DE ANZA COLLEGE
ENERGY MANAGEMENT
TECHNOLOGY PROGRAM

FINAL REPORT

June 15, 1995

California Energy Commission
Needs Assessment Survey
California Community Colleges
Contract #400-92-003
By De Anza College

Needs Assessment Survey of the

California Community Colleges

Submitted to the

California Energy Commission

June 15, 1995

By De Anza College

To realize energy savings,
the California Community Colleges must consider energy efficiency
as a fundamental part of their mission statements
as a "core" value for
each college and the system as a whole.

ABSTRACT

The purpose of this project is to develop and implement a needs assessment survey of energy use within the California Community Colleges. Eighteen geographically selected community colleges were surveyed over a two year period to assess energy use, the skill level of maintenance personnel and barriers to achieving energy efficiency within the community college system.

The needs assessment survey demonstrated a lack of continuity in the dispersal of information on training, monetary savings, maintenance strategies and new technologies in relation to energy within the California community college system. There was some general knowledge of energy and its importance but few colleges translated this into policy. All colleges identified the need for a comprehensive training program for energy management staff but few opportunities existed due to a lack of time, funds and commitment.

Each site is unique and works independently from other colleges with regards to energy. There are few good examples of the leadership necessary within the decision hierarchy to promote energy efficiency. A partnership must be created between the government agencies, colleges, utilities and business community to provide the technical knowledge and support, leadership and policy making guidelines which will be used in the promotion of energy efficiency. Some entity needs to provide a foundation and network for this partnership. De Anza is ideally suited for this task with its excellent communication facilities including satellite networks, internet capabilities and a track record of accomplishments.

To realize energy savings,
the California community colleges must consider energy efficiency
as a fundamental part of their mission statements
as a "core" value for
each college and the system as a whole.

A long term plan was developed at De Anza College to promote energy efficiency education through training, networking, and telecommunications.

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PROJECT SUMMARY

Due to the intense interest and exciting job potential in the field of energy management technology as well as the partnership that has developed between the California Energy Commission (Commission), Pacific Gas and Electric Company and De Anza College, the De Anza Administration committed staff and resources necessary for the creation of an Environmental Studies Program. A key component of the program is energy education/management. This interest in the environment and energy has permeated all curriculum and personnel within the campus.

De Anza College continues to provide in-kind support such as office space, staff support, equipment use and an advisory role for this project. The EMT staff continues to pursue additional monies for curriculum development for the energy training programs at De Anza. The EMT staff has received Vocational Education (VATEA) monies for this program and staff will begin course development in June, 1995. Staff continues to work with the college's support personnel to apply for military retraining funds, government grants and funds from private foundations for Phase 2.

The seed money provided by the Commission contract and any additional support is an important part of a larger project which will be based at De Anza College.

The partnerships that are developing and envisioned include the State Agencies, educational institutions, utilities, private industry and the military.

The Commission provided the initial seed money which was an essential part of the success of these innovative programs and partnerships. Hopefully, this initial effort will result in a permanent program linking all agencies in an effort to promote energy efficiency throughout the state of California.

OBJECTIVES OF PROJECT

The proper management of energy within the California community college system is an important environmental as well as an economic issue.

The initial survey goals of the EMT Program were to:

1. Determine the energy decision making hierarchy at each college surveyed;

2. Assess the current skill level of the maintenance personnel as well as the projected needs of those workers within the community college system;

3. Determine if preventive maintenance programs exist within the community college system and if they exist at what level are they being implemented;

4. Survey energy equipment and systems as well as the methods of operations of equipment and systems at each college;

5. Determine what energy education programs exist within the community college system; and

6. Discover whether there are any energy curricula present within these colleges.

Goal #1

For this project we set out to assess how energy decisions within the various levels of personnel are made. We also set out to determine how energy was perceived by the various staff levels and how energy information was disseminated to staff. We identified barriers to efficient energy use and ways to promote energy efficiency awareness at each college.

Goal #2

To determine the skill levels, the current and future training needs of the maintenance personnel working with energy equipment and systems at each college. This information will determine the types of courses, networking and strategies that the EMT Program staff needs to develop for this program.

Goal #3

To identify what preventive maintenance (PM) programs exist. This information will determine new technologies, strategies and key personnel necessary to promote successful PM programs.

Goal #4

To provide a sampling of the energy equipment and systems in use within the community college system. This information will be used to develop course work, networking and telecommunication strategies. Networking will be used to share information about development in new technologies and equipment, provide information about the types of energy equipment and systems available and to develop the skills necessary to maintain their own equipment and systems.

Goal #5

To identify energy education programs in existence at the colleges. Any unique or innovative programs were noted.

Goal #6

To determine any energy curricula that exists at the various colleges surveyed.

Summary of Results of the Needs Assessment Survey:

There is a lack of continuity in the dispersal of information on training-

(see pages on training/energy education information for college personnel)

There is a lack of continuity in the monetary savings that could be achieved by colleges

(see pages on actual energy costs, % of total operating costs)

There is a lack of continuity in the maintenance strategies utilized by energy personnel

(see pages on preventive maintenance techniques)

There is a lack of continuity in the new technologies in relation to energy

(see pages on training classes requested by interviewees)

There was some general knowledge of energy and its importance but few colleges translated this into policy

(see pages on responses on college policy regarding energy, responses is energy efficiency a priority at this college)

All colleges identified the need for training, but few opportunities existed due to lack of time, funds and commitment

(see pages on responses on funds available for training, barriers to training and view training as a priority)

As new energy technologies appear daily, it is essential that there be a statewide system to update and educate energy personnel

(see pages on training needs identified by energy personnel)

There are few good examples of the leadership necessary within the community college system to promote energy efficiency

(see Tables 5, 6, 7 on decision making hierarchy models and key indicators of energy efficiency)

The Commission has been a lead agency in promoting energy efficiency within the California Community College System

(see pages on responses to knowledge of the Commission and training sources identified)

The classroom comfort level is a concern within the entire system

(see pages on role of comfort complaint and personal responses of interviewees)

Addressing energy efficiency will improve the classroom climate and both staff and students

A partnership must be created between the government agencies, colleges, utilities and business community

NEEDS ASSESSMENT SURVEY

METHODS

Survey Tool

The EMT staff, assisted by the Commission staff, worked for over six months to develop an effective tool of interview packets for the needs assessment survey. The completed interview packets were given approval by the Commission staff by June of 1993. These interview packets address the six goals of this study.

Two interview packets were developed for the surveys. The college President, Vice President of Administrative Services/Business Manager, Maintenance Director and a maintenance staff member were asked the questions contained in Interview Packet #1 (Appendix 3). There was a total of 120 questions asked of these individuals. A less comprehensive Interview Packet (Interview Packet #2) was used for the interviews with the Division Dean, faculty member and student (Appendix 4). There was a total of 70 questions asked of these individuals. The responses within staff categories as well as the total responses among all colleges were analyzed to discover trends about energy within the community college system.

Some of the problems encountered in the interview process were:

1. Lack of responses by interviewees. (For example, interviewee would not respond to all questions, were unable to respond to particular questions, refused or deferred particular questions to other staff members);

2. Lack of uniformity among staff titles and responsibilities among colleges (Vice President, Business Managers, Budget Directors titles were utilized within the college administration and often had different responsibilities thus were unable or unwilling to respond to particular questions);

3. Schedules and time constraints of staff at the various colleges prevented some of the individuals from being interviewed. (Colleges personnel would not take the time for the interview or were unable due to scheduling conflicts to be interviewed);

4. Due to a lack of knowledge about energy, interviewees appeared apprehensive or unwilling to respond to particular questions; and

5. It was difficult to get interviewees to give only one response or prioritize responses to particular questions and thus multiple responses were often encountered.

Specific questions in the areas of knowledge of energy, decision hierarchy, training, preventative maintenance and energy education were analyzed to determine trends within the community college system.

DATA ANALYSIS

The information collected was compiled in a Claris Filemaker Pro survey data base as well as a Microsoft Excel spreadsheet. Once the surveys were completed, analysis was done using Statistical Package for the Social Sciences (SPSS). Descriptive statistics were obtained from Filemaker Pro and SPSS. Graphical representation of data were provided by use of Excel and Microsoft Power Point.

RESULTS

Twenty of the 107 California community colleges were randomly selected to be surveyed on energy use and management (Table 1). These colleges are a sampling of the California community college system. The criteria utilized to select these college sites were geographic location (interior north, coastal north, interior south and coastal south) (Table 2), density (rural or urban), the size and age of the campuses, the number of student and energy use.

Table 1. California Community Colleges surveyed

College	Date surveyed
Cabrillo College	April 16, 1993
Hartnell College	April 30, 1993
Solano College	June 2, 1993
Ohlone College	July 9, 1993
DiabloValley College	July 15, 1993
Chaffee College	July 22, 1993
Santa Barbara City	July 23, 1993
Bakersfield	August 20, 1993
College of Marin	August 23, 1993
Santa Rosa College	August 27, 1993
Lassen College	September 3, 1993
LA City College	September 9, 1993
Mt. San Jacinto	September 17, 1993
Lake Tahoe College	October 1, 1993
Saddleback College	October 8, 1993
Allan Hancock	November 19, 1993
El Camino College	December 1, 1993
American River	December 7, 1993
Grossmont	January 7, 1994
Fresno City College	January 28, 1994

Eighteen of the twenty colleges surveyed were used for the final data analysis. The first two colleges surveyed were used in the fine tuning of the survey tool thus the data could not be utilized appropriately for analysis for results. In addition to the survey data, we reviewed Commission audits, and obtained training course information from students and commission staff.

Table 2. Regional location of community colleges surveyed

	Interior North	Coastal North	Interior South	Coastal South
% colleges	34%	17%	17%	32%

A cross section of individuals representing all levels of energy use and the decision hierarchy were interviewed at each college. Of the 119 individuals interviewed:

13% Presidents,
13% Vice Presidents of Administrative Services/Business Managers,
15% Maintenance Directors,
14% Division Deans,
17% Faculty Members,
13% Maintenance Personnel,
16% Students.

Knowledge of energy

Of the 18 colleges surveyed

- 44% were aware of the policies regarding energy efficiency for the State of California (Figure 1).
- 56% were not aware of these policies.

- 84% were aware of the California Energy Commission (Figure 2).
- 13% were not.
- 4% were not sure.

- 29% of the colleges had a District energy policy.
- 33% did not have a policy.
- 38% were unsure if their District had a policy relating to energy.

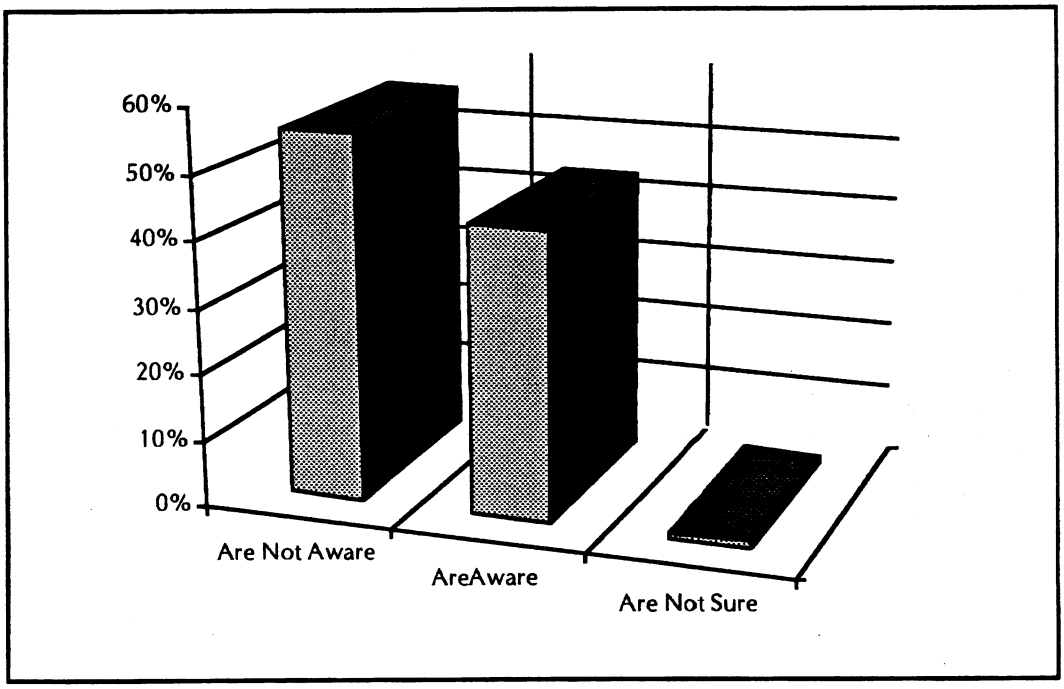


Figure 1. Response to survey Question. Are you aware of the State Policy?

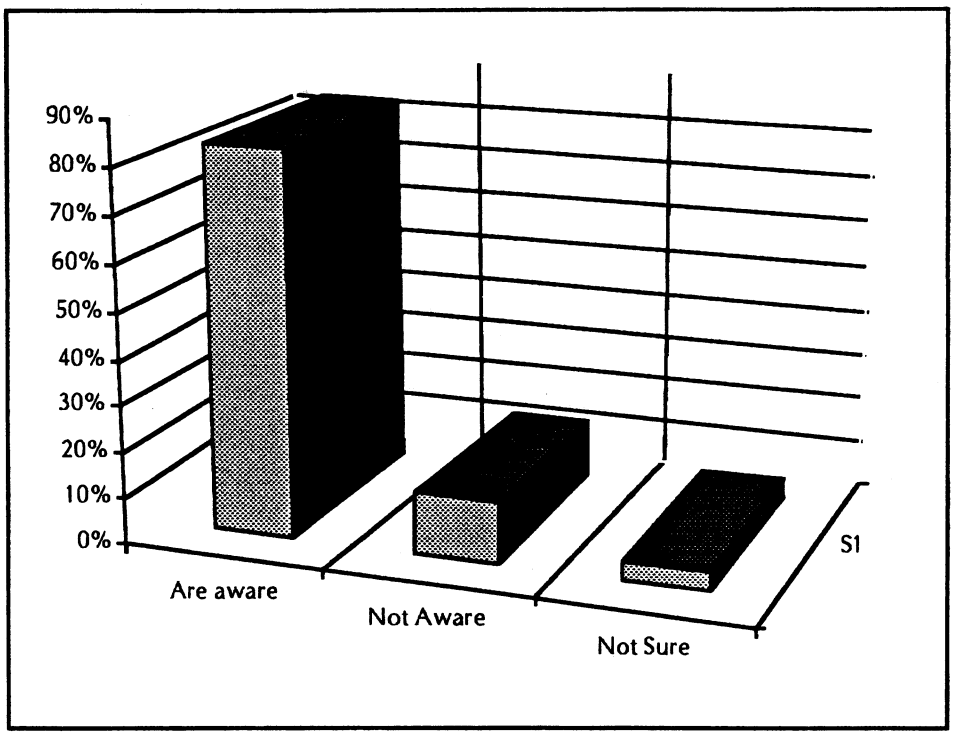


Figure 2. Response to survey Question: Are you aware of the California Energy Commission? 84% are aware.

Although there was some general knowledge and awareness about energy and state agencies dealing with energy, the knowledge of energy costs at individual colleges was quite variable. In response to a question of what are the energy costs at your college answers ranged from a low of $2,500 to a high of $25 million. Yet in response to the question of whether energy efficiency was promoted at the college, 71% responded yes and 26% responded no while 4% were unsure. Actions did not support this statement.

There was a general feeling that energy efficiency was important but respondents were unable to identify methods for achieving efficiency savings. When surveying faculty, students and staff about the level of support for energy efficiency by the college only 25% stated that it was a high priority.

In addition, methods for saving energy costs were not widespread and limited to selected individuals and/or programs. 81% of the respondents indicated that they were aware of energy rebate programs and 61% had contact with their local utility representative. Yet only 62% participated in a variety of different energy rebate programs. Even with this education regarding energy and contact with their local utility companies, 40% stated that energy costs were rising. In spite of these rising energy costs only 36% of the colleges utilized a computerized energy tracking system which may be the single best method to monitor energy costs.

71% of the respondents stated that they track their energy bills using a variety of methods and schedules logs, ledgers and computers.

Decision hierarchy

We identified 6 models of the decision hierarchies within the various colleges visited (Table 3).

Table 3. Model of Decision Hierarchies

Model	Administration	Narrative
Model One	President/Supt. dictates decisions.	Poor model. Energy efficiency may not be a priority because a lack of communication with the various levels involved with the energy decision making process are not involved.
Model Two	Business Manager dictates decisions.	Fair model. Depending on the business manager and the level of communication with the Director of Maintenance, energy efficiency may be a priority but occasionally was not.
Model Three	Director of Maintenance dictates decisions.	Fair model. Energy efficiency becomes a higher priority but depends upon the level of cooperation and communications with higher management.
Model Four	President/Business Manager/Director Maintenance Team *(only 3 of the 18 colleges surveyed met this criteria).*	Excellent model. Energy efficiency will be a high priority at this campus. All levels of the decision hierarchy are actively promoting energy efficiency (i.e. in the budget process, energy costs tracking, new construction design and oversight, selection of energy equipment /systems, preventive maintenance scheduling and training of maintenance personnel.
Model Five	Business Manager/Director Maintenance Team	Good model. Energy efficiency may be a high priority but communication with the president is not present and thus full implementation at the level of the above model may be lacking.
Model Six	President /Director of Maintenance Team	Good model. Energy efficiency may be a high priority but communication with the business manager is not present and often budgetary and logistical constraints on implementation of energy efficiency may not be considered.

Model Four is an excellent example of an energy decision making hierarchy in which all levels of the college community are involved in the decision making *(Only 3 of the 18 colleges surveyed met this criteria).*. All levels of the college community are interacting and communicating to promote energy efficiency as well as reduce energy costs. The president provides the oversight and authority for the implementation of a campus philosophy which views energy efficiency as a major goal and objective for the college. The president also communicates directly with the Board of Trustees for the college district which makes the final decisions regarding energy.

The vice president of administrative services/business manager oversees the financial concerns and priorities for the college. Providing the necessary resources for energy efficiency (i.e. a budget item, training budget, scheduling of facilities, energy costs tracking and purchase of equipment) is often under the control of this individual.

The Director of Maintenance is often the individual most knowledgeable about energy efficiency, equipment and systems, training of maintenance personnel and preventive maintenance practices. The involvement of this individual in decision making is critical to an energy efficient campus.

Training

96% of individuals stated that staff was encouraged to participate in training and 89% viewed energy training as a priority (Figure 3). 69% of the individuals interviewed stated that there were staff development funds available. Yet only 47% of the individuals interviewed stated that training was included in the Maintenance Department's budget. 37.2% do not receive any training at all. While 41% of those interviewed stated that training was not included in the budget and 12% stated that they did not know if it was included in the budget. 21.2% are not aware of any training programs, classes or seminars. In response to the question, what is your training budget, answers varied from zero to a high of $900,000.

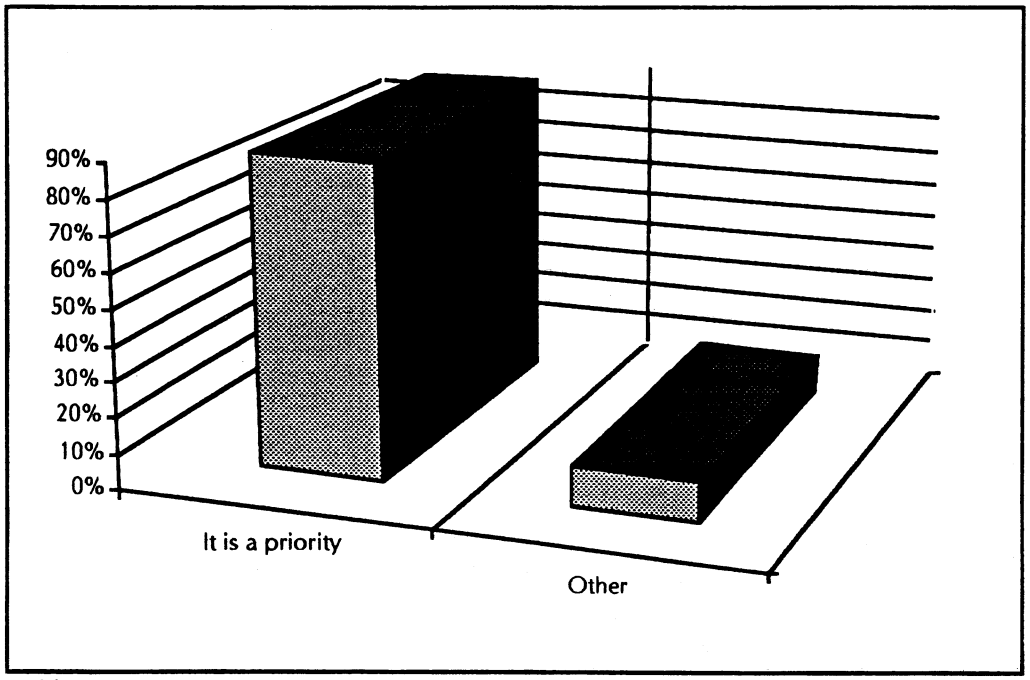


Figure 3. Response to survey question: Do you view training as a priority? 89% do view training as a priority.

If training was a priority, how could there be this lack of knowledge regarding training?

In response to the question about sources of information regarding training programs, 21 % are not aware of any training programs (figure 4).

