

Title:

**MOBILE ENERGY CLINIC PROGRAM
FOR PG&E SERVICE TERRITORY**

Submitted to:

**California Public Utilities Commission
R.01-08-028
2004/2005 Non-Utility Energy Efficiency Program Selection**

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Other Programs Proposed:

**Mobile Energy Clinic Program for SCE Service Territory
Mobile Energy Clinic Program for SoCalGas Service Territory
Mobile Energy Clinic Program for SDG&E Service Territory
Beverage Vending Machines Energy Savings Program
for PG&E Service Territory
Beverage Vending Machines Energy Savings Program
for PG&E Service Territory
Upstream High Efficiency Gas Water Heater Program
for PG&E Service Territory
Upstream High Efficiency Gas Water Heater Program
for SoCalGas Service Territory
Upstream High Efficiency Gas Water Heater Program
for SDG&E Service Territory**



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I. PROGRAM OVERVIEW

I.A PROGRAM CONCEPT

ADM Associates, Inc. (ADM) proposes to implement a Mobile Energy Clinic Program as a Non-Utility Nonresidential Energy Efficiency Program in PG&E's service territory for Program Years 2004 and 2005. The Mobile Energy Clinic Program is focused on improving energy efficiency for small businesses (1) by implementing no-cost/low-cost measures to improve energy efficiency and (2) by providing diagnostics of energy-using equipment for small businesses. For the small businesses that participate in the program, we make actual no-cost/low-cost improvements to their equipment. We also test the performance of their HVAC equipment and check that lighting systems and other energy-using equipment (e.g., water heaters, compressors and process equipment) are being properly used. Owners/managers are given a checklist of energy efficiency actions that they can take and are provided assistance in locating financing for such actions.

I.B PROGRAM RATIONALE

The Mobile Energy Clinic Program is a direct install program targeted at owners/operators of small commercial businesses occupying buildings with less than 5,000 square feet of floor area, particularly businesses in strip malls, small convenience stores, laundromats, and non-chain restaurants. Owners/operators of such small businesses are a "hard-to-reach" market for energy efficiency services and products for several reasons.

- Until recently the costs of energy have not been large enough to be noticed by small business owners.
- Many small business owners are not aware of what changes can be made to improve energy efficiency for their businesses and what these improvements can do for them.
- Owners of small businesses are often recent immigrants, whose primary language is not English. Thus, information disseminated through mass media channels are not likely to have much influence on them.
- The primary interest and concentration of these business owners is on maintaining a profitable operation. With their primary focus on running their business, these owners generally do not have the time available to attend seminars or to read and digest materials mailed to them. Nevertheless, most owners/operators of small businesses are business-savvy and responsive to ways to reduce their costs or improve the quality of service they offer their customers.

The Mobile Energy Clinic Program that we are proposing for implementation in PG&E's service territory is modeled on the Mobile Energy Clinic Program that ADM implemented as a CPUC-funded Local Nonresidential Energy Efficiency Program in the service territories of Southern California Edison (SCE) and Southern California Gas Company (SoCalGas) during 2002/2003. Our experience with that program provides evidence that

small businesses have not implemented energy efficiency measures to any great extent and that there still is a need to work with them to improve energy efficiency. For examples:

- About 96% of the facilities visited do not have T-8 lamps with electronic ballasts for their lighting.
- Fewer than 5% of contacted small businesses have compact fluorescent lights.
- More than 60% are in need of programmable thermostats.
- About 93% of existing air conditioners have an SEER of 10 or less.
- Maintenance of HVAC systems (including filters, airflow, and under-charge or over-charge of refrigerant) is very poor. Few of the systems inspected had clean condensor or evaporator coils.

Although lack of information about energy efficiency opportunities among owners/operators of small businesses has been a major market barrier for improving energy efficiency in small businesses, our implementation of the Mobile Energy Clinic Program in the service territories of SCE and SCG during 2002/2003 has shown that using a direct marketing approach with site visits can overcome this barrier. Both programs have been completed ahead of schedule and, as shown by the following accomplishments, have been very successful.

- In SCE's service territory, we provided services to 803 small businesses, resulting in expected annual savings of 1,336,643 kWh and 7,568 therms.
- In SCG's service territory, we provided services to 457 small businesses, resulting in expected annual savings of 813,592 kWh and 4,359 therms.

Our proposed Mobile Energy Clinic Program for PY2004/2005 builds on this success, but adds two additional features.

- We propose to clean evaporator as well as condensor coils on HVAC systems. Although cleaning evaporator coils is time-consuming, it greatly improves the efficiency of the air-conditioning equipment and lowers electricity use.
- To further educate owners/operators of small businesses on the advantages of using compact fluorescent lamps, we install an average of two CFLs at the facilities that we visit.

I.C PROGRAM OBJECTIVES

The primary objective for the MEC is to provide long-term energy (gas and electric) savings and electric peak demand reductions. This objective is accomplished by actually performing no-cost/low-cost energy efficiency improvements, by identifying measures that owners/operators of small businesses can implement to improve the energy efficiency of

their operations and by following up with the owners/operators to encourage them to make the improvements. Small business owners are also educated on energy efficiency by having them see what is to done to improve energy efficiency.

- A summary of the quantitative objectives for the proposed Mobile Energy Clinic Program in PG&E's service territory is provided in Table I-1. The program is cost effective in the savings it provides per dollar of cost, providing a TRC of 1.85 and a PPT of 3.15.

Table I-1. Summary of Quantitative Objectives for Mobile Energy Clinic Program in Service Territory of PG&E

Program Name	Mobile Energy Clinic
Program Type	Direct Install
Target Sector	Commercial
NR Customer Size	Very small
Performance Target	1,500 businesses
Annual kWh Savings Target	3,348,000 kWh
Annual Peak kW Reduction Target	601.8 kW
Annual Therm Savings Target	43,800 therms
Total Program Budget	\$906,825
TRC	2.17
PT	8.45

Besides its energy savings objectives, the Mobile Energy Clinic Program has other considerations recommending its implementation.

- It has strong equity considerations in that it is targeted toward a segment of the market that has traditionally been hard to reach with other programs.
- It is an innovative program, using a one-to-one marketing approach to bring information about energy efficiency to the owners/operators of small businesses.
- It has synergies with programs run by utilities and other entities in that it provides a vehicle for directing owners/operators of small businesses to programs that can provide them further assistance or financial incentives.

II. PROGRAM PROCESS

II.A PROGRAM IMPLEMENTATION

ADM has been implementing the Mobile Energy Clinic Program since 2001. Accordingly, we have program implementation procedures already in place. We describe those procedures in this section, including a plan for coordination with other energy efficiency programs and a description of how the Mobile Energy Clinic Program we propose differs from existing related programs.

Through the Mobile Energy Clinic Program we provide no cost/ low cost energy efficiency services to owners and/or operators of small, independently-owned businesses and recommend energy efficiency improvements to them. Chain-owned and/or -operated businesses are not in the target market for this program.

As discussed below, we have identified areas in PG&E's service territory with high concentrations of small businesses and focus our efforts on those areas. The target areas are in the Central Valley and will include such cities as Chico, Oroville, Marysville, Yuba City, Stockton, Woodland, Fresno, Fairfield, Vacaville, Vallejo, and Suisun City.

We implement the Mobile Energy Clinic Program in these areas on a turnkey basis through a direct sales strategy. For these areas, we market the program door-to-door to small businesses occupying facilities with less than 5,000 square feet of floor area. We use multilingual (e.g., Spanish, Chinese, Vietnamese, Farsi, Arabic) engineers working in three-person teams to do this marketing and to perform the energy efficiency work. Each team uses a van equipped with the tools needed to provide the services (e.g., ladders, filters, laptop computers and printer, vacuum pump and other coil cleaning equipment, thermostats, etc.) (See Figure II-1.)



