MASTER

STATE OF CALIFORNIA

HONORABLE EDMUND G. BROWN, JR.

GOVERNOR

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GRANT REQUEST

TO IMPLEMENT ENERGY CONSERVATION MEASURES AS PART OF THE STATE
ORIGINAL AND SUPPLEMENTAL ENERGY CONSERVATION PLANS

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JANUARY 16, 1978

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THIS GRANT REQUEST HAS BEEN PREPARED UNDER THE PROVISIONS OF THE ENERGY POLICY AND CONSERVATION ACT OF 1975 (PL-94-163), PART C, AND THE ENERGY CONSERVATION AND PRODUCTION ACT OF 1976 (PL-94-385), PART D.

THIS REQUEST HAS BEEN DEVELOPED BY AND FOR THE STATE OF CALIFORNIA
BY:

✓ 950 9623
- - - CONSERVATION DIVISION
- - - CALIFORNIA ENERGY RESOURCES CONSERVATION
- - - AND DEVELOPMENT COMMISSION
1111 Howe Avenue
Sacramento, California 95825

WE WISH TO THANK THE US DEPARTMENT OF ENERGY, THE VARIOUS STATE AGENCIES, THE CALIFORNIA UTILITIES, INTERESTED CITIZENS, AND OTHERS FOR THEIR EFFORTS IN MAKING THIS GRANT REQUEST A REALITY. WE WISH ALSO TO EXPRESS A SPECIAL THANKS TO THE FAITHFUL CLERICAL STAFFS FOR THEIR PATIENCE AND FORTITUDE DURING THE PREPARATION OF THIS REQUEST.

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FEDERAL ASSISTANCE		2. APPLICANT'S APPLICATION	3. STATE APPLICATION IDENTIFICATION	4. NUMBER
1. TYPE OF ACTION ☐ PREAPPLICATION ☒ APPLICATION ☐ NOTIFICATION OF INTENT (ONLY) ☐ REPORT OF FEDERAL ACTION		5. DATE 12 78 1 16	6. DATE Year month day 19 19 19	7. DATE Year month day 19 19 19
6. LEGAL APPLICANT/RECIPIENT a. Applicant Name b. Organization that c. Street/P.O. Box d. City e. State f. Contact Person (Name) g. Telephone No.		3. FEDERAL EMPLOYER IDENTIFICATION NO. N/A		
State of California Energy Resources Conservation and Development Commission 1111 Howe Ave. Sacramento, CA 95825 Steve Powlesland (916) 920-6081		8. TITLE Title III, Part C, Energy Policy and Con- servation Act (PL 94-163)		
7. TITLE AND DESCRIPTION OF APPLICANT'S PROJECT 1978 State Energy Conservation Plan Report (Implementation Phase)		9. TYPE OF APPLICANT/RECIPIENT a. State b. Private c. Local d. Other (Specify) e. Other (Specify) f. Other (Specify) g. Other (Specify) h. Other (Specify) i. Other (Specify) j. Other (Specify) k. Other (Specify) l. Other (Specify) m. Other (Specify) n. Other (Specify) o. Other (Specify) p. Other (Specify) q. Other (Specify) r. Other (Specify) s. Other (Specify) t. Other (Specify) u. Other (Specify) v. Other (Specify) w. Other (Specify) x. Other (Specify) y. Other (Specify) z. Other (Specify)		
10. AREA OF PROJECT IMPACT (Name of state, county, city, etc.) State of California		11. ESTIMATED NUMBER OF PERSONS BENEFITING 23 million		
12. TYPE OF APPLICATION a. New b. Renewal c. Extension d. Other (Specify) e. Other (Specify) f. Other (Specify) g. Other (Specify) h. Other (Specify) i. Other (Specify) j. Other (Specify) k. Other (Specify) l. Other (Specify) m. Other (Specify) n. Other (Specify) o. Other (Specify) p. Other (Specify) q. Other (Specify) r. Other (Specify) s. Other (Specify) t. Other (Specify) u. Other (Specify) v. Other (Specify) w. Other (Specify) x. Other (Specify) y. Other (Specify) z. Other (Specify)		13. TYPE OF CHANGE (For use of 12a) a. Addition b. Deletion c. Change d. Other (Specify) e. Other (Specify) f. Other (Specify) g. Other (Specify) h. Other (Specify) i. Other (Specify) j. Other (Specify) k. Other (Specify) l. Other (Specify) m. Other (Specify) n. Other (Specify) o. Other (Specify) p. Other (Specify) q. Other (Specify) r. Other (Specify) s. Other (Specify) t. Other (Specify) u. Other (Specify) v. Other (Specify) w. Other (Specify) x. Other (Specify) y. Other (Specify) z. Other (Specify)		
14. PROPOSED FUNDING a. FEDERAL \$ 3,706,900 b. APPLICANT \$ 3,785,622 c. STATE \$ 3,785,622 d. LOCAL \$ 3,785,622 e. OTHER \$ 3,785,622 f. TOTAL \$ 3,785,622		15. CONGRESSIONAL DISTRICTS OF PROJECT Statewide		
16. PROJECT START DATE 12 78 1 16		17. PROJECT END DATE 12 78 1 16		
18. ESTIMATED DATE TO BE SUBMITTED TO FEDERAL AGENCY 12 78 1 16		19. EXISTING FEDERAL IDENTIFICATION NUMBER N/A		
20. FEDERAL AGENCY TO RECEIVE REQUEST (Name, City, State, ZIP code) Department of Energy, Region IX San Francisco, CA 94111		21. REMARKS ADDED No		
22. APPLICANT CERTIFICATION a. I certify that the information provided is true and correct. b. I certify that the information provided is true and correct. c. I certify that the information provided is true and correct. d. I certify that the information provided is true and correct. e. I certify that the information provided is true and correct. f. I certify that the information provided is true and correct. g. I certify that the information provided is true and correct. h. I certify that the information provided is true and correct. i. I certify that the information provided is true and correct. j. I certify that the information provided is true and correct. k. I certify that the information provided is true and correct. l. I certify that the information provided is true and correct. m. I certify that the information provided is true and correct. n. I certify that the information provided is true and correct. o. I certify that the information provided is true and correct. p. I certify that the information provided is true and correct. q. I certify that the information provided is true and correct. r. I certify that the information provided is true and correct. s. I certify that the information provided is true and correct. t. I certify that the information provided is true and correct. u. I certify that the information provided is true and correct. v. I certify that the information provided is true and correct. w. I certify that the information provided is true and correct. x. I certify that the information provided is true and correct. y. I certify that the information provided is true and correct. z. I certify that the information provided is true and correct.		23. SIGNATURE Richard L. Maullin Chairman		
24. AGENCY NAME Energy Resources Conservation and Development Commission		25. APPLICANT'S RECEIVED 19 19 19		
26. ORGANIZATIONAL UNIT ADMINISTRATIVE OFFICE		27. FEDERAL APPLICATION IDENTIFICATION		
28. ADDRESS		29. FEDERAL GRANT IDENTIFICATION		
30. ACTION TAKEN a. AMENDED b. REJECTED c. RETURNED FOR AMENDMENT d. DEFERRED e. WITHDRAWN		31. ACTION DATE 19 19 19		
32. CONTACT FOR ADDITIONAL INFORMATION (Name and telephone number)		33. REMARKS ADDED No		
34. FEDERAL AGENCY ACTION a. ACTION b. ACTION c. ACTION d. ACTION e. ACTION f. ACTION g. ACTION h. ACTION i. ACTION j. ACTION k. ACTION l. ACTION m. ACTION n. ACTION o. ACTION p. ACTION q. ACTION r. ACTION s. ACTION t. ACTION u. ACTION v. ACTION w. ACTION x. ACTION y. ACTION z. ACTION		35. FEDERAL AGENCY ACTION a. ACTION b. ACTION c. ACTION d. ACTION e. ACTION f. ACTION g. ACTION h. ACTION i. ACTION j. ACTION k. ACTION l. ACTION m. ACTION n. ACTION o. ACTION p. ACTION q. ACTION r. ACTION s. ACTION t. ACTION u. ACTION v. ACTION w. ACTION x. ACTION y. ACTION z. ACTION		

FEDERAL ASSISTANCE		3. APPLICANT'S APPLICATION	4. NUMBER	5. STATE AGENCY IDENTIFICATION NUMBER	6. DATE
☐ PREAPPLICATION ☐ APPLICATION ☐ NOTIFICATION OF INTENT (NAI) ☐ REPORT OF FEDERAL ACTION		7. DATE	8. DATE	9. DATE	10. DATE
11. LEGAL APPLICANT/RECIPIENT		12. FEDERAL EMPLOYER IDENTIFICATION NO.		13. TITLE	
a. Applicant Name b. Organization Unit c. Street/P.O. Box d. City e. State f. Zip g. Contact Person (Name) h. Telephone No.		State of California Energy Resources Conservation and Development Commission 1111 Howe Ave. Sacramento, CA 95825 Steve Powlesland (916) 920-6084		N/A 1801000131 Title IV, Part B, Energy Conservation and Pro- duction Act (PL 94-385)	
14. TITLE AND DESCRIPTION OF APPLICANT'S PROJECT		15. TYPE OF APPLICANT/RECIPIENT		16. TYPE OF ASSISTANCE	
1978 Supplemental State Energy Conservation Plan Report (Implementation Phase)		☐ Individual ☐ Non-Profit ☐ Governmental ☐ Other		☐ Direct ☐ Indirect ☐ Other	
17. AREA OF PROJECT IMPACT (Name of area, street, etc.)		18. ESTIMATED NUMBER OF PERSONS BENEFITING		19. TYPE OF APPLICATION	
State of California		23 million		☐ Action ☐ Information ☐ Other	
20. PROPOSED FUNDING		21. CONGRESSIONAL DISTRICTS OF		22. TYPE OF CHANGE (If any, see 19)	
a. FEDERAL \$1,613,100 b. STATE \$408,711 c. LOCAL \$4,310,816		Statewide		☐ Addition ☐ Deletion ☐ Other	
23. PROJECT START DATE		24. PROJECT END DATE		25. EXISTING FEDERAL IDENTIFICATION NUMBER	
10/1/78		9/30/80		N/A	
26. FEDERAL AGENCY TO RECEIVE REQUEST (Name, City, State, ZIP code)		27. REMARKS ADDED		28. DATE	
Department of Energy, Region IX		San Francisco, CA 94111		9/1/78	
29. APPLICANT CERTIFIES THAT:		30. STATE CLEARINGHOUSE		31. DATE	
☐ I am the owner of the project and I am responsible for the project. ☐ I am the owner of the project and I am responsible for the project. ☐ I am the owner of the project and I am responsible for the project.		☐ Yes ☐ No		☐ Yes ☐ No	
32. CERTIFYING AGENCY REPRESENTATIVE		33. SIGNATURE		34. DATE SIGNED	
Richard L. Maullin Chairman		[Signature]		10	
35. AGENCY NAME		36. AGENCY TYPE		37. AGENCY TYPE	
Energy Resources Conservation and Development Commission		Conservation		Conservation	
38. ORGANIZATIONAL UNIT		39. ADMINISTRATIVE OFFICE		40. FEDERAL AGENCY IDENTIFICATION	
41. ADDRESS		42. FEDERAL GRANT IDENTIFICATION		43. ACTION DATE	
				10	
44. ACTION TABLE		45. ACTION DATE		46. ACTION DATE	
a. ACTION b. ACTION c. ACTION d. ACTION e. ACTION		10		10	
47. CONTACT FOR ADDITIONAL INFORMATION		48. ACTION DATE		49. ACTION DATE	
TOM (Name and telephone number)		10		10	
50. REMARKS ADDED		51. DATE		52. DATE	
53. FEDERAL AGENCY TO RECEIVE REQUEST (Name, City, State, ZIP code)		54. REMARKS ADDED		55. DATE	
Department of Energy, Region IX		San Francisco, CA 94111		9/1/78	

State CaliforniaDate January 16, 1978

Approved by GAO
B-181254 (R0356)
Expires 12-31-78

PART II

PROJECT APPROVAL INFORMATION

Item 1.

Does this assistance request require State, local, regional, or other priority rating?

Yes X No

Name of Governing Body _____

Priority Rating _____

Item 2.

Does this assistance request require State, or local advisory, educational or health clearances?

Yes X No

Name of Agency or Board _____

(Attach Documentation)

Item 3.

Does this assistance request require clearinghouse review in accordance with OMB Circular A-95?

X Yes No

(Attach Comments)

No comments submitted

Item 4.

Does this assistance request require State, local, regional or other planning approval?

