

2006-2008 Energy Efficiency Programs HVAC Training, Installation & Maintenance Concept Paper

1. Projected Program Budget

		2006	2007	2008
Administration				
	Administrative Overheads	\$ 212,495	\$ 212,495	\$ 182,139
	Administrative Other	\$ 15,958	\$ 15,958	\$ 13,678
Marketing & Outreach		\$ 144,976	\$ 144,976	\$ 124,265
Direct Implementation				
	Activity	\$ 258,400	\$ 258,400	\$ 221,486
	Installation	\$ -	\$ -	\$ -
	Hardware & Materials	\$ 85,521	\$ 85,521	\$ 73,303
	Procurement	\$ 93,203	\$ 108,737	\$ 108,737
	Incentives	\$ 1,380,410	\$ 2,523,889	\$ 4,484,700
EM&V		\$ -	\$ -	\$ -
Total		\$ 2,190,963	\$ 3,349,976	\$ 5,208,308

2. Projected Program Impacts

2006			2007			2008		
Net kWh	Net kW	Net Therms	Net kWh	Net kW	Net Therms	Net kWh	Net kW	Net Therms
9,115,517	5,482	4,931	15,565,406	10,484	20,711	25,368,241	19,503	48,779

3. Program Cost Effectiveness

Attached

4. Program Descriptors

Commercial Sector

Program Classification: Local

Geographic area targeted: All Climate Zones

Subsegments targeted: KEMA proposes to target the following types of facilities through outreach and marketing activities:

- Grocery stores;
- Restaurants (fast food and sit-down);
- Large single story retail (big box chains);
- Small retail.

These facility types share the following characteristics that make them attractive as a target market.

- **Relatively high cooling end-use intensities.** Compared to many other commercial building segments, these five have high end-use cooling

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

intensities and installed capacity (tons per square foot of space). Thus, these customers have the potential to realize relatively greater energy savings and financial returns than other kinds of commercial facility owners.

- **Facility-based businesses.** All of these businesses are facility-based, and customer comfort is an important competitive feature.
- **Facility management resources and capabilities.** Many of these customer facilities are owned or franchised by national or regional retail chains. These businesses typically have a facilities management department that has both the responsibility and the authority to contract for the kinds of efficiency services to be offered by this program. Many of these organizations already participate heavily in other elements of utility energy efficiency programs.
- **Multiple facilities with one decision maker.** For many chain locations, a single individual or group has responsibility for decisions involving multiple facilities.

Because the measures supported by this program are relatively new to the market, their current incremental costs are high relative to their savings they provide. Thus, the cost effectiveness of this program will depend to a large extent on its ability to hit the volume targets discussed below. Only in this way will program administrative costs be covered by savings. Thus it is important to focus program marketing on those customer segments that have been most interested in HVAC maintenance programs in other jurisdictions.

Market size and percent of market reached: Table 1 shows the distribution of business establishments in San Diego, Riverside, and Imperial counties, which provides a first approximation to the target market. We developed these population figures from the iMarket database of Dun & Bradstreet records. We also include in the table the number of establishments in the targeted segments to be served over the first three years of the program. Our participation targets are 9 percent of total establishments in the targeted categories; 19 percent of those establishments with 5 or more employees.

Table 1
Number of Establishments in Target Segments, by Number of Employees

Establishment Type	Number of Employees				Total Estab	Estab. in Program	% of Total Estab.	% of Estab w/ 5+ Emp
	2-4	5-9	10-49	50+				
Grocery	1,912	529	428	278	3,147	180	6%	15%
Restaurants	1,200	1,041	2,327	416	4,984	900	18%	24%
Other Retail	11,232	3,415	2,763	535	17,945	1,170	7%	17%
Total	14,344	4,985	5,518	1,229	26,076	2,250	9%	19%

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

Residential Sector

Program Classification: Local

Geographic area targeted: Climate Zones 10, 14, and 15

Subsegments targeted: KEMA proposes to target single-family and mobile homes built prior to 2000. These homes offer higher potential savings than units in multifamily buildings, as well as considerably fewer marketing and sales hurdles.

Market size and percent of market reached. According to the 2003 *American Housing Survey*, there are roughly 550,000 owner-occupied single-family and mobile homes in the San Diego metropolitan area. Over the three years of the program, we plan to serve roughly 25,000 homes, or 5 percent of the market.

5. Program Statement

The opportunities for achieving energy and peak demand savings through improved maintenance, installation, and commissioning of packaged unitary HVAC systems in the commercial retail marketplace are well documented. However, contractors have been slow to promote energy efficiency measures or to make investments in staff capacity needed to deliver these measures effectively. Most contractors do not perceive a strong business case for the investments required to deliver efficiency-related products and services. This situation is compounded by a lack of knowledge and interest in this suite of measures on the part of customers, who remain largely unaware of the short and long-term economic benefits associated with investment in routine HVAC maintenance and commissioning.

Our experience, and the documented experience of programs conducted by other organizations, suggests that the following are the major market barriers to more widespread customer acceptance and contractor promotion of HVAC efficiency services.

Pricing and competitive pressures. In surveys of HVAC contractors about what their customers value most highly, contractors report that quality/reliability issues (58%) and price (54%) are the most important factors. In contrast, energy efficiency is mentioned by customers as important only 25% of the time. While most contractors report that promoting high-efficiency equipment is important to their competitive position, most also say that it is “somewhat” or “very” difficult to sell high-efficiency units (XENERGY, 1999a). Other studies have found that many contractors seldom bid or even mention high efficiency equipment in sales situations (XENERGY, 1999; Robertson et al. 1996).

