ecos CONSULTING

Proposal to
California Public Utilities Commission
2004-2005 CPUC Energy Efficiency Programs
Pursuant to Decision 03-08-067

LiteVend II

Submitted by
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Making a World of Difference

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I. Program Overview

A. Program Concept

Ecos Consulting is proposing a multi-year incentive program designed to continue, expand, and improve upon ongoing efforts to improve the energy efficiency of both new and existing cold beverage vending machines (venders). This program will incorporate an understanding of current industry conditions and needs plus the implementation experience gained from Ecos' LiteVend Program (245C-02) currently operating in San Diego Gas & Electric's (SDG&E) service territories to further reduce energy consumption by venders. The proposed program consists of two discrete elements working in concert to comprehensively address the beverage vending machine market in Southern California, and to encourage the adoption of more energy-efficient technologies and measures in this commercial market.

- The first element addresses the new vending machines market and will help to accelerate the introduction of more energy-efficient beverage venders into the California market. This is an element that has worked well in our current program servicing SDG&E's territories.
- The second element of the program will focus on improving the energy-efficiency of the existing venders by working with operators to encourage the incorporation of more energy-efficient technologies or components into certain machines through the refurbishment process. This program element evolved from our current program as a response to participant needs and current economic conditions.

This proposed vending machine energy efficiency program presents the Commission with a clear, compelling opportunity for major energy savings in a market segment otherwise overlooked by existing energy efficiency programs. With a proposed program budget of about $1.25 million over the next two years, covering the service territories of San Diego Gas & Electric and Southern California Edison, this program will provide over $2.4 million in net benefits – a TRC of 2.0, according to the Commission's test methods.

B. Program Rationale

The prevalence of refrigerated beverage vending machines allows consumers to quench their thirst anytime, at almost any location. Behind consumers' ability to "do the dew," or enjoy beverages "made from the best stuff on earth" is the phenomenal growth of the cold beverage vending machine industry. Between 1994 and 1999, national annual sales of cold beverage venders grew 71% to 470,000 units, up from 275,000 units. While the economic conditions in the past two years has dampened this growth trajectory somewhat, this explosive growth and the machines' long service lives (up to 15 years) have combined to produce an installed base of approximately one cold beverage vending machine for every 90 persons.[1] This adds

[1] Horowitz, Noah D., Jennifer Dolan, Margaret Suozzo, Marc LaFrance, *A Roadmap for Simultaneously Developing the Supply and Demand for Energy Efficient Beverage Vending Machines*, ACEEE Summer Study 1998. Data adjusted based on information obtained from The Freedonia Group, *Commercial Refrigeration Equipment to 2004*, 2000.

up to over 3 million machines nationwide. Adjusted for population, this translates into approximately 360,000 venders in California, mostly in high population density areas, including the Bay Area and Southern California.[2]

These seemingly innocuous beverage vending machines are enormous energy users. The typical vending machine consumes, on average about 3,741 kWh/year. A number of newer, larger capacity machines (in service since 1995) are estimated to consume between 4,800 and 5,300 kWh/year.[3] Thus, over its 15-year lifespan, one beverage vending machine can use close to 80,000 kWh of electricity. Considered another way, two to three vending machines use as much electricity per year as an entire single family home. Together, the estimated 360,000 vending machines in California consume between 1.3 billion kWh and 1.9 billion kWh per year.[4] Fortunately, cost-effective technologies exist to significantly reduce the energy consumption of a typical beverage vending machine. More efficient components can reduce new beverage vending machine energy consumption by up to 50%. Beverage venders are typically re-manufactured with new components every three-to-five years, depending on location and service conditions.[5] Retrofitting venders with more energy-efficient components can reduce the energy consumption of some existing beverage vending machines from 14% to 35%, depending on components replaced. Other options include power management devices to reduce vender operating hours for a 25% to 30% reduction in energy consumption. (Table 1, below, summarizes the available energy-efficient options and the potential savings of each).

Table 1. Vending Machine Energy Efficiency Options and Savings Potential

Beverage Vending Machine Energy Efficiency Options	Potential Energy Savings kWh/machine	Estimated # of Vending Machines in CA Available for Measure	Potential Annual Savings (kWh)
New Energy Efficient Machine	1,425 to 2,200	27,000	648,000,000
Refurbishment of Existing Machines with Energy-Efficient Lighting (14%)	320 to 480	Over 50,000	20,000,000
Reduce operating hours by 25% to 30%	1,120	Over 250,000	336,690,000

Yet, existing market segmentation and lack of market signals up until now have prevented these energy-efficient technologies from being widely adopted by the beverage vending machine market. The US Environmental Protection Agency is working on an ENERGY STAR® specification for beverage venders. This proposed program will work in concert with

[2] Total CA population is approximately 12% of total US population.

[3] Note that machine energy consumption is likely higher than average for machines used outdoors in sunny, hot climates. This suggests higher possible usage and savings opportunities in California's inland and desert climate zones.

[4] Bayview Technology. Royal Vendor's presentation to the Consortium for Energy Efficiency in San Francisco, December, 2001

[5] E-Source Tech Update, May 1996, p. 3. Confirmed by Royal Vendors' VP of Engineering, December 2001.

EPA once the specification is finalized to help promote awareness and acceptance, as well as provide incentives to accelerate the introduction of qualified machines.