Figure II-1. An ADM Mobile Energy Clinic Team and Van

At each business we visit, our field staff perform various no-cost/low-cost energy efficiency improvements, as appropriate. We also make a walk-through evaluation to provide the owner/operator with other opportunities for saving energy at their facility or store. However, before providing any services to a customer, each customer will be asked if he/she has received similar services from other programs, including utility programs and other third-party programs. This will prevent any duplication of services from other programs. Business owners/operators are also given a disclosure statement (in English and in Spanish) that indicates that they are not required to purchase any full fee service or any other services or products in addition to those the CPUC has funded to receive the benefits of the Mobile Energy Clinic Program.

Upon arriving at a business for an on-site energy consultation, a team leader introduces himself as being from ADM Associates, Inc. Each consultation begins with a walk-through inspection of the facility, during which field person record specific information about energy-using aspects of the facility (e.g., HVAC, refrigeration, lighting) and particular areas where gains in energy efficiency can be made in businesses. We address the following technologies in each walk-through inspection:

- Energy efficient lighting;
- Energy efficient space heating and cooling; and
- Refrigeration

Based on the walk-through inspection of the small business, our field personnel make no-cost/low-cost energy efficiency improvements and perform diagnostics of energy-using equipment. The no-cost/low-cost improvements that we make include testing HVAC performance, cleaning condenser coils, changing filters, and installing a programmable thermostat. (We have found that fewer than 22% of small businesses have already installed programmable thermostats.) We also evaluate lighting systems, water heaters, compressors and process equipment and check them for proper use. In assessing energy efficiency improvements and performing diagnostics, we use the information gathered through the walk-through and a checklist that is based on established energy auditing procedures.

Many of the no-cost/low-cost improvements that we make will apply to HVAC units. Examples of these no-cost/low-cost improvements for HVAC units include the following.

- At sites that do not have them, we will install programmable thermostats and program them. We program the thermostats to match a business's operating schedule.
- Small businesses normally do not clean condenser coils as a matter of course. However, a dirty condenser coil results in a lower heat transfer and therefore a lower efficiency. We use a commercially available HVAC coil cleaner to effectively clean the condenser coils. Cleaning condenser coils can improve the efficiency of the A/C units by 6% to 8%.

- Similarly, evaporator coils on HVAC units are seldom cleaned. We clean these coils through a two-step process that involves first using a vacuum pump and then applying an alkaline foam cleaner. Cleaning evaporator coils can improve the efficiency of the HVAC unit by 12% to 14%.
- We check the return air filter and replace any dirty filters. The increased air flow due to clean filters will improve gas furnace and A/C unit efficiency.
- We inspect refrigerant lines for proper insulation. If the insulation is damaged or has been removed, we replace it with new insulation.
- We adjust outside air dampers, if such adjustment is needed. Proper adjustment of outside air dampers can reduce both gas and electricity use.
- We identify whether there is proper refrigerant charge and airflow.
- If an economizer is present, we check to see that it is operating properly.
- We replace two incandescent lamps with compact fluorescent lamps. We match the lighting level with the CFLs to that with the incandescent lamps.

We expect that some visits will be made to types of businesses that have particular types of energy-using equipment. No-cost/low-cost improvements are made at these businesses that are specific to the type of end-use.

- For water heaters we reset the temperature to the lowest setting required for the business' specific needs.
- For stand-alone refrigerator or freezer cases in small convenience stores, we make several checks to determine what no-cost/low-cost improvements can and should be made.
 - Insulation often becomes ripped and/or torn on the liquid and suction refrigerant lines. Accordingly, we visually check the lines and repair or re-insulate the lines as needed to restore efficiency and save on the kW used by the facility.
 - We check the condenser coils on refrigeration condensing units. If these coils are dirty, we clean them.
 - We check the operation of the condenser fan for current draw and against the nameplate data. It is also checked for truing by observation.
 - We check door gaskets by observation and make recommendations for any changes or repairs.
- In the case of non-chain restaurants, we insulate all non-insulated (or poorly-insulated) hot water pipes. We also provide the owner advice and information on high-efficiency gas cooking equipment, high-efficiency dishwashing equipment, and high efficiency water heaters.

- In laundromats/dry cleaners, we insulate all non-insulated (or poorly-insulated) steam pipes. We also provide information on high-efficiency steam boilers. For coin-operated laundry facilities where attendants are present, we insulate all reachable hot water pipes and implement other no-cost energy strategies (e.g., as identified under the existing SoCalGas coin-operated laundry program).

We give each business owner/manager a checklist of other energy efficiency actions that they can take. The face-to-face interaction from visiting individual businesses allows us to educate the owners/operators and make them aware of the importance of energy efficiency by providing them information about lighting, HVAC, and refrigeration measures that is customized to each particular facility or store. This customized approach increases the probability that the owner/operator will have the information and motivation necessary to follow up and to participate in other programs.

The information given to a business regarding potential energy efficiency improvements is specific to that facility. We equip each of our field teams with a laptop computer that is used to analyze the economics of energy efficiency for the different end uses that are specific to the particular facility and to demonstrate to the owners/operators what the savings for their facility would be. An example of the on-site audit form prepared for each facility is included in Appendix B. The computer program used to analyze energy and cost savings of the energy efficiency measures has been developed specifically to be used for small business facilities. The program uses algorithms that we have developed using extensive data on the physical and thermal characteristics of small businesses, the results of extensive building energy simulations with DOE 2, and published monitored end-use data. HVAC savings are computed that are specific to each of the 16 climate zones defined by the California Energy Commission for California. The costing of the measures is accomplished with data from the DEER data base.

Our recommendations regarding energy efficiency improvements are based on the existing equipment observed, and worksheets are completed for the recommended improvements, estimating the potential energy savings and payback periods. Available financial assistance programs are discussed and rebate forms reviewed, showing the decision-maker payment options.

We coordinate our work with that of the utilities and other parties who have programs directed towards small business firms. For example, we use the presentation and explanation of the worksheets as the opportunity to introduce each business owner/manager to the energy efficiency products and services that are being offering through utility statewide and other third-party programs.

- For all businesses with HVAC units, we provide lists of energy efficiency HVAC equipment changes for which rebates are available through other programs. These measures will include the following:
 - Package terminal air conditioners
 - Time clocks
 - Reflective window film
 - Evaporative coolers
- For all businesses, we provide lists of the lighting energy efficiency improvements for which rebates are available through other programs. These measures include the following:
 - Screw-in compact fluorescent lamps
 - Hard-wired fluorescent fixtures
 - High efficiency exit signs
 - Induction lamps and fixtures
 - Electronic ballasts
 - T-5 or T-8 lamps and electronic ballasts
 - Interior high-intensity discharge fixtures
 - Exterior high-intensity discharge fixtures
 - Occupancy sensors
 - Photocells
 - Time clocks
- Owners of small convenience stores with refrigeration cases are given a list of measures that improve the energy efficiency of refrigeration and that are covered in the Express Efficiency Program. The measures most likely to be applicable for “mom and pop” convenience stores include the following:
 - Night covers for display cases
 - Strip curtains for walk-in boxes
 - Glass or acrylic doors
 - New refrigeration display cases with doors
 - Efficient lighting for display cases
 - Insulation for bare suction lines
 - Door gaskets for coolers or freezers
 - Auto-closers for coolers or freezers
 - Evaporator fan controllers

We make a follow-up telephone call to an owner/operator at four (4) weeks after the site visit. Through these calls, we determine whether a business has proceeded to implement any recommended energy efficiency improvements. We also ask if we can provide any assistance in their selecting a vendor to perform the improvements or any additional information they might need to proceed with the implementation.