Such practices are indicative of a number of barriers in the HVAC contracting market, principally stiff price competition in the construction industry and limited facility owner understanding of or interest in HVAC energy efficiency. Those contractors who have been successful in selling high efficiency equipment have

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

generally taken a design-build approach. However, even many design-build contractors are uninterested in specifying high efficiency equipment.

Cost constraints on maintenance services. HVAC service companies routinely perform only non-invasive preventive maintenance on rooftop units, such as changing and cleaning filters, performing routine checks on system operation, and occasionally assessing level of refrigerant charge. Typically, minimal work is done to assure proper airflow or proper economizer operation. (Breuker, Rossi, and Braun, 2000) provide several reasons for the inefficient maintenance of HVAC systems across the industry. The cost of more extensive work using manual testing procedures is prohibitively high.

Sales challenges: end-user apathy and high cost of sales. From the perspective of the end-user, rooftop units are often “out-of-sight, out-of-mind”, and therefore completely ignored until performance has degraded to a point where the unit no longer performs adequately. This approach results in unnecessarily high operating costs and early equipment failure. Most contractors do not know how to effectively make this pitch to the end-user. Nor do they perceive the benefits of using energy efficiency as a means to differentiate themselves from their competition. Finally, the cost of developing proposals for maintenance and control-oriented projects is relatively high compared to revenues generated from incremental sales of those items.

Technician turnover. Turnover among HVAC technicians is very high. A typical contractor may lose as much as one quarter to one third of his technician staff in the course of a year. All HVAC maintenance strategies rely upon the technician at least to identify savings opportunities. In this program model, the technician must also learn how to use technical tools to qualify those opportunities, execute repairs, and coordinate with his company’s sales staff to develop proposals for larger projects. Ultimately technicians need to be paid more in order to retain good ones. This, in turn, requires that contractors develop a greater range of value-added services.

Our program strategy is founded upon KEMA’s observations of the following market dynamics, described from the perspective of the end-user and HVAC service provider:

- **End Users:** 1) Need to perceive and give credence to the value provided by the service, including energy and non-energy benefits; 2) Must believe that the benefits of the measure outweigh the costs of adoption. These include not only the cost of the product or service itself, but the search, staff training, information system, risks, and other management costs involved in purchasing and using the measures effectively as well; and 3) Must be willing to purchase the new service in sufficient numbers in order for vendors to invest in the skills, tools, and systems required to deliver those services profitably.
- **HVAC Service Providers:** 1) May be motivated to invest in delivering new energy efficiency services as a means to defend or gain market share in the

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

short term; 2) Need to determine that they can deliver the energy efficiency services profitably in the long term and successfully in light of constraints posed by a very tight labor market; and 3) Must be convinced that a sufficient number of customers are willing to buy the service to amortize investment in increased sales and delivery capacity.

We have designed our program to move end-users and vendors to invest in energy efficiency measures in light of the decision-making and behavioral tendencies described above.

6. Program Rationale

The proposed program is designed to overcome the barriers to the broader promotion and acceptance of packaged HVAC efficiency measures in the commercial market. It builds upon KEMA's current work with HVAC contractors to support the use of advanced diagnostic methods in system maintenance in multiple regions of the country, including California. The proposed program targets the commercial unitary HVAC market in the SDGE service territory, focusing first on big box retailers and owner/occupants of multi-site facilities. These initial targets have been selected based on their high total cooling load, visibility, economies of scale, and potential for replicability. The program targets both the organizational decision-makers at these facilities and the contractors who serve them. Once the program is established and participating contractors become convinced of its value, we will expand the marketing focus to mass market commercial and residential customers.

7. Program Outcomes

Figure 2 displays specific actions and milestones to be accomplished by category, along with potential indicators of milestone achievement.

2006-2008 Energy Efficiency Programs HVAC Training, Installation & Maintenance Concept Paper

Figure 1
Anticipated Program Outcomes by Program Year and Category

Category/Outcomes or Indicators
<p>Contractor adoption of energy-efficient installation practices</p> <ul style="list-style-type: none"> Number of contractors participating in training v. goal. Number of contractors purchasing Manual J software. Number of contractors purchasing Duct Blasters or other test equipment. Number of contractors receiving training in duct sealing. Number of contractors applying for Quality Installation measure incentive. Number of systems receiving Quality Installation measure incentives. Number of contractors adopting Quality Installation procedures outside program or without incentives (spillover).
<p>Contractor adoption of energy-efficient maintenance practices</p> <ul style="list-style-type: none"> Number of contractors participating in training v. goal. Purchasing Service Assistants™ or similar tools and systems. Number of technicians and sales persons trained on systems. Number of contractors applying for refrigerant charge and retrofit duct sealing measure incentives. Number of inspections uploaded, with and without incentives. Number of contractors using diagnostic systems without incentives.
<p>Contractor promotion of en-efficient installation and maintenance practices</p> <ul style="list-style-type: none"> Number of contractors who offer diagnostic services and or Quality Installation on all or most of their projects. Number of contractors who emphasize energy efficiency in their marketing materials and web sites. Number of contractors who report the energy efficiency is an important competitive advantage for them.
<p>Increase customer demand for energy-efficient installation and maintenance services</p> <ul style="list-style-type: none"> Contractor reports of customer interest in energy efficiency. Appearance of Quality Installation and diagnostic-driven maintenance requirements in customer bid documents or specifications. Number of applications for installation and maintenance measures in program v. goal.