Approved by the Commission in 2002, Ecos' LiteVend was the first program designed to directly address this market by working directly with the key market actors. Despite the slow economic conditions in the past two years, Ecos still was able to successfully engage both key industry bottlers – Coca-Cola Bottling of Southern California (Coke) and Pepsi Bottling, Southern California Business Unit (Pepsi). These two major bottlers are the key to the energy efficiency of this market, as they operate the majority of cold beverage venders in the San Diego Gas & Electric and Southern California Edison (SCE) service territories. Coke and Pepsi are both receptive to LiteVend's focus on energy savings, and have stated their support for Program activities (statements enclosed).

We have also successfully engaged a number of smaller vending service companies in the San Diego area in the past twelve months. However, as the majority of beverage vending companies currently hold lease contracts with one of the two large bottlers – Pepsi and/or Coke – the established relationships will continue to help this Program with its energy-efficiency message.[6] The LiteVend program is also successfully working with Bayview Technologies (manufacturer of Vending Miser products) to promote the use of power management devices for beverage venders where possible.

In addition, Ecos Consulting's LiteVend Program reached out to diverse organizations, institutions and interests with the Program's energy-efficiency message, and is successfully serving the community. For example, the Program is working with the City of San Diego to promote the installation of Vending Miser power management devices on city-hosted vending machines. We are also working with the San Diego Unified School District to address the energy consumption of beverage vending machines hosted by city schools. Our discussion with the school district office resulted in a memorandum by the School District office to City schools informing them of the energy consumption issue, energy-efficient alternatives, and available incentives for these measures.

As of August 2003, Ecos' LiteVend program is on track to achieve significant energy savings. The Program has committed all of its 2002 and 2003 Vending Miser allocations of 500 units. About 1/3 of the committed units (154) have received incentives from the Program, are now installed and operational, yielding an estimated 187,880 kWh in annual energy savings. Also, by the end of Third Quarter 2003, the Program expects to have committed about 60% of our 2002 – 2003 new beverage vending machine units (1,200 units). We anticipate that by the end of the Third Quarter of 2003, up to 50% of the committed units, or about 600 new, energy-efficient beverage vending machines will have received incentives from the program, are now installed and operational, yielding an estimated 1,200,000 kWh in annual energy savings.

C. Program Objectives

The goal of the proposed program is to continue to increase energy efficiency among new and existing vending machines in California. The most important result of this proposed

[6] A number of small and independent operators of cold beverage venders do not own the equipment. Instead, they lease the venders from larger bottlers or operators.

program will be the accelerated adoption of cold beverage vending machines that are 30% to 50% more energy-efficient than existing vending machines. The bulk of the proposed program's incentives will be used to bring 4,000 new, energy-efficient beverage vending units into service in Southern California over the next two years, saving close to 8,000,000 kWh. Additionally, the proposed program will aim to refurbish up to 1,500 currently operating beverage vending machines, yielding an additional 600,000 kWh in savings.

II. Program Process

A. Program Implementation

The proposed program outlined in this document is both a continuation and territorial expansion of our multi-year incentive program designed to improve the energy efficiency of new and existing vending machines. The proposed program will continue with a two-pronged approach to effectively match segmentation of the vending machine market. One of the program's "prongs" will focus on the new vending machine market, while the other will address energy consumption of the installed machines' market through the refurbishment process. The focus of the primary program resource will remain on the introduction of new, more energy-efficient venders, as they represent the most cost-effective way to reduce overall and long-term energy consumption for the Southern California market.

New Vending Machine Market

Ecos Consulting has developed working relationships with Coke and Pepsi, as well as their suppliers, including Royal Vendors, who currently controls about 40% of the US vending machine market. Royal Vendors recently developed and introduced the innovative "Econo-Cool" technology package, which combines more efficient lighting, cooling, and fan components for their new generation of beverage vending machines. Royal Vendors' "Econo-Cool"-equipped venders operate up to 50% more efficiently than similar machines with the same capacity. This technology was available in the Second Quarter of 2002. Ecos' LiteVend program was able to accelerate the introduction of this technology into SDG&E's service territories, making these locations the first with Econo-Cool equipped-machines in the country.

To effectively address the critical price point and information barriers for new, energy-efficient beverage vending machines, the Program will continue to provide financial incentives and marketing assistance. This will help potential purchasers of vending machines overcome "sticker shock" as well as performance concerns. Royal Vendors estimates that the incremental cost for each new, Econo-Cool equipped machine is $60, which is the proposed program incentive level for new machines.[7]

[7] This amount may be reduced after the first year of the program. As the program gains more public recognition, the benefits of energy-efficiency, lowered maintenance costs, combined with recognition of "green" benefits to machine owners/operators can become a more powerful incentive than the incremental costs. Ecos Consulting will work with Commission staff to adjust the incentive amount as needed.

Existing Vending Machine Market

With this groundbreaking program, building relationships with the beverage and vending industry is key. The Program was challenged by the fact that one of the elements proposed for the 2002-2003 program – providing incentives for vending machine refurbishment activities – was eliminated from due to a number of constraints, including cost. However, some bottlers have significantly cut back on new machine purchases due to economic conditions in the past two years, and instead concentrated on refurbishing existing machines – these bottlers have requested assistance with their refurbishment efforts.[8]

Ecos is in the process of reintroducing a refurbishment element into the current Program. We are working with Pepsi Bottling (Southern California Business Unit) to establish the appropriate level of incentives, identify qualified products and the expected energy savings from refurbishment activities. This new program element is expected to be in place by September 2003, thereby capturing refurbishment efforts by program participants in the Fourth Quarter of 2003. This effort will also help to generate bottler interest for the 2004-2005 proposed program.