Yes X No

Name of Approving Agency _____

Date _____

Item 5.

Is the proposed project covered by an approved comprehensive plan?

X Yes NoCheck one: State ☒Local ☐Regional ☐

Location of Plan _____

Submitted Herewith

Item 6.

Will the assistance requested serve a Federal installation?

Yes X No

Name of Federal Installation _____

Federal Population benefiting from Project _____

Item 7.

Will the assistance requested be on Federal land or installation?

Yes X No

Name of Federal Installation _____

Location of Federal Land _____

Percent of Project _____

Item 8.

Will the assistance requested have an impact or effect on the environment?

X Yes No

See instructions for additional information to be provided.

See section VI of submittal

Item 9.

Will the assistance requested cause the displacement of individuals, families, businesses, or farms?

Yes X No

Number of:

Individuals _____

Families _____

Businesses _____

Farms _____

Item 10.

Is there other related assistance on this project previous, pending, or anticipated?

X Yes No

See instructions for additional information to be provided.

As provided by PL 94-385

State CaliforniaDate January 16, 1978

Approved by G-0
B-181254 (R0356)
Expires 12-31-78

PART II

PROJECT APPROVAL INFORMATION

Item 1.

Does this assistance request require State, local, regional, or other priority rating?

Yes ☒ No

Name of Governing Body _____

Priority Rating _____

Item 2.

Does this assistance request require State, or local advisory, educational or health clearances?

Yes ☒ No

Name of Agency or Board _____

(Attach Documentation)

Item 3.

Does this assistance request require clearinghouse review in accordance with OMB Circular A-95?

☒ Yes No

(Attach Comments)

No comments submitted

Item 4.

Does this assistance request require State, local, regional or other planning approval?

Yes ☒ No

Name of Approving Agency _____

Date _____

Item 5.

Is the proposed project covered by an approved comprehensive plan?

☒ Yes No

Check one: State

Local

Regional

Location of Plan _____

☒ Submitted HerewithItem 6.

Will the assistance requested serve a Federal installation?

Yes ☒ No

Name of Federal Installation _____

Federal Population benefiting from Project _____

Item 7.

Will the assistance requested be on Federal land or installation?

Yes ☒ No

Name of Federal Installation _____

Location of Federal Land _____

Percent of Project _____

Item 8.

Will the assistance requested have an impact or effect on the environment?

☒ Yes No

See instructions for additional information to be provided.

See section VI of submittal

Item 9.

Will the assistance requested cause the displacement of individuals, families, businesses, or farms?

Yes ☒ No

Number of:

Individuals _____

Families _____

Businesses _____

Farms _____

Item 10.

Is there other related assistance on this project previous, pending, or anticipated?

☒ Yes No

See instructions for additional information to be provided.

As provided by PL 94-163

**PART III
BUDGET INFORMATION**

STATE California
DATE January 16, 1978

Approved by GAO
B-181254 (R0356)
Expires 12-31-78

PART III - BUDGET INFORMATION						
BUDGET PERIOD:						
SECTION A - BUDGET SUMMARY						
Grant Program, Function or Activity (a)	Federal Catalog No. (b)	Estimated Unobligated Funds		New or Revolved Budget		
		Federal (c)	Non-Federal (d)	FEA (e)	NON-FEA (f)	Total (g)
EPCA	80.001			13,706,900	13,785,622	17,492,522
TOTALS						
SECTION B - BUDGET CATEGORIES						
Object Class Categories	(1) FEA *		(2) NON-FEA *		Total (3) **	
a. Personnel	1,135,926					
b. Fringe Benefits	266,943					
c. Travel	30,534					
d. Equipment	0					
e. Supplies	0					
f. Contractual	1,940,037					
g. Construction **	0					
h. Other	109,000					
i. Total Direct Charges	3,482,440					
j. Indirect Charges	224,460					
k. TOTALS	13,706,900		13,785,622			17,492,522
l. Program Income	N/A		N/A			

STATE ENERGY CONSERVATION PLAN REPORT

* FEA funds refer to the funds authorized under the Energy Policy and Conservation Act, Title III, Part C, P.L. 94-163, and the Energy Conservation and Production Act, Title IV, Part B, P.L. 94-385. Non-FEA funds refer to all other funds including other authorized FEA funds.

** Construction: Not applicable for this program.

Approved by GAO
B-181254 (50356)
Expires 12-31-78

PART III
BUDGET INFORMATION

D-516-S-1

STATE California
DATE January 16, 1978

PART III - BUDGET INFORMATION

BUDGET PERIOD:

SECTION A - BUDGET SUMMARY

Grant Program, Division or Activity (a)	Federal Contrib. (b)	Estimated Unobligated Funds		New or Revised Budget		
		Federal (c)	Non-Federal (d)	FEA (e)	NON-FEA (f)	Total (g)
ECPA	80.003			\$ 1,848,100	\$ 468,714	\$ 2,316,814
TOTALS						

SECTION B - BUDGET CATEGORIES

Object Class Categories	FEA*		NON-FEA*		Total (g)
	(h)	(i)	(j)	(k)	
a. Personnel	\$ 424,773				
b. Fringe Benefits	99,822				
c. Travel	28,500				
d. Equipment	0				
e. Supplies	0				
f. Contractual	1,204,571				
g. Construction **	0				
h. Other	6,500				
i. Total Direct Charges	1,757,666				
j. Indirect Charges	83,934				
k. TOTALS	\$ 1,848,100	\$ 468,714			\$ 2,316,814
l. Program Income	N/A	N/A			

STATE ENERGY CONSERVATION PLAN REPORT

* FEA funds refer to the funds authorized under the Energy Policy and Conservation Act, Title III, Part C, P.L. 94-163, and the Energy Conservation and Production Act, Title IV, Part B, P.L. 94-385. Non-FEA funds refer to all other funds including other authorized FEA funds.

** Construction: Not applicable for this program.

PART V
ASSURANCES

The applicant hereby assures and certifies that they will comply with the regulations, policies, guidelines, and requirements including OMB Circular No. A-95 and FMC Nos. 74-4 (Cost Principles Applicable to Grants and Contracts with State and Local Governments) and A-102 (Uniform Administrative Requirements for Grants-in-Aid to State and Local Governments), as they relate to the application, acceptance, and use of Federal funds for this federally assisted project. Also the applicant assures and certifies with respect to the project that:

1. It possesses legal authority to apply for the grant; that a resolution, motion or similar action has been duly adopted or passed as an official act of the applicant's governing body, if necessary, authorizing the filing of the application, including all understandings and assurances contained therein, and directing and authorizing the person identified as the official representative of the applicant to act in connection with the application and to provide such additional information as may be required.
2. It will comply with Title VI of the Civil Rights Act of 1964 (P.L. 88-352) and in accordance with Title VI of that Act, no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity for which the applicant received Federal financial assistance and will immediately take any measures necessary to effectuate this agreement.
3. It will comply with Title VI of the Civil Rights Act of 1964 (42 USC 2000d) prohibiting employment discrimination where (1) the primary purpose of a grant is to provide employment or (2) discriminatory employment practices will result in unequal treatment of persons who are or should be benefiting from the grant-aided activity.

4. It will comply with requirements of the provisions of the Uniform Relocation Assistance and Real Property Acquisitions Act of 1970 (P.L. 91-646) which provides for fair and equitable treatment of persons displaced as a result of Federal and federally assisted programs.
5. It will comply with the provisions of the Hatch Act which limit the political activity of employees.
6. It will comply with minimum wage and maximum hours provisions of the Federal Fair Labor Standards Act, as they apply to hospital and educational institution employees of State and local governments.
7. It will establish safeguards to prohibit employees from using their positions for a purpose that is or gives the appearance of being motivated by a desire for private gain for themselves or others, particularly those with whom they have family, business, or other ties.
8. It will give the grantor agency or the Comptroller General through any authorized representative the access to and the right to examine all records, books, papers, or documents related to the grant.
9. It will comply with all requirements imposed by the Federal grantor agency concerning special requirements of law, program requirements, and other administrative requirements approved in accordance with A-102.
10. It will insure that the facilities under its ownership, lease or supervision which shall be utilized in the accomplishment of the project are not listed on the Environmental Protection Agency's (EPA) list of Violating Facilities and that it will notify the Federal grantor agency of the receipt of any communication from the Director of the EPA Office of Federal Activities indicating that a facility to be used in the project is under consideration for listing by the EPA.

11. It will comply with the flood insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973, Public Law 93-234, 87 Stat. 975, approved December 31, 1976. Section 102(a) requires, on and after March 2, 1975, the purchase of flood insurance in communities where such insurance is available as a condition for the receipt of any Federal financial assistance for construction or acquisition purposes for use in any area that has been identified by the Secretary of the Department of Housing and Urban Development as an area having special flood hazards. The phrase "Federal financial assistance" includes any form of loan, grant, guaranty, insurance payment, rebate, subsidy, disaster assistance loan or grant, or any other form of direct or indirect Federal assistance.
12. It will assist the Federal grantor agency in its compliance with Section 106 of the National Historic Preservation Act of 1966 as amended (16 U.S.C. 470), Executive Order 11593, and the Archeological and Historic Preservation Act of 1966 (16 U.S.C. 469a-1 et seq.) by (a) consulting with the State Historic Preservation Officer on the conduct of investigations, as necessary, to identify properties listed in or eligible for inclusion in the National Register of Historic Places that are subject to adverse effects (see 36 CFR Part 800.8) by the activity, and notifying the Federal grantor agency of the existence of any such properties, and by (b) complying with all requirements established by the Federal grantor agency to avoid or mitigate adverse effects upon such properties.

STATE OF CALIFORNIA
ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

RESOLUTION

WHEREAS, Congress has enacted the Energy Policy and Conservation Act (PL 94-163) ("EPCA"), of which Part C, Title III provides authority for a cooperative program between the federal government and the states to plan and implement state energy conservation programs which will reduce total energy consumption in the state;

WHEREAS, Congress has enacted the Energy Conservation and Production Act (PL 94-385) ("ECPA"), of which Part B, Title IV provides authority for a cooperative program between the federal government and the states to plan and implement supplemental state energy conservation programs which will reduce total energy commission consumption in the state;

WHEREAS, Section 25007 of the California Public Resources Code indicates that it is "...the policy of the State and the intent of the Legislature to employ a range of measures to reduce wasteful, uneconomical, and unnecessary uses of energy, thereby reducing the rate of growth of energy consumption, prudently conserve energy resources, and assure statewide environmental, public safety, and land use goals;

WHEREAS, the Governor of the State of California has designated the Energy Commission as the state agency with primary responsibility for undertaking the planning and implementation stages of the California State Conservation Program;

WHEREAS, the staff of the Energy Commission has prepared a report entitled "California Energy Conservation Plan in Response to the National Energy Policy and Conservation Act of 1975" which contains programs, consistent with the EPCA, aimed at achieving a reduction of five percent or more in the total energy consumption projected for California in 1980; and

WHEREAS, the Energy Commission has approved the California Energy Conservation Plan, and the California Supplemental Energy Conservation Plan prepared by the staff.

IT IS THEREFORE RESOLVED: That the Energy Commission hereby approves the amended California Energy Conservation Plan, and the amended California Supplemental Energy Conservation Plan prepared by the staff; and

IT IS FURTHER RESOLVED: That the Commission hereby requests the Governor of California to submit the amended California Energy Conservation Plan, and the amended California Supplemental Energy Conservation Plan to the Administrator of the U.S. Department of Energy for approval and funding pursuant to the provisions of Part C, Title III of the Energy Policy and Conservation Act (PL 94-163), and Part B, Title IV of the Energy Conservation and Production Act (PL 94-385); and

IT IS FURTHER RESOLVED: That the staff of the Energy Commission shall cooperate with the Governor and the appropriate governmental agencies in taking action necessary to obtain approval and funding of the amended plan pursuant to the EPCA and the ECPA.

Dated: December 21, 1977

STATE ENERGY RESOURCES CONSERVATION
AND DEVELOPMENT COMMISSION

Richard L. Maullin
Chairman

III. OVERVIEW OF THE CALIFORNIA PLAN

Background

The program measures described in this document comprise a grant request to the U.S. Department of Energy under the Energy Policy and Conservation Act (EPCA) of 1975 (PL-94-163) and the Energy Conservation and Production Act (ECPA) of 1976 (PL-94-385). The amount requested, \$5,555,000, will allow the extension, acceleration and implementation of energy conservation activities already in progress in California.

Accomplishments to date have included the adoption of residential standards, and the implementation of an energy survey program for public buildings. Efficiency standards have been established for refrigerators and room and central air conditioners, appliances which utilize a significant amount of residential energy. Before the end of 1977, efficiency standards will also be established for clothes dryers, washers, and water heaters.