8. Program Strategy

The key program strategies include the following.

- Financial incentives to contractors for adopting diagnostic-driven maintenance and installation practices.
- Financial incentives to customers for maintenance, installation, and control measures supported by the program.
- Contractor technical and sales training to enable delivery of the program measures.

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

- Assistance to contractors in organizing the sales function for new services to be offered by the program.
- Lead generation via direct mail and phone marketing to be carried out by KEMA on behalf of participating contractors.
- Additional marketing support to connect participating contractors to complementary efforts, including the upstream program and other statewide efforts.

8.1.1. Program Strategy Description

The program will achieve energy efficiency savings through a variety of interdependent measures targeting both HVAC service providers and end-users in the commercial marketplace. Key program elements and the rationale associated with each are highlighted below:

- **Incentives.** The program will administer incentives to contractors and/or end users for the implementation of qualifying HVAC energy efficiency measures (e.g., diagnostic tune-ups, duct sealing, and economizer restoration). Qualifying program measures have been selected for their proven ability to provide cost-effective energy and peak demand savings. Incentives are provided to improve the real and perceived economics of measure implementation from the perspective of end user decision-makers and HVAC service providers.
- **Automated diagnostic and sales tools.** KEMA and its project partners have developed an IT system that generates a systems assessment based on diagnostic readings for the HVAC units on a facility. The system uploads data collected by a technician and processes it into a sales report with pricing, incentive levels, and financial analysis for the full range of repair or replacement measures. This system has demonstrated its ability to reduce the time, cost, and technician training required to deliver energy efficiency services. It further provides customers with the information and third-party assurances they require to implement efficiency measures.
- **Program workshops.** Program workshops will be a key initial outreach strategy for the program, and will collectively target end users and HVAC service providers. In addition to serving as an initial source of information about program participation and offerings, program workshops that include potential end user clients among their attendees make a compelling case for contractors considering the adoption and delivery of energy efficiency as a business strategy. Likewise, facility managers that might otherwise be hesitant to adopt energy saving measures because of concerns about the ability of vendors to sufficiently provide such services, may be persuaded otherwise in this setting.
- **Comprehensive contractor training and sales support.** KEMA will provide classroom and individual field training for program contractors on

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

program measures and the use of program tools. As a requirement for program participation, training sessions will be attended by HVAC management staff, sales personnel, and the technicians who will be performing the prescribed measures in the field. The intent of training is to persuade actors across all levels of an organization, from decision-makers to field implementation staff, of the efficacy of energy efficiency measures from both an operations and revenue generating perspective.

- **Organization of the sales function.** In addition to technical training, KEMA will work with contractors to focus on their individual needs throughout the sales cycle. In our prior programs, we have frequently encountered a disconnect at the organizational level between the technicians who collect field data on HVAC efficiency opportunities and the sales staff who transform these opportunities into energy efficiency sales. KEMA will therefore provide sales training for contractors, and will be available to assist contractors on an individual basis, for instance by fine-tuning their customer proposals or accompanying them on customer sales calls focused on delivery of energy efficiency measures.
- **Lead generation.** Even mid-sized mechanical contractors seldom have the marketing and sales resources required to develop leads for new kinds of services. KEMA will develop leads through marketing efforts in both the residential and commercial sectors. In the residential sector, we will use billing data to identify customers who use abnormally high levels of energy for cooling. KEMA already has the billing data handling and analysis systems in place as part of its RECAP audit program. This analysis will yield a targeted customer list for direct mail and follow-up telemarketing. Customers who are interested in receiving services will be directed to a list of participating contractors. Alternatively, leads can be sent directly to contractors closest to the customer. On the commercial side, KEMA will work directly contractors to approach their national account customers. KEMA will independently market the program to those accounts as well. Finally, KEMA will use its call center capabilities to market the program directly to commercial customers.
- **Marketing support.** KEMA will work cooperatively the contractor for the Upstream Incentive program, SDGE, industry associations, and statewide programs such as Flex Your Power to raise customer awareness of the energy and non-energy benefits associated with the HVAC maintenance and installation measures supported by this program.

KEMA's proposed approach incorporates and reflects the insights that KEMA and its expert partners have gained over 10 years of working to promote more systematic and energy-efficient approaches to HVAC system management. Our program design leverages this experience across a market sector with significant and widely untapped potential for energy and peak demand savings.

2006-2008 Energy Efficiency Programs HVAC Training, Installation & Maintenance Concept Paper

8.1.2. Program Indicators

The principal indicators of program success will be estimates of energy savings generated in the program delivery process and summarized in Section 1 above. See Section 9 for other quantitative milestones by which program progress will be tracked.

9. Program Objectives

The table below displays proposed quantitative indicators of program progress.

Category/Outcomes or Indicators	Year		
	2006	2007	2008
Contractor adoption of energy-efficient installation practices			
Number of contractors participating in training v. goal.	20	30	40
Number of contractors purchasing Manual J software.	20	26	36
Number of contractors purchasing Duct Blasters or other test equipment.	7	10	15
Number of contractors receiving training in duct sealing.	20	30	40
Number of contractors applying for Quality Installation measure incentive.	20	30	40
Number of residential systems receiving Quality Installation measure incentives.	1,000	3,000	8,000
Number of contractors adopting Quality Installation procedures outside program or without incentives (spillover).	5	12	18
Contractor adoption of energy-efficient maintenance practices			
Number of contractors participating in training v. goal.	20	30	40
Number of contractors purchasing Service Assistants™ or similar tools and systems; applying for refrigerant charge and airflow adjustment incentives	20	30	40
Number of technicians and sales persons trained on systems.	60	80	110
Number of inspections uploaded with repairs	1,300	4,650	12,000
Number of contractors using diagnostic systems without incentives.	10	20	30
Contractor promotion of energy-efficient installation and maintenance practices			
Number of contractors who offer diagnostic services and or Quality Installation on all or most of their projects.	8	12	15
Number of contractors who emphasize energy efficiency in their marketing materials and web sites.	15	22	30
Number of contractors who report the energy efficiency is an important competitive advantage for them.	12	20	25
Increase customer demand for energy-efficient installation and maintenance services			
Contractor reports of increased customer interest in energy efficiency (from survey sample including nonparticipants).	60%	70%	75%
Number of commercial customers participating in the program.	500	750	1,000
Number of residential customers participating in the program.	2,750	7,500	18,200

