as well as overall satisfaction.<sup>5</sup>

Due to corporate policy concerns, Quantec was unable to conduct a telephone survey with either vending machine operator. However, Pepsi did return comments via email when sent the interview guide.

In its response, Pepsi noted that they had initially heard about the LiteVend directly from Ecos and that the marketing materials used to promote the Program had been sufficient. However, Pepsi recommended that the most effective way of notifying their organization of similar programs in the future was through the machine’s original manufacturer as they often communicate with Pepsi about such opportunities. Pepsi also mentioned that as a result of Ecos’ assistance, they were pleased with the Program’s enrollment process, eligibility requirements, and rebate application.

Lastly, Pepsi noted “having Ecos Consulting really helped us understand this. For the first time, it was nice to have someone familiar with the Program.”

While Coke did not return the interview guide, Quantec did receive a copy of the letter written by their Southern California Division Service Manager endorsing the LiteVend Program. In the letter, Coke states that LiteVend “has been a good opportunity for us to coordinate our energy efficiency efforts and work towards one of Coke’s goals to support energy savings and education through our selection of cold beverage vending machines.” In addition, the letter notes that Coke “would welcome the opportunity to continue this work with Ecos Consulting to improve the energy efficiency of new beverage vending machines, in 2004 and 2005.”

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<sup>5</sup> A copy of the interview guide is provided in Appendix B.

## II. Program Impact

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### Methodology

Two distinct methodologies were employed to determine the energy impacts attributable to the Program's energy efficient measures. The methodologies shared the following common characteristics:

- Quantec prepared the sample design and data collection methodology.
- Ecos field staff conducted the data logging.
- The treatment of anomalies and outliers was based on systematic and well-defined procedures. The removal of any anomalous observations is explained in detail in the Program Impacts section of the report.
- Savings were extrapolated from logged data or literature review to annual estimates.
- Net impacts for each technology and the Program's overall energy impact were calculated.

### VendingMisers

To determine the energy savings of the existing vending machines equipped with Program rebated VendingMisers, the energy use of 15 machines was logged at two participating locations, one a major hotel and the other a college campus. To ensure the consumption data reflected the full range of activity around the machine, a minimum of one week of both pre- and post-VendingMiser energy consumption data was collected for each machine.

However, since the Program did not know which machines were going to be retrofitted with a VendingMiser before the actual installation, it was not possible to collect pre-VendingMiser energy consumption prior to the retrofit. Consequently, the pre-period energy consumption of the sampled machine was simulated by temporarily disabling the installed VendingMiser. For a minimum of one week, energy consumption was recorded. Then the VendingMiser was restored, post installation energy consumption was recorded for an additional week.

The loggers collected the number of hours the logger was in place and the total number of kWh used by the vending machine during that time. The average daily energy consumption of each machine was then calculated by dividing the total hours logged by 24 and then, in turn, dividing the total energy consumption by that figure. The average daily pre and post

consumption were then compared to determine the energy saving attributable to the installation of the VendingMiser unit.

### **New Machines**

As with the VendingMisers, the Program did not know ahead of time which currently operating vending machines were going to be replaced with new, more energy efficient models procured through the Program. Therefore, establishing a baseline for the pre-post calculation of the energy savings attributable to the new machine could not be obtained by logging the existing machine prior to the installation of the new higher efficiency machine.

Therefore, in order to establish a baseline and collect viable pre-installation data, Ecos logged a sample of random existing machines comparable in age and size to those replaced by the motion-sensing energy-efficient technology eligible for a rebate.<sup>6</sup> In addition, other important characteristics were also collected on each machine for the purpose of accurately matching the energy consumption of the pre machines with the logged energy consumption of the rebated new machines. For example, since the new machines save energy by powering down when the area around the machine is unoccupied, it was critical that the logged existing machine be located in an area that experiences similar traffic levels as the new machine. Other important information such as location – inside, outside, outside-shaded – was also collected for possible use in the savings analysis.

Each logger collected a minimum of one week of energy consumption for both the pre and post periods. The average daily energy consumption of each machine was calculated by dividing the total hours logged by 24 and then, in turn, dividing the total energy consumption by that figure. The average daily pre and post period consumption of machines under similar conditions (i.e., traffic levels, locations, etc.) were then compared to determine the energy saving attributable to the installation of the new machine.