As appropriate, we pass information from our marketing efforts to trade allies to equip them to “close the deal” on selling energy efficient equipment to an interested small business.

II.B MARKETING PLAN

We are targeting the Mobile Energy Clinic within PG&E’s service territory to areas within the Central Valley with high concentrations of small businesses. We have already contacted many city officials in the Central Valley and have informed them of the potential services to be offered to businesses in their cities through the Mobile Energy Clinic Program. Cities where we may provide services include Chico, Oroville, Marysville, Yuba City, Stockton, Woodland, Fresno, Fairfield, Vacaville, Vallejo, and Suisun City. Appendix A includes letters of support from officials of some of these cities.

We market the Mobile Energy Clinic Program in the targeted areas through a direct sales strategy. We market the program door-to-door to small businesses occupying facilities with less than 5,000 square feet of floor area because most of these businesses meet the small business criteria of 20kW or less. However, there could be some who could exceed the 20kW limit. For example, in a strip mall setting some businesses with usage slightly larger than 20kW may request the service. No business will be served whose usage is 50kW or greater. If the CPUC feels that the program should only serve businesses with 20kW usage or less, we will screen businesses by checking their utility bills as a means of qualification.

We use multilingual (e.g., Spanish, Chinese, Vietnamese, Farsi, Arabic) engineers working in three-person teams to do the marketing as well as to perform the energy efficiency work.

The face-to-face interactions at individual facilities allow the owners/operators to watch and see what is being done to improve energy efficiency.

Follow-up telephone calls are made to the business owners/operators at 4 weeks after the site visit. These calls are used to determine whether the businesses have proceeded to implement any of the recommendations for energy efficiency improvements. They are also used to determine whether the owners/operators require assistance in their selecting of a vendor to perform the improvements or any additional information they might need to proceed with the implementation.

As appropriate, information from the marketing effort is passed to trade allies to equip them to “close the deal” on selling energy efficient equipment to an interested small business.

Marketing materials will include a disclosure statement (in English and in Spanish) that participants are not required to purchase any full fee service or any other services or products in addition to those the CPUC has funded to receive the benefits of the Mobile Energy Clinic Program.

Because of the relatively large numbers of small businesses in the targeted areas, our proposed Mobile Energy Clinic Program will complement, not compete, with programs that utilities and other third party implementors may offer for small businesses. We will coordinate the Mobile Energy Clinic Program with any other service programs offered by utilities or third parties to make sure that we do not overlap or compete to provide services to the same businesses.

II.C CUSTOMER ENROLLMENT

The customer enrollment process for the Mobile Energy Clinic Program is straightforward in that a small business is enrolled into the Program at the time of the on-site visit. We have been using this enrollment process since 2001 and have found it to be very effective.

II.D MATERIALS

As part of the services provided to small businesses through the Mobile Energy Clinic Program, we install programmable thermostats and compact fluorescent lamps and replace air conditioning filters. The specifications for these materials and the procedures used to procure them are as follows.

The programmable thermostats that we install have the following specifications:

- Unit shall operate on 24 Volts AC.
- Unit shall be compatible with 4 or 5 wire systems.
- Unit shall have the ability to accept a 2 day 5 day program schedule.
- Unit shall be able to control both a standard single compressor Air conditioning unit, and a standard single compressor heat pump.
- Unit shall have a fan/auto switch.
- Unit shall be field selectable between heating and cooling.
- Cooling anticipator shall be adjustable between 2 and 5 cycles per hour.
- Heating anticipator shall be adjustable between 3 and 5 cycles per hour.

We procure the thermostats by soliciting bids from prospective suppliers. Candidate suppliers of the programmable thermostats include the following vendors:

- United Refrigeration
- Pameco Air
- Slakey Brothers
- Cal Steam
- Ferguson
- Bay Supply

The compact fluorescent lamps that we install have the following specifications:

- Unit shall operate between 95 and 125 VAC
- Unit shall have a standard compact screw in base designed to fit a standard lighting socket
- Threads shall have a brass coating
- Lamps shall come in 18, 20, 25, and 30 Watt models.
- Unit shall have an integral lock ring to prevent theft.
- Unit shall come with an approval from a testing agency such as Underwriters Laboratories.

We procure the compact fluorescent lamps by soliciting bids from suppliers. Candidate suppliers include the following:

- Graybar Electric
- Consolidated Electrical
- Nunn-Royal Electric
- Home Depot
- Wal-Mart
- Ace Hardware

The air conditioning filters that we install have the following specifications:

- Unit shall come in a range of sizes (length and width) to fit all filter boxes.
- Unit shall be either 1-inch thick or 2-inch thick to fit the standard thickness filter box.
- Unit shall have a stiff edge to all for stand-alone support.
- The filter medium shall be non-allergenic fiberglass.
- The filter medium shall have a 30 percent capture rate.

We procure the filters by soliciting bids from suppliers. Candidate suppliers include:

- United Refrigeration
- Pameco Air
- Slakey Brothers

II.E PAYMENT OF INCENTIVES

No direct incentives are paid to the small businesses that participate in the Mobile Energy Clinic Program. Rather, businesses receive no cost/low cost energy efficiency improvements at no cost to them.

II.F STAFF AND SUBCONTRACTOR RESPONSIBILITIES

Our staffing structure for the Mobile Energy Clinic Program is as follows.

Table II-1. Staffing Structure and Responsibilities

<i>Name</i>	<i>Title</i>	<i>Responsibilities</i>	<i>% Avail.</i>
Taghi Alereza	Principal in Charge	Overall technical and administrative	10%
Sadfar Chaudhry	Senior Associate	Daily project management	20%
Donald Dohrmann	Principal	Development of tracking system and M&V coordination	8%
Seran Thamilseran	Senior Associate	Field supervisor	25%
Lon Smith	Senior Associate	Field supervisor	10%
Angelo Mineo	Senior Associate	Field supervisor	15%
Waqar Mustafa	Associate	Field supervisor	15%
Cyrus Davehlo	Associate	Field supervisor	25%
Mahmoud Fouladi	Associate	Field supervisor	15%
Khoi Tran	Associate	Field Engineer	25%
Thanh Nguyen	Associate	Field Engineer	25%
Richard Burkhart	Assistant	Marketing material development	5%
Field Staff 3	Assistant	Field Staff	100%
Field Staff 4	Assistant	Field Staff	100%

II.G WORK PLAN AND TIMELINE FOR PROGRAM IMPLEMENTATION

Our proposed timeline for implementing the Mobile Energy Clinic Program in PG&E's service territory is shown in Table II-2. This timeline is for a program covering PY 2004 and PY 2005.

*Table II-2. Timeline for Implementing Mobile Energy Clinic Program
in PG&E Service Territory*

<i>Activity</i>	<i>Target Date</i>
Program Begins	February 2, 2004
Program Implementation Plan	February 20, 2004
Evaluation, Measurement & Verification Plan	March 15, 2004
First Quarter Report	April 30, 2004
Second Quarter Report	July 31, 2004
Third Quarter Report	October 31, 2004
Fourth Quarter Report	January 31, 2005
Fifth Quarter Report	April 30, 2005
Sixth Quarter Report	July 31, 2005
Seventh Quarter Report	October 31, 2005
Eighth Quarter Report	December 31, 2005
Program Deadline	November 30, 2005
Final Report	December 31, 2005

III. CUSTOMER DESCRIPTION

III.A CUSTOMER DESCRIPTION

We define the target population for the Mobile Energy Clinic Program to include individually-owned small commercial businesses occupying less than 5,000 square feet of floor space. The major portion of such businesses use less than 20 kW of electricity or less than 10,000 therms of natural gas. However, there are some small businesses that will qualify because they have equipment that causes their energy use to exceed 20 kW (e.g., refrigeration in small “mom and pop” grocery stores).