2006-2008 Energy Efficiency Programs HVAC Training, Installation & Maintenance Concept Paper

10. Program Implementation

Our response to this item furnishes an overview of activities in the program start-up phase as well as of ongoing operations. We provide a brief description of contractor training, quality insurance, inspection, targeted customer segments, and customer marketing activities. We discuss each of those topics in more detail under the items below that pertain directly to them.

Start-up Phase Activities

Conduct program planning in coordination with SDGE, vendors managing the upstream program and other programs affecting targeted customers, contractor trade associations, and industry associations of key customer segments.

Develop detailed program procedures, forms, and data systems. KEMA will develop or revise for local use the following key program procedures, forms, and supporting data communication, storage, and analysis systems.

- ***Packaged HVAC Inspection System and Sales Report Generator.*** As part of KEMA's work for NSTAR and NYSERDA, we have developed an integrated unit inspection and measure sales report generator system based on the Service Assistant™ platform. The Service Assistant™ is a well-established HVAC maintenance tool that automatically records refrigerant line temperature measurements into a PDA carried by the technician. Programs in the PDA interpret the data based on an expert system and provide the technician with recommendations regarding repairs, focusing primarily on adjustments to refrigerant charge and airflow. The data transmission capabilities of the PDA can then be used to load the inspection data into a web-based system for storage and further processing.

Working with Field Diagnostics, the inventor and manufacturer of the Service Assistant™, KEMA has significantly expanded the range and functionality of the platform. First, we have programmed inspections and expanded the range of measure savings analysis to encompass the full range of HVAC measures. These include Quality Installations, as defined in the Work Papers accompanying this proposal, economizer restoration, and duct repair. The KEMA platform also supports calculation of costs and benefits for measures covered in the upstream programs, including unit replacement with high efficiency equipment.

In addition to the expanded range of measures covered by the inspection and savings calculation protocols, the KEMA platform includes an automated sales report generator that resides on Field Diagnostics' web server. When the contractor uploads inspection data, the report generator processes that data into energy savings estimates for selected measures. The report generator also estimates project costs (based on contractor estimates of unit costs provided as part of the training process – see below) and the applicable incentives. The

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

report generator then delivers a fully-formatted investment analysis to the contractor that can be given to the customer as a sales proposal.

KEMA and Field Diagnostics have used this system for a full year in the NSTAR program and have made many improvements to ensure reliable field operation and marketing effectiveness. However, the system will need some small revisions to account for local climate, measure definitions, and incentive structure. The system provides the further advantage of creating a database of all system inspections completed and measurements taken. This database can be used as a sample for inspections, to track the progress of individual contractors, and to generate verified energy savings estimates in at any point

- ***Standards for other inspection systems.*** KEMA is aware that there are other automated or assisted HVAC unit inspection systems in the market, and that some contractors who may wish to participate in the program may already have invested time and money in adopting those systems. KEMA will accept incentive applications for repairs indicated and verified using those systems, including Quality Installations. However, to ensure consistency, we will develop a set of technical criteria that approaches other than Service Assistant™-based systems must meet. We will publish these criteria and distribute them to contractors as part of the contractor recruitment process.
- ***Establish measure definitions and incentive schedule.*** We have included extensive discussion of measure definitions (for those not covered by DEER) in the Work Papers. ***Develop incentive processing/work management system.*** KEMA will adapt the on-line project management system it has deployed for the San Diego B.E.S.T. program for use in this program. That will allow contractors and to submit incentive applications on-line and will greatly facilitate program management.
- ***Develop marketing plans and materials.*** Working closely with our subcontractors Geltz Communications and Better Buildings, Inc., KEMA will develop detailed marketing plans and associated materials. It will be important for materials to be completed and marketing underway as we recruit contractors into the program. Key marketing initiatives will include:
 - A direct mail/call center operation directed primarily at residential and small business customers with large cooling loads identifiable through billing analysis.
 - Call center operation to support participating contractors.
 - Personal representation to national accounts and other customers with large fleets of packaged units.
 - Coordinated cross marketing with other programs.
 - Development of a program website.
 - Coordination, to the extent possible, with SDGE's corporate branding activities.

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

See the response to Question 14 for more detail on our proposed marketing concepts and activities.

On-Going Program Operations

- **Contractor Recruitment.** KEMA will concentrate contractor recruitment efforts in the period from October through February when maintenance operations generally run at a slower pace than during the summer. In the first year we will be getting a late start on the upcoming cooling season and will extend recruitment efforts into the cooling season. The objective is to assemble a cohort of 20 – 25 contractors whom we will train prior to or early in the cooling season, and then work with that group intensively through the cooling season to ensure that they actively market and deploy program products and services. Based on previous experience, we expect some attrition from this group during and after the cooling season. Our goal is to have 40 active contractors in the program by the 2008 cooling season.