Federal funding received in the summer and the fall of 1977 has provided start-up money for many conservation programs which will eventually result in the attainment of the Commission-adopted goal of a 10% reduction in the utilities' projected use of both electricity and natural gas by 1985.

New Directions

In addition to standard setting activities, the state has devoted much effort to expanding its energy data base in the residential, commercial and industrial sectors. Both regulatory and research activities will continue under the present plan. Regulatory approaches are needed where information or financial incentives alone will not overcome market constraints to energy conservation. Research and analysis is necessary in order to determine the most effective applications of energy conservation technology as well as the best means to encourage and facilitate energy conservation actions. It is not enough to merely document the potential energy savings which can accrue from a given action. It is also vital to develop compelling ways to stimulate individual and institutional decision-making which will result in the action being taken.

Technical assistance has been an integral part of the state's energy conservation programs, but, under the present plan, the sharing of state resources with individuals and organizations outside state government becomes a major objective. Increased funding will allow the Energy Commission to channel much of its technical knowledge, staff guidance and financial resources to the entities which can best utilize them: individuals, local action groups, small businesses, community groups, local governments, and as well as other State agencies. This outreach effort is based on the assumption that, for energy conservation to become a reality, it is crucial that the public be involved in the design and utilization of strategies for implementing energy conservation.

Program Elements

• Technical/Financial Assistance

In an effort to increase the involvement of the public in energy conservation activities, the state is developing programs which will increase its ability to provide technical information to the public, and provide the public with opportunities to utilize the resources of the state.

Mandatory technical assistance programs include energy surveys in both the commercial/industrial and state and local governmental sectors. The surveys consist of an on-site inspection, an energy-use analysis, and a set of recommended energy-conserving, cost-saving actions. Support for the Commercial/Industrial Survey program includes coordination with the CPUC rate-making process to ensure adequate funding of utility survey programs in this sector. The Local Governmental Energy Management Assistance program will train and assist local personnel to conduct energy surveys and to identify and implement improved operation procedures themselves. Other industrial sector technical assistance programs include the Waste Heat Recovery program and the boiler efficiency program.

Another mandated element is a program to include energy consumption as a factor in the procurement processes of state and local governments. This program will prioritize and analyze energy-using items, disseminate technical information to local government procurement officers and provide technical assistance to local agencies upon request.

Local governments will also receive technical assistance with transportation planning. Under new funding the ridesharing/transportation system management, and land-use and transportation planning assistance programs will be continued. These programs will provide local elected officials and staffs with assistance in the integration of energy conservation into transportation and land use planning in their jurisdictions.

Technical assistance will be provided to selected school districts to integrate energy education materials into classroom activities. This will be accomplished by establishing in-service training needs relating to energy/energy conservation education in grades Kindergarten through twelve.

Financial assistance will be provided by the Local Action Contracts program. Currently, five local governments are operating energy conservation programs under partial funding from the Energy Commission. This program, which will continue in 1978-79, will provide other local government with funding for such projects as preparation of energy elements to general plans, innovative demonstrative projects, and modifications to ministerial and discretionary permitting processes to permit increased energy conservation. Considerable funding will also be available for outreach programs developed by citizen action groups, building on the premise that the most effective long-term impact on the energy consciousness and energy use patterns of individuals consumers will occur when local governmental agencies and local citizen groups are involved in the determination and delivery of energy services.

Financial assistance to local governments and citizens groups will optimize the effectiveness of face to face contact, neighborhood and/or peer group orientation, and local accountability, and will complement existing Commission efforts by allowing citizen groups to tailor our programs and research to local needs, and to encourage innovative approaches in areas currently not being addressed by state conservation programs.

• Public Awareness

The awareness of the public about energy conservation benefits, opportunities, and techniques will be facilitated through a variety of program activities.

The Commission will develop an advertising campaign to promote the awareness of the availability of energy surveys for business and industry. Well-defined

marketing, advertising and consumer education programs will be designed to inform and motivate consumers to take specific actions to reduce energy consumption in their homes and businesses.

Publicly - accessible information systems are another way in which accurate information can be provided. A conservation information clearinghouse will be developed under the Residential Energy Efficiency program, and under the technology assessment program information will be gathered and disseminated on new developments in energy conservation.

• Standards Setting

One of the state's program goals is to implement and continue, to refine and strengthen energy efficiency standards for residential and non-residential buildings and for appliances.

Under the present grant request, the Energy Commission will continue to develop passive, direct solar-related amendments to the residential building standards, and begin to investigate possible changes in the new-non-residential building standards designed to encourage the use of available solar heat, daylight, and nighttime heat sinks. Non-residential building standards will be further improved through parametric studies of depletable and non-depletable energy-related building components. This effort will utilize "Cal/ERDA," the public domain energy analysis computer program. Residential buildings constructed under California's energy conservation standards will also be analyzed to verify the cost-effectiveness of the regulations.

At the present time there are no standards governing the insulating properties and quality of insulation sold and installed within California. To ensure that consumers receive good quality insulation of the proper thermal value, the state will develop standard test procedures to evaluate the thermal and other properties of insulation materials, certify testing laboratories and randomly test these materials on a continuing basis. Combined with the consumer complaint investigation service to be initiated under the residential energy efficiency program, this insulation certification program will decrease consumer hesitation about the retrofit of existing structures.

Other standard-setting programs include the development of improvements to appliance efficiency standards, the development of electrical load management standards, and safety analysis to assist the implementation of regulations adopted for gas intermittent ignition devices.

• Solar Element

One of the state's long-term energy goals is to reduce its dependence on fossil fuels. Programs under the Solar Element are designed to enhance the accomplishment of this goal. The measures included were selected to fulfill three objectives: 1) Provide the state with information on the design, construction, operating characteristics, and reliability of solar equipment; 2) To provide a model solar building code that can be implemented through state and local actions; 3) To provide the public with the proper information to enable consumers to make an educated choice about the solar energy option and solar equipment designs.

- Research/Analysis/Evaluation

Good public energy policy must be based on technically valid assessments of current and potential options in energy conservation technology. Under the Technology Assessment program, the Commission will keep abreast of and initiate research and documentation of new energy conservation technologies.

The commercial/industrial sector will be assisted through research in the area of industrial energy demand. Funding will also be provided for the continuation of a study to identify and devise strategies for removing institutional and financial barriers to the co-generation of energy.

The State Solid Waste Management Board during the period of this grant will complete its investigation of the energy and economic impacts of solid waste recovery alternatives and improved waste collection techniques. The results of the study will be presented to state, regional, and local officials and the general public through a series of workshops.

The State is and will be assisting the utilities through evaluation of a testing program for customer turn-off and turn-on of gas furnace pilot lights, and by providing funds for the study of alternative electricity pricing structures and designs to encourage conservation. The energy conservation programs of the state's utilities will be monitored through a data-collection and evaluation system implemented by the Energy Commission.

- Coordination and Management

The coordination of energy conservation activities of various governmental agencies will be continued using formal and informal means to enable the Energy Commission to maintain the state's knowledge of other agency energy programs and operations, future policy direction, and potential conservation opportunities. Efficient energy use of governmental agencies will be promoted by encouraging the agencies to consider the effect of their decisions on energy resources and to balance the impact of their decisions on energy resources and other goals.

On October 21 and 25, 1977, public workshops were held to receive comments on the proposed projects in this grant application, obtain suggestions for funding of other projects, and to exchange information and comments about a funding program for citizen-initiated local energy conservation projects. A summary of the workshops is attached as Appendix A.

The Conservation Division of the Energy Commission has the prime responsibility for developing new energy conservation programs, evaluating ongoing programs, coordinating between programs, and performing the administrative tasks associated with management of the grants program. The activities accomplished under these planning, evaluation, and management elements will ensure the successful performance of all the measures in this grant proposal.

IV. PROGRAM SUMMARY

The following listing summarizes the energy savings estimates and funding levels of those programs contained in this grant request, as well as the energy savings estimates and 1977 funding levels of those programs which no additional EPCA/ECFA funding is requested for in 1978. The 1980 projected California energy consumption is $6,897 \times 10^{12}$ Btu's; of this total, only 6511×10^{12} Btu's are consumed in uses which may be influenced by state actions. The programs described within this document will result in a total savings of 546.05×10^{12} Btu's, or a 8.38% savings of the latter energy consumption estimate.

<u>Program Measures</u>	1980 Estimated Energy Savings (in 10 ¹² BTU's)	Estimated Cost of Implementation (EPCA/ECPA)					
		<u>1977</u> <u>Grant/State</u>		<u>1978</u> <u>Grant/State</u>		<u>1979*</u> <u>Grant</u>	<u>1980*</u> <u>Grant</u>
A. TECHNICAL/FINANCIAL ASSISTANCE ELEMENT							
1. Industrial and Com- mercial Energy Surveys	316.00	96,042	283,907	276,412	205,298	310,000	330,000
2. Improvement of State Building Operations	2.80	76,000	3,602,072	150,466	122,515	160,000	160,000
3. Local Government Energy Management Assistance	5.91	112,709	32,381	111,860	66,081	120,000	130,000
4. Implementation of the Util- ity Industrial and Commer- cial Energy Survey Program Through the Rate-Making Process	Accounted for in measure A1.	28,875	0	22,725	0	0 ¹	0
5. Boiler Efficiency Measure- ment and Improvement Program	32.50	50,388	65,715	52,911	76,217	58,000	64,000
6. Waste Heat Recovery	1.60	-	-	60,000	30,017	40,000	0
7. State and Local Govern- ment Procurement	.10	91,226	-	48,000	0	52,000	55,000

<u>Program Measures</u>	<u>1980 Estimated Energy Savings (in 10¹² BTU's)</u>	<u>Estimated Cost of Implementation (EPCA/ECFA)</u>					
		<u>1977 Grant/State</u>		<u>1978 Grant/State</u>		<u>1979* Grant</u>	<u>1980* Grant</u>
8. Local Government Planning and Transportation Assistance Team	1.92	64,008	131,725	198,048	0	220,000	240,000
9. Transportation System Mgmt.	.03	48,720	0	60,000	210,000	90,000	125,000
10. Ridesharing	1.52	131,200	1,718,850	150,000	1,520,000	175,000	175,000
11. Substation Feeder Voltage Reduction Program	56.32	38,388	0	28,904	0	0	0
12. Street Lighting Efficiency Improvements and Electric System Load Balancing Program	8.00	24,000	0	19,328	0	0	0
13. Energy/Energy Conservation Education (K-12)	Exempted § 420.103(b)(1)	111,214	0	258,949	38,723	250,000	350,000
14. Local Action Contracts	3.73	132,643	10,000	855,186	0	900,000	1,200,000
B. PUBLIC AWARENESS ELEMENT							
1. Energy Survey Advertising	Accounted for in measure A1.	28,903	2,000	32,000	0	34,000	36,000
2. Conservation Marketing and Advertising	Accounted for in other measures	-	-	182,145	126,575	200,000	200,000
3. Residential Energy Efficiency	56.58	121,042	0	243,316	0	260,000	270,000
C. STANDARDS SETTING ELEMENT							
1. Climatic Appropriate Building Design	2.09	209,457	1,500	248,575	0	220,000	200,000
2. Non-Residential Standards, Amendments, and Additions	Accounted for in measure C4.	-	-	50,000	57,760	0	0
3. Cal/MDA Computer Program	Accounted for in measure C4.	75,000	15,000	32,162	79,166	35,000	40,000
4. Parametric Studies for Performance Standards	6.00	150,000	65,000	95,000	0	0	0

Program Measures	1980 Estimated Energy Savings (in 10 ¹² BTU's)	Estimated Cost of Implementation (EPCA/ECPA)					
		1977 Grant/State		1978 Grant/State		1979* Grant	1980* Grant
5. Residential Standards Validation	.01	-	-	86,162	0	0	0
6. Insulation Testing, Certification and Retrofit Insulation Standards	.49	53,335	55,000	93,069	0	75,000	79,000
7. Appliance Efficiency Standards Refinements	.14	75,000	65,000	51,081	179,744	0	0
8. Intermittent Ignition Device Standards Implementation	3.06	102,616	0	51,081	0	0	0
9. Load Management Standards Development	3.50	78,008	429,664	317,299	218,162	600,000	600,000
D. SOLAR ELEMENT	2.14	NA	NA	NA	NA	NA	NA
1. Direct Thermal Performance Predictions	Accounted for in estimate for the total element.	-	-	70,000	5,000	70,000	85,000
2. Solar Equipment Testing	"	-	-	149,534	139,000	100,000	115,000
3. Water Heating Optimization	"	-	-	40,948	70,000	32,000	35,000
4. Model Solar Building Code	"	-	-	29,518	65,000	32,000	35,000
5. Solar Public Information	"	-	-	90,118	55,000	66,000	60,000
6. Solar Energy Consumer Protection	"	-	-	27,895	125,000	50,000	0
7. Professional Education	"	-	-	27,895	25,000	150,000	220,000
E. RESEARCH/ANALYSIS/EVALUATION ELEMENT							
1. Technology Assessment	Accounted for in other measures	-	-	321,470	0	400,000	350,000
2. Industrial Forecasting	Accounted for in other measures	-	-	150,000	0	0	0
3. Removing Co-Generation Barriers	.25	28,875	0	120,636	105,000	80,000	90,000