### **Sampling Plan**

Since LiteVend offered rebates for both the placement of high efficiency new machines and purchase of VendingMiser units designed to modify the consumption of existing machines, the sample of 70 machines selected for logging, as specified in the work plan approved by the CPUC, was divided accordingly. As of March 2004 when the sampling plan was finalized, the Program had issued or planned to issue 951 rebates to offset the cost of new high efficiency machines as well as rebates toward the procurement of 264 VendingMiser units. Therefore, the representative sample selected for this

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<sup>6</sup> To aid these efforts, Coke also provided a list detailing the location of existing machines eligible for replacement (placed in 2000 or 2001).



population consisted of 55 high efficiency machines and 15 VendingMiser units, Table II.1.

**Table II.1: Initial Sample**

	Population*	Percent of Population	Sample	Percent of Sample
Vending Miser	264	21%	15	21%
New Machines	951	79%	55	79%
<b>Total</b>	<b>1,215</b>	<b>100%</b>	<b>70</b>	<b>100%</b>

\* Reflect the population at the time the sample was determined. Final Program participation – as noted in the Executive Summary was 295 VendingMisers and 1,383 new machines, 18% and 82% of the total Program population, respectively.

While Ecos was successful in logging the pre and post periods of 15 machines equipped with VendingMiser’s rebated by the Program, logging new machines posed more of a challenge. Due to unforeseen difficulties with the logging process, such as time constraints, access to the machine’s power supply and vandalized or lost loggers, Ecos was unable to log 55 pre and post periods as specified in the initial sampling plan for the new, more efficient machines. Table II.2 outlines Ecos effort to meet the sample goals.

**Table II.2: Logging Efforts – New Machines**

	Pre Period	Post Period
Goal	55	55
Loggers Placed*	63	23
Loggers Recovered**	43	19
Percent of Goal Obtained	78.2%	34.5%

\* Number of machines which Ecos was able access the power supply and place a logger

\*\* Loggers were not recovered due to vandalism or theft.

## Analysis of Energy Savings

Due to the difference in the technologies and data collection process, the analysis of the energy savings attributable to each of the Program’s two offerings are presented separately.

## VendingMiser Energy Impacts

Logged data for VendingMiser installations resulted in unreasonably high savings estimates.<sup>7</sup> Available time did not allow for a second attempt at VendingMiser logging; consequently, Quantec conducted a literature review of several other VendingMiser studies to gauge the reasonableness of the Program's deemed value. Specifically, Quantec sought VendingMiser evaluations of units installed at locations similar to participants in the LiteVend Program, such as university and hotels.

Several reports – with varying levels of formality – were available regarding VendingMisers installed on college campuses. For example, a group of graduate student of students at University of Illinois at Urbana-Champaign logged one vending machine in each of two buildings with differing traffic patterns. They estimated savings at 22% in the high traffic installation and 43% in the low traffic installation. The study includes a summary of 39 other studies in retail, commercial, university and hotel settings with savings between 24% and 76% and an average savings of 49%.<sup>8</sup>

Middlebury College logged five vending machines over four months in both a pre- and post-installation state. They found savings ranging from 24% to 63% with an average of 49%.<sup>9</sup> In addition, Rutgers University logged eight VendingMiser units on its campus and found a range of energy savings from 36% to 57% with an average of 46%.<sup>10</sup>

Based on this review of existing literature the Program's deemed value of 1,220 kWh a year falls within the observed range (and is less than the 1,589 kWh per year used by the Express Efficiency program). Therefore, we accept the unit deemed value for the annual energy savings attributable to a VendingMiser. The total savings generated by the 295 program rebated machines is 359,900 kWh annually.

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<sup>7</sup> To confirm that the determined savings were outside the range of possibility, Quantec consulted with Bayview/USA Technologies and found that the greatest possible energy savings that could be generated by the installation of a VendingMiser (i.e., under ideal conditions – no traffic at all, the only energy expended by the machine used to avoid exceeding maximum drink temperature) was in the range of 50% to 55%. Only one of the 15 machines logged returned a savings value below or within that range.

<sup>8</sup> The study is referenced at <http://www.arch.uiuc.edu/Courses/Arch463/Past2003.htm> and the file may be found at [http://www.bayviewtech.com/energy/downloads/UIUC\\_Report.pdf](http://www.bayviewtech.com/energy/downloads/UIUC_Report.pdf)

<sup>9</sup> <http://www.middlebury.edu/NR/rdonlyres/830217DA-3DA7-4F9B-9667-AF7323F91A4E/0/VendingMiserFinalreport.pdf>

<sup>10</sup> The original reference at the Rutger's website could not be located, however the file may be found at <http://www.bayviewtech.com/energy/downloads/rutgers.pdf>

## New Machine Energy Impacts

Due to the difficulties incurred logging both existing and Program-rebated new machines, insufficient data were collected for sample stratification according to location and traffic patterns. In addition, some of the data that were collected were identified as outliers. Since Coke was the only vending machine operator that provided a list of specific machines in specific locations – originally placed in 2000 or 2001 – that were eligible for retirement and could be replaced with Program-rebated high efficiency machines, the decision was made to only include the logged energy consumption data from the existing and new machines placed by Coke. Table II.3 outlines data attrition. As evident in the table, only one non-Coke new machine was logged.