In our current programs, we have been successful in recruiting contractors through the following mechanisms.

- *Personal program representation.* KEMA has many contacts with contractor trade and HVAC industry organizations that we can use to generate qualified lists of contractors. The SDGE territory is sufficiently compact to allow for economical personal representation to larger contractors. Our program manager will oversee and take part in this operation, which is crucial to program success.
- *Exhibits and presentations at trade shows and industry exhibitions.*
- *Program launch events.* Mid-way through the recruitment period we have staged launch events in the form of workshops open to interested contractors. The workshops prominently feature talks by contractors who have used advanced diagnostic techniques to increase the profitability of their maintenance operations through enhanced revenues, better customer retention, and reduced costs. We find this to be the best motivator for enrollment. Of course, the launch events cover program objectives, operations, and incentives.

Once a contractor agrees to participate in the program, KEMA will obtain a signed Memorandum of Understanding from the contractor that obliges the company to make staff available for training, to purchase required equipment, and to make best efforts to market program services to customers.

- **Contractor Training.** KEMA will provide a two-day on-site training sequence to each contractor that enrolls in the program. We have found this to be the most economical and effective approach for a number of reasons. First, multiple technicians in a given firm must be trained in order to generate the volume of inspections, repairs, and quality installations required for program cost

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

effectiveness. Second, effective sales of efficiency-oriented services requires cooperation from sales and business management staff as well. For example, it will be someone other than the technician who downloads the sales reports and sells repairs and upgrades to the customer. Items covered in the initial training include:

- *Principles and application of diagnostic-driven repairs.* KEMA trains technicians to use the Service Assistant™ and related software systems through a combination of classroom instruction and hands-on application at a ‘live’ site.
- *Maintenance service sales.* KEMA staff will train contractors’ sales staff and management on general principles of selling maintenance services, up-selling efficient equipment, and use of the “back end” of the report generator system.
- *Software installation and troubleshooting.* KEMA staff will install the Service Assistant™ and report generator software on the contractors’ PDAs and computers and perform tests to ensure that they function properly to produce reports from field data. They will also load contractor costing information into the report generator based on the results of an interview with the business manager. This is a key element in reducing the costs and learning curve for use of diagnostic systems.

See our response to Question 10 for more on the content of the training sessions.

- ***Ongoing Contractor Support.*** KEMA program staff will provide phone support to contractors who require assistance with any aspect of the program, the inspection protocol, or the report generator. We will also provide one additional day of on-site support per cooling season to train additional technicians and ensure that the inspection system and report generator are working properly.
- ***Program Web Site.*** KEMA will develop and maintain a program web site that will perform the following key functions.
 - *Contractor resources.* In an area accessible only to participating customers, KEMA will programs and documents that will be useful in selling and delivering program services. These include sales tip sheets, case studies, brochures, savings calculators, Manual J instructions, and so forth.
 - *Customer marketing.* The main part of the web site will provide information to customers on the benefits of program measures as well as contact information for participating contractors.
- ***Incentive Processing.*** For most measures, contractors will need to submit a records for pre- and post-installation or repair inspections. The use of the Service Assistant™ and its web-based data compilation and management capabilities greatly facilitates this process. There will be some exceptions to this practice. Documentation for Quality Installation measures will consist of a completed inspection checklist along with the “test in” results for refrigerant charge and airflow. Similarly, incentive payments for the Night Ventilation

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

measure will be paid upon delivery of invoices for materials and installation labor. Given the newness of the measure, we will likely require a post-installation inspection prior to authorizing incentive payments.

KEMA engineering staff familiar with HVAC technology will review all incentive applications to ensure that they comply with program rules, meet eligibility criteria in regard to customers and technology, include all necessary information, and provide plausible savings estimates. The program will be structured so that incentives can be disbursed to either the customer or the contractor.

All information from the incentive application, along with relevant records from the inspection and report generator system will be stored in a single database to support program management and evaluation.

- ***Quality Assurance and Inspections.*** KEMA program staff will conduct onsite inspections of at least five projects completed by each participating contractor. We will concentrate our efforts early in the contractor's participation in order to identify and correct any problems technicians may be having. Also, we will focus primarily on Quality Installations and economizer restorations because post-installation measurements will provide less information on the quality of these kinds of measures versus charge adjustments and duct sealing.

11. Customer Description

See our response to Question 4, which contains an extensive description of the proposed markets for this program.

12. Customer Interface

The program will be presented to commercial customers through the following channels.

- ***Contractor Sales.*** We anticipate that contractors will be the primary channel for acquainting customers with the program. KEMA will take the following steps to ensure that contractors communicate the benefits and relevant operations of the program in a way that is easy for customers to understand and use.
 - ***Program brochures and fact sheets.*** KEMA will prepare program brochures and fact sheets that clearly communicate the nature of program services, the benefits customers will obtain through those services, and the mechanics of program participation. Based on our experience, we are confident this information can be conveyed in very short formats, such as a 3-fold mailer, with plenty of graphics and white space. KEMA will provide copies of these fact sheets to contractors, as well as electronic templates to which contractor logos can be added.
 - ***Training.*** The initial contractor trainings will cover appropriate characterization and representation of the program to customers.

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

- **Direct Marketing.** KEMA staff will carry out direct marketing under close supervision by our Call Center manager. The program manager will be responsible for scripting all direct mail and phone protocols to ensure that program incentives, customer benefits, and means for contacting participating contractors are accurate.