Table III-1 shows the number of businesses with electricity use less than 20 kW for PG&E’s service territory. Among these business types we target primarily retail stores, restaurants, convenience stores, and other types of business service establishments. Moreover, we target areas that are in the Central Valley and will include such cities as Chico, Oroville, Marysville, Yuba City, Stockton, Woodland, Fresno, Fairfield, Vacaville, Vallejo, and Suisun City.

*Table III-1. Businesses with Electric Demands of 20 kW or less in PG&E’s Service Territory (1999 Data)**

<i>Type of Business</i>	<i>PG&E</i>
Office	41,881
Retail	57,853
Institutional	16,895
Industrial	23,110
Other	115,740
Total	255,479

*Memorandum, “Overview of Statewide Nonresidential Population”, M. Rufo, Xenergy, to M. O’Drain, PG&E, 2/08/2000.

III.B CUSTOMER ELIGIBILITY

Small businesses occupying facilities with less than 5,000 square feet of floor area will be entitled to participate in the Mobile Energy Clinic Program. Most of these businesses will meet the small business criteria of 20kW or less. However, there could be some businesses that could exceed the 20kW limit. For example, in a strip mall setting some businesses with usage slightly larger than 20kW may request the service. No business will be served whose usage is 50kW or greater. If the CPUC feels that the program should only serve businesses with 20kW usage or less, we will screen businesses by checking their utility bills as a means of qualification.

III.C CUSTOMER COMPLAINT RESOLUTION

To allow for customer questions or complaints, we establish a toll-free (“800”) telephone line that can be accessed by small business firms in SCE’s service territory. Firms can use

this line to request information about the Mobile Energy Clinic, to request a visit, or to place a complaint. We respond to any requests or complaints within 3 days.

Each information or complaint call is documented on a computerized form. This form provides for the recording of caller profile information, date and time of the call, nature of the call, resolution of the call, and any other relevant information. All complaint forms are maintained in a computerized database that will be accessible by PG&E and CPUC personnel for verification and auditing purposes.

Corrective actions for complaint calls are taken as appropriate and documented on the form. Cases where actions or verification visits are pending are kept in an active status file. Closed cases where problems have been resolved are retained to ensure documentation of problems and their solutions.

Periodic reports that summarize the number of information/complaint calls, the complaint backlog, and the time required for resolving complaints are prepared and included in the quarterly reports to PG&E.

III.D GEOGRAPHIC AREA

We are proposing to implement the Mobile Energy Clinic Program in California's Central Valley, an area within PG&E's service territory where heating and cooling requirements are relatively high. We focus our efforts in the cities of Chico, Oroville, Marysville, Yuba City, Stockton, Woodland, Fresno, Fairfield, Vacaville, Vallejo, and Suisun City.

IV. MEASURE AND ACTIVITY DESCRIPTIONS

IV.A ENERGY SAVINGS ASSUMPTIONS

The electric savings that result from different no-cost/low-cost energy services performed for small businesses through the Mobile Energy Clinic Program are shown in Table IV-1; gas savings are shown in Table IV-2. Also shown in these tables are the percent of businesses for which the no-cost/low-cost energy services are likely to be applicable. The estimates of applicability are based on our experience in implementing this type of program over the past several years.

Additional electric and gas savings may result from other recommendations for energy efficiency improvements that are made to the small businesses. The electric savings estimates from such recommendations are reported in Table IV-3; gas savings estimates are reported in Table IV-4. These savings have not been incorporated into the cost-effectiveness calculations; only services that we actually implement are included in the calculations.

Table IV-1. Expected Electric Savings from Different No-Cost/Low-Cost Energy Services Performed for Small Businesses through Mobile Energy Clinic Program

<i>No-Cost/Low-Cost Service</i>	<i>Average kWh Saved</i>	<i>Percent Applicable</i>	<i>Average kWh/ Site</i>	<i>Average kW</i>	<i>Percent Applicable</i>	<i>Average kW/ Site</i>
Add or replace refrigeration line insulation	267	0.19	52	0.30	0.19	0.06
Lower HW operating temperature	98	0.44	43	0.13	0.44	0.06
Add or replace hot water line insulation	93	0.47	44	0.13	0.47	0.06
Clean condenser coil	308	0.99	304	0.42	0.99	0.42
Clean evaporative coil	500	0.99	495	0.69	0.99	0.68
Reprogram thermostat	566	0.22	124			
Install programmable thermostat	1,044	0.62	651			
Check and re-position outside air dampers	263	0.00	0			
Check and adjust economizer	303	0.00	0			
Comb condenser fan coil	115	0.99	114	0.17	0.99	0.17
Replace incandescent bulbs with CFLs	814	0.90	733	0.23	0.90	0.21
Replace air filter	259	0.89	229	0.39	0.89	0.35
Total	4,630		2,790	2.47		2.01

Table IV-2. Expected Gas Savings from Different No-Cost/Low-Cost Energy Services Performed for Small Businesses through Mobile Energy Clinic Program

<i>No-Cost/Low-Cost Service</i>	<i>Average Therms</i>	<i>Percent Applicable</i>	<i>Average Therms/ Site</i>
Lower water heater operating temperature	15.3	0.44	6.8
Check and replace hot water line insulation	14.3	0.47	6.7
Reprogram thermostat	20.8	0.17	3.5
Install programmable thermostat	39.0	0.50	19.5
Total	89.4		36.5

Table IV-3. Expected Electric Savings from Different Energy Efficiency Improvements That May Be Recommended to Small Businesses through Mobile Energy Clinic Program

Recommended Energy Efficiency Improvement	Average kWh Saved	Percent Applicable	Average kWh/ Site	Average kW	Percent Applicable	Average kW/ Site
Change Lighting to T8 Fluorescent Lamps & Electronic Ballasts	2,772	0.99	2,739	0.81	0.99	0.80
Replace all incandescent bulbs with Compact Fluorescent Bulbs	788	0.62	490	0.22	0.62	0.14
Install Energy Efficient Exit Signs						
Replace existing advertising signs with energy efficient advertising signs	296	0.04	12	0.07	0.04	0.003
Install an evaporative cooler	4,272	0.41	1,753	5.31	0.41	2.18
Have ductwork tested and sealed	580	0.30	173	0.70	0.30	0.21
Insulate ductwork	321	0.52	168	0.43	0.52	0.22
Install window film	594	0.61	365	0.76	0.61	0.47
Upgrade to higher efficiency model water heater	117	0.63	74	0.01	0.63	0.01
Upgrade to higher efficiency model air conditioner	641	0.96	617	0.88	0.96	0.85
Install self-closing doors on exits	191	0.58	110	0.25	0.58	0.14
Insulate ice box	755	0.02	13	0.17	0.02	0.003
Install self-closing doors on reach-in boxes	1,176	0.05	57	2.15	0.05	0.10
Install plastic strip curtains	2,012	0.08	155	0.46	0.08	0.04
Install new gaskets around reach-in or walk-in door doors	801	0.06	46	0.18	0.06	0.01
Replace incandescent display spot lighting with high-efficiency spot lighting	874	0.02	22	0.24	0.02	0.01
Total	16,192		6,793	12.6		5.2

Table IV-4. Expected Gas Savings from Different Energy Efficiency Improvements That May Be Recommended to Small Businesses through Mobile Energy Clinic Program

Recommended Energy Efficiency Improvement	Average Therms	Percent Applicable	Average Therms/ Site
Upgrade to higher efficiency model water heater when replacing.	15.97	0.63	10.07
Total	15.97		10.07

IV.B DEVIATIONS IN STANDARD COST-EFFECTIVENESS VALUES

None of the cost-effectiveness variables that we have used deviate in value from those prescribed in the Energy Efficiency Policy Manual or the CEC's DEER database.