With the refurbishment process, the estimated incremental costs range from approximately $70 to $90 for T-8 lamps and ballast unit, to $85 for evaporator fan kit, and about $125 to over $200 for compressor units (excluding labor). For these measures, the incentive levels will be set at $100. This incentive level will provide the owner or operators with options to upgrade the lighting or fan motor, each will yield about 14% to 15% efficiency gains, or upgrade the compressor or even retire the units if they so choose. We expect the lighting upgrades to be a likely option in this category.

The Ecos team will incorporate the experience gained from our current program to ensure that the new program is as effective as possible.

B. Marketing Plan

Ecos will market the program as we have in the past with some modifications to include refurbishment. We will seek to leverage the messaging of the Flex Your Power campaign and the outreach it has planned for institutions and state and local government. In discussions with Efficiency Partnership, there appears to be opportunities to participate in planning forums and engage with some of its partnership networks. We will also coordinate with Express Efficiency programs to the greatest extent possible.

New Vending Machines Market

Because the current Program has already established communications with key industry participants, the program will not need to direct its marketing and outreach efforts to identify potential bottlers, independent operators, refurbishers, and hosts participants. The new program will not need to "reinvent the wheel." Instead, efforts will be directed toward working with identified "industry champions" – supporters within the targeted organizations who will help formulate success stories and move the program forward. In addition, the new

[8] Typically, older beverage vending machines (5 to 10 years old) undergo a refurbishment process, in which lighting, compressor, and other components may be replaced, along with any cosmetic enhancements. During this process, more energy-efficient components can be introduced to improve a machine's efficiency. Initially identified by our research as one a target area for energy savings, this element was eliminated in order to deliver a more streamlined program in 2002.

program work plan will be based on the successful elements of the current Program, as well as responding to customer input by including incentives for machine refurbishment.

For the new vending machines market, the program will continue to encourage the introduction and adoption of new, energy-efficient technologies by working directly with bottlers and independent operators, and providing incentives to cover the incremental cost of the energy-efficient venders. Using this approach, the program will enable bottlers and independent operators to purchase energy-efficient vending machines with little or no differential in price, as compared to non-energy-efficient vending machines. Purchasers of energy-efficient venders will receive the incentive directly upon furnishing Ecos Consulting with proof of installation. These transactions will be structured so that it will require little or no paperwork on the part of the purchasers.

The US EPA is working on an ENERGY STAR specification for beverage venders. This proposed program will work in concert with EPA once the specification is finalized to help promote awareness and acceptance. We expect that more manufacturers will be introducing energy-efficient options, and that the program can extend the incentives to these other manufacturers as well, to help accelerate the introduction of qualified machines.

The proposed Program will develop marketing materials for the new venders market, these will include updated presentation materials on the Program as well as the US EPA's ENERGY STAR's Cold Beverage Vending Machines program, information on energy efficiency, savings, examples of program successes, and rebate information. We will also investigate the possibility of setting up an online site for rebate information, and linking to the Express Efficiency and EPA sites.

Existing Machines Market

To address the installed vending machines market, we propose to provide incentives to bottlers/independent operators to refurbish inefficient machines as appropriate. Currently, there are three options available to increase the efficiency of the installed machine base:

- Provide incentives for the unit's retrofit with more energy-efficient components.
- Provide incentives for the installation of Vending Miser sensor/control units.
- Provide incentives to recycle or retire existing inefficient units and replace them with more efficient units.

Bottlers and independent operators of existing venders will be directly targeted with the retrofit option. Although the Vending Miser external power management unit option is available for existing machines, bottlers have expressed their preference for the retrofit options. In response, we have redirected current and proposed Program resources toward this measure.

Because they do not pay for the electricity that runs their equipment, bottlers/independent operators do not have a natural financial incentive to improve the energy-efficiency of their machines. However, the energy-efficient upgrades will decrease service and maintenance costs for these companies, and may provide them with opportunities for product differentiation, or the opportunity to invest in newer, low-maintenance (and more energy-efficient) equipment. Since the current Program has established direct contacts with bottlers/operators interested in the refurbishment option, the marketing efforts will be

directed towards creating materials to support this process, including brochures and case studies.

Hosts interested in the power management unit options will be directed toward the Express Efficiency option, thus allowing closer coordination with utility-run programs. Because of the segmentation of the installed machines market and the multiple incentive options, we anticipate that the tasks involved in addressing this market will be more resource-intensive than that needed for the new machines market. Some adaptive program management will be required. For this market, the Ecos team will follow a flexible, partnership-based approach that has proven so effective in our other work.

C. Customer Enrollment

Program field staff will provide identified bottlers and independent operators with follow up visits, training, and tracking visits, and can provide hosts and bottlers/operators with literature as part of the program awareness and education campaign. For example, when a specific potential participant has been identified, program staff will contact them through phone and/or email. The program staff will make the client aware of the energy savings potential, and will describe the program's free services and hardware subsidies that allow the participant to achieve those savings. Program staff may go to the site to meet with the energy champion, as applicable. After describing the program, the primary options for implementation, as applicable, will be presented. For existing vending machine owners and operators, the proposed program will coordinate outreach and marketing campaigns designed to provide information regarding available incentives for refurbishment with more energy-efficient technology.