13. Energy Measures and Program Activities

13.1. Prescriptive Measures

See SDG&E February 1, 2006 Workbook

13.2. kWh Level Data

See SDG&E February 1, 2006 Workbook

13.3. Non-energy Activities

13.3.1. Activity Description

Technical Training

Technical training will cover the following topics.

- **Basic operations of the refrigeration cycle.** A short refresher to set the stage for the discussion of diagnostic techniques.
- **Theory and application of HVAC diagnostics.** Relationships between operating parameters such as line temperatures, line pressures, air flow, and amperage to common installation and operational problems.
- **Use of diagnostic tools.** Instruction on the use of the Service Assistant™ and accompanying data communications and analysis software.
- **Guidelines for quality installations.** We will use guidelines developed by the Consortium for Energy Efficiency, ACCA, and the Energy Star program as sources for a streamlined introduction to this topic.
- **Hands-on application of diagnostic tools.** All trainings will include use of the Service Assistant™ on a 'live' customer site, uploading and analysis of site inspection data, and production of a sales proposal using the report generator.

KEMA expects to work with other utilities and market participants in California to ensure that program technical training integrates with the rapidly developing NATE/ACCA training and certification program and with training to support recent building changes.

Sales Training

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

Sales training will be oriented to proprietors and sales managers, and will cover the following topics.

- ***The business case for selling and delivering energy efficiency.*** It is our experience that contractors will not accept a one-size-fits-all statement of the business case for energy efficiency. Rather, we have found it most useful to explore the relevance of various potential benefits in a open discussion with participants from specific firms, then focus on how those firms can achieve their goals through promotion and delivery of efficiency-oriented services. The potential elements of the business case include: reduction in costs of delivery for contract maintenance service; expansion of scope and revenues from contract maintenance services; differentiation and positioning vis-à-vis competitors; increased revenue and margins from efficient equipment sales (up selling); customer retention. KEMA will develop a number of concrete strategies that participating contractors can pursue for achieving each of these objectives.
- ***Organization of the sales function.*** As mentioned above, technicians are called upon to identify opportunities for up selling, quality installations, and diagnostic-driven repair. However, their jobs are not structured so as to handle the selling and delivery process end-to-end. This portion of the sales training will develop a map of sales functions to individuals in the participating firm. As part of the feedback from the training process, KEMA will deliver to the main contact for each participating contractor a nicely formatted version of this map, as well as a step-by-step flow chart for delivering proposals, services, and rebate applications.
- ***Value propositions.*** The value propositions to the customer for efficient equipment, quality installation, and diagnostic-driven repair are fairly well understood. They include reduced operating costs, reduced emergency down time, longer equipment life, greater occupant comfort and productivity, and reduced emergency repair expenses. KEMA will provide participating contractors with concrete examples of these customer benefits (based on actual experience in California and elsewhere) that can be used as part of the sales presentation. We assume for the purposes of this proposal that all midstream service providers have already developed site assessment tools and calculators for identifying potential efficiency measures and for quantifying potential energy and demand reductions.
- ***Effective proposals.*** KEMA will prepare a number of templates of effective proposals that participating contractors can use to present opportunities to customers. These templates will be designed to integrate the results of the various diagnostic tools and programs that participating contractors use. We will also provide more general guidelines for development of effective proposals that participating

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

contractors can use to customize the proposal templates or to develop their own sales documents.

- **Objections, effective responses, typical closes.** KEMA will provide a brief “traditional” sales training package to participating contractors that applies well-known sales principles to the products and services promoted by the program. This component of the package will not be designed as an exhaustive, professional-level course. Rather, it will introduce the non-sales personnel in the delivery chain to the requirements of effective selling (one of which is timely development of proposals). It can also serve as a quick reference to issues in selling efficiency services for more experienced sales personnel.

13.3.2. Quantitative Activity Goals

The table below displays quantitative goals for the training activity.

Quantitative Goals for Training Activities

Category/Outcomes or Indicators	Year		
	2006	2007	2008
Number of contractors participating in training v. goal.	20	30	40
Number of technicians and sales persons trained on systems.	60	80	110

13.3.3. Assigned attributes of the activity (market sector, end use)

KEMA will offer the training exclusively to participating HVAC contractors in the SDGE service territory.

14. Subcontractor Activities

The following paragraphs summarize the activities of subcontractors that will be working with KEMA on this program, as well as their qualifications to carry out those activities.

- **Geltz Communications.** Geltz Communications will take primary responsibility for the development of customer marketing strategies, materials, and activities. Geltz Communications is a full-service marketing firm that specializes in promotion and sales for energy efficiency programs. The company is currently engaged in marketing energy efficiency programs for the following California utilities: Pacific Gas & Electric, Southern California Edison, San Diego Gas & Electric, SoCal Gas, Los Angeles Department of Water and Power, the Pasadena Department of Water and Power, and the Southern California Public Power Authority. Geltz Communications won the National ENERGY STAR for Small Business Award

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

in 2003 for its work in support of the Small Business Energy Alliance Program in California. The company has won ten other industry awards for its work in support of various other energy efficiency programs. Geltz Communications is a Certified Woman-Owned Business Enterprise by the California Public Utilities Commission.

Christine Geltz, the founder and CEO of Geltz Communications will lead the company's work on this program. Ms. Geltz has 23 years of experience in marketing communications management. She has developed a wide range of communication strategies and tools for Pacific Gas and Electric, Southern California Gas Company, and San Diego Gas and Electric. She has also worked with the municipal utilities of Los Angeles, Pasadena, Glendale, and Riverside, as well as the Southern California Public Power Authority and other public and private energy and water-related companies. In addition, Ms. Geltz is currently providing communications expertise for series of demand response and dynamic pricing pilot programs throughout the state.