IV.C REBATE AMOUNTS

No rebates are made for the measures taken under the Mobile Energy Clinic Program.

IV.D ACTIVITIES DESCRIPTIONS

As part of the Mobile Energy Clinic Program, we work with the owners/operators of the small businesses that we visit to help them actually implement other recommendations for energy efficiency improvements. This includes providing information to the owners/operators to guide them to participating in other local or statewide programs that will provide financial assistance to install energy efficiency improvements. These programs will include rebate/incentive programs being offered by the investor-owned utilities through their statewide efforts or through local programs implemented by other third-party implementors.

V. GOALS

The overall goal for the Mobile Energy Clinic Program in PG&E's service territory is to deliver energy efficiency services to small businesses in different cities in the Central Valley in the numbers shown in Table V-1. Also shown in Table V-1 are the goals for electric energy savings, peak demand reductions, and gas savings (on a per year basis).

Table V-1. Targets for Numbers of Businesses and Energy and Peak Demand Savings for Mobile Energy Clinic Program in PG&E Service Territory

<i>Program Year</i>	<i>Numbers of Businesses</i>	<i>Energy Savings (kWh)</i>	<i>Peak Demand Savings (kW)</i>	<i>Gas Savings (Therms)</i>
PY 2004				
PY 2005				
Total	1,500	3,348,000	601.8	43,800

Another goal of the Mobile Energy Clinic Program is to work with the owners/operators of the small businesses that we visit to help them actually implement other recommendations for energy efficiency improvements. This includes guiding the owners/operators to participate in other local or statewide programs that will provide financial assistance to install energy efficiency improvements. These programs will include rebate/incentive programs being offered by the investor-owned utilities through their statewide efforts or through local programs implemented by other third-party implementors.

VI. PROGRAM EVALUATION, MEASUREMENT AND VERIFICATION

This section discusses our approach to performing the evaluation, measurement and verification work for the Mobile Energy Clinic Program and to reporting on program progress.

ADM will contract with an independent third party who is not affiliated with AEV to evaluate the Mobile Energy Clinic Program and to measure and verify its claimed energy savings and measure installations. To assist the independent contractor in performing the M&V work, we collect needed data during the implementation of the program. Two types of data are needed to estimate the savings a business has realized from our services.

- We first estimate the savings resulting from the no-cost/low-cost energy services that were provided to the business.
- We then estimate the savings that result from the implementation of any other energy efficiency improvements that we recommended to a business. For this purpose of our evaluation effort, we collect additional information through telephone surveying in which we ask a sample of visited businesses about the types of energy efficiency improvements that they have made in response to the recommendations we gave them. We develop a sampling plan to determine the number of businesses to survey.

To make the estimates of savings, we use information about the characteristics of the particular facility, the number of measure units installed, and unit energy savings estimates from published sources (e.g., CEC's Database for Energy Efficient Resources (DEER)), any deemed savings value that the CPUC has approved, and our own in-house data. (Note that ADM was a subcontractor on the project team that prepared the latest version of the DEER, and therefore are completely familiar with the energy savings and implementation cost estimates in that database and how they are derived.)

From our work in implementing and evaluating other energy efficiency programs, we know the importance of having good information in a program tracking system in order to track the progress of the program and to evaluate its effects. For the Mobile Energy Clinic Program, we already have in place the system for tracking the work, based on our previous work in implementing this program. This tracking system is a full system that includes procedures, policies, protocols, forms, data entry and the data storage methods. The system is up and running and will require little modification to tailor it to meet the data collection and reporting requirements involved in our implementing of the Mobile Energy Clinic Program in PG&E's service territory during 2004/2005.

We use the system to track specific types of information that enable the progress of the program and our efforts to be evaluated. The information that we track includes the following:

- Name and address of each small business visited;

- Utility companies serving the business and electricity and gas account numbers for each business;
- Basic characteristics of business (e.g., square footage); and
- Energy efficiency measures recommended for the business.

During the course of the program, we use the tracking system to prepare monthly reports that detail the previous month's activities and progress towards meeting the goals of the program. Each monthly report includes information on the number of businesses contacted, their characteristics and locations.

At the end of the program, we provide the data in the tracking system to the selected EM&V contractor to support the preparation of an evaluation of the program's effects. This evaluation will include information about all activities undertaken as part of the program, including the number of businesses that received services through the Mobile Energy Clinic Program and the specifics on the measures recommended to and then implemented by each business. Estimates of savings are also provided for each business.

VI.A POTENTIAL EM&V CONTRACTORS

Potential EM&V contractors for the Mobile Energy Clinic Program include the following firms:

- Robert Mowris and Associates
- Sisson and Associates
- Ridge and Associates
- Itron (RER)

Each of these firms was an EM&V contractor for programs funded by the CPUC for 2002/2003 and have the capabilities and experience required to perform the evaluation of the Mobile Energy Clinic Program.

VII. DESCRIPTION OF ADM'S QUALIFICATIONS

This section provides information on the qualifications of ADM Associates and of the personnel who will be the staff for the Mobile Energy Clinic Program.

VII.A QUALIFICATIONS OF ADM ASSOCIATES (PRIME IMPLEMENTOR)

ADM's ability to implement the Mobile Energy Clinic Program is based on our considerable experience in working with small business firms to improve energy efficiency. Since beginning business in 1979, ADM Associates, Inc. has worked with utilities throughout the country to implement large-scale programs to help small commercial firms use energy more efficiently. We have conducted programs to market energy efficiency services to small business firms for various clients, including the California Energy Extension Service, the Bonneville Power Administration, Entergy Services, Northern States Power, El Paso Electric, and Colorado Springs Public Utilities Department.

Our ability to inform owners/operators of small businesses about energy efficiency opportunities derives more generally from our hands-on experience in collecting and analyzing data on energy use for large numbers of commercial facilities.

- We have conducted energy audits on nearly 3,000 commercial and industrial facilities for such clients as Niagara Mohawk Power, Entergy Services, Northern States Power, El Paso Electric, Wisconsin Electric Power, Iowa Southern Utilities, Centerior Services Company, the Bonneville Power Administration, San Diego Gas and Electric, and Rochester Gas and Electric.
- We have conducted on-site surveys of nearly 10,000 commercial and industrial facilities for clients such as Entergy Services, Northern States Power, Union Electric, Central Illinois Public Service, Florida Power and Light, Alabama Power Company, El Paso Electric, the Bonneville Power Administration, Southern California Edison, Pacific Gas and Electric, the California Energy Commission, the Sacramento Municipal Utility District, San Diego Gas and Electric and other utility companies.

The Mobile Energy Clinic Program that we are here proposing to implement in the service territory of PG&E is modeled on the program that ADM has been implementing in the service territories of Southern California Edison and Southern California Gas Company during 2002-2003. Our 2002-2003 program has been focused on improving energy efficiency for small businesses by making no-cost/low-cost improvements for energy efficiency and by providing diagnostics of energy-using equipment for small businesses. Small businesses that participated in this program have had actual no-cost/low-cost improvements made to their equipment. They also have had their HVAC performance tested, condensor coils cleaned, filters changed, lighting systems evaluated, and other energy using equipment such as water heaters, compressors and process equipment checked for proper use. Owners/managers have been given a checklist of other energy

efficiency actions that they can take. We provided energy services to nearly ??? small businesses through our existing program.