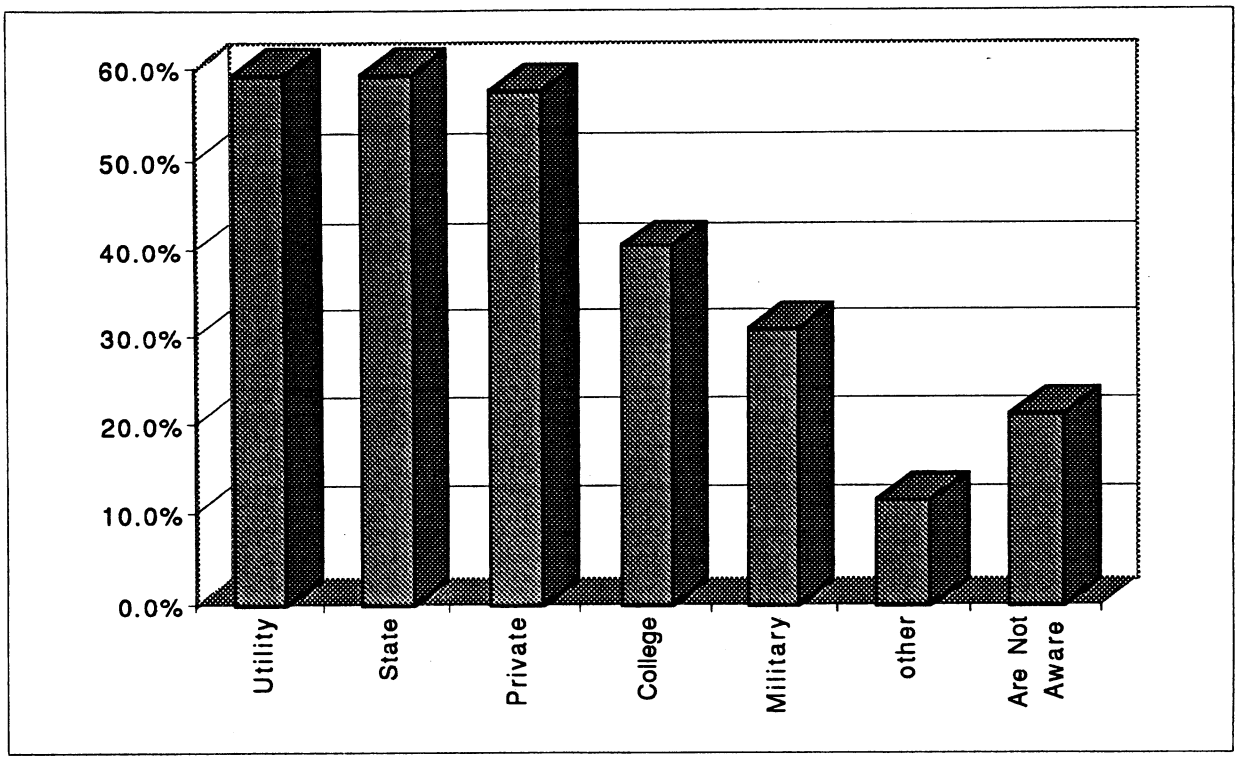


Figure 4. Response to survey question: Are you aware of energy training programs? Note there were multiple responses to this question.

A variety of training needs were identified by community college audits conducted through the Commission (Figure 5) including controls (28%), new technologies (22%), HVAC (11%) and energy management systems (11%) as their primary training need (College Flow Chart). Other responses included safety and health, absorption units, troubleshooting, safety skills, air quality and green lights.

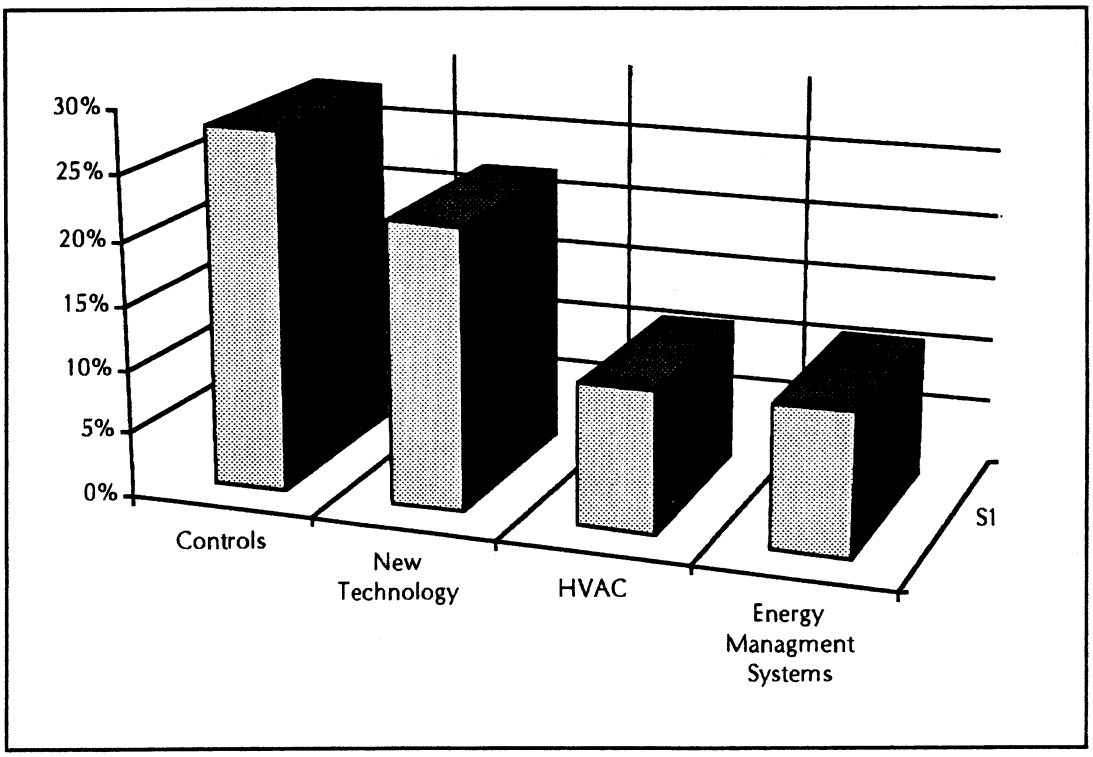


Figure 5. Training needs identified by audits conducted by the Commission.

The following reflects the training needs identified by the Needs Assessment survey.

- 20.5% Controls
- 12.8% Pneumatics
- 12.2% Electrical
- 10.9% Advanced
- 7.7% A Variety
- 5.8% Air Conditioning
- 31.1% Other Classes

This information reflects the same results as those who participated in State training classes listed below (Figure 6).

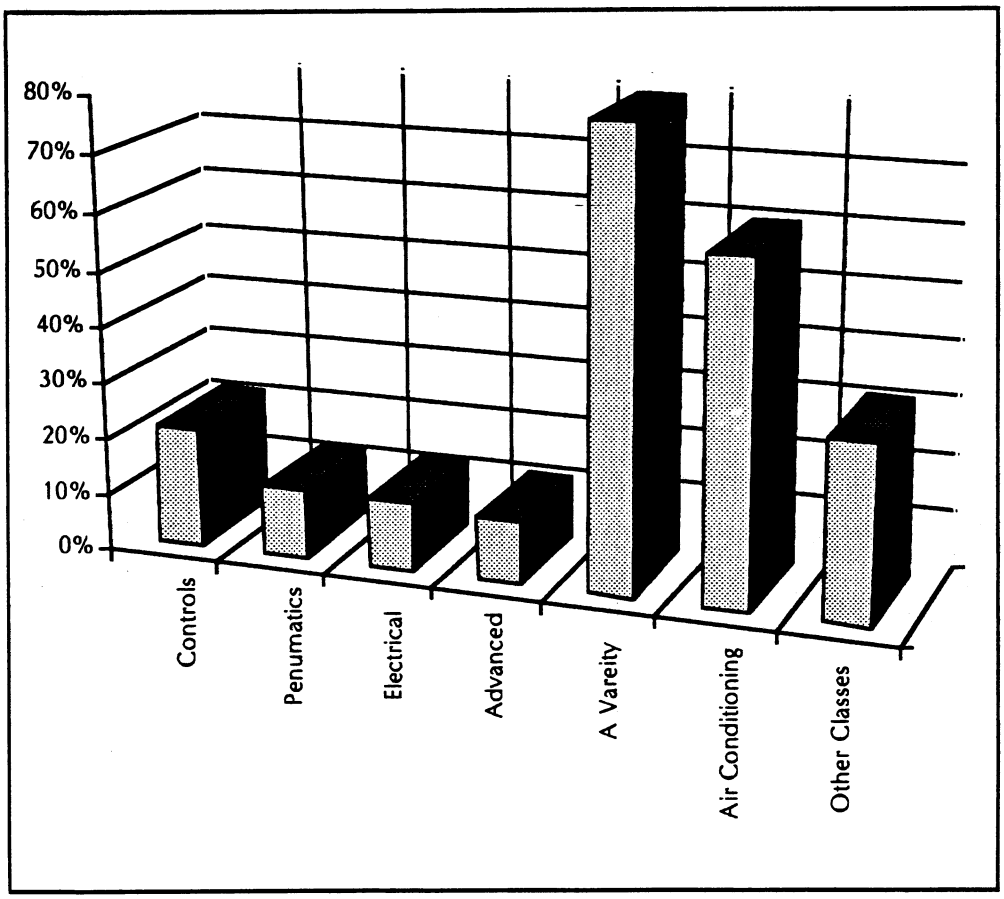


Figure 6. Training needs & wants as identified by 266 Commission Training participants' course evaluations. Note there were multiple responses to this questions. (source: California Energy Commission, Community College Program, 1995)

Training needs identified through energy audits of other California community colleges authorized by the CEC identified the following needs (Table 4).

Table 4. Energy Equipment/systems and Training Needs --(Source: *California Energy Commission, Community College Program, 1995)*

COLLEGE	*TYPE OF EQUIPMENT*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*EMS*
Butte College	Constant volume roof mounted units, gas fired H/W, reciprocal chillers, Evap cond	Reciprocal chillers	Evap condensors				Leviton 2000 EMS
College/ Redwoods	Multizone reheat system, H/W boilers, Roof mounted air handlers, Control units	2/3 day HVAC trng	New technologies				
Feather River Coll	Propane wall heaters, Heat pumps	2/3 day HVAC trng	New technologies				
Gavilan College	H/W heaters	HVAC training					
Kings River Coll	H/W boilers, chillers, package units, self contained units, radiant heat, TES	HVAC training	Basic refrigeration	recripocal comp.	Boilers training	air handlers, Pneumatic controls	
Mendocino College		Pneumatic controls	air handlers				
Merced College	Ceiling mounted units, package a/c units, cooling coils, gas furnaces, central plant	General HVAC	boiler maintenance	centrifi-gual chillers			
Columbia College	Propane heaters/furnaces, elec heaters, heat pumps, chillers	2/3 day HVAC trng	New technologies,	Energy strategies			Johnson Controls
Yuba College	H/W heaters						
Victor Valley Coll	Double duct system, well water cooling, gas fired H/W boilers	HVAC training	Basic refrigeration	Recipro-cal compres	Boilers	air handlers, elec controls	
Taft College	Package roof mounted units, single zone units	PM training	HVAC handling	Reciprocating comp.			HVAC, unident-ified
Shasta College		New technologies					
Porterville College		HVAC training					

Energy Equipment/Systems

Energy systems and equipment identified by the 18 community colleges surveyed are listed in Table 5.

Table 5. Energy Equipment/systems

COLLEGE	*TYPE OF EQUIPMENT*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*EMS*
Allan Hancock	Boilers, Double duct forced air heaters,	HVAC courses	New lighting				Solidyne EMS
	floor heating Tecogen Cogen, Heat pumps	CFC Recycling					
American River	Central Boiler, heating coils, heat pumps,	HVAC courses	New tech-nologies	Controls			Honeywell EMS
	heat recovery cooling, econo-mizer, TES						
Bakersfield	H/W boilers, Cooling towers, economizers, cooling towers	EMS training	New tech-nologies	Fibre optics	controls	computer training	Honeywell EMS
Chaffey College	H/W boilers, co-gen plant, cooling chillers, roof mounted a/c units	Health/safety trng.					Barber-Coleman
College of Marin	H/W boilers, heat pumps, economizers	Boilers	Econo-mizer controls	New tech-nologies			Andover EMS
Diablo Valley	Heat pumps, boilers, absorption chillers, screw compres-sor, a/c window units, VAV	Controls	EMS				Honeywell
El Camino	H/W boilers, heating coils, forced air heat, chiller, package units economiz-ers	EMS	New tech--nologies	Safety/ hazard			Western Powers
Fresno City	Boilers, double duty gas powered units, Evan coolers, econo-mizer, chillers	New tech-nologies	Trades training	water treat-ment	boilers	EMS	Texas Instrument
Grossmont	H/W boilers, roof mounted package units, chillers, economizer, co-gen not operating	Pneumatic controls	EMS				
Lake Tahoe	Forced air heat-ing, chillers, OSA	New tech-nologies	Green lights				
Lassen College	H/W boilers, H/W radiators, chillers, OSA	Elect main-tenance	HVAC training	air quality	safety		Solidyne EMS
LA City	Central High Press boiler, dual packs, individual portable bldg a/c, OSA						Watt Shaver
Mt. San Jacinto	Gas fired roof mounted double duty units	Absorption unit training	Safety trng				Western Powers
Ohlone	Heat pumps, economizers	EMS training	HVAC training	Controls			Yes, unidentified

COLLEGE	*TYPE OF EQUIPMENT*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*TRAINING NEEDS*	*EMS*
Saddleback	H/W boilers, heat pumps, cooling towers TES unit, compressors	HVAC training	Programming	New technologies	Controls systems		Andover 256 EMS
Santa Barbara	Heat pumps, boilers, OSA, double duty packs chillers, boilers	Controls	HVAC				Atherton 2000 EMS
Santa Rosa	H/W boilers, forced air heat, co-gen, roof mounted a/c, chillers, condenser units	pneumatic controls	compressor prog.	New technologies	EMS	Boiler PM	Barber-coleman
Solano	H/W boilers, re-heat coils, centrifugal chillers, OSA	EMS	New technologies				

PM Programs

65% of the colleges had a preventive maintenance program but when asked about specific aspects of their PM program including what work was done and how often the responses were difficult to put into distinctive categories. Some of the responses were "do work as needed, good repair and replacement, HVAC systems, visual checks and clean, grease and check".

Only 7% of the colleges utilized a computerized tracking system for their preventive maintenance program. Other methods of tracking included a "shoe box operation", log books, manually on cards, notebooks, no records and unknown methods!

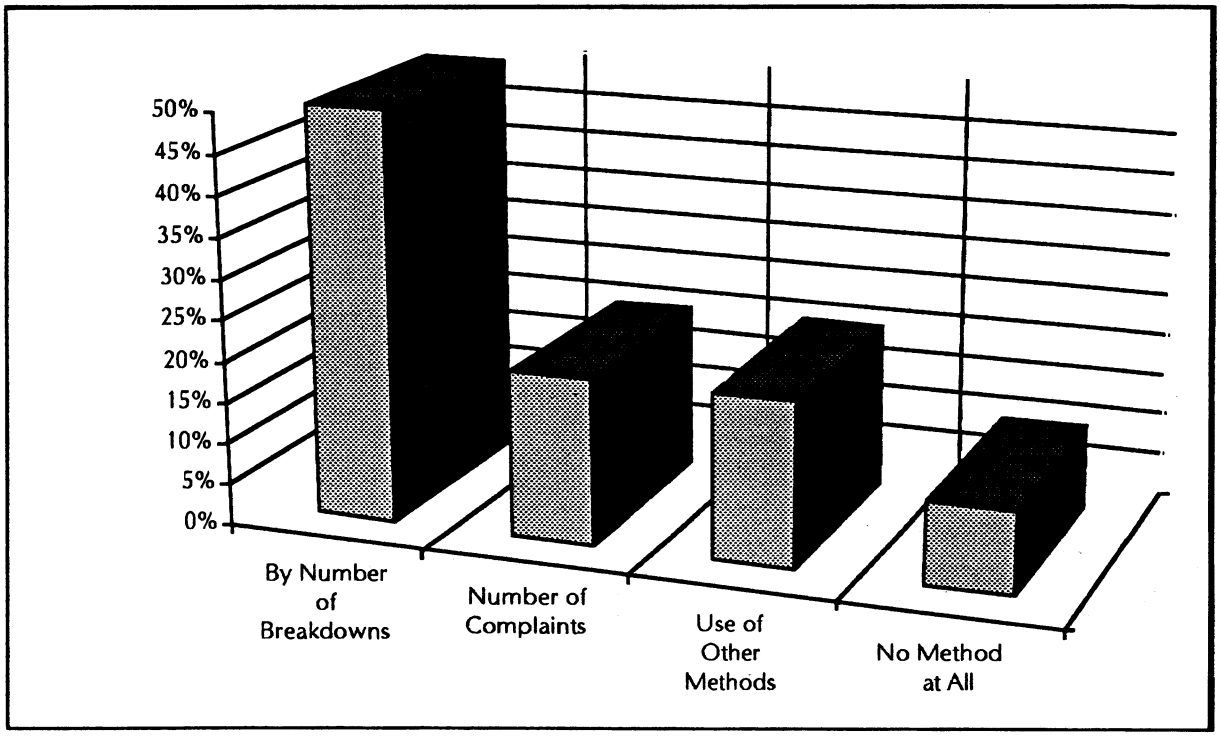


Figure 7. Response to Survey Question: How do you measure successful PM program?

In response to the question, how do you measure a successful PM program (figure 7), responses included the number of emergency calls received, complaints, rate of calls, lack of breakdowns and "if it works okay and if no complaints".

General Preventive Maintenance conclusions drawn from the survey (Figure 8):

- 59.5% of preventive maintenance work was done in-house,
- 32.4% was done both in-house and by outside contractors and
- 8.1% outside contractors.

- 39% stated that preventive maintenance work was conducted daily while
- 26% said that maintenance was done only as needed.

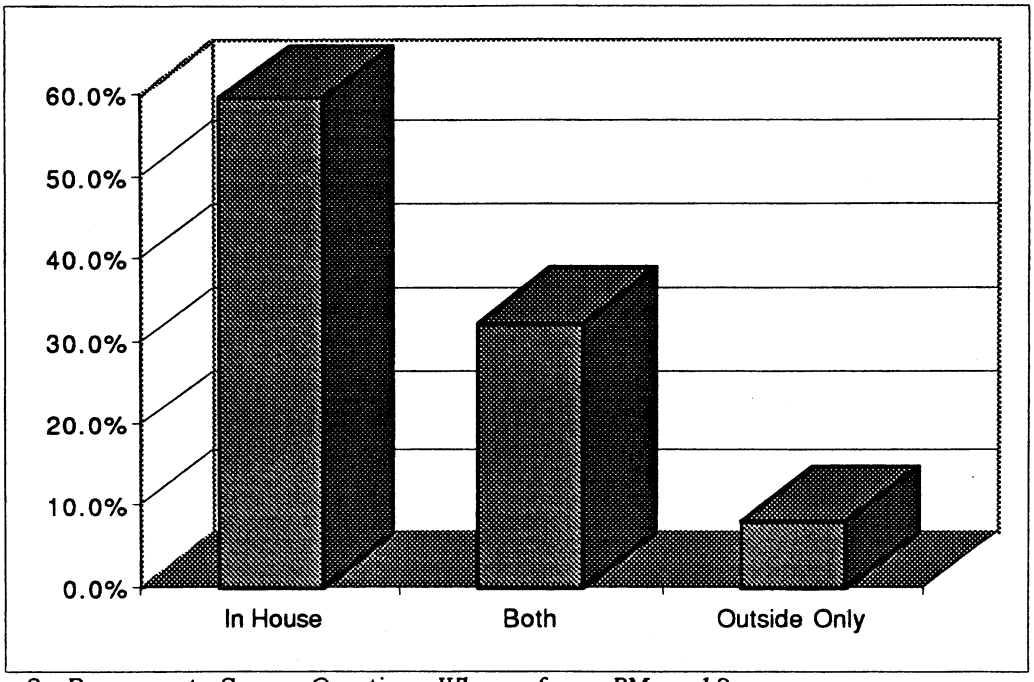


Figure 8. Response to Survey Question: Who performs PM work?

Energy Education

70.75% of the interviewees stated that energy efficiency information was not included in the college handbook and Figure 9 indicates the energy education opportunities within the 18 colleges surveyed

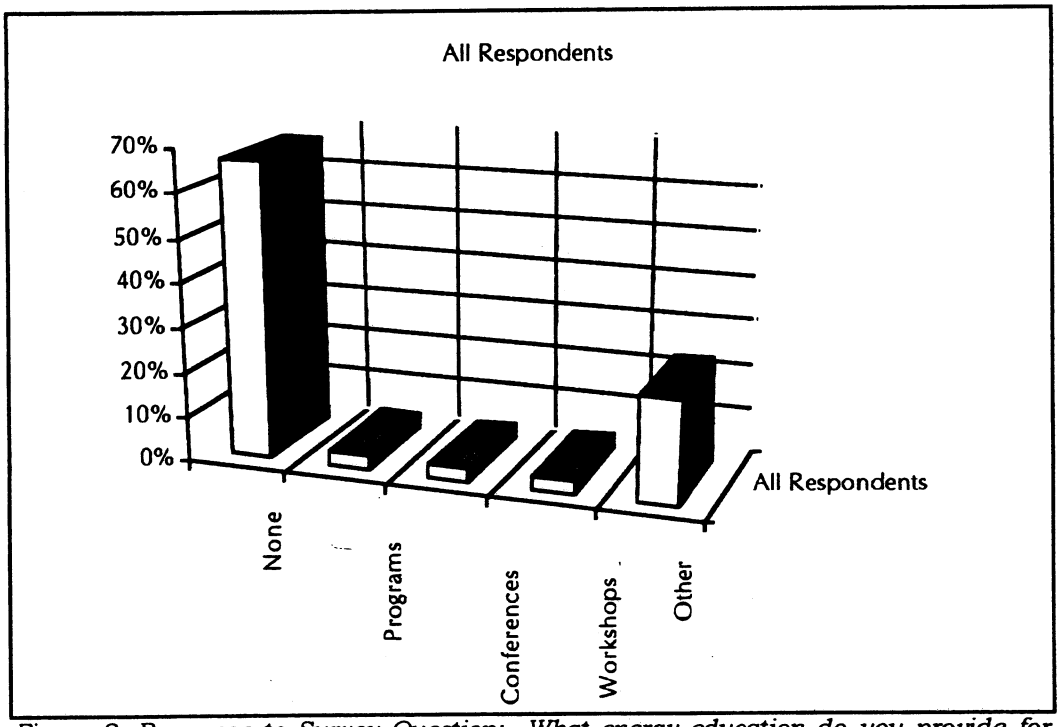


Figure 9. Response to Survey Question: What energy education do you provide for your staff.