- **Dale Gustavson, Principal, Better Buildings, Inc.:** Mr. Gustavson will participate in developing marketing strategies and materials for the program. A former vice president of a design/build electrical contracting company, Dale provides consulting and training to contractors, engineers, consultants, manufacturers, utilities and agencies throughout the U.S. He helps these stakeholder groups more effectively design, market, sell, apply, and support energy management projects. Director Emeritus of the California State Chapter of the Air Conditioning Contractors of America, (CAL-ACCA), long time editorial advisor to *Contracting Business* magazine, and Program Advisory Committee to the PIER "Energy Efficient & Affordable Small Commercial & Residential Buildings Program," Dale authored and helped implement the nation's first advanced diagnostic program for light commercial HVAC, "HVAC PACT."
- **Field Diagnostic Services, Inc., Todd Rossi, President:** Field Diagnostics will undertake the modification and management of the web-based field data collection and proposal generator software and associated data storage, analysis, and communication systems. Field Diagnostics develops and manufactures the HVAC Service Assistant, a device that automates collection of operating parameters for rooftop units *in situ* and provides prescriptions for maintenance, repair, or replacement. Dr. Rossi oversees all aspects of Field Diagnostics operations, including development of technology, software, and solutions for the HVAC industry. Dr. Rossi received his Ph.D. in Mechanical Engineering from Purdue University, where he pioneered techniques for automated fault detection and diagnostics of heating, ventilating, and air conditioning equipment. Among his current projects, Dr. Rossi is performing work for the CEC an automated monitoring and fault detection system that is embedded in rooftop packaged air conditioners that will report out alarms and operating data.

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

- **Dale Rossi, Senior Consultant, Better Buildings, Inc.:** Dale Rossi will serve as a senior trainer for the program. Proprietor of a large HVAC service firm in suburban Philadelphia and the most experienced professional nationwide in the technical and commercial applications of the Service Assistant. He has personally trained more than three hundred HVAC technicians in the use of this tool and dozens of managers in the use of ServiceAssistantOnline. Mr. Rossi has developed effective “I’m a tech, just like you” classroom and field training curriculum for the Service Assistant, support manuals for managers and their technicians, CD-ROM-based training in Advanced Refrigeration Diagnostics built around, not only his field experience, but on having collected, analyzed and sorted thousands of diagnostics records for the purpose of identifying the best targets for energy efficiency. Dale is the most compelling voice for the use of advanced portable diagnostics in the HVAC contracting industry today.
- **Marshall “Buck” Taylor, Principal, Roltay, Inc:** Mr. Taylor will serve as a senior trainer for the program. A current and former manager of several HVAC energy efficiency market transformation programs in the Northeast U.S., Mr. Taylor is highly experienced in contractor training in the technical and commercial applications of the service assistant, and is currently the technical lead in the U. S. Environmental Protection Agency’s ENERGY STAR Commercial HVAC Program. Mr. Taylor has led developed and implemented field training curricula for contractors on advanced diagnostics for energy efficiency programs in Connecticut, Massachusetts, and New York State.
- **Glenn Friedman, P.E.** Mr. Friedman will assist in developing guidelines and requirements for diagnostic systems and technical methods to be used in the program. Mr. Friedman is currently a principal at Taylor Engineering, a large California mechanical engineering that serves the commercial sector. He is a former national president and technical director of the Air Conditioning Contractors of America (ACCA). He has also been deeply involved in the development of the HVAC provisions of Title 24. His design/build projects include hospitals, chemical refineries, manufacturing, schools, casinos, municipalities, offices, malls, restaurants, hotels, retail and high-end custom residences throughout the California. Mr. Friedman is an experienced air and water balance professional, NEBB certified as an Air and Water Balancing Supervisor and a LEED™ Accredited Professional.

15. Quality Assurance and Evaluation Activities

KEMA expects to carry out the following quality assurance activities.

- **Review of inspection records:** Participating contractors who use the Service Assistant™ system will automatically upload all inspection results and records to Field Diagnostics web servers. KEMA staff will have full

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

access to those records. As in our other programs, we regularly review and analyze those records to ensure that the inspections were carried out correctly under appropriate ambient conditions and that all required data were entered. If we note patterns of problems from specific contractors or technicians, we contact those individuals directly to review correct operation of the equipment and performance of tests and inspections.

- **Review of incentive applications.** As discussed above, all incentive applications will be reviewed for completeness and technical quality by KEMA staff familiar with HVAC technology.
- **Inspections.** KEMA engineering staff familiar with HVAC technology will carry out inspections of completed repair and quality installation projects. Essentially, we will use the inspection protocols associated with the individual measures as well as the completed inspection forms to guide the quality assurance inspections. Any discrepancies between the recorded details of the projects, as well as any problems with installation or current operation will be noted and brought to the attention of the appropriate contractor and/or technician.

16. Marketing Activities

All marketing efforts for this program will generate customer demand or ‘pull’ for the services offered by participating contractors, using the most direct means available. We proceed from the following observation gained through managing similar programs. Most contractors, even large ones, do not have the marketing and sales resources required to generate significant volume for what constitutes an essentially new service. Their sales resources are focused primarily (and appropriately) on traditional equipment and contract maintenance lines. In order to realize the significant energy savings potential offered by this market and set of measures, the program will need to communicate directly with customers, educate them to the value of the new services, and direct them to participating contractors. KEMA proposes to undertake the following marketing activities to accomplish these objectives.