D. Materials

The Program materials for new venders will be based on materials already developed for the current LiteVend program, including program information flyers, rebate forms, and presentation materials. The proposed program will adopt the new ENERGY STAR Cold Beverage Vending Machines specification when available, and will modify current materials to reflect the requirements of the EPA program, including energy and performance specifications. For the vender refurbishment program, we will work with interested bottlers, including Pepsi and Coke's Montebello (CA) operations to develop guidelines for lighting and/or evaporator fan retrofits, lighting and evaporator fan specifications, as well as tracking and reporting requirements.

E. Payment of Incentives

The approach for new machines will allow the program administrator to pay both the bottlers and independent operator their incentives at the time a new machine is purchased. For retrofits and refurbishments, bottlers and independent operators have to furnish proof of both retrofit (i.e., repair/refurbish certificate) as well as proof of machine shipment/installation in order to qualify for the incentives. Table 2, below summarizes the proposed program incentives and estimated 2004 eligibility. We anticipate that in the second year of the program, manufacturer(s) who seek differentiation for their products will be working to

introduce even more energy-efficient venders meeting the "Tier II" specifications, and the program will be able to direct 2005 incentives toward these venders. Ecos estimates that a two-year program can retrofit approximately 1,500 of the installed machines and provide incentives for about 4,000 of new vending machine purchases in Southern California.[9]

Table 2. Types and Amounts of Incentives and Estimated 2004 Eligibility

Incentive Type	Incentive $/unit	Estimated 2004 units	Total 2004 incentives ($)
All new machines	60	2,000	120,000
Refurbished machines	100	700	70,000
Total		2,700	190,000

The program team will continue with the established application-handling procedures, quality control protocols, and rebate fulfillment mechanisms for the new machine purchases, as well as refine the procedures for the refurbishment process. For purchasers of new machines equipped with "Econo-Cool" or other energy-efficient options, the program will directly pay the $60 cost differential of a new vending unit. Purchasers will be paid once proof of purchase or refurbishment and delivery to an eligible location is provided to the Program.

F.Staff and Subcontractor Responsibilities

The Program structure and staffing will remain similar to the current Program, as illustrated in Table 3, below.

Table 3. Staff Program Responsibilities

Position	Approx. FTE	Responsibilities
Senior Program Manager	0.08	Overall Program Direction
Program Manager	0.75	Day-to-day Program Management
Program Coordinator (Rebate)	0.10	Incentive Processing & Inspection
Program Assistant	0.10	Program Support
Marketing Manager	0.03	Program Marketing & Material Design
Marketing Assistant	0.05	Program Materials Production
Field Coordinators	1.25	Outreach, Customer Support, Marketing & Verification
Accounting Assistant	0.03	Accounts Receivables & Account Payables
Technical Support	0.05	Incentive Database Maintenance and IT Support

[9] ECOS CONSULTING will refine this goal with the program design.

G. Work Plan and Timeline for Implementation

The program will run from March 1, 2004 to December 31, 2005. Key deliverables will include the following:

- Finalized program work plan for 2004 & 2005 program year, including budgets
- Updated database for the reporting and tracking of incentives, machine placements, and estimated program savings
- Program outreach materials for new and existing machines for bottlers/operators(??) and hosts
- Monthly progress reports
- Quarterly program analysis and EM&V reports
- Final program report and recommendations

The program implementation process consists of a number of tasks, as outlined in Sections 2 and 3 of this proposal. The following is a brief summary of the tasks and timeline for their completion. Upon program approval, Ecos Consulting will finalize these tasks with the corresponding timelines in the Program Implementation Plan, with input from Commission staff prior to execution of tasks.

Task One - Finalizing Program Design, Preparation of Work Plan

Ecos Consulting will finalize the program design upon funding to ensure the most effective work plan and focused outreach efforts. We expect this task will be completed in the first 30 days of the program.

Task Two - Enlisting Program Partners

This task will involve the refining of marketing materials and presentation package to continue outreach efforts to large vending machine operators. This task will be performed on an on-going basis. We expect more manufacturers will introduce energy-efficient options and that the program can extend the incentives to other manufacturers as well. Ecos Consulting will work with program partners, including the Flex Your Power campaign to develop materials and coordinate outreach to the various market segments, especially the state and local governments and institutions that have proven to be strong supporters of the program. This task will also require the preparation of comprehensive materials and a rebate package for approaching potential program partners and other refurbishers of vending machines. This task will also be a continuation of current efforts.

Task Three - Fulfillment Mechanisms and Database

The Program team will continue application-handling procedures, quality control protocols, and rebate fulfillment mechanisms for the refurbishment option, and continue to refine the new machines incentive process.

Task Four - EM&V Mechanisms

Our team will continue to generate baseline data that is based on information provided by participants and accepted energy use assumptions for refrigerated vending machines. The central core of the program's EM&V, tracking and reporting function is the design and

implementation of Participant Database (Database). The Database will be populated with key baseline data based on information provided by and collected from participants.

Task Five - Tracking & Providing Incentives

This will be an on-going task for the duration of the program. Participants will be paid according to program guidelines and established incentive levels. Payment and tracking information will be reported both on a monthly and quarterly basis.

Task Six – Verification

Ecos will select a small percentage of the total machines placed for measurement and verification purposes, as discussed in the EM&V plan. These machines will be inspected by Ecos field staff to ensure placement and proper identification for tracking in the database.

Task Seven – Program Analysis

Program analysis and evaluation will occur as a part of the final report. Our goals in program evaluation include:

- Measuring the level of energy savings achieved. The assessment will be based on results from the selected sample of program projects. Results will then be scaled up to reflect total program impacts.
- Measuring the peak demand savings achieved. The assessment will be based on results from the selected sample of program projects. Results will then be scaled up to reflect total program impacts.
- Providing a better understanding of energy-efficiency opportunities for refrigerated vending machines and how to market those opportunities.