Key Indicators for Energy Efficiency

We identified key "indicators" of energy efficiency practices (Table 6). Our survey of the colleges and college personnel demonstrated some key features that gave a good indication of whether the college supported energy efficiency as part of its operating procedures and policy (Tables 7, 8). The colleges that were committed to these key indicators were models of energy efficiency within the community college system (Table 7).

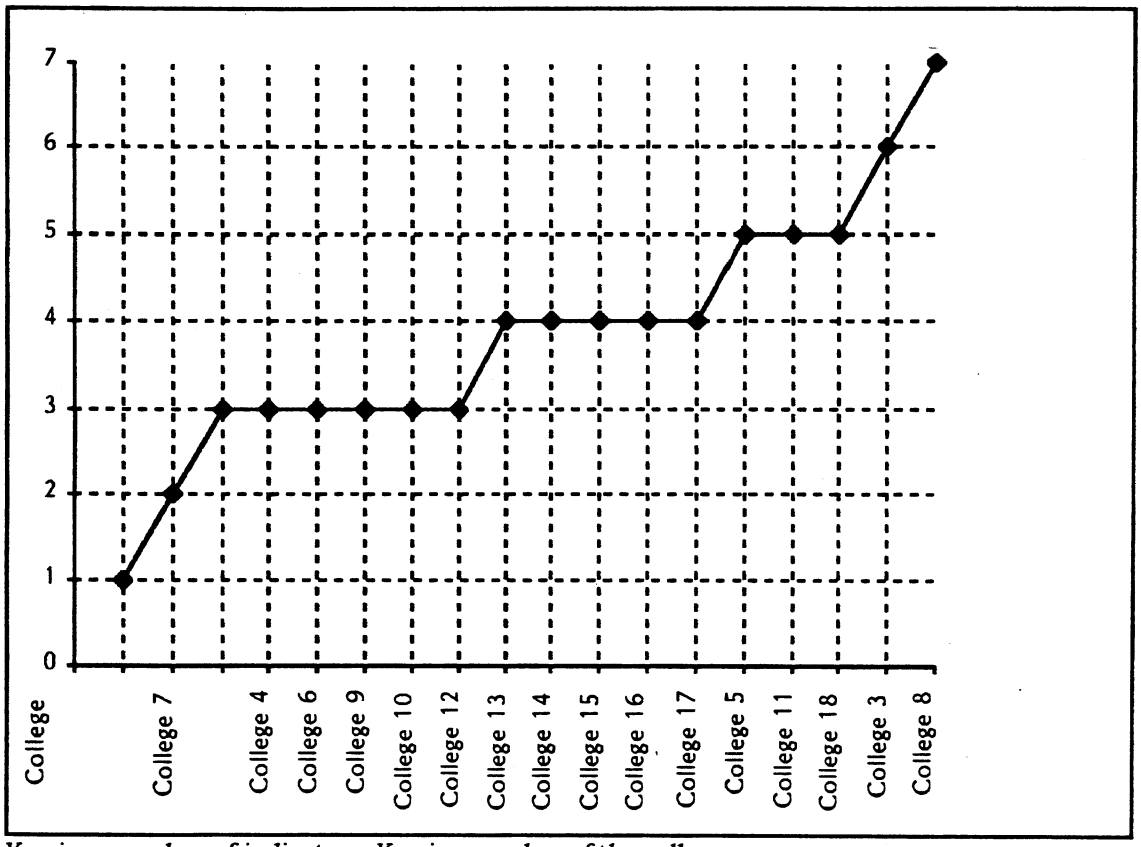
Table 6. Key Indicators of energy efficiency practices

Indicators:	A	=	Yearly Analysis of Energy costs/savings.
	B	=	Measurable goals & Objectives for energy efficiency and related costs by the college.
	C	=	Organized preventive maintenance program.
	D	=	Computerized energy management tracking system.
	E	=	Energy equipment/list including equipment in place and planned purchases of new equipment/technologies.
	F	=	Internal structure of energy decision making hierarchy.
	G	=	Budget and time allotment for training for energy maintenance personnel.
	H	=	Budget and time allotment for energy education for college staff.
	I	=	Energy Management Technician

Table 7. Table & Tally of key indicators of the 18 colleges surveyed

	A	B	C	D	E	F	G	H	I
College 7	X			X					
College 10	X			X					
College 4	X		X	X					
College 6	X		X	X					
College 9	X			X		X			
College 12	X		X			X			
College 17	X		X		X				
College 13	X		X	X		X			
College 14	X		X	X		X			
College 15	X		X	X	X				
College 16	X		X	X	X				
College 11	X		X	X	X	X			
College 18	X		X	X	X	X			
College 3	X		X	X	X	X	X		
College 5	X	X	X	X	X	X			
College 8	X	X	X	X	X	X			X

TABLE 8. Table & Tally of key indicators of the 18 colleges surveyed



Y axis = number of indicators, X axis - number of the college.

CONCLUSIONS

There is some general knowledge about energy among the colleges, but because of financial, personnel and time constraints there is little action with regards to this knowledge. There is some acceptance at each college that energy is a true priority, however, they all need to understand why it is important.

- **71% of all those surveyed are not aware of the college or the districts' energy policy.**
- **Energy cost estimates range from $2,500 to $25,000,000.** *The unrealistic figure of 25 million was given by the college's president.*
- **21.2% are not aware of any training programs.**
- **37.2% do not receive any training at all.**
- **63.8% receive all of their training on the job.**
- **41.1% either do not have or are not aware their preventive maintenance program.**
- **25% do not monitor their preventive maintenance program, and 50% measure success by the number of breakdowns.**
- **62.3% of new maintenance personnel do not receive any training related to energy efficiency.**

Issues

There are three issues within the community college system that must be addressed if energy efficiency is going to be achieved:

- the lack of knowledge about energy at each individual college; and
- the lack of knowledge about energy within the entire community college system.
- energy efficiency must be considered a fundamental part of the mission statement or a "core" value for the community college system as a whole.

Issue Number One

To address the lack of knowledge about energy, each college must evaluate their energy programs to determine their present situation in terms of energy policy, tracking energy use and savings, preventive maintenance programs, training programs and energy education.

Each college should **develop a policy** to address the following issues regarding energy:

- What are the energy costs?
- How can the energy costs be reduced?
- How do they implement, measure and evaluate energy use and savings?
- What are the long range goals for achieving additional energy savings?
- Who will manage, implement and evaluate these measures?

The analysis must be more than just a superficial financial analysis of the utility bills. There must be a consistent and coherent commitment at each college.

Each college should develop a reliable and valid method of evaluating their **preventive maintenance program** for energy equipment and systems. The PM programs should address the following:

- What is the current PM Program?
- How often is the PM work done? By whom?
- How can they increase efficiency within the PM Program?
- How will they measure their PM Program?
- Who will manage, implement and evaluate these measures?

Each college should develop a policy to address the **training of maintenance personnel** that work with energy equipment and systems. The training program must begin with an assessment of the following:

- Skill level of the energy personnel at this college
- Skills necessary to enhance energy savings at this college
- Training needs at this college
- Barriers to energy training at this college

Each college must commit to a plan for **educating all college personnel and students** about the savings potential of energy efficiency. That plan should contain the following:

- A policy and or mission statement supporting education
- Contain clear and achieveable measures that can be evaluated

Issue Number Two

To address the lack of knowledge about energy statewide, the California Community College system must be networked to exchange information about energy savings methods and strategies including energy policy and administration, preventive maintenance, energy equipment and systems and training.

Each site is unique and working independently with regards to energy. There appears to be no leadership or organization within the community college system despite the opportunities provided by the Commission and utilities. There needs to a partnership created which provides technical knowledge and support, leadership, measurable goals and objectives and policy making guidelines. Some entity must provide a foundation for this network of support with good communication facilities including satellite networks, internet capabilities and a track record of accomplishments in this regard.

Our pilot program will provide measurement tools for goals and objectives, a clearinghouse for information on energy technologies, training opportunities for all levels within the college hierarchy and an education network for exchange of ideas.

Issue Number Three

To improve the classroom environment and realize energy savings, the California community colleges should consider energy efficiency as a fundamental part of their mission statements or a "core" value for each college and the system as a whole.

- If the California Community College system commits to achieving energy efficiency the energy savings potential could be tremendous.

Energy costs for these 18 colleges are in the millions - - a 30-50% drop in this in annual savings is possible if a commitment to energy took place.

If we applied our model college (Table 3) as a base line for energy/commitment to the other community colleges, a potential savings of $24 million annually could be achieved (Table 9).

Table 9. Estimated energy savings within the Community College system

Number of Community Colleges	Average Cost	Savings %	Annual $$ Savings
107	743,000*	15 - 30%	12 to 24 million
		In 10 years up to	240 million

*Based upon surveyed colleges and their energy records

The Commission has been a lead agency in promoting energy efficiency within the California Community College system. The Commission has funded energy audits, provided staff and technical support and was a sponsor of HVAC workshops for colleges throughout the state.

The energy audits conducted in the early 1990's, utilizing the services of private vendors, often provided the only technical support and information for colleges about energy costs and savings. The utilities were identified as providing some technical and financial support through energy rebates and many of the colleges had contact with their local utility representatives.

The California Community College system needs a comprehensive, coherent plan for achieving energy efficiency at the 107 colleges. The colleges need a network to interact with other college personnel to be able to interpret the technical nature of energy information as well as learn ways to evaluate their training needs, preventive maintenance programs, energy equipment and systems and energy education.

The Commission provided the initial commitment and seed money for this project. The primary objective of this project is to develop a framework for a successful energy program and network within the community college system.

The second phase of this project described in the following section contains information on how to implement energy efficient measures in a cost effective way. If the college has few resources, we can provide information that colleges can do to commit to energy savings.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM

LONG TERM PLAN

The mission of the Energy Management Technology (EMT) Program at De Anza College is "to promote proper energy use and management within the California community college system through the use of training and energy education programs".

Partnership

De Anza envisions formation of a partnership that will become the model for cooperation in promoting and educating the public and others about energy technologies.

This program will be based at De Anza College but will also utilize the facilities of utilities, other community colleges and universities and local business. De Anza will work cooperatively with these agencies to combine resources and expertise so as to address energy issues, cooperate in developing appropriate energy training programs and provide an information network and resource base.

a partnership must be created between the government agencies, colleges, utilities and the business community

The De Anza College Energy Management Technology Program will develop a training program which provides career enhancement opportunities for California Community College personnel who work with energy equipment and systems, retrain the existing work force on energy technologies and recruit new students into the field of energy technologies. The program will also provide a network for energy education for schools, colleges, business and other institutions.

This project would focus on the following ***goals and objectives:***

1. ***To reduce energy costs for community colleges and industry***
2. ***To establish a state energy management policy for the community college system***
3. ***To establish a state standard for site surveys for community colleges and industry***
4. ***To provide a vocational training program for enhancing the skills of energy personnel, create opportunities to retrain the existing work force and recruit new students in the field of energy technologies***
5. ***To provide a network to link community colleges, utilities, government entities, industries and the public***

Goal #1:
To reduce energy costs for community colleges and industry

To develop a training program for community college and industry personnel that work with energy systems and equipment, educate personnel about energy efficiency strategies, provide information about technological advances in energy efficiency, utility rebate programs, funding resources, vendor information and regulatory compliance issues.

Goal #2:
To establish a state energy management policy for the community college system and industry

To develop a model for the new construction of facilities which incorporates energy efficiency design standards in the areas of HVAC, controls, lighting, motors, refrigeration, energy management systems, window glazing, building orientation and other energy savings devices. This model would be used as an energy management policy for retrofitting and new construction design.

Goal #3:
To establish a state standard for site surveys for community colleges which promotes proper energy use and management within the community college system.

To develop a site survey which determines the decision making hierarchy, assesses the skill level and training needs of the maintenance personnel, assesses the preventive maintenance programs, surveys energy equipment and systems, determines the energy education programs and curricula available and determines future needs for education within the community college system.

Goal #4:
To provide a vocational training program for energy personnel

To develop a training program which will provide training opportunities for Community College and industry personnel who work with energy equipment and systems, retrain the existing work force on energy technologies and recruit new students into the field of energy technologies.

The training program will focus on developing a well trained work force that is up to date on new energy efficiency standards, utility rebate programs, technologies, operation and maintenance of equipment, regulations and trends. This program will provide ongoing training for energy personnel of technological advancements in energy systems and equipment.

The training program will provide a foundation for the development of certificate and degree programs, short courses, seminars, workshops and others. This program will include the development of video training tapes, manuals and other supplemental course materials. This course work will be taught at community college and university sites, utility resource and training centers and local satellite facilities. This trained work force will satisfy market demands in the areas of maintenance and operation personnel and energy management technicians.

Goal #5:
To provide a network to link community colleges, utilities, government entities, industries and the public

This communication system will link community colleges, utilities, government agencies and business to combine resources and expertise so as to address energy issues, cooperate in developing appropriate training programs and provide a network and resource base for other agencies in the country.

ACTION PLAN FOR LONG TERM VISION

Action #1
Training Program

Implement a training program at De Anza College commencing Winter, 1996. Initially this program would train energy management technicians at De Anza to oversee energy management systems within the community colleges.

Action #2
Energy Communications Network - EnerG Net

As funding is obtained, these programs will expand throughout the state using De Anza's extensive satellite telecommunications facility, Long Distance Learning Center, Advanced Technology Center and the Business and Industry Institute as the vehicles for implementation.

A communication energy network (EnerG Net) would be based at De Anza. Utilizing the satellite telecommunication facility, the Internet and other telecommunications, De Anza College would provide the network for schools, colleges, utilities, government agencies, business and industry and the public to "link-up" on issues related to energy. This link-up could include customer education, energy personnel communications, energy education, vendor information, share energy success stories, network energy equipment/systems information, update knowledge on rebate programs, explore new technologies and developing markets and current information on local, state and federal laws and regulations on energy.

Action #3
Teleconferences

Three teleconferences highlighting energy are planned for Fall of 1996, Winter and Spring of 1997. These will be three hour teleconferences which will target not only personnel that operates energy equipment and systems but also the managers which make decisions involving energy. Technical manuals, video tapes and other training materials will be developed to supplement these teleconferences.

These teleconferences will be marketed to any interested parties, so that these programs will be provided to the California Community Colleges at a minimal cost.

Teleconference #1
Energy makes "Cents" for colleges

Teleconference #1 scheduled for Fall of 1996 will highlight the various methods for lowering energy and maintenance costs, improving operation efficiency and investing in training and career development for energy management personnel. This teleconference would provide opportunities to showcase the partnership and energy network, training programs and upcoming classes. In addition interactive sessions would allow participants to share success stories, exchange information about energy equipment and systems, explore the role of local, state and federal agencies with regards to energy and interact with utilities and vendors.

Teleconference #2
New Energy Technologies

Teleconference #2 will focus on new energy technologies as well as energy savings devices and equipment. This teleconference will showcase model applications of energy technologies throughout the state including energy management systems, electronic ballasts, T-8 lighting, motion sensors, controls, air handlers, passive solar design, photovoltaics and thermal energy storage. Vendor information and utility rebate opportunities will also be explored. Effective training and preventive maintenance program for energy equipment and systems will be discussed. The colleges will have an opportunity to identify training needs and desired courses.

Teleconference #3
"What, where and what if of controls"

Teleconference #3 will be the first technical teleconference and will highlight and showcase controls for energy equipment and systems. Such topics as "what, where and the what if of controls" will be discussed as well as how to select the appropriate control systems for specific functions. This teleconference will provide an opportunity for energy personnel to share information and experiences regarding this technology.

Action #4
Site Surveys

Site surveys of the remaining 87 community colleges would be initiated to more fully identify barriers to energy efficiency, promote energy education of staff and further identify training needs for energy personnel. These data will be used to develop a set of state standards for site surveys of schools and colleges which will help in establishing guidelines for early design and review for new construction, financing options, meeting utility guidelines, rebate programs, equipment and systems information and training options.

Summary

This partnership will become the "model for cooperation" in promoting and educating the schools, colleges, institutions, utilities, local, state and federal agencies and the public about the importance of energy efficiency design, practice and implementation.

PROGRAM IMPLEMENTATION

The Energy Management Technology Program at De Anza College is a part of the Environmental Studies Program. We will develop curricula for an energy management technician to coordinate and oversee the energy management systems and equipment at schools and colleges, government agencies, business and industry.

This technician will oversee the scheduling, maintenance and preventive maintenance of these systems, train personnel on the upkeep of these systems, educate other personnel about wise energy procedures and keep the facilities up to date on new technologies including rebate programs, state and federal grants and other potential money saving techniques. This includes working with the facilities coordinators to schedule building use at optimum efficiency.

The technician will generate monthly reports on the energy savings generated from appropriate scheduling and maintenance of the energy systems. The technician will continue to advise the facilities on the appropriate or timely retrofits or replacement of energy equipment or systems, demonstrate energy savings, payback, life cycle cost analysis as well as methods of financing projects.

The A.A. Degree and Certificate Program in Energy Management Technology will be implemented by Winter, 1996 at De Anza College.

De Anza College

De Anza College, a nationally acclaimed leader among community colleges, offers outstanding curriculum, excellent student services, a beautiful campus, state of the art facilities and exceptional faculty and staff. De Anza, located in Cupertino, California, is one of the largest two year colleges in the nation with over 26,000 students enrolling each quarter. De Anza College has been recognized as one of the top five community colleges in the nation according to a national survey.

De Anza has always played a key role in bringing technology to the community college system. In 1985, the first satellite downlinks were installed at De Anza and an uplink was established from Tandem Computers. Former President A. Robert DeHart established the California Community College Network in 1986 to link colleges in California. In addition, DeHart was one of the founders, in 1988, of the Community College Satellite Network (CCSN).

According to De Anza's current President, Martha Kanter, De Anza and Foothill Colleges have "lead the nation in educating the present and future workforce. Our colleges were the first among institutions of higher education to reach out to local companies with on-site courses and programs delivered exclusively for employees. We have educated, trained and retrained thousands of employees in hundreds of businesses throughout Silicon Valley".

This college has state of the art facilities including the De Anza Television Center, Advanced Technology Center, the Long Distance Learning Center, the Foothill-De Anza Business and Industry Institute, an extensive Vocational Educational Program and the Flint Center.

De Anza Television Center

De Anza's Television Center began satellite teleconferencing in 1989. During the 1990-91 academic year, the Television Center produced eleven national teleconferences. Teleconferencing services have been utilized by Stanford University, National Technological University, California State Department of Education and Merck Sharp & Dohme, among others.

The Television Center has two production studios, one production studio which can accommodate 30 participants in an interactive mode and a Ku band uplink and two additional downlink dishes. The Center operates two community cable channels, networks with six cable companies for the Community College Consortium, a group of six South Bay colleges offering telecourses. During each academic year, the Television Center produces 300

instructional programs for the college. There are currently 750 students taking courses in television production and the center employs 50 hourly and student assistants. The Television Center has been honored both locally and nationally for its telecourse operations and access productions.

Advanced Technology Center

A 76,000 square foot, $20 million, Advanced Technology Center (ATC) with video and computer technologies incorporated into the facility, opened its doors for instruction in the Fall of 1994. The Center includes television, computers, computer graphics, CAD/CAM/CIM areas, a television studio, production space and a 100 seat teleconferencing auditorium. The ATC will be the site for multimedia production efforts.

Long Distance Learning Center

The Distance Learning Center at De Anza College has offered distance learning courses in twenty different disciplines from seven divisions for twenty years. Distance Learning has one the largest learning enrollments in the nation with approximately 9,000 students taking courses by television each year. Some of the courses are pre-produced telecourses from PBS, courses developed by instructors or live, interactive courses broadcast from the Television Center.

Distance learning provides educational opportunities in a non-traditional setting for students who want to learn at their own pace in an environment that fits their work and personal schedules.

The Foothill-De Anza Colleges Business and Industry Institute

The Business and Industry Institute was established in 1981 to help employers train and retrain their workforce to meet the changing needs of society. They offer a full range of cost-effective on-site programs and services including courses, seminars and workshops to increase productivity and improve quality. The Business and Industry Institute has the capability to develop in-house training, provide comprehensive training programs, develop customized curriculum, retrain employees and deliver certificate and degree programs on site. Some of the employers utilizing these services include Amdahl, Hewlett-Packard, Tandem Computers and United States Geological Survey.

Vocational Education Program

De Anza College offers a variety of quality programs in career training including Automotive Technology, Business Management, Computer Information Systems, Electronics Technology, Film and Television Production, Industrial Technology and Machine Tool Technology. Thousands of students from a variety of age groups, ethnic backgrounds and educational levels have achieved their educational goals through these programs.