- **Independent lead development: residential and small business customers.** KEMA will organize and operate a direct marketing campaign designed to yield qualified leads for participating contractors. The campaign will consist of the following elements.
 - *Data mining to identify prospects.* KEMA will analyze residential and small business (<10 kW) customer billing records to identify those with abnormally high air conditioning consumption. KEMA has already developed the billing data handling programs and analysis techniques through its work on SDGE’s mail-in audit program and through similar programs for small businesses in other jurisdictions. The analysis will yield a list of customers who could most benefit from HVAC system repair or replacement.

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

- *Direct mail outreach.* KEMA and its marketing subcontractors will develop and send direct mail pieces to residential and small business customers of record who show high levels of air conditioning use. The piece will inform the customer that they are paying very high amounts for air conditioning, inform them of the services and benefits of the program, and provide an 800 number for further information. Customers will also be given a web site address where they can directly request program services.
- *Phone follow-up.* KEMA call center staff will call customers who do not contact the 800 number of web site. The call will gather information about the age and size of the air conditioning unit and whether maintenance contracts are already in place. Once this information is gathered, the call center staff will follow the appropriate script to inform the customer about available program services (including equipment upgrades via the Upstream Program). If the customer is interested and so authorizes, the call center staff will assign the customer to a participating contractor to schedule an inspection or sales call for new equipment.
- **Direct marketing support to participating contractors.** With the permission and support of participating contractors, the KEMA call center staff will conduct a similar direct marketing campaign to up to 20 commercial customers identified by each participating contractors. Any leads or interest developed through these calls will be forwarded to the sales manager or proprietor of the company that provides the customer contact.
- **Personal representation to national accounts.** Retail and restaurant chains, mall management companies, and supermarket chains represent the most important commercial markets for this program, based on their high intensity of cooling end use and multiple facilities. KEMA has found that the most effective way to approach these companies is through their corporate facilities departments. These managers work within a financial framework that supports the investment and fleet management models that lie at the heart of our program concept. They also have access to multiple facilities and direct knowledge of upcoming budgeted construction projects that the program could affect. Through our work in other jurisdictions, KEMA has already established connections to corporate energy managers in a number of the retail chains represented in the SDGE market. These include PetCo, Home Depot, Papa Gino's, Walgreen's, Target, Costco, and Marshall's (TJX companies). The KEMA program manager will approach these and similar customers individually and attempt to recruit them, along with their current contractors into the program.

Based on our experience with similar programs, we believe that these direct marketing activities will not only be most effective in generating timely customer interest, but will also provide clear, concrete value to participating contractors. This, in turn, will help solidify contractor allegiance to the

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

program and, we believe, encourage them to invest their own resources in training and supporting technicians and sales staff who deal directly with customers.

- **Marketing support.** As discussed above, we will undertake a number of activities to support the direct marketing efforts described in the previous three bullets. These include.
 - Coordinated cross marketing with other programs.
 - Development of a program website that allows customers to enroll directly for program services.

17. CPUC Objectives

The HVAC Training Installation and Maintenance Incentive Program that KEMA proposes to implement squarely addresses the major policy objectives that the California Public Utilities Commission lays out in Attachment 3 of its Energy Efficiency Policy Manual, v. 3, Part II.

High level of program savings. Given what we believe to be very reasonable assumptions concerning the level of contractor and customer participation, the cost-effectiveness calculator yields very high levels of energy savings. Specifically, the program will yield average annual electricity savings of 50 million kWh and lifetime savings of 245 million kWh. Projected CEC demand reduction totals 10.8 MW, with estimated annual gas savings of 93,000 therms.

High cost effectiveness. Projections using the cost-effectiveness calculator show very high net benefits for the program. The estimated program's TRC is 2.65, with \$28.3 million in lifetime net benefits. The estimated PAC is 3.62 with \$32.8 million in lifetime net benefits.

Capturing Lost Opportunities. Most of the projected savings for this program derive from capturing lost opportunities. This is clearly the case for the Quality Installation measures. The mechanics of HVAC system installation are such that problems leading to inefficient operation are likely to go undetected for several years, when they may (or may not) lead to comfort problems. It is relatively easy and inexpensive to prevent these problems during installation. Similarly, the entire HVAC contract maintenance business can be viewed as one very large lost opportunity. Each year, purportedly qualified technicians service thousands of residential and packaged commercial air conditioners in the SDGE service territory, at a societal cost of millions dollars. This enterprise could yield enormous energy savings, but it yields hardly any due to lack of commercial motivation, training, and appropriate tools. This program has the clear potential to change that situation.

Avoidance of cream skimming. This program neatly avoids cream skimming by promoting practices that, at present, have very little presence in the market.

Improvement of capacity utilization and lowering of peak loads. Given that the air conditioning end-use is highly concentrated in peak periods, the proposed

2006-2008 Energy Efficiency Programs

HVAC Training, Installation & Maintenance Concept Paper

program scores high in this regard. This is apparent from the results of the cost-effectiveness model, which yield high CEC peak reductions relative to annual energy savings.

Balance of portfolio funding across market sectors. The program provides services to both the commercial and residential sectors, working through one contractor base as the primary delivery channel. The program also makes use of one technical platform to serve these diverse customers. Finally, we have made provision, through the direct marketing campaigns and coordination with other program vendors, to provide services to hard-to-reach small businesses. KEMA's call center has Spanish, Korean, and Vietnamese language capability.