**Table II.3: Data Attrition**

	Pre Period	Post Period
Logger Data Submitted to Quantec	43	19
Non-Coke Vending Machine data removed from analysis	16	1
Final Sample Used in Analysis	27	18

As a result of the small sample size, Quantec is only able to provide an overall comparison of the average daily consumption of existing and participating machines. As presented in Table II.4, new machines rebated by the LiteVend Program used 21.6% less energy on average than the existing machines identified by Coke as eligible for replacement<sup>11</sup>. This translates into an annual savings of 1,149 kWh per year compared with the Program’s estimated savings based on the manufacturers information of 2,600 kWh per year and a 44.2% realization rate (Table II.5).

**Table II.4: Energy Impact of New Machines**

	No. Observations	Average Daily kWh
Pre	27	14.5
Post	18	11.4
<b>Difference</b>		<b>3.1 (21.6%)</b>

The discrepancy between the evaluation’s results and the deemed value provided by the manufacturer may be attributable to a number of factors, including sample size, differing characteristics of the machines used to establish a baseline, or controlled conditions logging. Due to the limited

<sup>11</sup> Several units had daily consumption greater than 20 kWh per day. This indicates that future iterations of this program targeted to high consumption units could yield considerably higher savings.

sample size in this evaluation we recommend additional data logging to confirm these results.

**Table II.5: Annual Energy Impacts**

	Evaluation Results	Deemed Value	Realization Rate
Annual kWh Saved	1,149	2,600	44.2%

Based on the evaluated savings the total energy impact of the 1,383 new machines rebated by the LiteVend Program is 1,589,067 annual kWh.

## III. Conclusions & Recommendations

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Overall, the LiteVend Program was successful in achieving its participation and energy impact goals, as well as in developing productive relationships with vending machine operators and others key stakeholders essential for the continued propagation of new, higher efficiency vending machines and the VendingMiser efficiency add-on.

The program:

- ***Had difficulty involving bottlers initially:*** The Program staff reported initial reluctance by the bottlers to participate. The San Diego school district declined to participate in the VendingViser program due to a lack of endorsement by the bottlers. Bottler reluctance was based on a lack of budget, unfamiliarity with the products and concern that customers not receiving new machines would demand them if they new they were available.
- ***Achieved high participant satisfaction:*** Each of the VendingMiser participants interviewed by Quantec expressed extremely high levels of satisfaction with the Program. In fact, participants noted their satisfaction with all aspects of the Program, including Bayview/USA Technologies and the VendingMiser technology itself. With regard to the new machine element of the Program, beverage vending machine operators Coke and Pepsi both expressed appreciation for and satisfaction with the Program. Coke even remarked that they looked forward to continuing to work with Ecos and the LiteVend Program to further pursue their mutual goal of saving energy through the increased efficiency levels of new vending machines.
- ***Had difficulty collecting logged energy data:*** Collecting data from both existing and rebated machines proved much more difficult than expected. Several factors inhibited the evaluation's ability to gather sufficient data for a thorough analysis of the energy impacts. First, access to the power supply of machines was difficult. The Ecos field representative estimated that only one of every 15 to 20 machines had a readily accessible power supply. Many of the units in custom alcoves or outlets were too far behind the machine to be reached. In addition, numerous loggers were lost due to theft or vandalism. Quantec recommends that the data-collection process for the purposes of evaluation be integrated into the Program's implementation process. Data logging could be accomplished more effectively during the installation process when machines are being moved and power supplies exposed. Quantec also recommends that future iterations of the Program designate more time to data

collection to ensure the ability of the study to gather information and to develop a more robust database of machines from which to draw statistically significant conclusions.

- ***Demonstrated a very successful approach:*** The Program penetration was significantly higher than that achieved by other programs offering vending machine control technology incentives. This is due to the targeted marketing efforts at all levels of the product chain, effectively addressing the disconnect between the ownership of the vending machines (typically the bottlers) and the customer who pays the energy consumption bills.

Data logging illustrated a significant variation in average daily energy consumption by vending machines. Less efficient machines used more than three times the energy of the more efficient machines. This indicates a substantial opportunity for savings with a targeted implementation of future iterations of this program toward high-energy consumption machines.