Program Measures	1980 Estimated Energy Savings (in 10 ¹² BTU's)	Estimated Cost of Implementation (EPCA/ECPA)					
		1977 Grant/State		1978 Grant/State		1979* Grant	1980* Grant
4. Resource Recovery	2.55	73,659	411,038	63,900	490,000	80,000	90,000
5. Gas Furnace Pilot Light Turn- Off and Re-Light	22.00	38,388	0	28,904	0	0	0
6. Rate Design Research	7.31	24,008	137,581	157,493	78,358	175,000	175,000
7. Utility Conservation Program Monitoring and Evaluation	Accounted for in other measures	-	-	99,325	0	65,000	72,000
F. COORDINATION OF MANAGEMENT ELEMENT							
1. Intergovernmental Coordination	Exempted § 420.103(b)(1)	55,871	0	52,543	0	55,000	57,000
2. Program Planning, Coordination, Evaluation, Monitoring and Enforcement	Accounted for in other measures	140,343	306,329	235,503	116,720	200,000	225,000
3. Grant Management	Accounted for in other measures	40,803	9,500	114,639	0	125,000	135,000
TOTAL: Programs Within This Funding Request	536.55	2,300,721	7,342,262	5,555,000	4,254,336	5,479,000	5,998,000
• Building Standards Development and Enforcement	9.00	299,654	683,084	0	518,000	0	0
• Energy Conservation Licensing	.50	26,500	0	0	0	0	0
• Energy Management Seminars	Accounted for in Measure C9.	30,500	28,797	0	0	0	0
• Procurement Specifications for Solar Equipment	Accounted for in the Solar Element	20,625	1,000	0	150,000	106,000	100,000
TOTAL: 1977 Grant Programs Not Within This Funding Request	9.50	377,279	712,881	0	668,000	106,000	100,000
GRAND TOTAL:	546.05	2,678,000	8,055,143	5,555,000	4,922,336	5,585,000	6,098,000

*No estimate of future state expenditures for these measures is currently available.

V. MEASURE ELEMENTS

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TECHNICAL/FINANCIAL ASSISTANCE ELEMENT

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A1. INDUSTRIAL AND COMMERCIAL ENERGY SURVEYS

Overview

This is a request for EPCA Phase II funding to continue Optional Measure 1 under EPCA, PL 94-163, Part C, filed March 7, 1977, pp. 75-80.

The industrial and commercial sector (which includes most public buildings, per FEA definition) accounts for 41 percent of end-use and 43 percent of primary energy use in California. An effective energy survey ("audit") program reaching the one million plus members of these two sectors could potentially reduce California energy use over five percent. This measure is also a means to improve the thermal and lighting efficiency of existing buildings, a major objective of the EPCA program.

All major California utilities now offer free energy surveys* and consultation with commercial and industrial customers. The survey may either be requested by the customer or initiated by the utilities which in time must contact as many commercial and industrial customers as are cost-effective. The surveys include on-site identification and analyses of energy use, concentrating on lighting, thermal, and general process equipment. Detailed process analysis is left to private energy and process consultants, a business service which is developing rapidly in California. The owners respond to the survey recommendations in order to save operating expenses. The analyst's role is to point out opportunities for saving money and energy. A major advantage of this voluntary approach is that the selection of specific actions to be taken is left to the business owner according to his own priorities and needs. The major elements of this approach have been worked out in practice over several years in California and are proving quite effective.

Some major state utilities have offered on-site plant and building energy surveys and consultation service since 1972; however, only now are such programs contemplated on a truly massive scale. Working with the utilities and the California Public Utilities Commission (CPUC), the Energy Commission is aiming toward a comprehensive program whereby all 1.1 million commercial and industrial utility customers in California will be given specific energy and cost savings information. To the extent possible, person-to-person contact will be used. The present force of several hundred utility energy management representatives will probably grow to a thousand or more under this program. Two methods will be used in the program:

1. On-site visits by utility representatives for the largest gas and electricity users.
2. Sector surveys, case studies, and workshops for the smaller businesses.

* As used here, an energy survey consists of an on-site inspection, an energy use analysis, and a set of recommended energy-conserving cost-saving actions performed by a trained representative of the serving utility.

On-Site Visits - Major utilities have already been effective to varying degrees in offering on-site surveys and energy analyses to their larger customers. Through this approach, the small number of customers who account for a very large share of energy use are contacted directly on a continuing basis. Many of these businesses already have vigorous and effective in-house energy/cost-saving programs. However, even the very large users have overlooked opportunities and will not be neglected.

This on-site program is designed primarily to achieve the easy energy savings (e.g., reduced lighting, plugging heat losses, rescheduling operations). However, many enterprises should and will want to go beyond these first steps. It is not intended that utilities supply in-depth expertise, particularly for complex systems and processes. In this case the customer would be referred to private energy consultants or a case study would be organized through an appropriate trade organization.

Sector Energy Surveys and Case Studies - It would probably take five to ten years to contact all CI customers on an on-site basis, and a large number of these businesses use very little energy (much less than a home). Since it is not desirable or effective to wait years to reach small businesses, the case study and workshop approach seem most appropriate for reaching this sector. Successful nonproprietary techniques used by the more advanced organizations and measures proven effective in the large business survey procedure will be passed down to smaller businesses.

The case study program will operate by dividing the commercial and industrial sectors into manageable segments using SIC categories. California utilities now collect and report energy use to the CERCDC by SIC category. The commercial sector will also be sectioned by building operation type (offices, retail, government, hospitals, schools, etc.). A utility-Energy Commission-private consultant team will perform one or more sample audits in each category with owners interested in being "success stories." Before-and-after energy use records would be compiled for favorable publicity. Some cases are now available from surveys previously performed. Well-illustrated case study manuals will be prepared for businessmen and shopkeepers rather than professionals. The case studies will then be mailed by utilities to other similar businesses (same SIC) in the same category and locale. The recipients can immediately relate to the techniques and money savings. To the extent possible, on-site follow-up surveys will be offered upon specific request. Follow-up contact will be made through trade organization workshops and individual contact. Two examples of such case studies developed in the 1977 program are enclosed with this submission.

Strategy

To date, the utilities have already contacted and achieved good savings results with a small number of their larger users, who, nevertheless, account for a large portion of system energy consumption. This program aims to maintain the current momentum with these customers and greatly expand the program to reach all one-million plus commercial and industrial users. Surveys performed by request are always preferable and likely to be more productive; however, the utilities will initiate and maintain contact with all sector users by one of the

two methods above. Should the utilities need assistance in gaining cooperation of their customers, tariff actions could potentially be taken by the Public Utilities Commission to ensure user cooperation. (Note: Please see the Implementation of the Utility Industrial and Commercial Energy Survey Program Through the Rate-Making Process Measure.)

Management Plan

The program will be a continuation of the joint effort of the CERCDC, CPUC, and state utilities. CERCDC will continue to provide overall coordination and will implement a statewide conservation savings reporting system aggregating results of utility surveys. CERCDC will continue to publish case studies for statewide use. The CPUC will continue to handle the administrative and financial arrangements through the ratemaking process that will permit the utilities to substantially expand their manpower and expenditures on the program.

Milestones

1. First Quarter, 1978:

- a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility survey programs;
- b. case study program continues and utilities are urged to increase level of participation.

2. Second Quarter, 1978:

- a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility survey programs;
- b. major effort on small business and industrial case study program.

3. Third Quarter, 1978:

- a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility survey programs;
- b. participating utilities report survey results to CERCDC;
- c. more municipal utilities worked into program and reporting system;
- d. case study programs continued.

4. Fourth Quarter, 1978:

- a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility survey programs;
- b. continue to work municipal utilities into program and reporting system;
- c. case study programs continued;

- d. SIC coded energy conservation and consumption data compared and reconciled with state economic and operating data.

5. Calendar Year, 1979:

- a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility survey programs;
- b. continue to cooperate with municipal utilities in program and reporting system;
- c. case study program continued.

6. Calendar Year, 1980:

- a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility survey programs;
- b. continue to cooperate with municipal utilities in program and reporting system;
- c. case study program continues.

Estimated Energy Savings

Results achieved to date in the energy survey programs have varied widely. In many cases, real energy savings have been concealed by changes in operating hours, product lines, weather, and schedules. The Commission is beginning to implement a uniform statewide results measuring system, based on actual conservation actions as verified by on-site visits of utility representatives reported to CERCDC by SIC aggregates on a quarterly basis.

To date, savings from surveys fall in the range of zero to 40 percent. Twenty percent savings is probably reasonable for an average end goal. If all businesses in the commercial sector were contacted and took conservative actions and an average 20 percent savings of the 43 percent total in the commercial/industrial sector results, 8.6 percent savings would be achieved. By 1980, however, a realistic goal is to contact perhaps 60 percent of the businesses in the state. In this case, our 1980 savings from this measure would be 316×10^{12} Btu, or about five percent of state energy use. This objective will be used for this measure.

Savings will be measured by the follow-up survey reporting system now being implemented by the California Energy Commission, the California Public Utilities Commission, and the utilities. Aggregate energy use data in the commercial and industrial sectors which are already available from the utilities by SIC sector and will be another check on the overall program effectiveness.

It is not possible to separate the savings in this program from those already forecast and claimed by DOE in their own industrial energy conservation program.

INDUSTRIAL AND COMMERCIAL ENERGY SURVEYS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)	12	24,720
Staff Level Professional (\$1,876/month)	24	45,024
Associate Level Professional (\$1,706/month)	12	20,496
Staff Services Analyst (\$1,422/month)	12	17,064
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	20	15,680
Total Salaries & Wages		122,984
Salary Savings (5%)		-6,149
Subtotal		116,835
Staff Benefits (23.5%)		27,456
Total Personnel Services		144,291
<u>Operating Expenses</u>		
General Expense		
Printing		25,000
Data Processing		
Travel In-State		4,034
Travel Out-State		
Consultant & Professional Services		80,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		23,087
Total Operating Expenses		132,121
Total EPCA Funding		276,412
State Funding		205,298
Total Funding		481,710

Estimated Future EPCA Funding Request

1979 310,000
1980 330,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A2. IMPROVEMENT OF STATE BUILDING OPERATIONS

Overview

The State of California is one of the largest energy users in California. Energy surveys conducted by the ERCDC staff have shown that the State also has one of the largest potentials for energy conservation.

The feasible potential for reduction is approximately 40 percent for natural gas, and 25 percent for electricity, depending on the effectiveness of the persuasive effort.

This project began in 1976 with State funding and continues in part with funding from the first EPCA grant. This project continues with the purpose of minimizing wasteful and inefficient use of energy in State government operation. Success of the project stems from cost-effective energy conservation recommendations and followup by the ERCDC staff.

Management Plan

This project is directly administered by a state-funded Energy Conservation Specialist III. In addition to a state-funded staff of three person-years, he supervises a federally funded staff of two Energy Conservation Specialists II, an Energy Conservation Specialist I and a Staff Services Analyst.

Prior to the survey, the ERCDC enters into an Interagency Agreement with the agency to ensure cooperation of personnel and accessibility to past utility usage data and all utility usage data subsequent to the survey for a period of not less than one year.

The Energy Conservation Specialists are responsible for conducting the survey and writing the survey report. The survey report recommends operational and functional changes that should be made to conserve energy. Each proposed change includes cost of modification (if any), electricity kilowatt-hour savings, natural gas therms savings, and the dollar amount to be saved at current prices.

The SSA is responsible for analyzing each facility's past energy usage data and is in the process of writing procedures for post-survey data gathering and analyses.

The \$20,000 contract request is to obtain technical assistance (beyond the expertise of the ERCDC staff) in determining energy saving potential in complex air conditioning and ventilation systems.

The ERCDC staff is currently taking inventory of equipment types in order to determine the most cost-effective study obtainable.