Flint Center

Adjacent to the Television Center is the Flint Center which seats 2,600. This facility has been used for company meetings, stage productions, satellite connections and lecture series.

Funding Sources for Program

The California Energy Commission provided the initial seed money to develop and implement a needs assessment survey of energy use within the California Community College System as well as develop a preliminary plan for training maintenance personnel involved with energy equipment and systems. This contract has allowed us to investigate the training needs of energy personnel within the community colleges surveyed. As a result of this study, De Anza College has committed the staff and resources necessary for the creation of an Environmental Studies Program of which Energy Management Technology will be a key component. This interest in the environment and energy has permeated all of the curriculum and personnel within the campus.

In addition to the Commission's original contract, the Environmental Studies Program has received state funding for program expansion and curriculum development in the area of energy management. The Environmental Studies Program was one of eight programs within De Anza that received a two year grant for vocational training (VATEA) for the 1995-96 and 1996-97 academic years. These additional monies will allow us to develop the program, courses, articulate with other community colleges and universities and pursue partnerships with local industry, government agencies, educational institutions and utilities.

Commencing Spring, 1995, the Environmental Studies staff will seek funding for the partnership highlighted above. Potential participants include the California Energy Commission and other state agencies, Federal agencies, the utilities, business and industry, private foundations and other educational institutions.

Partnership with other community colleges and universities

De Anza will work with other community colleges and universities to seek out existing programs related to energy as well as develop new training opportunities for maintenance personnel and others. De Anza will be the clearinghouse for these courses and will provide a network for other colleges to seek out the best training media for their institutions or community.

This network will be integrated into a statewide program which will continue to identify the training needs of energy personnel and provide degree and certificate program opportunities.

This program will work in close collaboration with the Commission, utilities and energy vendors.

APPENDIX

Appendix 1

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
SUMMARY OF PROJECT

This final report is submitted to California Energy Commission (the Commission) staff member Michael Magee on this 15th day of June, 1995 in compliance with the California Energy Commission contract #400-92-003. This contract agreement between the Commission and De Anza Community College was entered into by both parties on December 17, 1992. Quarterly report #1 was submitted to the Commission on February 17, 1993. Quarterly report #2 was submitted to the Commission on June 28, 1993 along with a Preliminary Data Analysis Report on July 15, 1993. Quarterly Report #3 was submitted to the Commission on October 22, 1993.

The purpose of this project is to develop and implement a needs assessment survey of energy use within the California community colleges, establish a steering committee and develop a long term plan to promote energy efficiency as well as develop a preliminary plan for training maintenance personnel involved with energy systems and equipment within the California community college system.

Work Authorization #3 was initiated by CEC staff on August 5, 1993. The deliverables under this Work Authorization as well as those stated under Work Authorization #2 are completion of the college visits, development of Quarterly Report #3 and generate the data base for these surveys as well as establishing methodology for the data analysis. Work Authorization #4 was initiated in late 1993 and the final report and analysis were the final products of this contract.

Appendix 2

ACKNOWLEDGMENTS

We would like to acknowledge the following individuals for their assistance and effort during this project. The California Energy Commission, Efficiency Services Office staff, including Don Kazama, Kae Lewis and Wendell Bakken provided invaluable input and direction during the implementation of this contract.

Michael Magee has worked tirelessly on this project over the last two years. He has provided positive feedback, direction and input on all aspects. Michael Magee has spent many hours attending the site surveys, participating on the Technical Advisory Committee meetings, communicating with De Anza staff and reviewing the project guidelines and final report objectives. His efforts were an essential part of this project.

Larry Doleman, Pacific Gas and Electric, provided assistance through all phases of this project. He spent many hours attending meetings at De Anza, working with staff to develop partnership ideas and guidelines and tirelessly supported the concept of a college/government/utility link up.

We appreciate the efforts and work of the Technical Advisory Committee members.

We appreciate the continued assistance provided by past and present De Anza College staff, students and administration including De Anza College President Martha Kanter, Mick Sullivan, Claudette Penner, Lori Prouty, Jorge Guevara, Gladys Penner and David Barney. We thank Claudette and her staff for their invaluable support and dedication to the project. Her efforts and enthusiasm for vocational education will be missed at De Anza College. We would like to acknowledge two students, Grace and Marcus Johnson for their efforts in this project.

We would like to acknowledge and thank the 20 colleges surveyed for their time and assistance during our preliminary surveys for this project. Without their willingness to assist staff during site visits, this survey would not have been possible. We hope our efforts result in opportunities for increased energy efficiency for each campus.

Most importantly, we thank the California Energy Commission for funding this contract over the last two years. Without their leadership and vision for a commitment to energy efficiency within the California Community College System, this project would not have been possible. We look forward to further association with the Commission.

We look forward to implementation and participation in Phase 2 of this project. If all of our dreams are realized, energy efficiency could become a critical part of the 107 community colleges' goals and objectives in the near future.

5/7/95

Julie Phillips, De Anza College

5/8/95

Al Guevara, De Anza College

5/7/95

Jim Anderson, De Anza College

5/7/95

Mark Grzan, De Anza College

Appendix 3

Interview Packet **Date**_____
College_____

Maintenance Director:_____
VP Business/Administration:_____
Maintenance Personnel:_____

DE ANZA COLLEGE SURVEY

1. Energy Decision Hierarchy

A. Energy Policies

1. Are you aware of policies regarding energy efficiency for the State of California? If yes, describe:

2. Are you aware of the California Energy Commission? If yes, describe:

3. Does your College/District have an energy policy? If yes, describe.

a. How is your energy policy implemented?

B. Knowledge of energy/utility expenses for District

1. What percentage of your total operating costs do you think goes towards energy?

2. What do you think the energy costs at this campus are?

3. Do you track your energy bills? If you track your bills, do you have a computerized tracking system?

4. Are your utility bills increasing/decreasing? Reasons?

5. Do you have contact with your local utility representative?

6. Are you familiar with utility rebate programs? If so, which ones:

C. Energy Decision Making Process

1. How do you define energy efficiency?

2. Is energy efficiency promoted on this campus?

If yes, describe:

a. What priority is given to energy efficiency in the decision making process? Rank 1 to 5:
(1 = top priority; 5 = lowest priority)

b. How have energy efficiency decisions been initiated in the past?
Specify: maintenance, administration, or business office?

c. What has been the level of support for energy efficiency by campus management?

3. Are decisions to purchase equipment and/or make improvements dictated by upper management?

4. Do you have any input into decisions made?
Describe:

5. Does your District have a Budget Committee?
If so, are you a member?

6. In making decisions regarding capital investments or improvements what criteria is utilized by the decision makers?
Specify: initial costs, pay back, life cycle

a. Are the long term benefits of energy efficiency considered along with the first costs of a project?

7. How would energy improvements typically be financed?
Specify: capital outlay, deferred maintenance, lease-purchase arrangements, state resources

Specify others:

8. Describe the decision making process on your campus:
(Sketch a flow chart)

2. <u>Skill level of maintenance personnel</u>

A. Knowledge of energy training programs

1. Are you aware of energy training programs?
   Specify: State:
   Utility:
   Private:
   Military:
   College:
   Other:

2. What type of training do you provide for your in-house maintenance staff?
   Specify: HVAC
   EMS
   Boilers
   Chillers
   Controls
   Filters/filter replacement
   Lighting

3. Who provides the training of in-house maintenance staff?

4. What source was used to obtain technical staff training? (Trade/vocational schools, OJT, ROP, PIC, military, etc.)

5. What types of equipment does your staff maintain? (Boilers, chillers, package units, EMS, etc.)

6. Do you view training as a priority? What areas of training would you like to see made available for your staff?

7. Does your District have an individual career development program with which you identify the training needs of individual employees, allocate hours each year for training and set goals based on individual and District needs?

8. Do you add this item to your department's budget?

9. What is your approximate annual training budget for all maintenance personnel? How many hours or days and dollars are allocated each year per individual for training in your District?

10. What is your greatest need in the area of training for your staff?

11. Do you encourage staff to attend seminars or training workshops?

B. Maintenance Personnel

1. Please list your maintenance staff by title:

2. Please list the apprentice, mid-level and journey level technicians (or equivalent) that you have on staff? What other maintenance staff? Custodial?

_____
_____
_____
_____
_____
_____
_____
_____
_____

3. Does this college have a preventative maintenance program?

"Preventative maintenance" can be defined as the timely servicing of equipment, and the systematic inspection for the detection and correction of potential equipment failures before defects develop.

A. Ideal preventative maintenance program

1. If you could define a PM program-what would you include in that plan?

B. In place preventative maintenance program

1. Does your district have a formal PM program?
   If not, why not?

   If yes, please answer:
   1. Do you have a program outline?

   2. Do you have training manuals? Are they available?

   3. How many employees are involved?

   4. How often is it carried out?

   5. Do you provide regular instruction to staff on PM procedures? Who teaches staff?

   6. Who performs most of the PM work on your campus? In-house? Outside contractor?

   7. How do you monitor your PM program?
      Describe the system or equipment utilized:

   8. How do you measure success of PM program?

C. Maintenance Program (if not PM program)

1. What is the majority of you maintenance time spent on?
   List:

motors	oil changes
lights	change fluids
switches	filters
grease fittings	belts
other	

2. Who performs most of the maintenance work on your campus? In-house? Outside contractors?

3. How do you keep track of your maintenance program?
Describe the system or equipment utilized:

4. Is there a lighting maintenance and disposal program? Are lamps recycled?

4. Operations and Equipment Survey for each campus

A. College demographics (Complete prior to survey visit)

1. Operation:

Students: # Faculty: # Staff:

Semester system: Quarter system:

Fall __ Spr __ Sum __ Fall __ Wtr __ Spr __ Sum ___

Hours of operation:

2. Buildings:

Gross square feet: # Total Buildings:

Year built: Type architecture:
Stucco __ Wood __ Brick __ Metal __

Adobe __ Masonry __ Other ___

Comment:

3. Utility Company:

Elec. ___ Natural gas ___ Propane ___ Other ___
Rate: Rate: Gal:

Annual consumption of energy:

_____ per kW _____ per Therm

4. Environmental:

Calendar year: Amount:

Degree Days:

Elevation: Rural or Urban:

Geographic location:

B. College energy systems

1. List the major energy systems on your campus?

Lighting:

Cooling:

Heating:

Energy management system:

Energy savings devices:

C. Equipment (Maintenance Director only)

1. List the major energy equipment:

Type: Vendor: Age: Hrs./Op.: Rate:

_____
_____
_____
_____

2. Who maintains the major equipment?

3. With regards to the acquisition of new energy equipment, how do you rank the following factors (1 = top priority and 5 = lowest priority)

Cost _____
Safety _____
Efficiency _____
Comfort _____
Ease of maintenance _____

4. Describe the process for purchasing energy equipment in your department:

5. Describe the process for purchasing energy equipment on your campus:

6. Who makes the final decision regarding the purchase of energy equipment? Does this vary dependent upon the costs of the equipment?

7. On average, what is your college's total capital replacement budget for energy using equipment?

8. How does your college determine when it should replace energy using equipment?

D. New construction/modernization projects

1. Are there plans for new construction on this campus?

2. List any recent construction projects:

   If any, was energy efficiency a consideration in that project?

3. Who is in charge of the planning process for new construction?

4. Are you part of the planning process for new construction?
   If yes, describe:

   a. Do you meet with Architect to oversee new construction equipment design? Installation?

   b. Do you have any input in architectural design?

5. List your campus architect:

E. Questions for Architect:

1. Is compliance with Title 24 Energy Standards assured? How?

2. Is achieving energy efficiency BEYOND the Title 24 standards in new buildings important to the District? If exceeding Title 24 - in what manner?

5. Are there energy education programs on campus?

A. Staff Activities:

1. Do you provide training for new maintenance personnel on issues relating to energy efficiency on your campus?

2. Do you provide information for new faculty, staff and students on issues relating to energy efficiency on your campus?

a. Does your college handbooks address energy efficiency?

3. Does you campus provide newsletters/information sheets on energy programs?

4. Are you familiar with utility rebate programs? If so, which ones have you or do you participate in?

5. What incentives are available for saving energy on campus? Recognition? Monetary? Other?

6. Is energy efficiency understood to be a method of saving the District money?

7. Do you subscribe to energy publications? (EUN, APPA, etc.)

8. Do you or your staff participate in on-going energy education programs, seminars, workshops, conferences, etc.? If yes, please describe:

6. <u>What energy curriculum is present on this campus?</u>

A. <u>Courses</u> (Refer to college catalog and schedule prior to visit)

1. List all courses related to energy:

HVAC:

Lighting:

Principles of electricity:

Pneumatics:

Hydronics:

Architecture and design:

Building and construction:

Controls:

Others:

2. What is the status of these courses?

3. Are any of your staff encouraged to take these courses?

4. Are any of your staff involved with the teaching of these courses?

Appendix 4

Interview Packet

Date_____
College_____

Division Chair_____
Faculty_____
Student_____

DE ANZA COLLEGE SURVEY

1. Energy Decision Hierarchy
   A. Energy Policies

      1. Are you aware of policies regarding energy efficiency for the State of California? If yes, describe:

      2. Are you aware of the California Energy Commission? If yes, describe:

      3. Does your College/District have an energy policy? If yes, describe.

         a. How is your energy policy implemented?

   B. Knowledge of energy/utility expenses for District

      1. What percentage of your total operating costs do you think goes towards energy?

      2. What do you think the energy costs at this campus are?

C. Energy Decision Making Process

1. How do you define energy efficiency?

2. Is energy efficiency promoted on this campus?
   If yes, describe:
   a. What priority is given to energy efficiency in the decision making process? Rank 1 to 5:
      (1 = top priority; 5 = lowest priority)

   b. How have energy efficiency decisions been initiated in the past?
      Specify: maintenance, administration, or business office?

   c. What has been the level of support for energy efficiency by campus management?

3. Do you have any input into decisions made?
   Describe:

4. Does your District have a Budget Committee?
   If so, are you a member?

5. Describe the decision making process on your campus:
   (Sketch a flow chart)

5. Are there energy education programs on campus?

A. Staff Activities:

1. Does your campus provide information for new faculty, staff and students on issues relating to energy efficiency?

    a. Does your college handbooks address energy efficiency?

2. Does you campus provide newsletters/information sheets on energy programs?

3. Are you familiar with utility rebate programs?
   If so, which ones have you or do you participate in?

4. What incentives are available for saving energy on campus? Recognition? Monetary? Other?
5. Is energy efficiency understood to be a method of saving the District money?

6. Do you participate in on-going energy education programs, seminars, workshops, conferences, etc.?
   If yes, please describe:

6. What energy curriculum is present on this campus?
(Division Chair and faculty only)

A. Courses (Refer to college catalog and schedule prior to visit)

1. List all courses related to energy:
   HVAC:

   Lighting:

   Principles of electricity:

   Pneumatics/hydronics control:

   Architecture and design:

   Building and construction:

   Others:

2. What is the status of these courses?

3. Are any of your staff encouraged to take these courses?

4. Are any of your staff involved with the teaching of these courses?

Appendix 5

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Allan Hancock College

Overview:
Allan Hancock College, Allan Hanconck Joint Community College District, is located in Santa Maria, California. The college has approximately 8,200 students and a faculty and staff of 700 (Allan Hancock College Catalogue). The buildings are occupied approximately 3000 hours per year. Southern California Edison provides electricity at a cost of $175,000 for the 1992-93 fiscal year. Gas is provided by Remak and the 1992-93 fiscal year costs were $65,000 (Norm Sirnic, pers. comm.). Heating Degree Days 3,053, Cooling Degree Days 84 (source, California Solar Data Manual California Energy Commission Publication No. 500-78-018)

History and Building construction:
Allan Hancock College was founded in 1920 when the Santa Maria High School District established Santa Maria Junior College. In 1963, the Allan Hancock Community College District was formed by annexing the areas served by the Santa Ynez Valley High School District and the Lompoc Unified School District. The construction types include concrete, heavy and light wood frame and light non-combustible pre-fab metal frame.

Heating, Ventilation & Air Conditioning:
Heating Five hot water boilers and 30 double duct roof mounted forced air heating package unit systems provide heat throughout most of the classrooms and buildings.
Floor heaters and furnaces provide heat to older barrack type buildings used for office space and a Ray Pac roof mounted heater provides heat to the administration building. Two Tecogen Co-generator plants are used to provide hot water to the pool, domestic hot water and space heating.

Cooling is provided by one chiller that cools the Administration Building, Computer Center, library, several offices and the theatre. Many of the classrooms are cooled via heat pumps and individual double duct forced air packaged units. A 40 ton Thermal Energy Storage system is used for about six months for additional cooling during the warmer time of the year.
Energy Management System:

A Solidyne energy management system controls the start/stop functions of the heating air handling units on the campus. The thermal energy storage system has a solitary control unit as are all lights.

Lighting:
Most interior lights are 40 watt fluorescent. Exterior and parking lot lights are high pressure sodium and metal halide.vT-8 lamps are not installed on this campus.

Glazing:
Single layer glazing is used throughout the campus.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Student Services	7,701	1967
Administration	8,730	1967
Humanities	21,189	1990
Performing Arts Ctr.	24,705	1968
Music	5,456	1965
Art	9,531	1965
Student Ctr.	20,224	1962
Bookstore	8,030	1971
Learning Assist.	2,880	1982
Consumer Ed.	10,127	1990
Business Ed.	14,112	1964
Learning Res. Ctr.	31,411	1962
Science	25,538	1962
Gym	53,715	1962
Industrial Tech.	34,789	1966
Plant Maint.	8,602	1963
Plant Auto	2,748	1963
Public Serv. Ed.	10,380	1963
Child Study Ctr.	3,168	1945
Drama	4,176	1945
Community Ed.	2,064	1940
Personnel Serv.	2,064	1940
Building V	2,064	1940
Building X	3,790	1940
Arts & Sciences	13,099	1932
Community Ed.	6,708	1928
Lompoc Ctr.	23,981	1991
Business Ctr	35,380	1991
TOTAL	394,362	

Identified training needs:
The training needs identified at this college include automatic controls, preventive maintenance, HVAC courses, computer literacy training, CFC recycling and new lighting technologies. It should be noted that the staff felt that training was not a priority.

Summary:
This college has committed to energy efficiency by incorporating co-generation and thermal energy storage units along with the low cost of gas through Remak. HVAC training and a Preventive Maintenance program would benefit this college.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

American River College

Overview:
American River College, Los Rios Community College District, is located in Sacramento, California. It is one of the larger community colleges with a student enrollment of approximately 21,000 students and over 1,100 faculty and staff (Bob Allegre, pers. comm.). The buildings are occupied 3,500 hours per year. Electricity is provided by Sacramento Municipal Utilities District (SMUD) at an annual cost of approximately $1,000,000 for the 1992-93 fiscal year. Gas is provided by Pacific Gas and Electric at an annual cost of $850,000 (Utility bills provided by the Business Office). Heating Degree Days 3143 and Cooling Degree Days 1,220 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
American River College was established in 1955 but its history goes back to when Grant Union Junior College was established in Del Paso Heights to train civilian personnel for national service during World War II. In 1945 the name was changed to Grant Technical College. In 1954, voters agreed to the establishment of a new junior college district and approved a $3 million bond issue that same year. Building expansion projects over the last 40 years have included numerous buildings for teaching, faculty offices and student use. The majority of the buildings are slump stone/building block construction. Other types of building construction include masonry, light incombustible steel frame and several wood frame buildings. The majority of the roofs are tar and gravel.

Heating, Ventilation and Air Conditioning
Heating for the campus consists of a 12 million BTU Clever Brooks central industrial boiler used to provide heat throughout the campus. Other heating systems include heating coils and heat pumps.

Cooling and air conditioning is provided by a heat recovery system, a Trane ice making thermal energy storage system, roof top package units, heat pumps and economizers. The college is going to invest in a larger thermal energy storage system that will provide cooling for the entire campus within the next several months.

Glazing:
Single layer clear and sun shaded glazing is used on all buildings.

Lighting:
All of the classroom and office lighting is fluorescent and low watt incandescent. Outdoor lighting consists of high pressure sodium and metal halide. The gymnasium lights are either fluorescent or halide lights. All of the building remodels and construction include the newer T-8 lights and energy saving ballasts.

Energy Management System:
The three Los Rios Community College District campuses are linked to a Honeywell Delta 1000 energy management system. The EMS controls the dampers, pumps, motors, chillers, boiler operations and set points. Currently the EMS has a capacity of 50,000 points and the district is utilizing only about 5,000 points. Expansion possibilities include outside lights, the new thermal energy storage system and indoor lights.

Other energy saving devices:
Motion sensors and turn-off light signs are visible in many of the classrooms and offices throughout the campus.

Building areas and construction dates.

Building	Gross Sq Ft.	Year
Administration	25,141	1958
Liberal Arts	48,950	1958
Raef Hall	9,654	1963
Physical Education	66,151	1958
Technical Vocation	75,243	1973
Tech Voc Portable	2,590	1967
Life Science	43,170	1958
Life Sci. Port. #11	1,803	1942
Life Sci. Port. #12	2,244	1942
Life Sci. Port. #14	1,410	1977
Fine Arts	40,720	1958
Fine Arts Port. #16	3,835	1974
Fine Arts Port. #17	1,822	1942
Student Services	27,513	1992
Cafeteria	17,280	1958
Davies Hall	27,513	1967
Bookstore	10,303	1982
Library	43,815	1972
Children Center	2,560	1976
Allied Health	10,072	1966
Enabling Health	1983	1976
Stadium	4,129	1963
Faculty House	1,892	1936
Centrex	741	1967

Warehouse 1	4,900	1981
Warehouse 2	8,646	1976
Shop 1	700	1985
Environmental Res.	1,289	1972
Horticulture	1,152	1972
Utility	1,144	1967
Greenhouses	4,320	1967
Landscape	1,200	1979
TOTAL	549,928	

Identified training needs:
Training needs identified at this college include more information on heating, ventilation and air conditioning, variable air volume systems, new technologies and controls.