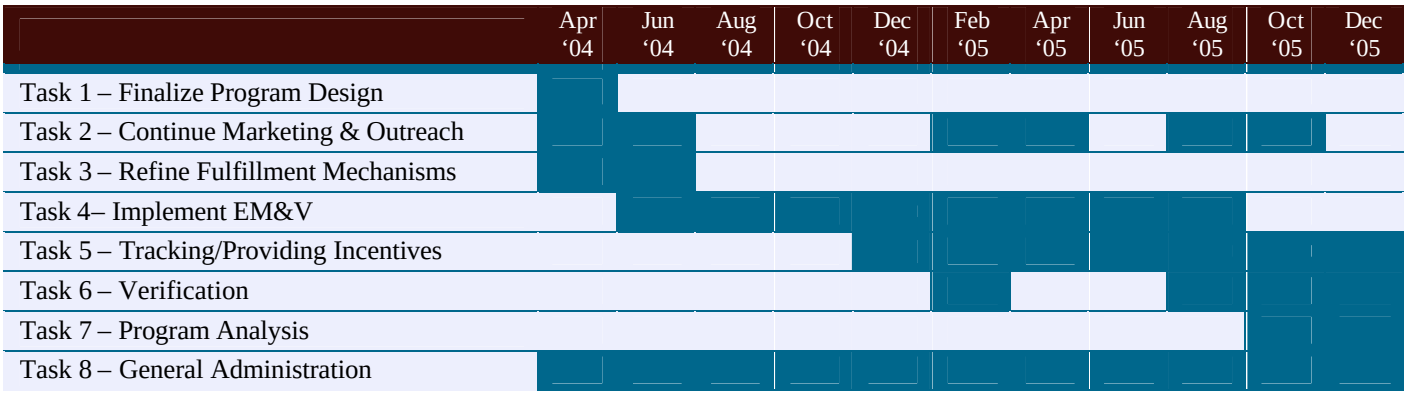
Task Eight – General Program Administration

Ecos Consulting will provide overall program management and administration for the duration of the program.

Program Timeline and Milestones

Table 4 below provides an overview of the Program schedule and identifies key milestones as well.

Table 4. Overview of Program Timeline and Milestones



= Activity is planned

Key Milestones:

- 25% Unit Goals - December 2004
- 50% Unit Goals - June 2005
- 100% Unit Goals - December 2005

III. Customer Description

A. Customer Description

1. The Coca-Cola and Pepsi Bottling Companies of California

These companies are regional bottlers in California, covering large geographical areas, including San Diego, Los Angeles, and the Bay Areas. Together, these companies purchase the majority of all new beverage vending machines in California annually, and represent a large potential market for new, energy-efficient machines and energy-efficient machine components.

2. Independent bottlers

These independent bottlers include Shasta and other juice and soft drink companies in California. They also represent a significant market for new vending machines and components. The current Program has identified approximately 30 independent bottlers operating in Southern California.

B. Customer Eligibility

This proposal focuses on geographic areas where there is a concentration of beverage vending machines and/or an organizational infrastructure to reach targeted customers. All vending machine purchasers and operators within the territories serviced by SDG&E and SCE will be eligible for the program. The proposed program will target large and independent bottlers and operators in the government, business, and educational sectors.

C. Customer Complaint Resolution

Customer compliant resolution was not an issue during the first phase of this program and we do not anticipate any issues in a second phase.

This program works through market actors who have a strong financial vested interest in equipment uptime and host satisfaction. The two major players, Coke and Pepsi and other major bottlers/operators have well-established systems in place for maintaining equipment and managing customer (host) complaints. The Program sets up market actors and the product manufacturers so they have a direct relationship with each other. The equipment suppliers (Bayview for power management retrofit and Royal Vending for new machines) warrantee their products.

D. Geographic Area

This proposal focuses on geographic areas where there is a concentration of beverage vending machines and/or an organizational infrastructure to reach targeted customers. All vending machine purchasers and operators within the territories serviced by SDG&E and SCE will be eligible for the program. The program will target large and independent bottlers and operators in the government, business, and educational sectors.

IV. Measure and Activity Descriptions

A. Energy Savings Assumptions

Because the program is introducing a number of newly available energy-efficiency measures, we have used assumptions that are summarized in Table 5 below, based on the Commission's guidelines:

Table 5. Assumptions Used in Cost Effectiveness Calculations

Vending Machine Equipment Type/Energy-Efficiency Options	Potential Annual Savings (kWh/yr)	Effective Useful Life (EUL)	Gross Incremental Measure Cost per Unit	Incentive Amount
New Energy-Efficient Venders	1,400 to 2,200	12	$60	$60
Energy-Efficient Retrofit (lights or fans)	380 to 420	5	$70 - $150	$100

B. Deviations in Standard Cost-effectiveness Values

Rationales for Assumptions:

- **New Machines – 12 years.** According to industry and research sources, vending machines typically last 12 to 15 years.[10] We chose to use the shorter length, as machines may be changing more rapidly in the near future as manufacturers respond to new container shapes and sizes.
- **New "Econo-Cool" or ENERGY STAR® equivalent – 12 years.** Using the same rationale as above, we believe that a new, energy-efficient machine will have a similar length of service.
- **Energy efficient retrofit – 5 years.** According to industry sources, vending machines generally undergo a refurbishment process every three to five years.[11] In this case, the longer service life applies, as the energy-efficient components have proven to last longer. While the retrofitted components may last longer, after 5 years of service, a retrofitted machine will have about 8 to 10 years of service, and may be destined for retirement.