Energy Savings Estimate

State government currently operates approximately 2,000 buildings which consume approximately 4.00 trillion (i.e., 10^{12}) Btu's of natural gas and other fuels annually. State buildings also consume approximately 10.00 trillion Btu's of

electricity annually (@ 10,000 Btu's per kw). Total approximate consumption is presently 14.00 trillion Btu's annually. Facilities under construction or in the planning stages will increase consumption to 15.40 trillion Btu's (10 percent increase) by 1980.

This project is expected to cover most state buildings by 1980, and savings are expected to be 20 percent per building not built to the recently adopted non-residential building standards.

Annual savings at 1980 consumption levels for these buildings, therefore, are expected to be approximately 2.80 trillion (10^{12}) Btu's. Actual savings will be computed from actual post-survey energy billings obtained by the ERCDC staff as part of the survey agreement.

Milestones

The ERCDC staff has received commitments from a number of agencies and negotiations are underway to secure additional commitments. The following timetable shows the estimated completion date for each agency.

1. First Quarter 1978: Continue surveys of current target agencies.
2. Second Quarter 1978: Complete Department of General Services.
3. Third Quarter 1978: Complete California Youth Authority.
4. Fourth Quarter 1978: Continue surveys.
5. Calendar Year 1979: Complete surveys for the following agencies: (a) Department of Health/Benefit Payments; (b) Department of Corrections; (c) Employment Development Department; (d) Department of Motor Vehicles.
6. Calendar Year 1980: Complete surveys for the following agencies: (a) University of California/State Universities; (b) Department of Veterans Affairs; (c) Department of Consumer Affairs; (d) Department of Forestry.

Follow-up surveys are an essential component of the overall program. They will enable the ERCDC staff to validate survey savings recommendations, and make necessary changes to the survey process.

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<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	24	45,024
Associate Level Professional (\$1,703/month)	12	20,496
Staff Services Analyst (\$1,422/month)	12	17,064
Graduate Student Assistant (\$937/month)		
Stenographer (\$784/month)	16	12,544
<u>Total Salaries & Wages</u>		<u>95,128</u>
Salary Savings (5%)		-4,756
Subtotal		90,372
Staff Benefits (23.5%)		21,237
<u>Total Personnel Services</u>		<u>111,609</u>

Operating Expenses

General Expense	
Printing	1,000
Data Processing	
Travel In-State	
Travel Out-State	
Consultant & Professional Services	20,000
Training	
Contracts	
Indirect Costs (16% of Total Personnel Services*)	17,857
Total Operating Expenses	38,857
Total EPCA Funding	150,466
State Funding	122,515
Total Funding	272,981

Estimated Future EPCA Funding Request

1979	160,000
1980	160,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A3. LOCAL GOVERNMENT ENERGY MANAGEMENT ASSISTANCE

Overview

This project, a continuation of the program started under the California ECPA grant application, meets some of the requirements for all three mandatory areas of the ECPA: education, government coordination and energy audits. In this program writeup, we have aimed to refine the program to more specially address the needs of local governments. In addition, the Transportation Engineering section of the original measure writeup is now included within the Local Government Planning and Transportation Assistance Team measure of this grant application.

This project is patterned after an EPCA-funded project aimed at minimizing wasteful and inefficient use of energy in State government operations. Surveys conducted at State government facilities indicate a great potential to reduce energy use and cost in all government buildings. The project was initiated, at the request of numerous counties and cities, to assist local governments in implementing similar energy-saving programs.

The large number of local government facilities precludes on-site surveys of each facility. However, on-site workshops, in conjunction with on-site training surveys, are proving to be a successful energy conservation program.

The most successful program for improving the operation and efficiency of all local governments, will be to train and assist local personnel to conduct energy surveys and to identify and implement improved operation procedures themselves.

The CERCDC staff stresses that knowledge gained by one local government should be passed to another. The cumulative effect should produce a visible reduction in energy use and corresponding reduction in tax dollars needed to pay utility bills.

Management Plan

The project is directly administered by a State-funded Energy Conservation Specialist III. In addition to one State-funded position, he supervises a Federally-funded staff of one Energy Conservation Specialist II, one Energy Conservation Specialist I, and one Staff Services Analyst.

Prior to the local government technical assistance session(s), verbal assurance of employee cooperation and accessibility to energy usage data (pre- and post-survey) is obtained from the local government(s).

The CERCDC staff is responsible for conducting the site visit and performing training surveys. The training surveys will make facility operators aware of potential operational changes and system modifications that should be made to conserve energy. After the surveys are completed the CERCDC will conduct workshops to further train the facilities operations and maintenance personnel. A typical workshop will include an initial visit with one or more follow-up visits to evaluate program effectiveness.

Commission staff are in the process of writing procedures for data gathering and analysis to evaluate program effectiveness and assist in workshop presentations.

Milestones

1. First Quarter 1978:
Conduct two workshops (includes six surveys).
2. Second Quarter 1978:
Conduct two workshops (includes six surveys).
3. Third Quarter 1978:
Conduct two workshops (includes six surveys).
4. Fourth Quarter 1978:
Conduct two workshops (includes six surveys).
5. Calendar Year 1979:
Conduct eight workshops (includes 24 surveys).
6. Calendar Year 1980:
Conduct eight workshops (includes 24 surveys).

Estimation of Energy Savings

The State of California currently employs approximately 200,000 people. Approximately 4.00×10^{12} Btu's of natural gas and fuels, and 10.00×10^{12} Btu's of electricity are consumed annually to provide conditions suitable for state employees and the general public. There are approximately 228,000 county and 194,000 city employees in the state. Assuming a per capita energy use correlation between state and local government employees, local government energy consumption is computed as follows:

$$\begin{array}{r} \text{Employees} \\ \text{County} \quad \text{City} \\ 228,000 + 194,000 \\ \hline \text{State} \\ 200,000 \end{array} \times (10.00 \times 10^{12} + 4.00 \times 10^{12}) = 29.54 \times 10^{12} \text{ Btu's/year}$$

Energy surveys of state facilities have shown the feasible potential energy consumption reductions to be 20 percent. Therefore, estimated potential energy savings for local government are:

$$.20 \times 29.54 \times 10^{12} \text{ Btu's} = 5.91 \times 10^{12} \text{ Btu's}$$

LOCAL GOVERNMENT ENERGY MANAGEMENT ASSISTANCE

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	12	22,512
Associate Level Professional (\$1,708/month)	12	20,496
Staff Services Analyst (\$1,422/month)	12	17,064
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	12	9,408
Total Salaries & Wages		69,480
Salary Savings (5%)		-3,474
Subtotal		66,006
Staff Benefits (23.5%)		15,511
Total Personnel Services		81,517
<u>Operating Expenses</u>		
General Expense		
Printing		4,000
Data Processing		
Travel In-State		13,300
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		13,043
Total Operating Expenses		30,343
Total ECPA Funding		111,860
State Funding		66,081
Total Funding		177,941

Estimated Future ECPA Funding Request

1979	120,000
1980	130,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A4. IMPLEMENTATION OF THE UTILITY INDUSTRIAL AND COMMERCIAL ENERGY SURVEY PROGRAM THROUGH THE RATE-MAKING PROCESS

Overview

Optional Measure 1 of the California EPCA plan (submitted March 7, 1977 to FEA) provided for a major tripartite effort between the CERCDC, the California Public Utilities Commission (CPUC) and the state utilities to reduce energy use in the commercial and industrial sectors. The utilities play the largest role since their representatives will be making the thousands of contacts with energy users.

This major effort will require the utilities to spent tens of millions of dollars each year. These funds depend on the CPUC rate-making process. The correct level of funding requires that the CPUC decision makers be thoroughly aware of the benefits and cost-effectiveness of this program which is highly rewarding to rate payers.

Management Plan

This measure provides continuing funds for one Senior Utilities Engineer with utility economics background to work closely with the CERCDC staff in the commercial/industrial energy survey program. This person will provide all necessary coordination in rate cases to ensure that the appropriate financial needs of the utility energy survey program are being met.

Milestones

1. First Quarter, 1978:
 - a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility energy survey programs;
2. Second Quarter, 1978:
 - a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility energy survey programs;
3. Third Quarter, 1978:
 - a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility energy survey programs;
4. Fourth Quarter, 1978:
 - a. CERCDC and CPUC continue to cooperate in tariff action to expand regulated utility energy survey programs;
 - b. SIC coded energy conservation and consumption data compared and reconciled with operating levels of state commerce.

5. Calendar Year, 1979 and 1980: CERCD and CPUC continue to cooperate in tariff action to expand regulated utility energy programs.

Energy Savings Estimate

The energy savings from this measure will appear in the Industrial and Commercial Energy Survey measure.

IMPLEMENTATION OF THE UTILITY INDUSTRIAL AND COMMERCIAL ENERGY
SURVEY PROGRAM THROUGH THE RATE-MAKING PROCESS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$734/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		22,725
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		22,725
Total ECPA Funding		22,725
State Funding		-0-
Total Funding		22,725
<u>Estimated Future ECPA Funding Request</u>		
1979	-0-	
1980	-0-	

*The indirect cost used in this budget is under negotiation.
A change in the final percentage will not alter the total
requested funding under this grant request.

A5. BOILER EFFICIENCY MEASUREMENT AND IMPROVEMENT PROGRAM

Overview

This is a request for EPCA Phase II funding to continue work begun under optional measure 4a, Boiler Efficiency Measurement and Improvement Program, started under the first EPCA grant request, filed by this state March 7, 1977. The writeup below reflects a focusing of the work program and a shifting of program milestones from the original measure writeup due to delays encountered by all parties.

Industrial boilers represent a predominate use of energy by the industrial sector in California, a sector which accounts for one-third of all the energy consumed in the state. Industrial boilers account for approximately 800 trillion Btu's of energy use annually. With rising fuel costs, continuing fuel supply problems, and the adoption of stringent air quality standards, it has become imperative that the operating efficiency of California's boilers be improved to reduce their current high consumption. To achieve this goal, it is proposed that data be collected to assist in taking specific actions in the areas of combustion efficiency, alternate fuels applications, and co-generation.

Management Plan

The Energy Commission has taken the lead role in the development and implementation of this measure, working with the California Department of Industrial Relations - Division of Industrial Safety (DIS), the California Air Resources Board (ARB), and the California gas utilities.

General Management Description:

1. DIS currently performs annual boiler safety inspections to ensure compliance with the California state boiler code.

The Air Resources Board (ARB) is responsible for controlling emissions from all stationary-fired equipment.

The Conservation Division of the Energy Commission is mandated to press for the conservation of boiler fuels.

2. DIS boiler inspectors will sample boiler flue gas for O₂, CO₂, CO, NO_x and obtain a fuel oil sample where applicable. A supplemental reporting form will be added to the existing form.

NO_x and fuel oil samples will be analyzed in the ARB lab.

The Energy Commission will use the data obtained from the boiler flue gas samples to determine the combustion efficiencies of the boilers tested, and notify the operator when maintenance is necessary.

This program will provide all three agencies annually with information necessary to promote combustion efficiency, low emission of pollutants and boiler safety.

Tasks:

1. Flue gas testing equipment (CO_2 , O_2 , CO , and NO_x) will be distributed to boiler inspectors.
2. Seminars will be held to train boiler inspectors in the use of flue gas testing equipment. Written testing procedures will be provided for their use.
3. An additional form will be developed and attached to the present boiler inspection form to collect data for this program. This form will be mailed to computer facility for key punching.
4. Computer data processing of the collected information will identify combustion efficiency and NO_x level deviations from standards. Access to data storage will be available to all agencies.
5. Follow-up assistance for boiler operators whose boilers deviate from standards will be provided. The assistance will be in such forms as:
 - a. Consultant lists
 - b. Materials and brochures
 - c. Local utility contacts
 - d. Tune-ups by Energy Commission staff when appropriate.
6. Due to the correlation between steam loads and electrical power generation, it is possible to assess co-generation potential from the same data. The Division of Industrial Safety's boiler inspection records now contain most of the required steam load information. However, additional information concerning load factors and fuel use is required to make existing information more specific. Therefore, an accessible data base which would include additional required information in the boiler inspection process will be used to assess the California co-generation potential. A rough industrial survey of boilers in the Bay Area was developed and used by the Pacific Gas & Electric Company as back-up material for co-generation testimony in recent Combined Cycle Hearings. Similar surveys are planned for the Los Angeles area. However, data gathering is a tedious process since current steam load factor data is not readily available. The additional data acquired from this proposed measure will satisfy this need.