Summary:
This college will become more energy efficient as it incorporates a second thermal energy storage system to its facility. The college has an underutilized the energy management system, that if brought up to full capacity, can further trim energy use.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Bakersfield College

Overview:
Bakersfield College, Kern County Community College District, is located in Bakersfield, California which is in Kern County. Bakersfield College has approximately 12,362 students (Richard Wright, pers. comm.). The college opened the 153 acre campus on Panorama Drive in 1956. The buildings operate 3,000 hours per year. Pacific Gas and Electric provides electricity and the costs for fiscal year 1992-93 were $578,410. Gas is provided by Remak at an annual cost of $126,262 (Utility bills provided by the Business Office). Heating Degree Days 2,185 and Cooling Degree Days 2,179 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction
Established in 1913, the college is one of the oldest two year community colleges in the nation. The initial program offered a one-year curriculum but in 1915, the trustees of the Kern County High School District authorized a second year of junior college and normal school courses. Bakersfield College provides limited, on-campus housing for students.

Heating, Ventilation and Air Conditioning:
Heating to the campus is provided by several hot water boilers which are controlled by a Honeywell EMS on a shared savings program.

Cooling for the campus is provided by a several cooling towers including a 500 ton Baltimore Coil cooling tower and economizers. The cooling is also controlled by a Honeywell EMS on a shared savings program.

Energy Management System:
The college has a 10 year contract with Honeywell on a shared savings program. Honeywell performed a detailed energy study which details ways of saving energy use. In addition, a Honeywell energy management system was installed. Under this program, Honeywell maintains the system and enables the college to receive a rebate if the agreed upon usage and costs are not met over a 10 year period. The energy management system controls start/stop of the heating and air conditioning functions. To date, the college has been receiving these checks because the college has not met or exceeded anticipated savings.

Lighting:
90% of the outside lights are metal halide and High Pressure Sodiums. Most of the indoor lights are fluorescent with several T-8 replacement lights and electronic ballasts.

Glazing:
Single layer glazing is used throughout the campus.

Building and construction dates:

Building	Gross Sq. Ft.	Year
Administration	16,357	1956
Agriculture	11,043	1956
Fine Arts	30,731	1956
Business	17,029	1956
Campus Ctr	101,508	1956
Gymnasium	19,966	1956
Family & Cons. Ed.	31,450	1956
Library	63,130	1956
Math Science	35,946	1962
Auto Technology	13,173	0000
Science/Engin.	45,035	1956
Speech Arts/Music	30,292	1956
Applied Science	48,377	0000
Bookstore Bus Off.	11,448	1966
Schafer Hall	43,200	1968
Finlinson Conf Ctr	2,028	1968
Forum	7,850	1968
Women Res Hall	12,472	1956
Mens Res Hall	12,472	1956
Romain Clerou	7,564	1974
Weill Institute	66,875	1975
Custodial	3,105	1956
Outdoor Theatre	1,564	1956
Health Career Ctr	8,145	0000
Maintenance Shop	1,845	1982
Stadium	11,007	1956
Horticulture Lab	2,068	1975
Greenhouses	2,388	1975
Tennis Restroom	280	1973
Baseball Restroom	392	1969
TOTAL	692,125	

Identified training needs:
The training priorities identified at this college include energy management systems, new technologies, fiber optics, controls and computer training.

Summary:
This college has committed to energy savings through a long term agreement with an energy management control company. This agreement will enable staff to receive training and save energy costs.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Cabrillo College

Overview:
Cabrillo College, Cabrillo Community College District, is located in the Monterey Bay region. The college has approximately 13,000 students and a faculty and staff of 1,000 (Business Office, pers. comm.). The buildings are occupied about 3,000 to 4,000 hours per year. The gas and electricity is provided by Pacific Gas and Electric and the 1992-93 fiscal year costs are $500,000 (Utility bills provided by the Business Office). Heating Degree Days 3,418 and Cooling Degree Days 25 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
The district was established in 1958 and construction of the campus on 6500 Soquel Drive, Aptos began in 1961. The college began construction of 3 additional major classroom structures in 1966. A second expansion of campus facilities was approved in 1972. The majority of the buildings are of a slump stone/building block construction. Other construction types include pre-fab metal and wood frame construction. The majority of the roofs have a 30% pitch with asphalt tar and gravel roofing.

Heating, Ventilation and Air Conditioning:
Heating for the campus consists of forced air heating into buildings and classrooms, 5 low pressure boilers provide heating and hot water at the gym facility and throughout the campus.

Cooling and air conditioning is provided to two buildings, the Computer Lab and to the Computer main frame room. The majority of the cooling on campus is provided by outside air. The outside air is pumped into the classrooms by air handling units located at each building. For further cooling, some of the classrooms utilize small window panels which can be opened to allow outside air to enter for further ventilation. An energy management system controls all of the air handling equipment, fans, motors and all outside lighting.

Glazing:
Single layer clear and sun shaded glazing is used on all buildings. Small window panels are used in many classrooms.

Lighting:

90% of the lighting on campus is fluorescent lighting. Other lighting types include high pressure sodium and incandescent. The classrooms have fluorescent lighting. Upgrading began several years ago to replace many of the F-40, 4 and 8 foot light fixtures with newer T-8 lamps and electronic ballasts. During much of the asbestos abatement work being done on campus, new T-8's with electronic ballasts will be installed. Mechanical rooms and the store rooms use incandescent lighting while most outside lighting is sodium lighting.

Building areas and construction dates:

Building	Gross Sq Ft.	Year
Administration	15,892	1962
Art Workshop	1,282	1967
Bus-Soc Science	19,287	1962
College Center	27,675	1962
Concessions	2,168	1962
Forum	11,416	1967
Gym	43,857	1962
Visual Arts	18,338	1962
Library	27,402	1962
Maint & Oper.	11,719	
Math Engr Tech	20,717	1962
Phys Tech Com	26,888	1967
Science	31,009	1962
Social Science	23,784	1967
Pool Off.	347	1962
Theatre Music	34,870	1962
Grounds Shop	15,010	
Custodial Shop	15,010	
Vehicle Storage	1,920	
Indiv Learn Ctr	17,209	1975
Bldg trades	11,748	1976
Elec serv.	9,900	1976
Early child nurs	17,840	1976
Nursing off	2,510	1976
Tool shed	526	1979
Grnhse 1	578	1978
Grnhse 2	386	1978
Public Serv	8,120	1979
Gazebo	235	1978
Comm Educ	11,897	1930
Admin serv	6,820	1930
Police/Safety	1,818	1930
Indust Tech	895	1978
Haz Mat Stor	158	1986

Old Hse Stror	1,133	
Lang Arts Stor 1	451	1981
Lang Arts Stor 2	111	1965
Lang Arts Stor 3	938	1983
Lang Arts Stor 4	96	1983
Grnhse 3	1,326	1983
Grnhse 4	927	1983
Grnhse 5	494	1980
Headhse	2,095	1986
Tool Shed 2	90	1980
Tool Shed 3	90	1980
Stor Shed 4	120	1980
M & O PE Stor	1,230	1962
Paint Shop	516	1973
Paint Off	216	1973
Sign Stor	216	
Solar hse	761	1980
Solar Shed	172	1977
Solar open shed	442	1981
Sol P Voltic	151	1983
Observatory	177	
Dome Stor	155	
Obser Storq	157	1987
Fld Stor 1	51	1988
Fld Sror 2	51	1988
Fld Stor 3	253	1979
Fld Stor 4	150	1987
Press Box	274	1962
Dugout 1	314	1964
Dugout 2	314	1964
PE Ticket 1	56	1962
PE Ticket 2	62	1962
Early ch ed	76	1982
Early ch ed	82	1982
Early ch ed	92	1979
Early ch ed	40	1979
Theatre ticket	125	1970
Bus stop east	369	1973
Bus stop west	305	1973
TOTAL	455,375	

Identified training needs:

The training needs identified include operation and maintenance of the energy management systems, controls and boilers.

Summary:
Although this college maintains equipment and systems on a crisis mode, the maintenance staff is well trained and keeps the systems working as well as possible. The staff is enthusiastic about energy efficiency and creative measures have been utilized inspite of budgetary constraints.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Chaffey College

Overview:
Chaffey College, Chaffey Community College District, is located in Ontario, California. The college has approximately 13,923 students and 700 faculty and staff (Steve Menzel, pers. comm.). The buildings are occupied 3,500 hours per year. Gas is provided by Remak at a cost of $230,000 for the 1992-93 fiscal year. Electricity was provided by Southern California Edison at cost of $550,000 for the 1992-93 fiscal year (Utility bills provided by the Business Office). Heating Degree Days 2,166 and Cooling Degree Days 1,109 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
Chaffey College, established in 1883, was one of the first colleges in California and was publicly funded in 1916. In 1916 the Chaffey Junior College of Agriculture was added as a post-graduate department to the high school. A separate junior college district was created in 1922 and in 1957 bonds were approved to separate the high school and college facilities. The majority of the buildings are concrete and brick construction. Other building construction types include light incombustible frame construction and wood frame. The majority of the roofs are tar and gravel.

Heating, Ventilation and Air Conditioning:
Heating for the campus is provided by 5 boilers. A co-generation plant for the physical education facilities provides hot water for both the pool and locker rooms.

Cooling and air conditioning is provided by 18-20 Baltimore Coil chillers and numerous individual roof top air conditioners located throughout the campus.

Glazing:
Single layer clear and sun shaded glazing is used on all buildings.

Lighting:

Most of the lighting throughout the campus is fluorescent. Other lights include high pressure sodium walkway lights and 1500 watt incandescent stadium lights.

Energy Management System:
A Barber-Coleman energy management system is used to schedule all the air handling equipment, chillers, boilers and lights.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Administration	17,174	1959
Aeronautics	22,198	1959
Life Science East	8,121	1968
Art	6,642	1959
Business Ed.	16,278	1959
Camp Ctr West	30,137	1959
Electronics	12,316	1959
Gymnasium	47,792	1959
Home Economics	3,275	1959
Language Arts	12,198	1959
Library	24,665	1959
Allied Health West	17,951	1959
Maintenance Shop	18,601	1962
Physical Science	28,596	1959
Social Science	14,251	1959
Theatre	31,469	1959
Forum	11,431	1968
Vocational Educ.	26,511	1978
Planetarium	3,013	1968
Camp Ctr East	18,094	1969
Museum Gallery	3,940	1972
Warehouse	2,488	1974
Learning Ctr	1,271	1974
Trailer 1	360	1975
Trailer 5	1,200	1981
Trailer 2	360	1975
Modular 1	960	1981
Trailer3	900	1976
Trailer 4	360	1973
Children's Ctr	3,575	1976
Auto Tech Lab	21,028	1977
TOTAL	407,155	

Identified training needs:
The training needs identified at this college include basic health and safety training.

Summary:
This college is committed to energy efficiency. The college utilizes a good preventive maintenance program and a number of energy saving devices. It would further benefit the maintenance staff to participate in HVAC and other related training.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

College of Marin

Overview:
College of Marin, Marin Community College District, is located in Kentfield. The college was built in 1926. This college has approximately 9,600 students and 385 faculty and staff (College of Marin catalogue). The cost for electricity and gas for fiscal year 1992-93 was $1 million dollars and was provided by Pacific Gas and Electric (Robert Thompson, pers. comm.). The buildings are occupied 3,000 to 4,000 hours per year. Heating Degree Days 3,077 and Cooling Degree Days 280 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
The original college, Marin Junior College, awarded the first Associate degrees in 1929. In 1945, the College was renamed College of Marin. In 1970 a second college was added, Indian Valley College and in 1985, the two Colleges merged. The two campuses are known as College of Marin and classes are offered at both sites. The types of building construction include concrete, wood frame and light non-combustible pre-fab metal frame.

Heating Ventilation and Air Conditioning:
Heating to the buildings is provided by hot water boilers which include outside air reset controllers.

Cooling is provided to most of the buildings by a combination of chillers, heat pumps and economizers. The Physical Education Building is not cooled.

Energy Management System:
An Andover energy management system controls the boilers including the outside air reset controllers, chillers, economizers and most of the air handling equipment. It also controls all of the pool operations.

Lighting:
Most of the interior building lighting is fluorescent and the outdoor lighting is primarily high pressure sodium.
Glazing:
Single layer clear glazing is used in all of the buildings.

Other energy saving devices:
Most of the boilers have reset controls. There are motion sensors installed throughout the campus.

Building areas and construction dates:

Building	Gross Sq. ft.	Year
Dickson Hall	11,870	1935
Fusselman Hall	14,717	1939
Fine Arts Ctr.	79,636	1950
Business & Mgmt Ctr.	5,429	1952
Industrial Tech.	8,850	1955
Olney Hall	12,227	1956
Pysical Ed Ctr.	36,392	1965
Student Serv Ctr.	36,227	1966
Harlan Ctr.	26,651	1971
Science Ctr.	50,837	1971
Learning Res. Ctr.	65,575	1973
Auto Annex	1,661	1976
Bolinas Marine Ctr.	3,333	1910
Landscape Mgmt	1,320	1982
Landscape Mgmt 41	952	1965
Landscape Mgmt 42	952	1967
Landscape Mgmt 43	952	1967
Temp Bldg 1	3,815	1965
Dance Ctr.	2,421	1965
Counseling/Admiss.	6,664	1968
Administrative Ctr.	3,595	1941
TOTAL	373,076	

Identified training needs:
The training needs identified at this college include boiler and economizer controls and new technologies including energy management systems.

Summary:
This campus may benefit from HVAC training.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Diablo Valley College

Overview:
Diablo Valley College, Contra Costa Community College District, is located in Pleasant Hill in the East Bay. In 1950, the College Board of Trustees purchased the DVC site for $172,000, and construction began in 1951. The college has approximately 20,697 students and 1,000 faculty and staff (Chris Leivas, pers. comm.). The buildings are occupied 3000 to 4000 hours per year. Pacific Gas & Electric provides the natural gas and electricity. The costs for natural gas for fiscal year 1992-93 were $256,568 and the costs for electricity for fiscal year 1992-93 were $945,541 (Utility bills provided by the Business Office). Heating Degree Days 2,627 and Cooling Degree Days 956 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
The majority of the buildings on campus are wood frame construction and have a flat roof. Other building types include
tilt-up in place concrete, light weight pre-fab, light weight metal, heavy timber and masonry.

Heating Ventilation and Air Conditioning:
Heating for the campus is provided by heat pumps and boilers. The campus does not provide hot water to most buildings in order to save energy and the only areas on campus that utilize hot water are the gyms, pools and food service facilities.

Cooling for the campus is provided by absorption chillers, two screw compressors, one reciprocal chiller. Each office has a locally controlled window air conditioning unit. Ventilation is provided, for some of the buildings, by a double duct constant volume and variable air volume system.

Lighting
Lighting for the campus is primarily fluorescent. Most of the classrooms, cafeteria and library use newly retrofitted T-8 lamps and electronic ballasts. The gym uses high pressure sodium lights. Motion sensors are located in all offices and in many of the classrooms.
Energy Management Systems
A Honeywell energy management system is used to schedule the start/stop operations of the air handling equipment, chillers, boilers and outside lighting.

Glazing

Single layer clear glazing is used throughout the campus.

Building areas and construction types:

Building	Gross Sq. Ft.	Year
Life Science	19,505	1960
Humanities	16,248	1964
Gymnasium	18,098	1955
Lath House	476	1965
Business Ed.	34,568	1955
Dist Storage Bldg	8,890	1957
Men's Locker	14,889	1961
Music	14,522	1963
Phys. Ed.	24,274	1963
Phys Sci.	33,884	1960
Science Ctr.	7,481	1960
Stud Act.	19,732	1956
Tech Ed.	14,700	1977
Perf. Arts	34,423	1978
Temp 13	640	1965
Temp 14	1,728	1966
Women's Lckr	6,850	1962
Library	55,914	1970
Engr Tech	34,144	1971
Counsel	7,375	1972
Fam Life Ed.	3,792	1972
Comm Lab	5,538	1972
Liberal Arts	25,246	1972
Faculty Off	22,316	1972
Restroom	338	1972
Health Ctr	1,257	1972
Health Ctr	1,257	1972
Stud Pers	2,127	1972
Plac Fin Aide	1,152	1972
Inst Svs	19,437	1973
Pys Ed	5,710	1973
Art Bldg	29,400	1975
Sci Ctr 2	4,184	1976
Sci Ctr 3	1,281	1976
Sci Ctr 4	846	1976
Sci Ctr 5	1,597	1976
Sci Ctr 6	330	1976
Sci Ctr 7	389	1976
Sci Ctr 8	401	1976
Sci Util	1,332	1976

Orn Hort	1,520	1975
Stor Bldg	903	1965
Toilet Bldg	2,874	1965
Temp Bldg	589	1965
Fam Life Ed	3,639	1980
Warehse/Maint	25,900	
TOTAL	530,573	

Identified training needs:
The training needs identified at this college include training on controls, trouble shooting and the energy management systems.

Summary:
The highly trained maintenance staff and the various energy saving measures used throughout this facility demonstrate a commitment to energy efficiency and costs savings.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE
El Camino College

Overview
El Camino College, El Camino Community College District, is located in Torrance, California. The college has approximately 28,000 students and about 1,000 faculty and staff (El Camino College Catalogue). The buildings are occupied 3,500 hours per year. The electricity provided by Southern California Edison and the gas provided by Remak costs were $1.6 million for the 1992-93 fiscal year (Utility bills provided by the Business Office). Heating Degree Days1,859 and Cooling Degree Days 578 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
El Camino College was established in 1947 and is located in the South Bay. The El Camino Community College District encompasses 5 high schools districts, twelve elementary school districts and nine cities. Early classrooms were surplus World War II barracks and the first permanent building for classroom instruction was a shop that opened in 1949. The majority of the buildings are constructed of a slump stone building block construction. Other buildings are made of pre-fab metal construction and wood frame. The majority of the roofs are asphalt tar and gravel.

Heating Ventilation and Air Conditioning:
Heating for the campus is provided by 15 hot water boilers, heating coils, forced air heating systems and heat pumps.

Cooling and air conditioning is provided by eight chillers, several package units including heat pumps. About one-half of the campus is cooled by economizers which draw in natural cool outdoor air.

Glazing:
Single layer clear and sun shaded glazing is used on all buildings.

Lighting:
The majority of the interior lighting is fluorescent. The gymnasium lights consist of metal halide and fluorescent. Exterior lighting consists of mercury vapor and metal halide lights. As a result of the changing student demographics and location, more security lighting is scheduled to be added throughout the campus.
Energy management system:

A Western Powers Energy management system is used to control all the air handling equipment on campus. In addition, the EMS controls the boilers, chillers, cooling towers and some outside lighting.

Building and construction dates:

Building	Gross Sq. Ft.	Year
Administration	50,358	1950
Student Serv Ctr	69,350	1950
Library	46,623	1952
Art	112,006	1955
Alumni House	1,496	1984
Natural Sciences	46,023	1952
Business	24,826	1953
Music	82,366	1955
Health Ctr	65,227	1955
Field House	6,377	1949
Shops	105,908	1949
Receiving-Maint.	36,224	1958
Humanities	36,378	1950
Math Engineering	107,553	1969
Chemistry	27,910	1956
Physics	16,036	1956
Planetarium	3,953	1969
Auditorium	53,591	1967
Mens Gym	97,026	1968
Technical Arts	56,914	1959
Social Science	34,081	1960
Communications Ctr.	36,950	1962
Cafeteria Bookstore	53,416	1974
Occup. Educ	6,982	1986
Construc. Tech.	11,143	1982
TOTAL	1,188,695	

Identified training needs:
The training needs at this college include information on energy management systems, new technologies, safety and hazardous materials handling.

Summary:
The college is aware of the need to conserve energy but the security of students is the top priority. The college incorporates efficient lighting and other measures when possible.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
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Fresno City College

Overview:
Fresno City College, State Center Community College District, is located in Central California. Fresno City College was established in 1910 making it the first community college in California. There are approximately 17,457 students and 650 faculty and staff (Fresno City College Catalogue). Pacific Gas & Electric provides both electricity and natural gas to the campus at an annual cost of $1,000,000 for the 1992-93 fiscal year (Brice Harris, pers. comm.). The campus buildings are occupied approximately 3,000 hours per year. Heating Degree Days 2,650 and Cooling Degree Days1,671 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction:
The college was established in 1910 when C. L. McLane, then superintendent of schools for the City of Fresno, recognized the need for college instruction for San Joaquin Valley students. Fresno City College opened in in 1910. The first class consisted of 20 students and three instructors. The campus was originally located at the former Fresno High School campus on "0" street. In 1921, Fresno Junior College combined with the Fresno Normal School to operate the junior college on the same campus as the four-year school (Fresno State University). In 1948 new laws permitted the local districts to operate as junior colleges. By 1956 the college moved to its present location on University Avenue. The majority of the buildings are fire resistant and concrete. The remainder are a combination of light wood, metal frame and red brick buildings.

Heating, Ventilation and Air Conditioning:
Heating for the campus is provided by boilers and forced air furnaces located throughout the campus. In addition, there are approximately 20 to 30 newly installed gas powered double duty package units that provide both heating and cooling. Some solar is used but more for an ornamental.

Cooling for the campus is provided by a combination of several evaporative coolers and large roof top mounted economizers, two 350 ton chillers and one18 ton chiller. At the new Tech and Industrial

Buildings, all new gas powered, double duty package units have been installed.