Sources for Gross Incremental Measure Cost per Unit Used

The gross incremental measure cost per unit values used in the calculations were provided to Ecos Consulting by Royal Vendors, Bayview Technologies (information available at www.bayviewtech.com - for 1,000+ units), Pepsi Bottling, and Vendo Corporation.

C. Rebate Amounts

Rebate amounts are provided above in Table 5. Rebate rationale is as follows:

- **New "Econo-Cool" or ENERGY STAR® equivalent – $60.** This is the amount that accounts for an energy efficient venders (or ENERGY STAR® equivalent) incremental cost. Since there are no other installation or repair costs associated with a new machine, this level is sufficient to levelize new machine cost.
- **Energy efficient retrofit – $100.** This rebate amount accounts for both the new component costs (approximately $70 to $85, depending on whether a lighting or fan kit is used), and also accounts for a part of the cost of installation labor. As bottlers do not generally replace the components unless they fail, we believe this amount provides the right signal for bottler and operators to replace inefficient vender components.

[10] E-Source Tech Update, May 1996, p. 3. Confirmed by Royal Vendors' VP of Engineering, December 2001.

[11] Ibid.

D. Activities Descriptions

Not applicable. All of the activities planned for this program will contribute to program savings.

V. Goals

The proposed program includes several performance goals. Because the program will continue to directly address vending machine energy consumption, the primary focus will be on achieving the projected energy savings with the proposed energy efficiency measures (both new and retrofit). We intend with this program to reinforce the concept of energy efficiency into the vending machines market, and generate additional consumer, operator, and manufacturer interest by showing the concept's viability. Table 6 below contains a summary of program goals.

Table 6. Summary of Program Unit and Energy Savings Goals

Incentive Type	2004 Incentive $/unit	Estimated 2004 units	Total 2004 Incentives	Estimated 2004 kWh Savings	Estimated 2004 kW Savings
All new machines	60	2,000	120,000	3,600,000	411
Refurbished machines	100	700	70,000	280,000	98
TOTAL - 2004			190,000	3,880,000	509

Incentive Type	2005 Incentive $/unit	Estimated 2005 units	Total 2005 Incentives	Estimated 2005 kWh Savings	Estimated 2005 kW Savings
All new machines	60	2,000	120,000	3,600,000	411
Refurbished machines	100	800	80,000	320,000	112
TOTAL -2005			200,000	3,920,000	523
PROGRAM TOTAL		5,500	390,000	7,800,000	1,031

VI. Evaluation, Measurement and Verification Plans

A. Overview

The EM&V Plan will use methodology consistent with guidelines provided in the International Performance Measurement and Verification Protocol (IPMVP) and reflect any program design changes, as well as specific EM&V requirements identified during contract negotiations. In support of the Commission's future analyses of ratepayer-funded programs, we plan to provide an appropriate EM&V approach that can be completed on time and within budget. We will hire one of the following two firms to perform the outside program evaluation tasks: Quantec or Xenergy.

Monthly reports, including the final report, will show the amount of energy savings and peak demand reductions associated with program expenditures. These reports will be formatted as

directed by the Reporting Requirements Manual 2 (RRM2), as provided by the Commission, and will be made available to all interested parties. In addition to detailing energy savings and peak demand reductions, the reports will also relay information on program expenditures, funded measures and a description of progress compared to program goals.

B. Components of the EM&V Plan

1. Program Participation and Baseline Information

Our team will continue to generate baseline data that is based on information provided by participants and accepted energy use assumptions for refrigerated venders. We understand that properly recording and referencing sources of baseline data for the duration of the project is critical, as this remains the only program in the country working with this market. The central core of the program's EM&V, tracking and reporting function is the Participant Database (Database). The Database will be populated with key baseline data based on information provided by participants, and reports and engineering calculations provided by national laboratories and other energy research institutions.

2. Energy Efficiency Measure Information

There are two energy efficiency measures (EEMs) that will be implemented within this program:

- **Econo-cool or other energy-efficient equipped new machine.** Econo-cool is an integrated package of energy-efficient lighting, fan, and compressor components. The package replaces T-12 lamps and magnetic ballasts with T-8 lamps and electronic ballasts, includes a high-efficiency fan and motor package, and a high-efficiency compressor for the cooling system.
- **Retrofit of existing machine.** The retrofit package provides for T-12 lamps and magnetic ballasts replacement with T-8 lamps and electronic ballasts, or a high-efficiency fan and motor package,

3. Measurement and Verification Approach

Because this program remains the first of its kind, there has not been widespread deployment and monitoring of the energy savings, nor are there deemed savings, associated with the measures listed above. It is our expectation that in most cases the appropriate M&V approach for this program is the IPMVP "Partially Measured Retrofit Isolation" approach. According to this approach, savings are determined by partial field measurement of the energy use after the EEM is applied, separate from the energy use of the rest of the facility. The savings are calculated using engineering calculations using short term retrofit measurements and stipulation.

For quality control purposes, the program team will conduct site verification visits at five to 10 percent of the project sites where incentivized machines are installed. M&V can occur at, or any time following, the quality control site visit and owner follow up. Because only two types of measure installations will be performed among all program sites, not all sites need to have third party savings verification. Therefore, as the IPMVP suggests, "statistically valid samples (will) be used as valid measurements of the total parameter." The goal is to balance

certainty of savings with evaluation costs. Documentation of each installation, including site and contact information, will be required prior to payment of incentives.