EPCA funding will be used in three areas:

1. To pay the salary of one Energy Commission industrial process engineer.
2. To pay the Energy Commission's share of the keypunch/data processing costs--\$10,000.

3. To cover the Energy Commission's share of training materials and printing costs--\$5,000.

State funds will be used for all other program costs. (Funds listed as "state" in the budget for this measure refer only to Energy Commission expenditure--both ARB and DIS will also supply funding, but this is not shown here.)

Milestones

1. First Quarter 1978:
 - a. Development of inspection form;
 - b. Development of data processing system;
 - c. Inspector training and testing program;
 - d. Equipment purchase and distribution.
2. Second Quarter 1978:
 - a. Complete inspector training and testing program;
 - b. Continue equipment purchase and distribution;
 - c. Field report procedure begins;
 - d. Energy Commission analysis of field reports and contact with boiler operators begins.
3. Third Quarter 1978:
 - a. Complete equipment purchase and distribution;
 - b. Continue field report procedure;
 - c. Energy Commission analysis of field reports and contact with boiler operators continued;
 - d. Ongoing assistance and evaluation program begins.
4. Fourth Quarter 1978:
 - a. Continue field report procedure;
 - b. Continue Energy Commission analysis of field reports and contact with boiler operators;
 - c. Continue ongoing assistance and evaluation program.
5. Calendar Year 1979:
 - a. Continue field report procedure;

- b. Continue Energy Commission analysis of field reports and contact with boiler operators;
 - c. Continue ongoing assistance and evaluation program.
6. Calendar Year 1980:
- a. Continue field report procedure;
 - b. Continue Energy Commission analysis of field reports and contact with boiler operators;
 - c. Continue ongoing assistance and evaluation program.

Estimated Energy Savings

Energy savings from this measure will be measured via the reporting system in the Industrial and Commercial Energy Surveys measure. Savings will also be reflected in current SIC fuel consumption summaries contained in the Commission's Quarterly Fuel and Energy Reporting System. Accurate savings cannot be calculated at this time for this measure because of lack of data and the potential of double-counting savings. A rough estimate can be made, however, for energy savings that will begin to occur April 1, 1978 as testing begins. As data is gathered, contacts will be made by the Energy Commission to assist each tested industry in improving boiler and process heat efficiency. With the ability to test 14,000 boilers per year by the current staff of 350 state inspectors, and an estimated five percent efficiency improvement for each responding boiler operator, it is estimated that the savings would be:

<u>Year</u>	<u>Contacts</u>	<u>Number Responding</u>	<u>Savings</u>
1978-1979	14,000	3,500	5%
1979-1980	10,500	5,250	5%
1980-1981	5,250	2,625	5%
1981-1982	2,625	2,625	5%
1982-continued (contacts will be made on yearly data reviews to maintain peak efficiency.)			

Calculated Savings

$$\text{Year 1978} \\ \text{Savings} = \frac{3,500 \text{ boilers}}{14,000 \text{ boilers}} (\text{tot.}) \times 5\% \times 0.8 \times 10^{15} \text{ Btu's} = 10 \times 10^{12} \text{ Btu's}$$

$$\text{Year 1979} \\ \text{Savings} = \frac{5,250 \text{ boilers}}{14,000 \text{ boilers}} (\text{tot.}) \times 5\% \times 0.8 \times 10^{15} \text{ Btu's} = 15 \times 10^{12} \text{ Btu's}$$

$$\text{Year 1980} \\ \text{Savings} = \frac{2,625 \text{ boilers}}{14,000 \text{ boilers}} (\text{tot.}) \times 5\% \times 0.8 \times 10^{15} \text{ Btu's} = 7.5 \times 10^{12} \text{ Btu's}$$

These savings will be accumulated. Therefore, the savings expected in 1980 from this measure total 32.5×10^{12} Btu's.

BOILER EFFICIENCY MEASUREMENT AND IMPROVEMENT PROGRAM

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
Salaries & Wages		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)	12	24,720
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	4	3,136
Total Salaries & Wages		27,856
Salary Savings (5%)		-1,393
Subtotal		26,463
Staff Benefits (23.5%)		6,219
Total Personnel Services		32,682
Operating Expenses		
General Expense		
Printing		5,000
Data Processing		10,000
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		5,229
Total Operating Expenses		20,229
Total EPCA Funding		52,911
State Funding		76,217
Total Funding		129,128

Estimated Future EPCA Funding Request

1979	58,000
1980	64,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A6. WASTE HEAT RECOVERY

Overview

In an earlier age of cheap energy, it was frequently less costly overall to design processes that used more energy in favor of reducing initial cost. The current capital plant of California industry has numerous waste heat flows, which are relics of that earlier age. In some of the largest and most dramatic cases, cogeneration is the appropriate corrective action. Cogeneration should be viewed as a special case of waste heat recover - applying to those situations where the waste heat flow is large enough and thermodynamically suitable for a turbine. The other waste heat flows, either too dispersed, too cool, or too small to be suitable for cogeneration, are currently not emphasized by Energy Commission programs.

One method of waste heat recovery that is technologically feasible, economical, and has a large potential application is heat recuperation. Heat recuperation is the process of using exhaust flue gases to preheat combustion air. Preheating combustion air reduces heat needed for the firing process.

Various studies and surveys by the federal government (ERDA) indicate that there should be numerous possibilities for installing heat recuperation devices in the state. Most plant managers are aware of heat recuperation possibilities but are wary of the technical and economic information offered by suppliers. In this measure, the Energy Commission plans to increase the use of recuperators through an information focusing on technical, economic, and institutional factors.

Management Plan

The state will fund one senior professional for one full year to organize and direct this project. The \$60,000 of federal funds from this grant will be used to contract for the collection of the following information:

- A classification of flue gases by temperature and emissions content.
- A survey of 12 industrial sites, producing a mix of candidate sites for recuperation and sites with recent installation of recuperation systems. An information base will be established for each site containing:
 - a. General plan/facility layout configuration.
 - b. Engineering and equipment data.
 - c. Fuel savings (actual or potential).
 - d. Economic data.
 - e. Environmental impact.
 - f. Institutional effects (fuel priority changes, fuel switching, etc.).

- A classification of available recuperation equipment, specifications, costs.
- Identification of the economic, technological, and institutional factors involved.
- Develop an economic model of the operations.
- Develop a self-evaluation package for decision-makers.
- Assess the institutional and environmental impacts and develop recommendations for future governmental actions and policy.

The information developed from this survey will be used to produce an information package which will be distributed to business through trade organizations. The package will contain sufficient information for a businessperson to assess the technological feasibility and economic effects of heat recuperation within his facility, and enough product data would be included to initiate contacts for implementation.

Milestones

1. First Quarter, 1978: Initial data collection and detailed workplan development period.
2. Second Quarter, 1978: Request for proposal prepared and issued.
3. Third Quarter, 1978: (a) Full-time staff person hired; (b) contract(s) awarded.
4. Fourth Quarter, 1978: Interim progress report on contract.
5. 1979: (a) Final report submitted by contractor and analyzed by staff; (b) information package prepared and distributed; (c) evaluation of information package impact; (d) evaluation of additional programs and policy for state action.
6. 1980: Continuation of programs as indicated by initial results.

Estimated Energy Savings

Recuperation measures may produce anywhere from 20-50 percent in fuel savings per heat source. If ten percent of the total California boiler population were able to use recuperation techniques, savings of approximately 1.6 to 4.0×10^{12} Btu's per year could be realized. This estimate is a deliberate undercount in that it does not consider savings from heat recuperation applications on direct heating processes. Because of much higher temperatures in the waste heat exhaust from direct fired processes, potential savings are far greater than those from boiler applications.

WASTE HEAT RECOVERY

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		60,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		60,000
Total EPCA Funding		60,000
State Funding		30,017
Total Funding		90,017

Estimated Future EPCA Funding Request

1979	40,000
1980	-0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A7. STATE AND LOCAL GOVERNMENT PROCUREMENT

Overview

This EPCA-mandated program measure will continue the energy analysis work commenced by the State Office of Procurement in 1977 using EPCA funds.

The Procurement Office annually handles 50,000 purchase orders worth more than \$200,000,000. The local agencies (i.e., approximately 5,000 political sub-units in California, including cities, counties, school districts, and special jurisdictions) have a total annual procurement expenditure of approximately 2 billion dollars. Many of the items purchased by California governments require energy inputs over their useful lifetimes. The Procurement Program seeks to include energy consumption as a factor of evaluation in the state and local procurement process.

The program at this time primarily considers the energy that an item uses during its operational life. A product's manufacturing energy is assumed to be at least partially reflected in the purchase price of the product.

The energy savings to be found in reclaiming or recycling certain products are addressed in Optional Measure 7 of the State's prior submission under EPCA.

The Procurement Program has four major tasks:

- The development of a priority sorting procedure for energy-using items, based upon certain energy-related criteria.
- An energy analysis of priority items.
- The dissemination of the State's program experience through a newsletter for local government procurement officers.
- The servicing of requests by local agencies for information and assistance.

Tasks 1 and 2 will be done by the State Office of Procurement of the General Services Department through an interagency contract with the Energy Commission, Task 3 will be done by the Energy Commission staff, and Task 4 continues an existing Office of Procurement function.

Task One: The Sorting Algorithm

The objective of Task 1 is to identify procurement items having the greatest potential to save energy and, by implication, operating costs. An in-depth energy analysis of the State's 50,000 annual purchase orders would be impractical, inappropriate, and expensive.

The algorithm should eliminate from consideration:

- Items which require little or no energy in their use.
- Items purchased in such small quantities as to be insignificant energy users.
- Items used so infrequently that they produce relatively little energy demand.
- Items which are high energy users but for which there is little or no choice among competing product lines in terms of energy efficiencies.
- Items for which the projected net dollar savings, due to selection of an energy-efficient product, will not at least repay the cost of doing the energy analysis.

The algorithm will produce a rank-order listing of all procurement items that can save energy and repay the cost to the State of the energy analysis and specifications modification. It is expected that within one or two years the Procurement Program will pay for itself from energy cost savings.

Task Two: Energy Analysis

The second task is the detailed energy analysis of items selected through the sorting algorithm. Analysis will start with the highest rank item and continue down the list until all items have been analyzed or until all available funds have been expended. Energy analysis will be performed by staff in the Standards and Quality Control Branch of the Office of Procurement. Factors such as function, total cost, durability and maintenance also are incorporated into the specifications and bidding procedure.

Considerable staff time is required to analyze the first few items, but should decrease as data is accumulated and experience is gained. By the third year, most of the Energy Section's work will consist of updating existing files. The energy analysis group also will monitor the product analysis work of the Federal Supply Service, the National Bureau of Standards, ASTM, and other governmental procurement efforts.

This task is expected to produce documentation of the cost/benefit ratio for the program. Favorable benefit/cost information is needed to justify the use of State funds to extend this program after the three-year EPCA funding is terminated. Task Two, therefore, is of critical importance both to achieving energy savings and to continuing the energy-efficiency analysis.

Task Three: Local Agency Involvement

Definition - Local Agency: A political subunit of California. This includes cities (413), counties (58), school districts (1,400), and various forms of independent special districts (3,000). All told, there are approximately 5,000 local agencies in California.

Achieving maximum effectiveness and complying with EPCA guidelines mandates that local agencies participate in the state energy procurement process. Total procurement expenditures by local agencies are roughly ten times the state procurement expenditures and offer great potential to practice energy-efficient purchasing. The State's product research, specifications modifications, and clear documentation of economic and energy savings will provide valuable material to share with local procurement offices.

The primary objective of Task Three is to develop a procurement newsletter for local agencies. This newsletter will inform local agencies of the state energy analysis program and provide them with a brief summary of the procurement specifications that are available from the state. This first issue will be sent to all local state agencies. Local government association newsletters will be used to draw maximum attention to the first issue.

The first issue of the newsletter (tentatively titled "Procurement Update") would be expanded to include a one-time-only information package to contain:

- A description of the State Energy Procurement Program
- An explanation of the various ways that local agencies could make use of the state program
- A short "how-to-do-it" explanation of life-cycle costing (LCC) procedures.
- An annotated bibliography on energy and procurement
- An annotated, "whom to contact" list of information sources (federal, state, associations, private) for the procurement/energy topic

Included in the first issue and emphasized as the main feature in all subsequent issues will be a report on procurement items recently analyzed for their energy use. The report will include:

- A short description of each item
- The bid selected by the state (when available)
- The estimated energy and operational cost savings of the new selection when compared to the same class item for the previous year's procurement. Savings given in both dollars per year and Btu's per year (to clearly emphasize both the economic and the energy savings potential).
- An indication of additional technical information available on the item and its procurement.