Following are brief descriptions of other projects where we have provided energy efficiency services.

- **Upstream High-Efficiency Gas Water Heater Program**

For: Southern California Gas Company

Under a contract with Southern California Gas, ADM implemented an upstream gas water heater program to increase the market penetration of high efficiency gas water heaters. For this program, we worked with wholesalers and distributors of gas water heaters as well as with plumbers to increase the sales of the higher efficiency gas water heaters. We provided rebates to wholesalers and distributors for each high efficiency gas water heater that they stocked and sold, but with two-thirds of the rebate going to reduce the price at which the water heaters were sold to plumbers and with one-third going to the wholesaler/distributor to defray his administrative costs. All of the major wholesalers/distributors in SoCalGas's service area participated in the program, which increased the sales of high efficiency gas water heaters significantly.

- **Mobile Energy Clinic Program**

For: Southern California Gas Company and Southern California Edison Co.

Under contracts with Southern California Gas and Southern California Edison, ADM designed and implemented the Mobile Energy Clinic energy efficiency program. In this program, we focus on improving energy efficiency for small businesses by making no-cost/low-cost improvements for energy efficiency and by providing diagnostics of energy-using equipment for small businesses. Small businesses that participate in this program have actual no-cost/low-cost improvements made to their equipment. They also have their HVAC performance tested, condenser coils cleaned, filters changed, lighting systems evaluated, and other energy using equipment such as water heaters, compressors and process equipment checked for proper use. Owners/managers are given a checklist of other energy efficiency actions that they can take.

- **Beverage Vending Machine Program**

For: Southern California Edison Company

Under contract with SCE, we implemented an Energy Savings Program for Beverage Vending Machines. We installed VendingMisers™ or time clocks (as appropriate) on 3,400 vending machines in SCE's service territory. The control strategies are defined by (1) whether the vending machine is lighted and (2) whether the location of the machine will permit use of a time clock or requires use of a VendingMiser™. Most of these savings will go to small commercial customers, who are a particular target for the program.

- **Lodging Industry Energy Education Program**

For: Southern California Gas Company

Through the Lodging Industry Energy Education Program, ADM visited hotels/motels in SoCalGas's service territory and offered their operators hands-on assistance to identify ways in which they can improve energy efficiency and save energy in their facilities. The Lodging Industry Energy Education Program demonstrated that a hands-on approach is a very effective approach to getting small business owners to think about energy and to take actions to improve energy efficiency. We visited over 900 lodging facilities during 2000 and have visited over 400 more in 2001.

- **Duct Efficiency Programs**

For: Pacific Gas and Electric
Southern California Edison
Southern California Gas
San Diego Gas and Electric

Under the California Board for Energy Efficiency's third party program, ADM was under contract with the four major investor-owned utilities in California (i.e., Pacific Gas and Electric, Southern California Edison, San Diego Gas and Electric, and Southern California Gas) to implement residential duct efficiency programs throughout California. The Duct Efficiency Programs were aimed at institutionalizing good duct design and establishing retrofit duct repair as a component of HVAC maintenance. Through the Duct Efficiency Program, we provided HVAC and/or sheet metal contractors with the information, procedures, and technologies that they could use to market duct leakage inspection and repair services to residential single-family and multi-family houses. Through the program, contractors were educated and trained on how to provide duct inspection and repair services as a viable business venture. Contractors were taught new techniques and procedures that were explicitly designed under this program in order to be effective and not too expensive. Contractors who participated in the programs were also assisted in identifying households who are interested in having their duct system inspected and repaired.

- **RCP Training**

For: Southern California Gas
Southern California Edison

ADM conducted training workshops to provide training to HVAC contractors to better equip them to participate in the Residential Contractors' Program. One aspect of the training was to provide training in central air conditioner/central heat pump diagnostic tune-up, duct testing and duct sealing in conjunction with SCE/SoCalGas Installation Standards. The other aspect was to provide an overview of the RCP fulfillment process from consideration of installation of energy efficiency measures through completion of

work and contractor payment. This overview included proper completion of program-related paperwork, including Incentive Voucher/Application and Customer Information and Declaration forms.

- **Local Energy Assistance Program**

For: Southern California Edison
Pacific Gas and Electric
Southern California Gas

ADM developed a program that we implemented throughout California to provide assistance to the planning departments in selected communities to encourage energy efficiency in new industrial and commercial developments that are being proposed in those communities. This program included directly influencing specific development plans and providing assistance to the planning departments of the local governments to plan/approve planning and zoning areas, based on energy use as well as other infrastructure criteria presently used. We also disseminated information regarding the results of these energy planning activities to other communities. Our program in California was funded at \$1.2 million by the major utilities (i.e., Pacific Gas and Electric, Southern California Edison, and Southern California Gas).

- **Energy Efficiency Site Surveys of Commercial, Industrial, and Agricultural Facilities**

For: Pacific Gas and Electric

In this project for PG&E, we are conducting surveys of commercial, industrial, and agricultural customer facilities to identify and analyze the energy efficiency opportunities using the 1-2-3 tiered approach to energy conservation. For Tier 1, we identify and analyze the no-cost energy efficiency opportunities in each customer facility. For Tier 2, we identify and analyze the low-cost energy efficiency opportunities in each customer facility. For Tier 3, we identify and analyze customer facilities with a view to identifying energy efficiency opportunities that will require major financial investments on the part of the customers. All recommendations target and prioritize measures and technologies that deliver both immediate and long-term peak-period kW demand savings and annual kWh and therm savings.

- **Energy and Water Efficiency Services Support**

For: Colorado Springs Utilities

Under this contract with the City of Colorado Springs Utilities, ADM provided energy and water efficiency services for CSU's industrial and large commercial customers. We provided feasibility evaluations for energy and water efficiency projects and provided design plans for energy and water efficient projects. In addition, we provided training on energy and water efficiency projects for CSU staff.

- **Technical Support to Demand Side Management Unit**

For: Jamaica Public Service Company, Ltd.

Under a contract with the Jamaica Public Service Company, ADM provided technical support to JPSCo's Demand Side Management Unit. We provided a Resident Consultant who worked with JPSCo staff in planning demand-side management programs for JPSCo's customers. Subject areas for which we provide technical support included program planning and implementation, cogeneration feasibility studies, energy auditing, building codes, simulation modeling, monitoring, and program evaluation.

- **Technical Audits for Large Industrial Customers**

For: Power Agency of California

Under contract with the Power Agency of California, we conducted audits of large industrial electricity customers in order to identify appropriate energy efficiency improvements. To support this activity, we developed the audit form to be used in data collection, conducted on-site interviews of plant personnel on facility operations, collected other relevant data on-site, evaluated the collected data, and prepared engineering estimates of the energy savings for energy efficiency improvements for each of the audited facilities. Estimates of expected savings were developed through engineering calculations or through simulations with computerized energy analysis models.

- **Business Energy Advocates Program for Small Business**

For: California Energy Extension Service

ADM provided marketing and technical support services on energy conservation for a program to encourage small business firms in California to adopt techniques and technologies that reduce energy consumption and costs. The program was also intended to reduce the barriers encountered by business firms in gaining access to energy management techniques and practices. We identified energy conservation measures that are particularly applicable to given types of businesses and supported their applications for utility company incentive payments and low-interest small business loans.