In summary, the measurement methodology will be to track the number of EEMs installed at each site and to multiply that number by the measured savings from a statistically valid number of installations for each measure. Savings uncertainty is possible as a result of instrumentation and sampling error and planned and unplanned assumptions. In addition, because we are addressing a refrigeration technology with these measures, there will be a seasonal variance in energy savings. The M&V Plan will address a method for accounting for these uncertainties.

4. Evaluation Approach

Program evaluation will occur as a part of the final report. Our goals in program evaluation include:

- Measuring the level of energy savings achieved. The assessment will be based on third party-verified M&V results from the selected sample of program projects. Results will then be scaled up to reflect total program impacts.
- Measuring the peak demand savings achieved. The assessment will be based on third party-verified M&V results from the selected sample of program projects. Results will then be scaled up to reflect total program impacts.
- Measuring cost-effectiveness.
- Providing a better understanding of energy-efficiency opportunities for refrigerated vending machines and how to market those opportunities to hosts.
- Providing ongoing feedback and corrective and constructive guidance regarding the implementation of energy efficiency programs for refrigerated vending machines.
- Assessing hosts' satisfaction with the program and the chosen measure. This will be determined through a post-support survey instrument consistent with standard survey practices.
- Informing decisions regarding incentives and program compensation.
- Helping to assess the continuing need for the program.

VII. Qualifications

A. Primary Implementer

Ecos Consulting (Ecos) was founded in 1997 by four principals from the utility industry, environmental community, government, and academia. The company specializes in researching opportunities for energy efficiency in the marketplace and in the application of market-based methods to encourage increased use of environmentally beneficial technologies. Our client list includes investor-owned utilities, municipal utilities and regional energy-efficiency organizations in the Pacific Northwest, California, Nevada, the Midwest and the Northeast. We have offices in Covina, California, Portland, Oregon, and Durango,

Colorado. Ecos maintains a staff of more than 40 employees and supplements its capabilities, as needed, with affiliated expert consultants.

Ecos' successful experience with the current LiteVend program strongly positions our team to implement another two-year program. Highlights from the current program include:

- **Engaging Industry Participants:** The Program has been able to successfully engage the two major industry bottlers – Coca-Cola Bottling of Southern California and Pepsi Bottling, Southern California Business Unit. These two major bottlers are the key to achieving Program energy savings, as they operate the majority of cold beverage venders in the San Diego Gas & Electric service territories. The Program is also successfully working with Bayview Technologies, the manufacturer of the Vending Miser™ product, to promote the use of these power management devices for beverage venders where possible. The Program was also able to engage diverse organizations, institutions and interests with its energy-efficiency message. For example, the Program is working with the City of San Diego to promote the installation of Vending Miser power management units on city-hosted vending machines. We are also working with the San Diego Unified School District to address the energy consumption of beverage vending machines hosted by city schools.
- **On Track for 2003:** As of August 2003, the Program had committed all of its 2002 and 2003 Vending Miser allocations of 500 units. About one-third of the allocated units (154) have received incentives from the Program and are now installed and operational, yielding an estimated 187,880 kWh in annual energy savings. Also, by the end of third quarter 2003, we expect to have committed about 60% of our 2002 – 2003 new beverage vending machine units (1,200 units). As of August 2003, 50% of the committed allocations, or about 600 of new, energy-efficient beverage vending machines will have received incentives from the Program. They are now installed and operational, yielding an estimated 1,200,000 kWh in energy savings.
- **Demand for Program Services:** The Program was responsible for the first energy-efficient beverage vending machines installed in the SDG&E service territories, and it continues to receive support from Coke and Pepsi for the Program's assistance in reducing the energy consumption of their machines.

Ecos is a key player in designing and implementing residential and commercial energy efficiency programs. Areas of expertise as it relates to this project include:

Program Design, Management and Implementation

Ecos has significant experience designing and managing programs including many multi-year, multi-million dollar programs in the Northwest and California, of note, the CRLAP and the ENERGY STAR® CFL Program for Small Hardware and Grocery Retailers. The company has developed a number of award-winning programs, most recently capturing ACEEE's 2002 Exemplary Programs award and an ENERGY STAR® award for its work on the Northwest Energy Efficiency Alliance ENERGY STAR® Residential Lighting Program.

Incentive Fulfillment Services

Efficient clearinghouse functions are essential for a successful program, and Ecos has developed a system to minimize and eliminate fraud opportunities and ensure timely

payments to program participants. Ecos has a complete processing system in place for high volume and lower volume, customized campaigns. Ecos currently manages incentive fulfillment services for the CPUC ENERGY STAR® CFL Program for Small Hardware and Grocery Retailers program, the Energy Trust's Home Energy Savings Program, Puget Sound Energy, Idaho Power, Nevada Power, Sierra Pacific Power Company and other utilities in the Pacific Northwest.

Industry Relationships

By maintaining a strong understanding of competitive markets, Ecos has forged strategic relations with retailers, manufacturers and various industry stakeholders to help promote environmentally friendly technologies. Ecos builds on these relationships to develop and deliver effective program results. As noted earlier, Ecos relationships with Coca-Cola Bottling of Southern California and Pepsi Bottling, Southern California Business Unit have been a key component for LiteVend's success.