Whereas the first newsletter will bring the program to the attention of the local agencies, subsequent issues will provide concrete information and incentives to use energy specifications. Organizations will be asked to return a card indicating their desire to remain on the mailing list. This limits publication costs by sending newsletters only to those who will use the information.

Task Four: Servicing of Local Agency Requests

If the Task 3 information program is successful, local agencies will respond with requests for additional information and technical assistance. Present state law allows state assistance to local agencies in several ways:

- Simple information transfer of specifications and other technical information which is then used independently by the local agency.
- Technical assistance in the development of specifications for specific items.
- Specification development and bid solicitation for a select group of items. This is done for a fee and only at the request of a local agency.

Task 4 requires that the energy analysis staff be organized to satisfactorily respond to requests by local agencies. If local agency response is great enough, the energy section may designate one or more full-time workers to handle local agency information requests.

Management Plan

This program will be performed by an interagency agreement between the Energy Commission and the Office of Procurement. Under this contract, the Office of Procurement will:

- Develop and test the sorting algorithm.
- Perform product energy analyses.
- Service local agency requests for information.
- The Office of Procurement program manager will be Donald L. Ekstedt, Section Supervisor. One existing section member will be assigned on a part-time basis to provide direction and coordination. Two additional staff members will conduct the detailed analyses. Consultants will be used for special assignments as required.

The Commission will manage the local agency communication task and, as part of that program, produce and distribute the "Procurement Update" newsletter for local state agencies.

Milestones

- A. First Quarter 1978: (1) commodity scan by groups, (2) nonenergy users culled by groups, (3) nonenergy users culled by class.
- B. Second Quarter 1978: (1) all other nonenergy items culled.

- C. Third Quarter 1978: (1) ranking handbook prepared and printed, (2) pilot item(s) prepared for pilot bid, (3) first five items prepared for bid.
- D. Fourth Quarter 1978: (1) first five items prepared for bid (continued), (2) normal processing of bids begins, (3) collection and analysis of actual and-use data begins, (4) first copy of newsletter published.
- E. Calendar Year 1979 and 1980. Bid processing and program analysis continues, regular publication of newsletter.

NOTE: The Office of Procurement will prepare written reports on the progress and problems of this program for the Energy Commission. These reports will be monthly through January 1979 and quarterly thereafter.

Energy Savings Estimate

Predicted energy savings in the 1980 period for commodities to be analyzed in the program are not readily predictable. Energy savings calculations and predictions will be specific tasks of the program. Savings likely will not be large in relation to state energy consumption. However, energy specifications should create incentives for efficient product design having ripple effects throughout public and private sector purchasing.

The state on its own has initiated an energy-efficient procurement program which suggests potential energy savings. Specifications for state fleet cars now require an average mileage of 22 mpg for subcompacts. In the current fleet of approximately 4,200 cars, of which 10 percent are subcompacts, the fleet average is 15.9 mpg. With the addition of 10 percent new subcompacts in the 1977 fleet, the average mpg will be 16.5. By 1980, at the same intended annual replacement rate, the value will increase to nearly 19 mpg. This savings amounts to 19 percent of the current fleet mileage and is equivalent to approximately 77×10^9 Btu's in 1980. These values are conservative because the subcompacts will replace existing models with lower-than-average mileage ratings.

The state procured over 36,000 fluorescent simulator tubes to install on state university and college campuses. Replacement was made primarily in area-lighting where the light level is determined to be more than adequate. It is estimated that this change represents a savings of 2,300 kilowatts for the mix of tube sizes which, at the typical use cycle of 2,800 hours per year, results in a savings of approximately six-and-one-half million Kwh per year. This is equivalent to 22×10^9 Btu's for 1980.

The state found that 122 Kwh/year could be saved by appropriate purchasing of electric typewriters. Annual purchase/replacement of electric typewriters for the state is approximately 2,000 units. In 1980, the state will be able to save 3.34×10^9 Btu's with the units purchased in 1977-80.

Similarly, a savings of $.737 \times 10^6$ Btu's a year can be made in the purchase of one class of copying machine. The state expects to purchase approximately 900 such machines prior to 1980, leading to a savings, in that year of $.663 \times 10^9$ Btu's.

The total projected savings in 1980 for these four items is being used as a surrogate for an energy savings estimate for this measure. Actual savings are naturally assumed to be much higher, but cannot be specified until Tasks One and Two are completed.

Automobiles	77.00×10^9 Btu's
Special Lighting	22.00×10^9 Btu's
Typewriters	3.34×10^9 Btu's
Copiers	$.66 \times 10^9$ Btu's
	<hr/>
	103.00×10^9

Minimum expected 1980 Savings = 103.00×10^9 Btu's or
 $.10 \times 10^{12}$ Btu's

Actual Calculations - Unit energy consumption data for priority-sorted commodities will be drawn primarily from state use records, engineering calculations and the several state, federal and private organizations regularly supplying such statistics by commodity for various applications, daily or seasonal periods, geographic location, etc. Where specific values are not available, estimated average or envelope values can be used until more precise data is available. Commodity quantity data will be obtained from purchase orders, property records and detailed counts as required. Duty cycles will be gathered from agency records or estimated from related published data. From these values, it will be possible to calculate current and predicted energy use data.

Energy Savings Measurement

Energy savings will be documented by the following series of events:

- Recording the estimated savings for commodities evaluated in the program.
- Monitoring procurement of these commodities.
- Coordinating with the using agencies and retrieving the related energy use data.
- Analyzing and reporting the results through the permanent procurement energy staff.

The energy savings will be stated by commodity in Btu's per time period, as both cumulative and incremental values as related to the pre-implementation usage rates.

STATE AND LOCAL GOVERNMENT PROCUREMENT

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		8,000
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		40,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		48,000
Total EPCA Funding		48,000
State Funding		-0-
Total Funding		48,000

Estimated Future EPCA Funding Request

1979	52,000
1980	55,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

AS. LOCAL GOVERNMENT PLANNING AND TRANSPORTATION ASSISTANCE TEAM*

Overview

Local governments throughout California have demonstrated differing degrees of responsiveness to energy problems. In most cases there is an active concern to mitigate energy problems, but the courses of action which can be followed are not always clear.

While a variety of responses are necessary, it is felt that one of the major ways which the Energy Commission can effectively meet this need is to provide for the development of an appropriate form of direct and comprehensive land-use, environmental, and transportation planning assistance which aids localities in devising and implementing energy conserving planning programs based upon their unique governmental powers and authorities.

This program measure seeks to provide this assistance via a CERCDC staff team outreach to the elected officials of localities and their professional staffs. Their goal would be to provide guidance and to work with city and/or county governments and with association of governments, to identify, analyze, and recommend changes in the planning processes or governmental powers that can be reasonably implemented to achieve immediate and long-term energy and resource savings, and are appropriate to the legal and physical jurisdiction of the local public body. The objectives of such a program are:

- To illustrate energy planning considerations which are particularly within the purview and differing needs of localities.
- Identify constraints or planning problems faced by local governments in pursuing the implementation of energy conservation planning programs.
- To aid local government personnel in developing their own planning and implementation programs directed at conserving energy and to act as a transfer point of knowledge between localities.
- To implement local programs of energy conservation which reflect local climatic, topographic, economic, and/or resource availabilities, in furtherance of state and federal programs.
- In the long-term to provide localities with the ability to mitigate the need for energy resources through optimization of energy-effectiveness of governmental land-use and transportation planning processes.

Management Plan

It is critically important to develop effective channels to assist localities in their attempts to become more energy efficient.

*Note: This measure incorporates measure 5c of the California EPCA grant application, dated March 7, 1977, and the transportation engineering function of measure 3 of the California EPCA grant application, dated July 24, 1977.

To meet this need, a planning and transportation assistance team consisting of 48 person-months of energy specialists and 12 person-months of a senior energy specialist/project manager be formed to provide assistance to local governments. These energy specialist members of this team would be staff members of the Energy Commission: two of whom would specialize in the environmental planning requirements, needs, and processes of local governments, while the others would be knowledgeable in the technical aspects of energy conservation technologies and methods in such areas as building performance and transportation systems planning and engineering, in addition to having an environmental planning background. The team manager would have a like knowledge and experience in energy issues plus theoretical and applied knowledge and experience in such areas as public policy and administration, urban economics, and energy conservation program management. The staff members will be responsible with the supervision of the project manager for preparing an analysis with recommendations of the types and forms of change that can and should be made in the localities regulatory and planning processes and suggest methods that the locality may use to effect energy conservation within their jurisdiction. It will also be the responsibility of these staff to apprise the local government representatives of current or foreseeable energy conservation programs that may be available to them, (e.g., commercial building audit programs). The project manager would have responsibility for selection of local governments to be assisted and would provide overall program direction and management.

This effort would have as its goal actual directed assistance on a person-to-person basis by CERDC staff to specific localities undertaking energy conservation programs or wishing to undertake such programs. It is anticipated that the particular emphasis of these in-kind assistance services would encompass efforts to make city, county, regional agency, and special district planning programs more energy-conservant, efficient, and effective. Examples of areas where this in-kind assistance team would work include:

- The formulation of programs for general plan elements;
- The review and consideration of energy resource impacts (and particularly energy conservation opportunities) in environmental impact documentation processes;
- Modification in building, structural plumbing, mechanical codes and zoning ordinances based upon local conditions;
- Changes to transportation system operations management and design standards;
- The financing of conservation planning and programs.

The assistance provided through this staff team will be made with the provision, as a part of the stipulation to work with the local government, that a written description be made of what action the locality has taken on the recommendation left by members of its own staff and the Planning and Transportation Assistance Team.

This team will also produce a handbook of appropriate opportunities for energy conservation in land-use planning and transportation planning, design and operations, to both attract local interest and to guide application of energy-efficient planning practices by localities. A further aspect will be a CERDC team role of transfer or "brokerage" of information about these efforts between localities.

As part of this work program, the team will coordinate with the staff of the Local Action Contracts measure and both measures will be jointly managed to achieve the maximum distribution of the results of the contract program. The team effort will also manage the Ridesharing measure, and assist in the work being done under the Transportation System Management measure. These efforts, as well as the other efforts of the team, will be fully integrated through common supervision and management by the senior professional identified herein.

Calendar Milestones

1. First Quarter, 1978: (a) Team staff selected; (b) back-up research and materials prepared; (c) notice of the availability of the Planning and Transportation Assistance Team is made in various local agency newsletters; (d) visit one locality and prepare an evaluation with recommendations.
2. Second Quarter, 1978: (a) Between eight and ten localities visited; (b) recommendation completed on all of visits; and (c) continued advertisement of the project.
3. Third Quarter, 1978: (a) Prepare a summary of experiences and recommendations to date; (b) begin receiving reports from the first localities visited on their progress to implement changes; (c) visit another six to eight localities and prepare recommendations; and (d) hold the second Local Government Energy Conference, to further update the efforts reported upon at the July 1976 conference.
4. Fourth Quarter, 1978: (a) Visit four to eight additional localities; (b) write up recommendations; (c) continue receiving reports from localities on their progress to implement changes in their planning process; and (d) summarize the recommendations and progress made in implementation to date--make further recommendations as to how to assist localities that are having difficulties in making progress to implement changes.
5. Calendar Year, 1979: (a) Continue all of the activities of 1978; (b) survey and monitor progress of past year's localities in implementing changes; and (c) visit and make recommendation on 25 to 35 additional localities.
6. Calendar Year, 1980: (a) Continue all of the activities of 1979; and (b) visit and make recommendations on another 25 to 35 localities.

Energy Savings

Conservation will be expected to occur due to this measure through the continued "brokerage" and assistance to localities through the activities of the in-kind

staff team and the publication of a more comprehensive handbook detailing opportunities for localities to more effectively implement energy conservation and alternative energy supplies within the purview of their own unique powers and authorities.

New Residential Construction

Energy savings due to these effects in new residential construction are estimated at:

440,000 new dwelling units x 5% effected by program x

$$\frac{500 \text{ kWh savings}}{\text{dwelling unit}} \times \frac{10,000 \text{ Btu}}{\text{kWh}} = .11 \times 10^{12} \text{ Btu}$$

Existing Residential Construction

Local actions in the areas of improving the efficiencies of existing residential structures, through integrating the myriad of local planning processes into the statewide standards on buildings should also bring about increased conservation. Such areas of potential local action which may be transferred between localities due to the actions of the CERCDC in-kind staff assistance team would be retrofit ordinances, land-use mix changes (such as location of neighborhood service facilities), allowance for alternative transportation modes in existing street systems, modification of existing street standards to allow tree-shading, government-sponsored weatherization programs and clinics, and other appropriate changes.