Energy Management System:
Currently the college has an older Texas Instrument EMS that controls on/off air handler operation and some lights and controls approximately 600 points. A newer Powers system is being installed that will have the capabilities of the older Texas Instruments system, plus the added feature of temperature controls, more on/off, air handling, inside/outside lights and irrigation.

Lighting:
The majority of the indoor lighting is fluorescent, which inclues T-8 lamps, electronic ballasts and watt savers. The gym also utilizes fluorescent lights. Outdoor lighting is mostly high pressure sodium.

Glazing:
Single layer clear glazing is used throughout the campus.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Assessment Center	1,860	1953
Gym	58,447	1963
Library	42,882	1932
Student Center	27,050	1940
Technical Industrial	26,390	1960
Technical Industrial	23,840	1960
Technical Industrial	15,530	1960
Technical Industrial	14,400	1960
Technical Industrial	11,800	1960
Technical Industrial	10,340	1960
Cafeteria	26,842	1965
Faculty Office A	5,841	1971
Science	58,140	1973
Animal House	393	1973
Greenhouse Prep	493	1973
Greenhouse	1,013	1973
Speech-Music	19,972	1973
Language Arts	18,445	1975
Art-Home Economics	24,461	1975
Theatre Arts	35,452	1975
Business Education	30,356	1976
Administration	11,525	1976
Student Services	29,286	1976
Social Science	23,204	1976
Police Academy	4,840	1953

PE Field House	17,901	1977
Campus Serv Ctr	23,259	1978
Utility Bldg	4,746	1972
Athletic Toilets	1,350	1977
Child Dev Lab	4,290	1986
Independence Ctr 1	960	1988
Independence Ctr 2	960	1988
Handball Courts	8,528	1970
Independence Ctr 5	960	1990
Economic Dev Ctr	960	1990
Economic Dev Ctr	960	1990
TOTAL	587,676	

Identified training needs:
The training priorities at this college include new technologies, training on various trades such as electricity, plumbing, carpentry, refrigeration, customer service, R-12, water treatment, boilers, quality management, computer skills, and energy conservation methods.

Summary:
This college continues to become more energy efficient by adding new gas fired air conditioning units to existing facilities along with a new energy management control system. Training on Preventive Maintenance and HVAC would benefit the college maintenance staff.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Grossmont College

Overview:
Grossmont College, Grossmont-Cuyamaca Community College District, is located in El Cajon, California and is east of the city of San Diego. Grossmont College was established in 1961 and has approximately 15,500 students, 450 faculty and 150 staff (Grossmont College Catalogue). San Diego Gas and Electric Company provides both electricity and gas. The cost for electricity for fiscal year 1992-93 was $739,000 and $96,000 for natural gas. The buildings are occupied 3,000 to 4,000 hours per year. Heating Degree Days 2,077 and Cooling Degree Days 907 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction:
The campus opened in 1961 at the Monte Vista High School campus in Spring Valley. Land was purchased and ground was broken for construction of a new campus in 1963. Classes were officially held at the current site in September 1964. The buildings were built between 1964 and 1990. The majority of the buildings are fire resistant cast in place concrete and light non-combustible metal frame. There are several masonry temporary buildings. The maintenance buildings. which are located at the district yard across the road from the campus, are a combination of portables and Quonsets. Roofs are primarily tar and gravel.

Heating, Ventilation and Air Conditioning:
Heating for the campus is provided by 7 multi-type and brand hot water boilers, roof mounted hot water coils and about 35-50 gas/electric single and multi-zone roof mounted package units. The campus has a co-generation system which was installed in the mid- 1980's that does not operate and is scheduled to begin operation in 1994-95.

Cooling for the campus is provided by 5 Trane and Carrier chillers in concert with a number of double duty roof mounted gas/electric single and multi-zone package units that heat and cool as needed. Economizer units are also used. Some of the older portable buildings have individual side mounted air conditioning units.

Energy Management System:
No energy management is installed but was recommended on a completed energy study.

Lighting:
Most of the classroom lights us F-34 fluorescent lamps. New energy efficient T-8 lights have been installed in many of the classrooms and office buildings. Parking lots use 400 watt mercury vapor lights and metal halide lights are used in the gym. Parking lot lights are mercury vapor or incandescent.

Glazing:
Single layer clear and sun shaded glazing is located throughout the campus.

Other energy saving devices:
Time clocks are installed on all the chillers and some motion sensors are installed in some classrooms and offices.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Admin. West	10,400	1964
Admin. East	10,400	1964
Art	11,411	1964
Music	12,925	1964
Drama	17,779	1967
Speech-Photo.	13,416	1967
Sculpture	1,646	1971
Kiln	981	1971
Art Gallery	2,688	1967
Temp Bldg A	2,366	1975
Temp Bldg. B	2,216	1975
Child Dev Ctr	4,600	1988
Animal-Grnhse	856	1964
Science-West	22,193	1964
Science-North	25,744	1964
Science-South	19,857	1967
Temp Bldg. C	1,024	1971
Temp Bldg. D	1,846	1975
Chem Stor Bldg	348	1976
Observatory	713	1970
Temp Health Sci.	2,240	1990
Locker Shower Bldg.	30,548	1964
Gymnasium	20,687	1967
Little Gymnasium	9,270	1967
Track Storage	664	1967
Field Storage	664	1967
Academic Off. So.	5,127	1964
Liberal Arts So.	16,384	1964
Liberal Arts East	18,749	1964

Academic Off. No.	5,821	1967
Liberal Arts No.	15,549	1967
Temp Bldg. E	3,200	1971
Student Center	28,633	1964
Bookstore	11,088	1971
Temp Bldg. F.	5,177	1975
Trailer VAES	2,000	1988
Trailer ROP	735	1990
Learning Res.	43,351	1964
Quonset Stor 2	300	1974
TOTAL	383,576	

Identified training needs:
The training priorities at this college include pneumatic controls more and information on energy management systems.

Summary:
This college had no energy management control system installed at thjis time. However it was to be incorporated as part of a recommended retrofit during a recent energy study. That plus the training of the maintenance staff would enable this college to become more energy efficient.

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Hartnell College

Overview:
Hartnell College is located in Salinas, California south of San Jose. Hartnell College, has about 5,500 full time students and about 550 faculty and staff (Business Office, pers. comm.). The buildings are occupied 3,000 to 4,000 hours per year. The 1992-93 fiscal year electric and gas costs are $600,000 (Utility bills provided by the Business Office). Pacific Gas and Electric provides both electricity and natural gas. Heating Degree Days 2,959 and Cooling Degree Days 74 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction type:
The first building, the auxiliary Gym was constructed in 1938 and the last building built, the College Center, was constructed in 1982. The construction type for most of the buildings are cast in place concrete construction. Some of the buildings are tilt-ups and have decorative brick exteriors. The auxiliary gym is a wood frame building. The shop buildings are pre-fab metal construction.

Heating Ventilation & Air Conditioning:
Heating for the campus consists of gas fired boilers, steam to hot water heat exchangers, ceiling suspended gas fired heaters, pre-heat coils in air handlers, gas fired furnaces at the air handlers and electric duct heaters, ceiling mounted radiant heat panels, solar hot water fed fan coils and radiant floor heating. The college has a solar hot water heating system above the gym facility providing heated water to two pools and shower facilities.

Cooling is provided by air conditioners and heat pumps, an Outside Air multi-zone system, a thermal energy storage ice maker, a variable air volume system, 2 speed fan motors and roof-mounted trane air cooled condensing systems.

Glazing:
Single layer clear and sun shaded glazing is used in all the buildings throughout the campus. In the campus center and administration buildings, sun shaded glazing is used.

Lighting:
The majority of the classroom and office lighting used on campus is standard F-40 and F-34 type fluorescents. Remodels and lightings upgrades include T-8 lamps and electronic ballasts. Other lighting types include mercury vapor and high pressure sodium outdoor and pathway lighting, metal halide gym lighting, and incandescent for storage and mechanical rooms. The new campus center building makes use of a large retractable atrium and floor to ceiling windows facing south to capture natural light. Metal halide lights suspended from the ceiling of the building add additional light to the inside of the building.

Other Energy Saving devices:
Variable speed motors, off peak chilled water production, light conservation notices, use of passive solar lighting in campus facility, low flow shower heads in gym facilities.

Building areas and construction dates

Building	Gross Sq. Ft.	Year
Library	25,132	1959
Relocatbles	6,881	1975
Merrill Hall	43,337	1964
Auxilary Gym	25,797	1938
Relocatables	1,266	1984
Field4	66	1978
Field3	1,024	1978
Field2	100	1976
Field1	420	1976
Handball Crts	3,528	1974
Campus Storage 2	432	1976
Campus Storage 1	9,655	1974
Sheds	1,000	1976
Greenhouse	277	1948
Storage	780	1976
Technical Vocational	40,250	1969
Animal Health Tech	8,570	1979
Music Drama Bldg	43,645	1974
Gymnasium	48,220	1974
Visual Art Facility	25,175	1977
Classroom/Admin/Coun.	62,578	1977

Maint./Warehouse	7,533	1971
Child Dev Ctr	6,203	1978
College Center	35,000	1982
College Center Annex	11,575	1959
Gleason Center	1,982	1943
	373,180	

Identified training needs:
The training needs identified were information on new technologies, chillers and preventive maintenance. These can be developed by the EMT staff as possible training programs.

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Lake Tahoe College

Overview:
Lake Tahoe Community College, Lake Tahoe Community College District, was formed in 1974. The West Campus opened in the fall of 1982 (Lake Tahoe College Catalogue). Lake Tahoe Community College boundaries include Emerald Bay on the north, the California-Nevada mountains on the west, the El Dorado-Alpine County line on the south and the Nevada state line to the east. The college has approximately 3,132 students, 157 faculty and 45 staff (Mark Zacovic, pers. comm.). Sierra Pacific Power provides the electricity at a cost of $48,000 for the 1992-93 fiscal year. WP Natural Gas from Spokane, Washington provides the gas at cost of $6,100 for the 1992-93 fiscal year (Utility bills provided by the Business Office). The buildings are occupied 3,000 to 4,000 hours per year. Heating Degree Days 8,262 and Cooling Degree Days 32 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
On January 1979, Lake Tahoe Community College was granted full accreditation. The 164 acre site, where the original campus is located, opened in 1979. The West Campus opened in 1982. In 1986 ground breaking began on the first phase of the construction for the current site and occupation did not begin until 1988. In 1993 the college completed construction on a Child Development Center located adjacent to the campus. The main campus is only one building which is divided up into various rooms. The building construction is heavy timber and a metal pitched roof for the heavy cold weather and snow.

Heating, Ventilation and Air Conditioning:
Heating for the campus is provided by two 2 million BTU super heat glycol boilers which feed into 72 air coil-forced air systems throughout the building. The driveway in front of the college is heated to decrease ice buildup.

Cooling is provided by a Carrier freon chiller and 6 air conditioning units that cool only 3 rooms which include the computer labs and a music room. The remainder of the building is cooled by natural outside air.

Energy Management System:
There is no energy management system at this campus.

Lighting:
All indoor lights are fluorescent and outside lights are high pressure sodium. Parking lot lights are on timers.

Glazing:
All windows are weathered insulated.

Building construction and dates:

Building	Gross Sq. Ft.	Year
Tahoe Campus	54,800	1988
TOTAL	54,800	

Identified training needs:
The training priorities identified at this college include information on what is state of the art and the new technologies, the Green Lights Program and other state funded programs.

Summary:
Even though this college is one of the smallest in the state, because of it's recent construction, it incorporates good technology for an energy efficient plant. The staff would benefit by training.

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Lassen College

Overview:
Lassen College, Lassen Community College District, is located in Susanville in northeastern California. The campus has approximately 3,000 students and 350 faculty and staff (Larry Blake, pers. comm.). Lassen Municipal Utility provides electricity to the campus. The cost for electricity for fiscal year 1992-93 was $320,000. Fuel oil and propane are used for heating at a cost of about $120,000 for fiscal year 1992-93. The campus has on-campus housing for about 130 students during the academic year. The buildings are occupied approximately 6,000 to 7,000 hours per year. Heating Degree Days 6,248 and Cooling Degree Days 361 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building Construction:
The Junior College Department of the Lassen Union High School District began classes on the Lassen High School Campus in 1925. A separate facility was created in 1941 with the remodeling of a Main Street garage to provide classroom space. In 1945, because of increasing enrollment, a new building was built adjacent to the high school. Lassen College became a separate entity within the Lassen Community College District in 1965. The new campus consists of 165 acres, 18 buildings and was completed in 1971. The majority of the buildings at Lassen College are concrete and noncombustible steel frame. The roofs are tar and gravel.

Heating, Ventilation and Air Conditioning:
Heating to the campus is provided by four hot water boilers. Three of the boilers are fuel oil powered and the fourth is propane. Three large fuel oil powered hot water boilers are located at the Gym and provide heat for the entire campus including the student housing units. Buildings have hot water radiators or wall units. A smaller propane powered hot water boiler provides auxiliary hot water when necessary.

Cooling is provided by 3 Trane chillers units for the Science and about 30 percent of the TV/Photo Lab. Most of the campus, including the student housing units, are not air conditioned.

Glazing:
Approximately half of the campus has insulated windows while the other half of the campus is single layer clear. When the campus

upgrades or remodels the buildings, the code specified windows are installed.

Lighting:
Most of the indoor classroom lights are fluorescent. Currently a relamping project is underway to replace the old fluorescent lights with more energy efficient lights and ballasts. Most of the exterior lights are quartz and halogen. A major project to replace these lights with high pressure sodium lights is ongoing because the campus is underlit. Metal halide lights are used in the gym and the auto shop uses high pressure sodium lights. There are some incandescent lights remaining on this campus.

Energy Management System:
A 1988 Solidyne energy management system is installed at this campus. The system controls the start/stop and the air handling activities for most of the buildings.

Other energy saving devices:
45% of the classrooms have motion sensors. The boilers have direct drive constant speed fans. There are plans to install a variable air volume system to work as an economizer but manipulated manually.

Buildings and construction dates:

Building	Gross Sq. Ft.	Year
Portable Unit 1	3,840	1966
Portable Unit 3	3,200	1966
Administration	3,197	1971
Liberal Arts/Lib.	16,839	1971
Forestry/Agricul.	10,085	1971
Gunshop	5,719	1971
Main Gym	14,214	1971
Locker/Shower	7,697	1971
Exercise/Wrestling	6,606	1971
Cafeteria	10,125	1973
Dormitory	23,413	1972
Science	14,267	1974
Student Pers.	7,805	1975
Maint Rec Stor.	8,074	1975
Child Dev Port	2,500	1975
Athletic Fld Stor.	512	1975
Child Dev Stor.	80	1975
Creative Arts	25,800	1975
Trades Bldg.	12,400	1975
Trades Bldg. Shed	500	1975
Bookstore	2,037	1975

Agri. Stor. Bldg.	1,277	1975
TOTAL	180,187	

Identified training needs:
The training priorities identified at this college include electrical maintenance, heating and air conditioning training, information on indoor/outdoor air quality, safety, skills and information on Title 24 codes and OSHA regulations.

Summary:
This college president has committed to energy efficiency and places a high priority on an efficient campus. facility. The maintenance staff is committed to training and uses video cassette programs as part of the operations.

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Los Angeles City College

Overview:
Los Angeles City College, Los Angeles Community College District, is located in the Hollywood area of Los Angeles and was established in 1929 (LA City College Catalogue). This college has approximately 15,400 students and a faculty and staff of 863 (Richard Wilkinson, pers. comm.). Southern California Edison and Gas provide electricity and natural gas to the campus and the costs for the 1992-93 fiscal year were $630,000 (Utility summary sheets provided by the Director of Maintenance). The buildings are occupied 3,000 to 4,000 hours per year. Heating Degree Days 1,536 and Cooling Degree Days 754 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction:
The first building was built in 1923 when the campus was the original University of Southern California campus. The campus became a high school for a short period and in1929 the site became a two year college. The newest building, the Communications Building was built in 1980. The campus has a variety of construction types including concrete, wood frame and light metal frame construction.

Heating Ventilation and Air Conditioning:
Heating for the campus is provided by a high pressure centralized steam boiler which provides heat to14 buildings. The remainder of the buildings are heated by hot water boilers and dual pack roof units located on many of the portables.

Cooling for the main campus is provided by natural outside air through open windows. There are 3 offices in the Administration Building that are air conditioned by window mounted units. Many of the portable buildings are air conditioned by individual package units attached to those buildings. The portables air conditioners are not controlled by the main EMS but rather individually controlled.

Energy Management System:
A 15 year old Watt Shaver energy management system controls most of the air handling operations on campus which include duty cycling and

fan operations. Indoor and outdoor lighting are also controlled by the EMS. The EMS does not control the individual air conditioning units on the portable buildings.

Lighting:
Most indoor lighting is fluorescent. Outdoor lighting is high pressure sodium or metal halide. Passive solar is utilized for additional lighting in the Communications Building.

Glazing:
Single layer clear glazing is used throughout the campus. The Communications Building which was constructed in 1980 utilizes passive solar design to allow for added interior lighting in the center of the building.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Administration	85,538	1962
Chemistry	37,137	1937
DA Vinci Hall	63,235	1964
Franklin Hall	102,865	1962
Gym Men	33,126	1935
Gym Women	32,987	1959
Holmes Hall	30,656	1938
Jefferson Hall	50,322	1959
Library	62,494	1937
Life Sciences Bldg	22,540	1937
Music Bldg	60,646	1964
Stadium	9,018	1960
Plant Facilities	5,216	1926
Cafeteria	18,928	1937
Theatre Arts	49,876	1965
Bungalows 29-Y	8,474	1949
Phys Plant Rec.	8,923	1949
Bungalows 101-129	21,690	1950
Registration	5,398	1951
Night Custodian	3,457	1949
Utility Bldg	3,854	1959
Bungalows 7-9	2,720	1947
Greenhouse	2,496	1962
Flammable Stor	168	1949
Women's Dress Rm	1,708	1923
Bungalow R	4,929	1971
Vending Machines	311	1962
Vending Machines	327	1964
Radiological Tech	4,800	1973

Child Dev Ctr South	1,800	1975
Child Dev Ctr North	1,800	1978
Communications	65,859	1980
TOTAL	803,805	

Identified training needs:
The maintenance director indicated that he could not identify any training needs at the time of the visit.

Summary:
This campus is in a survival mode. Given the age, location and condition of the energy equipment, this college's highest priority is to run an educational facility and insure student safety. Thus, energy efficiency is not viewed as a priority. If an energy management control system can tie in the package units at the various portable buildings, it would help control energy costs. Training of the staff would benefit this college.

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Mt. San Jacinto College

Overview:
Mt. San Jacinto Community College, Mt. San Jacinto Community College District, is located in the northern end of the San Jacinto Valley. This college has approximately 3,500 students and 173 faculty and staff (Wally Upper, pers. comm.). The cost for electricity for fiscal year 92-93 was $224,354 and the gas costs were $100,650 (Utility bills provided by Business Office). Southern California Edison was the supplier of electricity while REMAC supplied the gas. The buildings are occupied approximately 3,000 to 4,000 hours per year. Heating Degree Days 2,376 and Cooling Degree Days 1,413 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction:
The Mt. San Jacinto Community College District was formed in 1962. The college opened in the fall of 1963, holding classes in rented facilities. The current Mt. San Jacinto Campus was opened in 1965 with two buildings. The San Jacinto campus will be rebuilt over the next 15 to 20 years to accommodate approximately 12,000 to 15,000 students. In 1993 the Alice B. Cutting Business and Technology Center opened, and in a new Music Building was scheduled to begin construction in 1994. The campus has various construction types including fire resistant concrete tilt ups, heavy timber, various light combination frame structures and wood frame construction.

Heating, Ventilation and Air Conditioning:
Heating to the campus utilizes approximately 92 5-ton gas fired, roof-mounted, package units that provide both heating and cooling to the classrooms. These units are used because of their reliability and the low cost of the natural gas fuel source.

Cooling for the campus, in addition to the 92 5-ton gas packs include several 20 ton gas fired units which serve the newer buildings. Economizers are also used, in addition to opened windows for outside air where ever possible.

Energy Management System:
A Western-Powers energy management system is used to control the parking lot lights, pathway lighting, outside irrigation and the gas fired packaged units.

Lighting:
Most of the indoor lighting is fluorescent to include watt saver F-34 lights. Most of the out door lights are high pressure sodium. Photocells are located on several buildings, manual time clocks on some of the indoor and outdoor lighting, and motion sensors are located in two of the classrooms on an experimental basis.

Glazing:
Single layer clear and sun shaded glazing located throughout the campus.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Administration	11,018	1966
Humanities	13,500	1966
Science	16,439	1973
Centre	15,412	1966
Auditorium	12,737	1969
Music-Drama	6,160	1966
Library	19,369	1970
Fine Arts Center	9,855	1978
Vocational	8,065	1965
Shower-Locker	7,168	1965
Gymnasium	25,161	1968
Technology	11,657	1970
Maintenance	4,776	1970
Warehouse	4,115	1904
SGA Modular	960	1990
Child Care Center	3,800	1991
Business & Technol	18,943	1993
TOTAL	189,135	

Identified training needs:
The training priorities identified at this college include absorption units and safety training.

Summary:
This campus combines the use of low cost natural gas to fire the many dual pack units for both heating and cooling. The maintenance staff would probably benefit by participating in HVAC training classes.