- **Commercial Audits Project**

For: Entergy Services, Inc.

For Entergy, we performed the Commercial Audits Project. We performed on-site audits at about 650 commercial facilities throughout Entergy's service area. Using the data collected through these audits, we prepared customer-specific DOE-2 analyses of energy savings from conservation measures. We prepared audit reports for the individual customers and also aggregated the data to prepare system-level estimates of the saturations of various end-use technologies and DSM measures.

- **Energy Audit Services for Small and Medium Commercial and Industrial Customers**

For: El Paso Electric

For El Paso Electric, ADM provided energy audit services to its small- and medium-size commercial and industrial customers. We conducted energy audits for approximately 250 small C&I customers and for approximately 75 medium C&I customers. The audit services included collecting data on-site, preparing an analysis of energy use and potential energy efficiency measures (using our *CPA 123* model), and preparing an audit report for each customer audited.

VII.B DESCRIPTION OF EXPERIENCE FOR KEY PERSONNEL

Our staffing structure for the Mobile Energy Clinic Program in SCE's service territory was presented in Section II.F. Descriptions of the experience of the key personnel for the program are provided in this section.

Taghi Alereza, P.E., who is President of ADM, will be the Principal-in-Charge of the work. Mr. Alereza is a nationally recognized expert in building energy simulation and modeling. He has pioneered the development of several state-of-the-art simulation procedures and models. Mr. Alereza has led ADM's effort to develop and implement two statewide residential programs during the 1998 program year. He conceived and developed the "Residential Duct Efficiency Program," which was implemented in the service territories of Pacific Gas and Electric, Southern California Edison, Southern California Gas and San Diego Gas and Electric. Mr. Alereza also conceived the Local Energy Assistance Program (LEAP), which was implemented in the PG&E, SCE and SCG service areas. This program provided extensive training to developer/builders, local government staff and elected officials. He has directed program design and implementation including

Dr. Safdar Chaudhry is a Senior Engineer at ADM Associates, Inc. Dr. Chaudhry has been directing, and performing day-to-day management, of the Mobile Energy Clinic program being implemented in the SCE and SCG service areas. While at ADM, Dr. Chaudhry has performed engineering analysis and evaluations for several residential, commercial and industrial facilities conducted for several utilities including PGE, SMUD, SCE and B.C. Hydro. He conducted on-site inspections, analysis, energy conservation recommendations and report preparation in most of these projects, and has been responsible for organizing and managing several other energy efficiency improvement projects. He developed energy conservation evaluation procedures, monitored field staff, and reviewed recommended energy measures for the Mobile Energy Clinic program conducted for Southern California Gas Company. He also developed energy auditing and measure evaluation procedures conducted for the Lodging Industry Education Program conducted for SCG. Dr. Chaudhry has been responsible for hundreds of building energy simulations using DOE-2, CALRES and other computer simulation programs. Dr.

Chaudhry has a Ph.D. in Mechanical Engineering from the University of Birmingham, a M.S. in Mechanical Engineering from George Washington University and a B.S. in Mechanical Engineering from the University of Engineering and Technology in Pakistan.

- “Upstream High Efficiency Residential Water Heater Program” - implemented for Southern California Gas Co.
- “Refrigerated Vending Machine Cycling Program” - designed and implemented for Southern California Edison Co.
- “Performance Assurance Project” - designed and implemented simplified building commissioning project for Southern California Edison Co. and San Diego Gas and Electric Co.
- “Mobile Energy Clinic” – designed and implemented for Southern California Gas Co.
- “Lodging Industry Education And Audit Program” – designed and implemented for Southern California Gas Co.

Mr. Alereza holds a Bachelor of Mechanical Engineering degree from Auburn University and has completed an MS and the coursework for D.Sc. in mechanical engineering from the George Washington University. He is a member and past chairman of ASHRAE Technical Committee 9.6 (Energy Utilization), which is responsible for developing and applying protocols for assessing energy use in buildings, and the cognizant TC for the ASHRAE Standard 90.2. He is a registered professional engineer in California.

Dr. Donald Dohrmann is a Principal of ADM Associates and Director of Economic Studies. He will be responsible for market analysis and measurement, evaluation, and verification for the program. Dr. Dohrmann has technical expertise in economics, survey design, and statistical analysis. He has developed and applied analytical methodologies for evaluating DSM programs, including evaluations of Portland General Electric’s commercial new construction programs, Northern States Power’s high efficiency motors and adjustable speed drives programs, Pacific Gas and Electric's Commercial New Construction Program and its Nonresidential Energy Management Services Programs. He has been responsible for designing the statistical sampling plans for surveys of residential, commercial and industrial firms that ADM has conducted for various companies, including Pacific Gas and Electric Company, Southern California Edison Company, the Bonneville Power Administration, Florida Power and Light, B.C. Hydro, Kansas City Power and Light, El Paso Electric, Southern California Edison Co., the Sacramento Municipal Utility District, San Diego Gas and Electric Co., and many other utilities. Dr. Dohrmann received his B. S. in economics from Iowa State University and his M. A. and Ph. D. in economics from Yale University.

Sabarattmam Thamilsaran, Ph.D., P.E. is a Mechanical Engineer with ADM Associates, Inc. Dr. Thamilsaran has exceptional capabilities in the development of engineering

algorithms for assessing energy savings through both engineering principles and statistical and regression analysis. His extensive experience in statistical modeling includes multi-variable regression equations, Fourier-series and cluster analysis, and polynomial orthogonalization modeling. His responsibilities include energy auditing and analysis, DOE-2 simulation and analysis of energy use, assessing energy savings and writing technical reports for industrial and commercial buildings. He assisted in development of algorithms for estimation of energy savings for the High Efficiency Gas Water Heater and Mobile Energy Clinic programs that ADM is conducting in the SCE and SCG service areas. He has conducted audits and technical evaluations of energy conservation opportunities, building HVAC simulations and baseline model development for commercial buildings for El Paso Electric, Portland General Electric and Southern California Edison. Dr. Thamilsaran also has over six years of experience in energy simulation modeling and analysis for residential and commercial buildings, using both CALRES and DOE-2. For the LoanSTAR program, funded by the state of Texas, he performed energy efficiency evaluations and performed commissioning of energy conservation measures. Dr. Thamilsaran earned his Ph.D. in Mechanical Engineering, specializing in Thermal Sciences and Energy Management, from Texas A&M University, and is a registered Professional Engineer in the state of California.

Lon Smith is a Senior Associate at ADM Associates, Inc., responsible for development and conducting training in the areas of HVAC systems. He has extensive experience in refrigeration, transport and control systems in residential, commercial and industrial buildings. During his previous employment of 20 years with United Refrigeration Inc., Honeywell Inc., and New England Sheet Metal Works, Inc., he has developed an exceptional understanding of not only the theoretical aspects of HVAC and refrigeration systems, but also he has mastered the practical side of these systems as well. In the past, he has provided consultation to HVAC designers, and has conducted training in refrigeration and control systems. Mr. Smith was an instructor at the State Center College District. He taught classes in pneumatic, electrical and electronic controls for commercial, residential and industrial mechanical systems. He has also taught classes on refrigerant types and their application, refrigerant recovery and power distribution systems, and their application to power line carrier transmissions. Some of the projects that Mr. Smith has been responsible for include:

- For the Mobile Energy Clinic Program that ADM performed for Southern California Gas Company, he prepared field procedures and trained field staff.
- For the Upstream High Efficiency Water Heater Program that ADM performed for Southern California Gas Company, he was responsible for coordination of wholesalers, verification and payment.