B. Subcontractors

Although an EM&V contractor has not been selected for the Program, this company will serve as a subcontractor to Ecos Consulting. As noted previously, both Quantec and Xenergy are experienced with performing evaluations of utility and third party programs and are known to the IOUs and the CPUC.

C. Relevant Experience – Program Managers

My Ton, Senior Program Manager

My Ton is currently the senior program manager for the LiteVend project and will continue to serve the program in this capacity. His extensive project management experience, technical background and understanding of how natural market actors work have been key to the success of the LiteVend program.

As one of the co-founders of Ecos Consulting, My conducts research and provides project oversight for both commercial and residential programs. In addition to his role with LiteVend, relevant experience specific to this project include:

- Program direction for projects in the Pacific Northwest, California, Idaho and Nevada. He also supported the CPUC 2002 - 2003 LiteWash program. His typical responsibilities include research, strategic guidance, staff supervision, client/partner interface and budget management.
- Researching and evaluating testing methodologies for the Energy Foundation's energy-efficient tires project, and assisting Green Seal in working with the California Department of General Services to evaluate and encourage environmental purchasing practices.
- In the lighting arena, he performed the technology research and market-segmentation efforts in support of the Department of Energy and Environmental Protection Agency's ENERGY STAR® Residential Light Fixtures program (under a grant to the Natural Resources Defense Council).

- While at Green Seal, he led the research for the environmental standards program. The program identified environmentally preferable product categories and set criteria to define, as well as label, such products. He drafted product standards based on product life-cycle analysis, energy efficiency, technology evaluation, and market assessment. This included working with stakeholders to finalize standards in each product category, including manufacturers, trade associations, environmental organizations, and government agencies.

My holds a M.S. in engineering and public policy from Washington University and a B.S. in electrical engineering and history from Carnegie Mellon University.

Marlene Sealey-Frey, Program Manager

Marlene Sealey-Frey is currently the Program Manager for the LiteVend project and will continue to serve the program in this capacity. Marlene brings over eight years of marketing experience to the program, four of which she spent as Project Manager at San Diego Gas & Electric. While her background is in the California utility industry, Marlene's understanding of how to implement an energy efficiency program has been key to the success of the LiteVend program.

In addition to her work on LiteVend, Marlene works with the Covina office team on the ENERGY STAR® CFL Small Hardware & Grocery Retailer Program. Her roles for these projects include:

- Program strategy and implementation of program activities for LiteVend.
- Development of key account business relationships with the bottling industry, most notably Pepsi and Coke.
- Coordination of the EM&V plan with Quantec to monitor and collect energy data from the field to set a baseline for LiteVend as well as effectively implementing the measurement and evaluation plan for LiteVend.
- Providing assistance on the project and working in the field to encourage Ethnic Grocery and Rural Hardware market to participate in the project.

While at SDG&E Marlene was a member of the California Residential Lighting and Appliance Committee that led California in its first statewide project budgeted at 26 million dollars. While on the committee Marlene worked with EPA & DOE to identify technology standards, environmentally preferable product categories and set criteria to define, as well as label, such products. This included working with the California investor owned utilities, industry manufacturers, retailers, trade associations, environmental organizations and government agencies.

VIII. Budget

Table 7 below provides a budget summary for the Program. Table 8 offers a budget summary for each program year.

Table 7. Budget Summary

Cost Category	SCE	SDG&E	Total
Program Labor			
Management & Administration	*$ 193,991*	*$ 82,299*	*$ 276,290*
Marketing/Advertising/Outreach	*$ 181,603*	*$ 77,044*	*$ 258,646*
Direct Implementation	*$ 116,764*	*$ 49,536*	*$ 166,301*
Program Total - Labor	***$ 492,358***	***$ 208,879***	***$ 701,237***
Program Total - Indirects	***$ 27,383***	***$ 11,617***	***$ 39,000***
Program Total - Marketing & Materials	***$ 75,409***	***$ 31,991***	***$ 107,400***
Program Total - EM&V	***$ 43,449***	***$ 18,433***	***$ 61,882***
Program Total - Incentives	***$ 273,830***	***$ 116,170***	***$ 390,000***
Total Program Costs	**$ 912,428**	**$ 387,091**	**$ 1,299,519**

Table 8. Budget Summary by Program Year

	2004 Budget			2005 Budget			Total Program		
Ecos Program Budget	SCE	SDG&E	Total	SCE	SDG&E	Total	SCE	SDG&E	Total
Ecos Labor	200,471	85,049	285,520	291,886	123,831	415,717	492,358	208,879	701,237
Ecos Direct Expenses	25,119	10,656	35,775	41,864	17,761	59,625	66,983	28,417	95,400
Marketing & Education	15,447	6,553	22,000	20,362	8,638	29,000	35,809	15,191	51,000
Incentives	133,404	56,596	190,000	140,426	59,574	200,000	273,830	116,170	390,000
Total Ecos Budget	374,441	158,854	533,295	494,538	209,804	704,342	868,979	368,658	1,237,637
Sub-Contractor EM&V	17,597	7,465	25,062	25,852	10,968	36,820	43,449	18,433	61,882
Total Program Budget	**392,038**	**166,319**	**558,357**	**520,390**	**220,772**	**741,162**	**912,428**	**387,091**	**1,299,519**

The budget above assumes that the 2004-2005 program will start in the second quarter of 2004, in order for the 2002-2003 program to finish its planned activities. In addition, we have held down program costs by keeping our 2004 costs at current levels.