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Ohlone College

Overview:
Ohlone College, Fremont-Newark Community College District, is located on a 534 acre hillside site in Mission San Jose in the city of Fremont. The main campus opened in 1974. Pacific Gas & Electric Company provides the natural gas and electricity to this campus. The cost for natural gas in fiscal year 92-93 was $82,371 and the cost for electricity was $345,488 (Utility bills provided by Business Office). Buildings are occupied approximately 3,000 to 4,000 hours per year. Heating Degree Days 2,969 and Cooling Degree Days 236 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction:
Ohlone College opened on September 25, 1967 at the former Serra Center Home for Girls in Fremont. The permanent site of the campus is on the Huddelson Ranch property located in the Mission foothills. The campus has an old historic wood frame building which was built in 1895 and is used for business operations. Other ranch style buildings are used for administrative offices. The majority of the buildings are concrete and wood frame. The major current construction project under way is the Performing Arts building.

Heating Ventilation & Air Conditioning:
Heating for the campus is provided primarily by the use of 193 heat pumps located throughout the campus.

Cooling:
Cooling for the campus is provided by heat pumps. Since the classrooms are located on the elevated portion of the campus, economizers are used to draw in outside air from the southern portion of San Francisco Bay to help in cooling of these facilities.

Energy Management System:
A newly installed energy management system controls load shedding, cycling of individual heat pumps, circulation pumps, monitors pool temperature and outside lighting. This system replaces an older DDX system.

Lighting:
The campus has primarily fluorescent lighting. Most of the F-30 and F-40 lamps have been replaced with T-8 lamps and electronic ballasts.

Incandescent walkway lights have been replaced with PL 7 fluorescent lamps, 70 w HPS lamps have replaced 100w spots and metal halide lamps have replaced older mercury vapor lighting as needed. HPS lights are in the gym and halides are used in the parking lots.

Glazing:
Clear and sun screened single layer glazing is used throughout the campus.

Building areas and construction types:

Building	Gross Sq Ft	Year
Blanchard Ctr	82,285	1974
Northwest Class	31,919	1974
North forum	8,633	1974
Northeast Class	23,899	1974
Hochler Stud Ctr	26,234	1975
Southeast Class	23,195	1974
South forum	8,633	1974
Southwest Class	31,933	1974
Epler Gym	39,341	1975
Wahse/Maint	15,591	1974
Swim Pool	3,380	1975
Early Child Ctr	3,200	1968
Orchard Hse	2,851	1895
Personnel Off	1,292	1946
Drama Studio	7,592	1968
Gallaudet	1,524	1943
Inst Off	3,188	1967
Dupl Ctr	2,430	1967
Inst Admin	2,991	1967
Pres Off	2,897	1962
Bldg 28	512	1962
Pub Info	1,500	1944
TOTAL	325,020	

Identified Training Needs:
The training priorities identified at this college include knowledge of energy management systems and controls systems for the HVAC equipment.

Summary:

This campus has recently installed a new energy management control system. The maintenance staff would benefit by participating in HVAC and PM training courses.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Saddleback College

Overview:
Saddleback College, Saddleback Community College District, is located in the City of Mission Viejo which is in the Southern portion of Orange County. The campus was built in 1969 and sits on approximately 200 acres. The campus area also accommodates a satellite facility for California State University, Fullerton. The college has approximately 24,000 students and faculty and staff of over 645 (Everett Bower, pers. comm.). San Diego Gas & Electricity provides electricity and Southern California Gas provides natural gas for a combined cost of $1,200,000 (Utility bills provided by Business Office). Buildings are occupied between 3,000 - 4,000 hours per year. Heating Degree Days 1,867 and Cooling Degree Days 759 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction:
The campus was originally built in 1967. The campus uses a combination of various types of construction types which include; heavy wood frame, in place concrete, light non-combustible frame, and ordinary masonry.

Heating, Ventilation and Air Conditioning:
Heating for the campus is provided by 8 hot water boilers which are de-centralized and located around the campus. Also small individual heat pumps are used.

Cooling for the campus is provided by a central thermal energy storage system located at the maintenance yard. Cooling towers combined with compressors are located at both the maintenance yard and on the upper campus. Also small individual heat pumps and evaporative coolers are used.

Energy Management System:
A 3-4 year old Andover 256 system that has 32 control points is utilized. This system controls; compressors, pumps, and cooling towers. No lighting is controlled by this system, though security is going to be added into this system.
Lighting:
Most indoor lighting is fluorescent. Much of the other lighting includes: high pressure sodium and metal halides are used on the

walkways and the stadium, some incandescents and sodium lights are used in the equipment rooms and other areas.

Glazing:
Single layer clear and sun shaded glazing is used in all the buildings throughout the campus.

Building areas and construction types:

Building	Gross Sq Ft.	Year
Purchasing/Comm Serv	7,909	1968
Observatory	151	1973
Construction Tech	3,040	1968
Admin Governance	7,920	1981
Child Care Cntr-Agri	12,362	1968
Academic Facility	3,427	1968
Storage	165	1973
Storage	408	1974
Community Services	3,203	1969
Academic Facility	2,883	1969
Academic Facility	2,243	1969
Human Serv Classroom	3,224	1969
Automotive Tech	5,797	1969
Grounds	1,321	1969
Transportation	885	1969
UTT Library	101,664	1974
Science Math	81,420	1974
Handball/Courts	7,218	1976
Central Plant	17,529	1975
PE Shower/Locker	20,549	1976
Gymnasium	20,318	1976
PE Activity Room	9,049	1976
PE Offices	4,994	1976
Fine Arts	52,599	1977
Facilities Planning	700	1977
Student Affairs	4,067	1977
.Greenhouse	6,463	1977
Flammable Storage	528	1974
Acid Storage	100	1976
Oxidizer Storage	100	1978
Maintenance Storage	1,276	1978
PE Storage General	270	1976
PE Storage Baseball	180	1975
Transportation Storage	262	1975
Classroom Cluster	11,592	1980

Health Sciences	10,080	1980
Warehouse	7,211	1982
Safety Security	1,096	1983
Dist Comp Ctr	2,409	1985
Business Gen Studies	84,442	1986
Student Services Ctr	62,400	1990
Tech/Applied Sciences	26,601	1991
TOTAL	599,965	

Identified Training Needs:
The training priorities identified at this college include HVAC information, information on combustion engines, site based "hands on" skills on equipment, refresher courses on programming, what is energy efficiency, new technology, planning for future needs. Other needs include computer literacy, and energy control systems.

Summary:
This campus is a model for energy efficiency. The Maintenance Director has been able to utilize limited resources to help keep energy costs down for this campus. This campus utilizes Thermal Energy Storage for cooling a main portion of the campus, energy efficient lighting, passive solar and other energy saving devices.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Santa Barbara City College

Overview:
Santa Barbara City College, Santa Barbara Community College District, is located on the southern coast of Santa Barbara County. The college has approximately 12,000 students and 1,500 faculty and staff (Santa Barbara College Catalogue). Santa Barbara City College purchases natural gas through a joint effort with other institutions through REMAC. The costs for natural gas for fiscal year 92-93 were $96,914. Electricity was purchased through Southern California Edison, and the costs for fiscal year 92-93 were approximately $665,327 (Utility bills provided by Business Office). Heating Degree Days 2,160 and Cooling Degree Days 386 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and construction types:
Santa Barbara City College was established in 1909. The campus has been at the present site since 1959 and is located on a 74 acre site overlooking the Pacific Ocean. The campus has several different construction types. The buildings are constructed of concrete, tilt ups, wood frame or light incombustible frame and some masonry or timber.

Heating Ventilation and Air Conditioning:
Heating for a majority of the campus is provided by use of heat pumps. Boilers are used at some of the major facilities to provide hot water as needed for the circulation pumps for the air handler supply.

Cooling is provided by outside air which keeps the campus climate comfortable most of the time and some use of heat pumps in the newer buildings. Windows facing towards the ocean are normally open to allow fresh outside air to cool some of the facilities. Many of the buildings have their own double duct package systems. Larger buildings have their own chillers and boilers.

Energy Management System:
An Atherton System 2000 energy management system is used to maintain the operation of the chillers, boilers, air handlers, the

outside lights and individual package units. The energy management system also replaced many of the individual time clocks.

Lighting:
The majority of the campus uses fluorescent lighting. Newer T-8 lamps have been installed wherever possible. Metal halide lamps are used in the gym facility replacing older inefficient lighting. High pressure walkway lights are used throughout the campus. 95% of the incandescent lights on campus have been replaced with PL 13 fluorescent lamps.

Glazing:
The majority of the campus uses clear single glazing. Solar tint is used on several buildings, particularly some of the newer buildings which face south which adds to the cooling process.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Admin	76,454	1939
Camp Ctr	30,384	1965
Stud Svs	43,038	1965
Life Sci	36,651	1970
Phys Ed	64,894	1965
Phys Sci	22,767	1975
Humanities	39,912	1975
Occup Educ	18,389	1976
Marine Tech	8,608	1978
Drama/Music	46,325	1977
Phys Sci Lec	3,883	1968
Htl/Rst Mgmt	5,591	1980
Interdscpl	39,147	1991
Staff Ctr	4,406	1971
Phys Plant	2,419	1955
Reloc	328	1991
Reloc	198	1991
Reloc	211	1991
Reloc	211	1991
Reloc	207	1991
Reloc	320	1991
Reloc	320	1991
Ticket Bth	56	1972
Ticket Bth	31	1972
Stad Restrm	575	1939
Grnds Stor	145	1972

Grnds Stor	306	1978
Reloc	3,840	1967
Press Box	218	1939
Learn Res Ctr	52,327	1989
Sec Ksk	49	1983
Trlr 1	450	1975
Trlr 2	220	1973
Child Ctr	5,528	1977
Temp	1,056	1989
Temp	960	1989
Temp	1,440	1989
TOTAL	511,712	

Identified training needs:
The training priorities identified at the college including direct digital control systems in HVAC systems.

Summary:
This college is a model of energy efficiency. The administration of the college considers energy efficiency a high priority and seeks ways to increase efficiency without sacrificing the classroom comfort levels. It is recommended that the staff participate in HVAC and PM workshops regularly.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Santa Rosa Junior College

Overview:
Santa Rosa Junior College, Sonoma County Community College District, is located in Northern California. It was established in 1918 and was operated as part of the Santa Rosa High School until 1927 when a junior college district was formed. The college has approximately 31,677 students and 1,780 faculty and staff (Curt Groninga, pers. comm.). Pacific Gas & Electric Company provides gas and electricity for the campus. The cost for fiscal year 92-93 was approximately $1,000,000 (Utility bills provided by Business Office). The buildings on campus are occupied between 3,000 to 4,000 hours per year. Kent Hall offers on campus student housing for 72 students during the year. Heating Degree Days 3,065 and Cooling Degree Days 315 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction:
Burbank Park, a 40 acre site north of downtown Santa Rosa, was donated to the college in 1929 by the city of Santa Rosa and the Chamber of Commerce. The first building, Pioneer Hass, was completed in 1931 on the site which then was 99 acres. In 1972, Santa Rosa Junior College was deeded an additional 275 acres of land by the Federal Government. This land is used for agriculture, forestry and life science instruction. The campus has a variety of construction types which include concrete, light combustible frame, wood frame and masonry. Many of the roofs are made of tar, gravel and heavy tiles.

Heating Ventilation and Air Conditioning:
Heating for the campus is provided by hot water boilers which are located throughout the campus. The shops use forced air heaters and the gyms use roof mounted heating coils. A co-generation plant is installed at the gym facility to provide hot water for the pool and showers.

Cooling is provided by roof mounted air conditioning package units located throughout the campus. Chillers, cooling towers and condenser units provide cooling for about 10% of the buildings.

Energy Management System:
The college uses a Barber-Coleman energy management system. The system is programmed on an optimum start/stop mode for the mechanical equipment

Lighting:
Most indoor lights are either F-34 fluorescent or the newer T-8s combined with electronic ballasts. The gym and outdoor lights consists of High Pressure Sodium (HPS) lamps, and in the library metal halides and HPS lights are used. The library also employs a white reflective ceiling that bounced light to illuminate the studying surface below.

Glazing:
Single layer clear, glazing is used throughout the campus.

Building areas and construction dates:

Building	Gross Sq. Ft.	Year
Forsyth Hall	15,013	1980
Luther Burbank Thea.	26,954	1940
Student Book Store	14,040	1974
Doyle Student Center	26,089	1953
Plover Library	34,701	1971
Analy Lot Temp.	22,107	1069
Analy Hall	26,420	1939
Garcia Hall	9,669	1936
Tauzer Gym	36,585	1935
Quinn Swim Ctr	29,863	1972
Walter Hael Pavil	32,800	1981
Barnett Hall	26,340	1958
Bailey Hall	19,813	1964
Bussman Hall	26,759	1939
Emiritus Hall	58,456	1978
Shushaw	37,125	1955
Baker Hall	31,309	1965
Bech Hall	20,289	1967
Lark Hall	37,371	1978
Kent Hall	15,016	1966
Maintenance Comp.	29,797	1962
Lounibos Ctr	41,861	1980
Child Devevelop LB	6,305	1969
Comm Serv	3,200	1975
Maggini Hall	43,744	1990
Infant Toddler Ctr	1,820	1985
Assessment Bldg	1,650	1972
EOPS House	1,784	1960

ESL House	1,382	1950
Staff Dev House	1,450	1951
Miller House	1,600	1950
Archery Hut	264	1935
Bailery Field	5,082	1935
TOTAL	687,036	

Identified training needs:
The training priorities identified at this college include pneumatic and electric controls, computer programming, new technologies, EMS, HVAC equipment updates, Boiler optimization and waste water chemical treatment. Other training includes vent hood, freezers and refrigerant cycles and preventive maintenance programs on mechanical systems.

Summary:
This college is a model for energy efficiency. It is one of the only colleges that has a full time energy management technician to monitor and schedule building use for maximum energy efficiency.

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL SUMMARY NARRATIVE

Solano Community College

Overview:
Solano Community College, Solano County Community College District, was established in 1945 as Vallejo Junior College. Solano was part of the Vallejo Unified School District until 1967 when the College became a countywide institution. Solano currently has approximately 12,000 students and approximately 1,000 faculty and staff (Solano College Catalogue). The college's buildings are in use about 3,000 to 4,000 hours per year. Heating Degree Days for the 2,812 and Cooling Degree Days 1,173 (source, California Solar Data Manual, California Energy Commission Publication No. 500-78-018).

History and Building construction type:
The 192 acre campus, centrally located just off Interstate 80 was completed in 1972. The majority of the buildings are tilt-up concrete slab construction and several of the other buildings are constructed of a light pre-fab metal construction. There are no wood frame buildings on this campus.

Glazing:
Single layer clear and sun shaded glazing is used in all the buildings throughout the campus.

Heating Ventilation & Air Conditioning:
Heating for the campus is provided by 3 forced draft boilers primarily which are located at a central plant. Hot water pumps circulate the water to the buildings as needed. Reheat coils located at the building hot decks provided heat additional heat.

Cooling is provided primarily by 3 large centrifugal chillers located at the central plant. Cooling is also provided by using the regions natural air conditioning, out side air. The region known as Suisun, which is Indian for West Wind, provides natural cooling coming in from the Suisun Bay near Benicia. No energy management system is used on this campus, however, 38 time clocks are used to schedule the air handling equipment and lighting needs of the campus.

Lighting:

Almost all the lighting on campus is fluorescent. Sodium outside lighting and parking lot lights are used. Mechanical rooms use incandescent lights.

Building areas and construction dates:

Building	Gross Sq Ft.	Year
Portable A	2,329	1960
Portable B	930	1965
Portable C	1,904	1960
Portable D	1,928	1960
Portable E	1,928	1960
Library	49,600	1971
Science	24,240	1971
Bus Admin	11,616	1971
Administration	13,056	1971
Social Science	16,864	1971
Multi Discipline	14,032	1978
Horticulture	3,977	1977
Music Drama	25,231	1974
Fine Arts	12,400	1978
Student Center	30,976	1971
Math Engineer	11,616	1971
Voc. Arts	14,336	1971
Phys Ed	48,201	1971
Voc. Complex	35,150	1973
Warehouse	10,730	1971
Central Plant	3,160	1971
Pool Mech	1,707	1970
TOTAL	335,911	

Identified training needs:
The training priorities identified at this college include new technologies and energy management systems.

Summary:
This campus has been able to control its energy use effectively without an energy management system and has saved start up costs by using time clocks and staff. In addition, this campus utilizes the natural air conditioning from the prevailing winds off the Suisun Bay to cool its many buildings. HVAC and PM training for the staff would be helpful to this staff.

Appendix 6

Interview Packet Date_____

College_____
Maintenance Director:_____
VP Business/Administration:_____
Maintenance Personnel:_____

DE ANZA COLLEGE SURVEY

1. Energy Decision Hierarchy
   A. Energy Policies

      1. Are you aware of policies regarding energy efficiency for the State of California? If yes, describe:

55.7% are not aware
43.5% are aware
.09% are unsure

      2. Are you aware of the California Energy Commission? If yes, describe:

83.5% are aware
13% are not
3.5% are not sure

      3. Does your College/District have an energy policy? If yes, describe.

28.9% yes
33.3% no
37.7% unknown
(71% either do not have or are not sure).

         a. How is your energy policy implemented?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

   B. Knowledge of energy/utility expenses for District

      1. What percentage of your total operating costs do you think goes towards energy?

Answers ranged from 3% to 70%
with the average of 10.8%

2. What do you think the energy costs at this campus are?

Answers range from $2,500 to 25,000,000

3. Do you track your energy bills? If you track your bills, do you have a computerized tracking system?

4. Are your utility bills increasing/decreasing? Reasons?

40.35% up
35% down
12.8% flat
12.8% don't know

5. Do you have contact with your local utility representative?

33.3% no
61.35% yes
3% do not know

6. Are you familiar with utility rebate programs? If so, which ones:

81.35% yes
11.86 no
6.77% are no sure

C. <u>Energy Decision Making Process</u>

1. How do you define energy efficiency?

2. Is energy efficiency promoted on this campus? If yes, describe:

70.6% say yes
25.6% say no
3.9% are not sure

a. What priority is given to energy efficiency in the decision making process? Rank 1 to 5: (1 = top priority; 5 = lowest priority)

12.4% high
25% above average
30.1% average
25.2% below average
7.6% low
(62.9% ranked energy priority as average or below while only 37.4% ranked it high or above average).

b. How have energy efficiency decisions been initiated in the past? Specify: maintenance, administration, or business office?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

c. What has been the level of support for energy efficiency by campus management?

24% high
21.8% above average
29.8% average
19.5% below average
0% low

3. Are decisions to purchase equipment and/or make improvements dictated by upper management?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

4. Do you have any input into decisions made? Describe:

78.57% yes
19.6% no
1.7% are not sure

5. Does your District have a Budget Committee?

94.4% yes
2.7% no
2.7% are not sure

If so, are you a member?

25.2% yes
74.7% no

6. In making decisions regarding capital investments or improvements what criteria is utilized by the decision makers?
Specify: initial costs, pay back, life cycle

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

a. Are the long term benefits of energy efficiency considered along with the first costs of a project?

82.6% yes
13.5% no
3.8 % are not sure

7. How would energy improvements typically be financed?
Specify: capital outlay, deferred maintenance, lease-purchase arrangements, state resources

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

Specify others:

8. Describe the decision making process on your campus: (Sketch a flow chart)

2. Skill level of maintenance personnel

A. Knowledge of energy training programs

1. Are you aware of energy training programs?
Specify: State:
Utility:
Private:
Military:
College:
Other:

There are multiple responses to this question:

59.6% Utility
59.6% State
57.7% Private
40.4% College
30.8% Military
11.57% Other
21.2% Are not aware of any training programs

2. What type of training do you provide for your in-house maintenance staff?

Specify: HVAC
EMS
Boilers
Chillers
Controls
Filters/filter replacement
Lighting

37.2 % do not have any in-house training
62.8% have a wide variety of training
41.9% HVAC
32.5% Boilers
30.2% Controls
27.9% Chillers
25.6% EMS
25.6% Lighting
23.3% Filters
18.6% Pool
2.3% Cogeneration

3. Who provides the in-house training of maintenance staff?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

4. What source was used to obtain technical staff training? (Trade/vocational schools, OJT, ROP, PIC, military, etc.)

63.8 % OJT
30.5% Military
5.5% Vocational Schools

5. What types of equipment does your staff maintain? (Boilers, chillers, package units, EMS, etc.)

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

6. Do you view training as a priority?

89.3% feel that energy training is a priority

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

What areas of training would you like to see made available for your staff?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

7. Does your District have an individual career development program with which you identify the training needs of individual employees, allocate hours each year for training and set goals based on individual and District needs?

73.3% yes
21.7% no
5% are not sure

8. Do you add this item to your department's budget?

47% yes
41.1% no
11.76% are not sure

9. What is your approximate annual training budget for all maintenance personnel? How many hours or days and dollars are allocated each year per individual for training in your District?

Range from $0 to $900,000

10. What is your greatest need in the area of training for your staff?

A Majority feels a need for technical training.

11. Do you encourage staff to attend seminars or training workshops?

96.4% yes
3.6% no

B. Maintenance Personnel

1. Please list your maintenance staff by title:

Conclusions and analysis in the Narrative

2. Please list the apprentice, mid-level and journey level technicians (or equivalent) that you have on staff? What other maintenance staff? Custodial?

_____
_____
_____
_____
_____
_____
_____

Conclusions and analysis in the Narrative

3. Does this college have a preventative maintenance program?

"Preventative maintenance" can be defined as the timely servicing of equipment, and the systematic inspection for the detection and correction of potential equipment failures before defects develop.

A. Ideal preventative maintenance program

1. If you could define a PM program-what would you include in that plan?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

B. In place preventative maintenance program

1. Does your district have a formal PM program?
If not, why not?

64.9% Do have a plan
29.8% Do not have a plan

If yes, please answer:
1. Do you have a program outline?