Mr. Smith is a licensed Energy Auditor for the Environmental Protection Agency and the California Energy Commission. He earned his Bachelor of Arts in Communications from California State University Fresno.

Angelo Mineo, who is a Senior Engineer at ADM, has considerable experience in on-site data collection and end-use monitoring. For the past eight years at ADM, he has conducted extensive evaluations of variable speed drive (VSD) applications for commercial HVAC and industrial drives. He is presently a team leader in the Mobile Energy Clinic project being conducted for SCE and SCG. As an end-use monitoring specialist, he has conducted end-use metering of many commercial and industrial buildings. His experience includes on-site data collection, installing, inspecting and verifying monitoring equipment and validating collected data for our projects for B.C. Hydro, Northern States Power, Entergy Services, Inc., SCE and Los Angeles Department of Water and Power. Examples of specific tasks that Mr. Mineo has conducted include:

- Performed data collection and end-use monitoring for the Commercial Program Evaluation conducted for Central Power and Light Co. in Texas.
- Performed data collection and end-use monitoring of fixed and adjustable-speed motors for the evaluation of Northern States Power's Motors program.
- Performed data collection and end-use monitoring of Commercial buildings in Arkansas, Texas, Mississippi and Louisiana for the development of end-use load shapes for Entergy Services Co.
- Has been conducting on-site inspections and data collection for the Nonresidential Retention study being conducted for Southern California Edison Co. for the past 6 years.

Mr. Mineo earned his Bachelor of Science in Electrical Engineering from California State Polytechnic University.

Waqar Mustafa is a Mechanical Engineer at ADM Associates, Inc. His responsibilities include site surveys, building energy end-use analysis, technical evaluation of energy conservation retrofits in commercial and industrial applications, and preparation of energy audit reports. Before joining ADM Associates, Mr. Mustafa was a graduate research assistant in the Industrial Assessment Center, Department of Mechanical Engineering, University of Texas at Arlington. He conducted on-site surveys of several small & medium size manufacturing facilities in Dallas and Fort Worth metroplex, performed analysis of energy efficiency measures, and prepared energy audit reports. These projects were funded by the Department of Energy, Office of Industrial Technology. Mr. Mustafa has earned a B.Sc. in Mechanical Engineering from the University of Engineering and Technology in Lahore, Pakistan. He earned a Master of Science degree in Mechanical Engineering from the University of Texas, Arlington.

Cyrus Davehlo is a Mechanical Engineer at ADM. For the past ten years, Mr. Davehlo has been a field engineer and supervisor for implementation of the Mobile Energy Clinic project that ADM has conducted in the SCE and SCG service territories for the past two years. He has personally collected on-site data for over 1,500 buildings in the last ten years. In this work, he has collected data on industrial processes, HVAC and lighting systems in a wide variety of commercial and industrial facilities. Examples of specific projects that Mr. Davehlo has participated in include:

- Conducted energy audits of commercial buildings for El Paso Electric Co., Florida Power and Light Co. and Northeast Utilities.
- Conducted on-site data collection for energy audits conducted in Arkansas, Louisiana, Mississippi and Texas for Entergy Services Co.

Mr. Davehlo graduated from Florida Atlantic University with a B.S. degree in Mechanical Engineering.

Mahmoud Fouladi, a Mechanical Engineer at ADM, has considerable experience in performing energy audits and building energy analysis, recommending energy efficiency measures and providing strategies for control systems for various commercial and industrial projects. He has been conducting quality control for the Mobile Energy Clinic that ADM has been conducting in the SCE and SCG service areas for the past two years. During the past seven years he has participated in more than ten major commercial & industrial data collection projects conducted by ADM. He has been conducting on-site data collection on commercial and industrial facilities as a member of the field staff for the Non-Residential Measure Retention Study that ADM has been performing for Southern California Edison for the past five years. Other projects that Mr. Fouladi has participated in include:

- Performed on-site data collection and monitoring of lighting and HVAC motors for three projects conducted for Central Power and Light Co. in Texas.
- Performed on-site data collection for the evaluation of the New Commercial Construction Program conducted for Portland General Electric Co. The on-site data were used to develop DOE-2 simulations.
- Performed on-site data collection of commercial buildings for the Saturation Study conducted for Southern California Edison Co.

Mr. Fouladi earned his M.S. degree in Mechanical Engineering from George Washington University and his B.S. in Mechanical Engineering from Howard University.

Khoi Tran is a field Engineer at ADM Associates, Inc. His responsibilities include site surveys, building energy end-use analysis, technical evaluation of energy conservation retrofits in commercial and industrial applications, and preparation of energy audit reports. Mr. Tran is currently working on the Mobile Energy Clinic Program. The Mobile Energy

Clinic is a program that is focused on improving energy efficiency for small businesses by implementing low-cost/no-cost measures, providing diagnostics of energy using equipment, and identifying cost intensive energy efficiency measures. This program is funded by California Public Utilities Commission and administrated by Southern California Edison Company. Under Southern California Edison's Vending Machine Cycling program, Mr. Tran has been responsible for installing controllers on vending and beverage machines located in commercial facilities throughout Southern California region. Mr. Tran received a Bachelor of Science degree in Mechanical Engineering from University of California, Long Beach.

Thanh Nguyen is a field Engineer at ADM Associates, Inc. His responsibilities include conducting site surveys, building energy end-use analysis, and technical evaluation of energy conservation retrofits in residential, commercial and industrial applications, and preparation of energy audit reports. Mr. Nguyen is currently working on the Mobile Energy Clinic Program. The Mobile Energy Clinic is a program that is focused on improving energy efficiency for small businesses by implementing low-cost/no-cost measures, providing diagnostics of energy using equipment, and identifying cost intensive energy efficiency measures. This program is funded by California Public Utilities Commission and administrated by Southern California Edison Company. Mr. Nguyen has earned an Associates degree in Mathematics from Golden West College, and a Bachelor's degree in Computer Science from the University of California at Fullerton.

Richard Burkhart serves as the Senior Technical Editor and desktop publisher at ADM Associates, Inc. As technical editor, his responsibilities include copy-editing, graphic design and production for documentation, marketing materials, survey questionnaires, and web page layout and design for ADM projects. He is responsible for the production of a quarterly newsletter and accompanying website for the Southern California Gas Co. *Lodging Industry Education Program*. He was in charge of designing and publishing marketing materials for the Duct Efficiency Training Program, Upstream High-Efficiency Gas Water Heater program and several other energy efficiency marketing programs performed for California utilities. He was responsible for the production of a series of Commercial / Industrial site audit reports for Entergy Services, Inc. For Kansas City Power and Light Co. he developed automated templates using the data linking functions in Microsoft Word and Excel to generate site reports, and was responsible for final copyediting and cleanup of the reports. He has also performed similar work for projects for Southern California Edison Co. He is well versed in the advanced techniques for a wide variety of production software packages and web page design software, under multiple operating systems. Prior to joining ADM, he worked as a freelance editing assistant, performing editing, graphic production and page layout for a series of operating manuals for computerized production equipment. Mr. Burkhart earned his B.A. degree in Communications from California State University, Fullerton.

VIII. BUDGET

Our summary budget table for implementing the Mobile Energy Clinic Program in PG&E's service territory is detailed in Table VIII-1.

*Table VIII-1. Budget Summary for Mobile Energy Clinic Program
in PG&E Service Territory*

<i>Budget Item</i>	<i>Amount</i>
Administrative Budget	\$118,280
Marketing Budget	\$8,845
Direct Implementation Budget	\$686,475
EM&V Budget	\$33,900
Other Budget	\$59,325
Budget Total	\$906,825