58.8% yes
29.4% no
11.7% unknown

2. Do you have training manuals? Are they available?

77,4% yes
16.1% no

3. How many employees are involved?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

4. How often is it carried out?

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

5. Do you provide regular instruction to staff on PM procedures? Who teaches staff?

64% yes
24% no
12% are not sure

6. Who performs most of the PM work on your campus? In-house? Outside contractor?

59.5% In-house
32.4% both In-house and Outside Contractor
8.1% use only Outside Contractors

7. How do you monitor your PM program? Describe the system or equipment utilized:

25% do not have any monitoring method
18.8% record failures or breakdown
6.25% use a computer
50% use logbooks or another method of monitoring

8. How do you measure success of PM program?

50% by the number of breakdowns or equipment failure
20% by the number of complaints
20% use other various methods
10% do not use any method

C. Maintenance Program (if not PM program)

1. What is the majority of you maintenance time spent on?
List: motors, lights, switches, grease fittings, other, oil changes, change fluids, filters, belts

Conclusions and analysis in the Narrative

2. Who performs most of the maintenance work on your campus? In-house? Outside contractors?

59.5% In-house
32.4% Both In-house & Outside Contractors
8.1% Outside Contractor

3. How do you keep track of your maintenance program? Describe the system or equipment utilized:

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

4. Is there a lighting maintenance and disposal program? Are lamps recycled?

Disposal
42.86% Yes
42.86% No
14.28% Unknown

Recycled
29.4% Yes
55.9% No
14.7% Unknown

4. Operations and Equipment Survey for each campus

A. College demographics (Complete prior to survey visit)

Conclusions and analysis in the Narrative

1. Operation:

Students: # Faculty: # Staff:

Semester system: Quarter system:

Fall __ Spr __ Sum __ Fall __ Wtr __ Spr __ Sum ___

Hours of operation:

2. Buildings:

Gross square feet: # Total Buildings:

Year built: Type architecture:
Stucco __ Wood __ Brick __ Metal __

Adobe __ Masonry __ Other ___

Comment:
3. Utility Company:

Elec. ___ Natural gas ___ Propane ___ Other ___
Rate: Rate: Gal:

Annual consumption of energy:

_____ per kWh _____ per Therm

4. Environmental:

Calendar year: Amount:

Degree Days:

Elevation: Rural or Urban:

Geographic location:

B. College energy systems

1. List the major energy systems on your campus?

Lighting:

Cooling:

Heating:

Energy management system:

Energy savings devices:

Conclusions and analysis in the Narrative

C. Equipment (Maintenance Director only)

1. List the major energy equipment:

Type: Vendor: Age: Hrs./Op.: Rate:

_____
_____
_____
_____

2. Who maintains the major equipment?

89.26% use I-house staff
10.5% use an Outside Contractor

3. With regards to the acquisition of new energy equipment, how do you rank the following factors (1 = top priority and 5 = lowest priority)

Cost	_____
Safety	_____
Efficiency	_____
Comfort	_____
Ease of maintenance	_____

4. Describe the process for purchasing energy equipment in your department:

Conclusions will be made in the form of content analysis in the narrative of the final report.

5. Describe the process for purchasing energy equipment on your campus:

Conclusions will be made in the form of content analysis in the narrative of the final report.

6. Who makes the final decision regarding the purchase of energy equipment? Does this vary dependent upon the costs of the equipment?

Conclusions will be made in the form of content analysis in the narrative of the final report.

7. On average, what is your college's total capital replacement budget for energy using equipment?

Conclusions will be made in the form of content analysis in the narrative of the final report.

8. How does your college determine when it should replace energy using equipment?

Conclusions will be made in the form of content analysis in the narrative of the final report.

D. <u>New construction/modernization projects</u>

1. Are there plans for new construction on this campus?

80% yes
11.4% no
8.25% yes

2. List any recent construction projects:

   If any, was energy efficiency a consideration in that project?

84.8% yes
3% no
12.1% no sure

3. Who is in charge of the planning process for new construction?

Conclusions will be made in the form of content analysis in the narrative of the final report.

4. Are you part of the planning process for new construction?
   <u>If yes,</u> describe:

82% yes
9% no

   a. Do you meet with Architect to oversee new construction equipment design? Installation?

90% yes
7.5% no
2.5 are unsure

b. Do you have any input in architectural design?

87.5% yes
12.5% no

5. List your campus architect:

Conclusions will be made in the form of content analysis in the narrative of the final report.

E. Questions for Architect:

1. Is compliance with Title 24 Energy Standards assured? How?

Conclusions will be made in the form of content analysis in the narrative of the final report.

2. Is achieving energy efficiency BEYOND the Title 24 standards in new buildings important to the District? If exceeding Title 24 - in what manner?

5. Are there energy education programs on campus?

A. Staff Activities:

1. Do you provide training for new maintenance personnel on issues relating to energy efficiency on your campus?

27.8% yes
62.3% no
9.8 are not sure

2. Do you provide information for new faculty, staff and students on issues relating to energy efficiency on your campus?

a. Does your college handbooks address energy efficiency?

9.4% yes
70.75% no
19.8% are not sure

3. Does you campus provide newsletters/information sheets on energy programs?]

28.4% yes
65.7% no
5.9% do not know

4. Are you familiar with utility rebate programs?

81.4% yes
11.9% no
6.8% not sure

If so, which ones have you or do you participate in?

Conclusions will be made in the form of content analysis in the narrative of the final report.

5. What incentives are available for saving energy on campus? Recognition? Monetary? Other?

73.8% responded none

6. Is energy efficiency understood to be a method of saving the District money?

91.7% yes
8.3% no

7. Do you subscribe to energy publications? (EUN, APPA, etc.)

Conclusions will be made in the form of content analysis in the narrative of the final report.

8. Do you or your staff participate in on-going energy education programs, seminars, workshops, conferences, etc.? If yes, please describe:

Statistics are unavailable as their was a lack of standardization. Conclusions will be made in the form of content analysis in the narrative of the final report.

9. <u>What energy curriculum is present on this campus?</u>

A. <u>Courses</u> (Refer to college catalog and schedule prior to visit)

1. List all courses related to energy:

HVAC:
Lighting:
Principles of electricity:
Pneumatics/hydronics control:
Architecture and design:

Building and construction:
Others:

100% No classes are offered

2. What is the status of these courses?

3. Are any of your staff encouraged to take these courses?

4. Are any of your staff involved with the teaching of these courses?

Appendix 7

TECHNICAL ADVISORY COMMITTEE

The first meeting of the Energy Management Technology Program Technical Advisory Committee (TAC) was held at De Anza College on April 20, 1993. Sixteen individuals from government, business, utilities and the education community were invited to serve on this committee. The sixteen member list was submitted to the Commission staff for approval.

The TAC was established as an advisory board for the Energy Management Technology Program at De Anza. Members were asked to give input into program goals and objectives, needs assessment survey design, funding and partnership possibilities, curriculum development and other issues related to energy management.

TAC meetings were held on the following dates:

April 20, 1993	TAC meeting
July 27, 1993	TAC meeting
September 28, 1993	TAC meeting
February 9, 1994	Partnership meeting with PG&E
March 15, 1994	TAC meeting (cancelled at request of PG&E)
May 4, 1994	TAC meeting & luncheon

Many of the members participating in the TAC meetings eventually left their organizations or changed job descriptions. Further meetings were not scheduled due to the lack of participation by TAC members. Some members were asked to give input into the final report for this project.

Additional meetings were held between EMT staff and PG&E staff to discuss a partnership between the utilities and De Anza for the development of energy curriculum. The dates of those meetings were:

February 8, 1994	Partnership meeting with PG&E
February 9, 1994	Partnership meeting with PG&E
February 18, 1994	Partnership meeting with PG&E
February 22, 1994	Partnership meeting with PG&E
October 29, 1994	ATC Celebration

A preliminary partnership between the utilities, colleges and government agencies was outlined and discussed. All parties were asked to go back to their respective organizations and ask for a commitment to the development of a partnership to promote energy education and efficiency throughout California. Unfortunately, the possibility of the deregulation of electricity within California brought about a major reorganization of PG&E. Although PG&E has continued to participate in discussions and activities at De Anza, the discussion of the partnership did not continue.

The EMT staff appreciates the input by the TAC members during this project.

February 12, 1993

Don Aitken
Senior Analyst
Union of Concerned Scientists
20100 Skyline Boulevard
Woodside, CA. 94002

Re: Energy Management Technology Program
Steering Committee

Dear Don:

I am very pleased that you are interested in finding out more about this project and possibly be a member of our program steering committee.

De Anza Community College and the California Energy Commission (CEC) have entered into an agreement to develop an Energy Management Technology (EMT) Program. In the first Phase of this project, we will develop and implement a needs assessment survey of energy management within the California Community College System. In addition, we will establish a program steering committee to oversee and advise this program and assist in the development of a long term plan for an EMT Program.

The needs assessment survey will focus on community college personnel involved in energy management, use and decision making policy. This will include maintenance staff, purchasing agents, business managers and administrators. By assessing the energy needs within the community college system and applying this knowledge to the training of personnel, De Anza will accumulate the information needed to develop a vocational program in this field.

The program steering committee will be comprised of De Anza College EMT Program personnel, CEC personnel, a respresentative of the State Chancellors Office, utility

representatives, energy specialists and engineers, and members of the business community. This committee will serve in an advisory capacity and be a technical resource for this project. The committee will meet quarterly with the EMT Program personnel to review the goals and progress of this program.

We would be honored if you would accept our offer to be one of the members of the De Anza College EMT Program steering committee. If we can provide further clarification or other information for you, please do not hesitate to contact us.

Sincerely,

Julie Phillips
Program Director

cc: California Energy Commission

March 12, 1993

Mick Sullivan
Dean of Instruction
Career & Technical Education
De Anza College
21250 Stevens Creek Boulevard
Cupertino, CA 95014

Re: Technical Advisory Committee

Dear Mick:

Congratulations! On February 17, 1993, California Energy Commission staff approved our Technical Advisory Committee (TAC) members. We are pleased and honored to have you serve as a member of this committee.

As you may recall from previous communications, De Anza and the California Energy Commission (CEC) have entered into an agreement to develop an Energy Management Technology (EMT) Program. In the first phase of this project, we will develop and implement a needs assessment survey of energy management within the California Community College system. The Technical Advisory Committee, of which you are a member, will oversee and advise this program and assist in the development of a long term plan for an EMT Program.

You, along with De Anza College EMT staff, CEC personnel, energy specialists and engineers and members of the business community, will serve on the Technical Advisory Committee.

We would like to hold our first meeting of this committee as soon as possible. The potential dates are: April 6, April 13 or April 20 at 7:00 p.m. at De Anza College. Please let us know which date is most convenient for you. We are aware that all members may not be able to attend all meetings. We will select the date which the majority of TAC members can attend.

Please send us written acknowledgment of your willingness to serve on the Technical Advisory Committee. Also, it would be helpful if you could send your resume or background information for our records.

We are excited about this innovative new project! We look forward to working with you. Please let us know if we can provide any further information for you.

Sincerely,

Julie Phillips
Project Director

TECHNICAL ADVISORY COMMITTEE MEMBERS

NAME	COMMUNICATIONS RECEIVED:	
	Info Rec'd:	Phone contact:

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Senior Energy Analyst
Union of Concerned Scientists
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Mick Sullivan
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STILL NEED TO CONTACT & CONFIRM MEMBERSHIP:

Date contacted: Letter sent:

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DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
TECHNICAL ADVISORY COMMITTEE
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OTHER MEMBERS (NOT CONFIRMED)

JIM CHASE (415)973-7268
Pacific Energy Center
Pacific Gas & Electric Company
851 Howard Street
San Francisco, CA

MARIA TIKHOFF (916)445-5900
Cal EPA
Green Lights Program
Sacramento, CA

April 13, 1993

TO: All Members
Technical Advisory Committee
Energy Management Technology Program

FROM: Julie Phillips
Al Guevara
Jim Anderson

Re: First Meeting of Technical Advisory Committee

We look forward to the first meeting of our Technical Advisory Committee on Tuesday, April 20, 1993 at 7:00 p.m. in the Administrative Conference Room, Administration Building at De Anza College.

It was a difficult task to try to coordinate the schedules of 17 committee members. Because of this difficulty, some of you will not be able to attend this first meeting. We are hopeful that you will be able to attend our second meeting scheduled for some time in July.

We will forward a copy of the minutes of our first meeting as well as a copy of the objectives and guidelines for this project to those members who could not attend. We would ask that you forward any comments that you may have on these items to us.

Enclosed please find a map of the De Anza campus. The Administration Building is marked on the map. A parking permit for April 20 is also enclosed.

Again, thank you for your willingness to serve on this committee. We look forward to seeing you on April 20.

DE ANZA COLLEGE

ENERGY MANAGEMENT TECHNOLOGY PROGRAM

TECHNICAL ADVISORY COMMITTEE

MEETING OF APRIL 20, 1993

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
AGENDA
MEETING OF APRIL 20, 1993

7:00 p.m.	Arrival Introductions
7:15 p.m.	Overview of Energy Management Technology Program Objectives & Guidelines
7:45 p.m.	Survey methodology Cabrillo visit
8:00 p.m.	Role of the Technical Advisory Committee
8:30 p.m.	Future Agenda items
8:45 p.m.	Adjournment

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY (EMT) PROGRAM
TECHNICAL ADVISORY COMMITTEE
MINUTES OF MEETING OF APRIL 20, 1993

Members present:

Jim Anderson, De Anza College, EMT Program
Al Guevara, De Anza College, EMT Program
Kae Lewis, California Energy Commission
Michael Magee, California Energy Commission
Susan Mas, Southern California Edison
Bob Mibach, Peralta College
Julie Phillips, De Anza College, EMT Program
Mick Sullivan, De Anza College

The meeting was called to order at 7:15 p.m. Each committee member gave a brief introduction about themselves and their background.

Items discussed: EMT Program staff gave an overview of the Energy Management Technology Program project guidelines and objectives. Each member was given a copy of the First Quarterly Report to the California Energy Commission, dated February 17, 1993. (Copies of the report will be forwarded to all members not present at this meeting). Staff briefly reviewed key components of that report including the goals and objectives, colleges selected to be included in the survey, needs assessment survey, survey sheets and Technical Advisory Committee objectives. (Committee members not present at this meeting are encouraged to review this report and forward any comments to staff).

Susan Mas, Southern California Edison, discussed her experience in developing surveys of energy use within colleges in Southern California. She encouraged the staff to be objective and brief in the interview process. She emphasized the importance of identifying the "barriers" to energy efficiency within the college systems.

Bob Mibach, Peralta College, emphasized his interest and excitement about the project and would like the Peralta District to be involved in the survey. Staff informed him that Merritt College, Peralta District, is included in the survey. He looks forward to working with staff on this project.

Kae Lewis and Michael Magee, California Energy Commission (CEC), gave an overview of the functions of the CEC. They informed the group that the CEC has completed 19 community college technical audits to date and these will be incorporated into this survey. The decision making processes, training, preventative maintenance and other services related to energy within the community college system were not adequately assessed by the technical audits. They envision this project helping to answer these questions. CEC staff wants a copy of the work statement within the original contract forwarded to TAC members. CEC staff emphasized that the CEC funded this project because the needs assessment survey will result in training programs for community college personnel.

It was agreed by all present that this project is a very needed aspect of energy use in the State of California.

The next meeting of the Technical Advisory Committee will be in July. The meeting was adjourned at 9:00 p.m.

ENERGY MANAGEMENT TECHNOLOGY PROGRAM
PARTNERSHIP TASK FORCE
AGENDA
MAY 4,1994 MEETING

DE ANZA COLLEGE
21250 Stevens Creek Blvd., Cupertino
Administrative Conference Room

AGENCIES REPRESENTED:

Pacific Gas & Electric
Lucinda Andreani, Director, Public and Institutional Markets
Larry Doleman, Corporate Account Representative, Public and Institutional Markets
LouAnn Klein, Distance Learning Program Manager
Debra Moreno, Executive Producer, Corporate Communications
Tom Patterson, Pacific Energy Center
Bryan Caluwe, Products and Services

Southern California Edison
Susan Mas, Southern Cal Edison

California Energy Commission
Michael Magee, Efficiency Services Office
Don Kazama, Efficiency Services Office

De Anza College
Martha Kanter, President
Mick Sullivan, Dean Of Instruction, Career & Technical Education
Claudette Penner, Coordinator of Vocational Education
Dennis Peterson, Division Dean, Biology/Health Sciences
Lorie Prouty, Business & Industry Institute
David Barney, Telecommunications Dean, TV Center
Gladys Penner, Television Center
Julie Phillips, Energy Management Tech Program
Jim Anderson, Energy Management Tech Program
Al Guevara, Energy Management Tech Program

MEETING AGENDA

MAY 4, 1994

9:00 a.m. Introductions

9:15 a.m. Partnership Goals
De Anza College (Julie Phillips)
Pacific Gas & Electric (Larry Doleman)
California Energy Commission (Mike Magee)

9:45 a.m. What Will the Program Look Like? (Julie Phillips)

10:00 a.m. Discussion: Partnership Goals/Program (All)

10:20 a.m. Proposed Teleconferences: Phase 1 (Julie Phillips, Larry Doleman)

Proposed Budget

10:45 a.m. Discussion: Phase 1 (All)

11:15 a.m. The next step

11:30 a.m. Buffet lunch

Appendix 8

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
MONTHLY REPORTS
8/1/94 - 7/15/95

MONTH	TASKS	HOURS
8/94	Staff meetings Continue data analysis Communications Meet with Computer Consultant	30
9/94	Staff meetings Communications Continue data analysis Write first draft final report	30
10/94	Staff meetings Communications Continue data analysis Write final report	30
11/94	Staff meetings Communications Continue data analysis Write final report	30
12/94	Staff meetings Communications Continue data analysis First draft completed	30
1/95	Staff meetings Communications Continue data analysis Rewrite first draft	30
2/95	Staff meetings Communications Continue data analysis Write second draft final report	30
3/95	Staff meetings Communications Continue data analysis Write second draft final report	30
4/95	Staff meetings Communications Search for funding for Phase 2 Write third draft final report	30

MONTH	TASKS	HOURS
5/95	Staff meetings Communications Search for funding for Phase 2 Write fourth draft final report	30
6/95	Staff meetings Communications Search for funding for Phase 2 Final draft complete	30
7/95	Staff meetings Communications Present final report to Commission Mail out copies of final report to 20 colleges Distribute copies of final report to TAC	30

Submitted by:

Julie Phillips
Coordinator
De Anza College
Energy Management Tech Program

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
MONTHLY REPORTS 1/1/94 - 4/30/94

MONTH	TASKS	HOURS
January	Staff meetings Data entry/data review Preliminary data analysis Prepare for college visits Fresno City College visit 1/28 Meeting with CEC in Sacramento 7/15 Communications Meet with Computer Consultant Curriculum development Communications with PG&E re: partnership	120
February	Staff meetings Debrief from Fresno City College visit Communications Prepare for TAC /partnership meeting Communications with TAC members Data entry/data review Curriculum development Partnership development Meet with De Anza Staff February 9 meeting with Larry Doleman, PG&E	120
March	Staff meetings Review all college data/edit & refine Communications Prepare for TAC /partnership meeting on 3/15 Currciulum development Data entry/data review Partnership development March 8 meeting with Larry Doleman, PG&E March 18 meeting with Larry Doleman, PG&E March 22 meeting with Larry Doleman, PG&E TAC meeting 3/15 - cancelled Follow-up work to reschedule meeting to 5/4	120
April	Staff meetings Review all college data/edit & refine Communications Prepare for TAC /partnership meeting - May 4 Currciulum development Data entry/data review Partnership development Third Quarterly Report meetings Follow-up correspondence/communications re: May 4 meeting	120

DE ANZA COLLEGE
ENERGY MANAGEMENT TECHNOLOGY PROGRAM
MONTHLY REPORTS 5/1/94 - 8/31/94

MONTH	TASKS	HOURS
May	Staff meetings	120
	Data entry/data review	
	Preliminary data analysis	
	Communications	
	Meet with Computer Consultant	
	Curriculum development	
	Communications with PG&E re: partnership	
	Prepare for May 4 Partnership Meeting at De Anza	
	Communications with Larry Doleman, PG&E	
	Communications with Michael Magee, CEC	
	Communications with Susan Mas, SCE	
	Communications with De Anza staff	
	TV Center	
	Vocational Education	
	Business & Industry Institute	
	Environmental Studies Program/Division	
	Administration/President's Office	
	May 4 meeting of CEC/PG&E/DAC	
	Meeting	
	Luncheon	
	Communications PG&E re: partnership presentation	
June	Staff meetings	120
	Data entry/data review	
	Finish up data entry and revisions	
	Preliminary data analysis	
	Communications	
	Meet with Computer Consultant	
	Curriculum development	
	Communications with PG&E re: partnership	
	Third Quarterly Report review	
	Hewlett/Packard - Long Distance Learning Forum -	
	Al Guevara attended	
	Training Programs information requested from various agencies	
July	Staff meetings	120
	Preliminary data analysis	
	Prioritize data	
	Develop statistical test analysis	
	Communications	
	Meet with Computer Consultant	
	Curriculum development	
	Communications with PG&E re: partnership	
	Third Quarterly Report review	
	Letter mailed out re: partnership	
	CEC, PG&E, SCE, De Anza Administration	

August

Staff meetings
Preliminary data analysis
    Prioritize data
    Develop statistical test analysis
Communications
    With CEC re: final report & partnership
    With PG&E re: partnership
Meet with Computer Consultant
Curriculum development
    Course development
Communications with PG&E re: partnership
Third Quarterly Report writing
    Timeline developed
    Report outline developed
    Data analysis outline developed
Outline forwarded to CEC for review