A conservative estimate of the additional, marginal, energy savings which could occur due to these changes, at 1% of the 7.3 million dwelling units in the state, are:

7,300,000 dwelling units x 1% effected by program x

$$\frac{300 \text{ kWh}}{\text{d.u.}} \times \frac{10,000 \text{ Btu}}{\text{kWh}} = .22 \times 10^{12} \text{ Btu}$$

Environmental Impact Mitigations

A part of this measure will also entail the review of selected environmental impact reports and other appropriate environmental documents, and the active encouragement of mitigation of significant energy resource commitments of an adverse nature. These actions will be completed by continuing training sessions with local agency and consultant EIR preparers upon the appropriate level of energy-impacts data and mitigation in such documents.

$$200 \text{ residential EIR's} \times \frac{200 \text{ dwelling units}}{\text{each EIR}} \times \frac{500 \text{ kWh savings}}{\text{d.u.}} \times \frac{10,000 \text{ Btu}}{\text{kWh}} = .20 \times 10^{12} \text{ Btu}$$

Transportation System Energy Surveys

An example of the kind of effort and savings to be expected from this action is suggested by the CERCDC partially-funded "Program to Interconnect, Time, and Test Traffic Signals for Energy Conservation" with the City of Santa Barbara. This program started with phasing modifications of a string of seven signals on outer State Street in 1974, and is estimated to now be saving approximately 50,000 gallons of gasoline per year compared to preproject signal phasing. This estimate is based upon before and after fuel use measurements of cars driven through the test section. The present program, directed at optimizing 106 traffic signals, would save 500,000 gallons (12,000 barrels) of gasoline per year, extrapolating from the previous results.

Studies performed in Fresno and Pasadena* indicate that about 50 percent of the electrical energy used for street and highway lighting can be saved by converting from incandescent to vapor discharge and metal halide fixtures. Additional savings can sometimes be achieved by increasing the spacing interval when changing to the more efficient fixtures. A substantial part of this effort will be changing standards to accommodate these efficiencies.

This program would conservatively save:**

Gasoline: 6,000,000 gallons x 125,000 Btu/gal = $.75 \times 10^{12}$ Btu
 Electricity: 1,593,000,000 kWh x 4% x 10,000 Btu/kWh = $.64 \times 10^{12}$ Btu

The net energy savings of this measure are:

New Residential Construction:	$.11 \times 10^{12}$ Btu's
Existing Structures:	$.22 \times 10^{12}$ Btu's
Environmental Impact Mitigations:	$.20 \times 10^{12}$ Btu's
Transportation System Energy Audits	--
Gasoline: $.75 \times 10^{12}$ Btu's	
Electricity: $.64 \times 10^{12}$ Btu's	1.39×10^{12} Btu's
Total	1.92×10^{12} Btu's

*Estimate made by CERCDC staff from California Innovations Group information brokerage.

**Gasoline savings estimated from Santa Barbara experience. Electricity savings assume one percent of street lighting use will be impacted in 1980 and prior years but carrying over to 1980 (see also Measure 17 of ECPA grant submittal dated July 24, 1977).

LOCAL GOVERNMENT PLANNING AND TRANSPORTATION ASSISTANCE

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)	12	24,720
Staff Level Professional (\$1,876/month)	24	45,024
Associate Level Professional (\$1,708/month)	24	40,992
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	20	15,680
Total Salaries & Wages		126,416
Salary Savings (5%)		-6,321
Subtotal		120,095
Staff Benefits (23.5%)		28,222
Total Personnel Services		148,317
<u>Operating Expenses</u>		
General Expense		
Printing		1,000
Data Processing		
Travel In-State		25,000
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		23,731
Total Operating Expenses		49,731
Total EPCA Funding		198,048
State Funding		-0-
Total Funding		198,048

Estimated Future EPCA Funding Request

1979	220,000
1980	240,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A9. TRANSPORTATION SYSTEM MANAGEMENT

Transportation System Management (TSM) is the concept of using existing facilities more efficiently. Such a concept includes a wide range of activities that may be employed in lieu of new capital facilities such as:

- Traffic operations improvements to manage and control the flow of motor vehicles.
- Preferential treatment for transit and high-occupancy vehicles.
- Appropriate provisions for pedestrians and bicycles.
- Management and control of parking.
- Changes in work schedules, fare structure, auto tolls or auto restricted zones to reduce peak period travel and to encourage off-peak use of transportation facilities and transit services.

Most TSM activities have been tried and tested in some location. Many of the activities are mutually exclusive and should not be implemented concurrently in the same area. Ideally, however, an area should be selected to implement and test as many mutually supportive activities as possible.

The process of the development of this task project is proceeding and functioning as a four-phase process.

In the first phase, using funds from measure 6B of the EPCA grant application dated March 7, 1977, possible TSM techniques, which have the greatest potential for energy savings and implementation, will be selected from a range of possible TSM techniques which are now being evaluated by both Commission and Caltrans staff to bring about increased transportation sector energy efficiencies.

The second phase will be the selection of a region or regions which the selected measures can be implemented. This phase will proceed in a series of steps through present efforts and initial funding under this grant proposal. First, a series of regional meetings will be held to acquaint state, regional, and local government officials and the general public with the program concept. Out of these meetings, and out of further in-depth discussions with these groups on a one-to-one basis, a list of candidate regions and associated cities and counties will be drawn up. To these candidates, a formal program proposal in the form of a RFP (request for proposals), will be presented for their response. The received responses to the RFP will be evaluated against a series of factors including:

- Similarity of the regional or local transportation system (i.e., network) with other regions of the state and the country with the goal of determining possible program results transferability.
- Level of agreement with the adopted regional transportation plan or commitment to preparation of a strong TSM element to said plan, to conserve energy resources.

- Level of public support for the program (e.g., city and county resolutions, public interest groups support).
- Level of past and present implementation of TSM efforts.
- Estimation of the possible levels of success if the proposed program is implemented in that region.
- Amounts of matching funds that can be allocated for the project, if any.

Based on the above and other factors, the region (or regions, if appropriate) which appear most committed to use transportation facilities in an energy-efficient manner, to move people and goods effectively, and most cost-effectively implement such programs (particularly in minimizing energy costs and capital commitments), will be selected for project implementation.

Phase 3 involves the final planning and preparation for the TSM measures implementation in the selected region(s). This includes securing any needed additional matching program funds for the project, and the process integrating the program into the region. This process will include the securing of additional comments on the program from the public and a go or no-go evaluation of the support for the program.

During phase 4, actual program implementation will take place. This phase will also include a program evaluation by a team of transportation planners and engineers. The product of their work will be a program evaluation and recommendations document which will be used as a guide in implementing other TSM programs, and will be a useful document for other states and regions as well.

Program Staffing, Funding and Control

Under present EPCA funding, twelve person-months of professional-level effort at Caltrans are assigned to this task; this grant application will increase staffing to 24 person-months of professional-level effort.

This staffing will be either at the California Department of Transportation (Caltrans) or the Energy Commission, depending upon the potential commitments and abilities of each party to implement the program as outlined.

Milestones

1. Third Quarter 1977: Selection of TSM measures will continue during this quarter based on work started during the fourth quarter 1977.
2. Fourth Quarter 1977: (a) The process of TSM techniques selection will be completed; (b) Informational regional meetings will be started; (c) Preparation of the RFP will begin.
3. First Quarter 1978: TSM demonstration project RFP will be released.

4. Second Quarter 1978: (a) RFP responses will be received and evaluated, and a selection of a region or regions will be made; (b) Final planning for project implementation will begin.
5. Third Quarter 1978: Implementation plan will be finalized, additional funding will be obtained, and local informational hearings will be held on the project.
6. Fourth Quarter, 1978 through 1979: Project will be implemented and evaluation of the project will begin.
7. Calendar Year 1980: The evaluation work by the project evaluation team will be completed, and their final report, along with the final report on the project by staff, will be released to the public.

Energy Savings Estimate

An intensive TSM program has never been carried out before but we would hope to save approximately five percent of the transportation energy used in an urban area. For central business districts, the savings might be much greater, perhaps approaching 25 percent if auto-free zones are included in the TSM plan.

The most likely possibilities are unique areas such as Tahoe, Davis, Berkeley, and the like. Using Davis as an example, a 5 percent reduction in the approximately 70×10^6 annual VTM will produce a savings of:

$$\frac{(70 \times 10^6) \times .05 \times (.125 \times 10^6)}{15}$$

$$= .03 \times 10^{12} \text{ Btu/Year}$$

We could expect that a successful demonstration in one area will lead to implementation in other areas and eventual achievement of 5 percent of VMT in all metropolitan areas.

TRANSPORTATION SYSTEM MANAGEMENT

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		60,000 ¹
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		60,000
Total EPCA Funding		60,000
State Funding		210,000
Total Funding		270,000

Estimated Future EPCA Funding Request

1979	90,000
1980	125,000

¹This funding will be utilized for staffing at either the ERCDC, the California Department of Transportation, or other appropriate agencies, to best fulfill the objectives of this measure.

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A10. RIDESHARING

Overview

This measure will reduce vehicle-miles traveled (VMT), increase the efficiency of total traffic flow, and encourage major increases in passenger load factors (thus Btu's per passenger mile efficiencies) during urban peak highway-roadway load commute hours.

Since the average occupancy of cars used for commuting to work is only 1.1 or 1.2, there is an opportunity for energy savings in this area. The commute trip is the best market for promoting ridesharing because it is a very repetitive trip between the same points and commuting typically accounts for about 30 percent of VMT in the major populated areas.

Carpool matching services are a proven method to encourage carpool formations. Several U.S. Department of Transportation (DOT) publications have indicated that this can reduce regional transportation energy consumption by three to six percent. California's experience is that this estimate is too high, barring a publicly perceived energy crisis, which is not currently the case. Nevertheless, important gasoline savings have been achieved for every carpool matching program implemented in the state. Carrying this concept a step further, Caltrans, other government agencies, and private companies around the country have started vanpool programs that reduce annual VMT 80,000 to 100,000 miles per year per van. Vanpool programs either provide the "seed" money to initially purchase the vans or merely assist people in buying vans and provide matching services to insure riders for the commute trip.

A complete ridesharing program provides both carpool and vanpool matching services through employers and to the general public via a dial-in service. Some form of assistance for the purchase of a van, plus helping individuals set up proper accounting procedures should also be provided in a vanpool program. Of course, general promotion of ridesharing concepts and their associated benefits to the community is an essential part of any ridesharing program.

The following program does all of these things and supports activities that provide additional incentives for pooling such as park and pool lots, parking incentives, use of company/agency vehicles for pooling, preferential treatment on streets and highways, and public education about the cost of driving to work alone versus the benefits of pooling.

Management Plan

During the first year of EPCA funding, a comprehensive ridesharing program for the San Francisco Bay Area was developed, which included the formation of a nonprofit, nonstock corporation to assist employers, employees, and other groups to form vanpools, with the corporation acting as the lease guarantor. Programs in the Los Angeles, Sacramento, and the San Diego Metropolitan areas were continued and expanded. Below is a summary of the number of people placed in carpools and vanpools as a direct result of the Caltrans Ridesharing Program and which are actively involved currently.

<u>Location (Metropolitan Area)</u>	<u>Persons Placed in Carpools</u>	<u>Persons Placed in Vanpools</u>
Los Angeles	10,900	641
San Francisco Bay	7,300	34
San Diego	2,800	--
Sacramento	4,000	122

Following the pattern of last year's requests, EPCA funding is being requested for the San Francisco Bay Area program only in the amount of \$150,000. This funding will be used to continue and expand the comprehensive ridesharing program started with first EPCA funding of \$114,960. The major program emphasis will continue to be on vanpooling.

Management of this project will be exercised by both Commission staff, as part of the work program of the Local Government Planning and Transportation Assistance Team, and the Office of Ridesharing, California Department of Transportation (Caltrans). Commission staff will provide overall program guidance, and support. The Office of Ridesharing will provide direction and guidance on the operation of each of the metropolitan ridesharing programs, and will administer the actual transfer of contract funds. Total funding for state-supported ridesharing programs in California is expected to reach 2.60 million dollars, with Caltrans providing 1.67 million (including EPCA funds) and local and regional governments and private institutions providing \$930,000.

Milestones

1. First Quarter 1978: (a) Contract is signed between selected van leasing company and the corporation; (b) program marketing approach is tested before business and labor groups; (c) hiring of ridesharing corporation staff completed; (d) media campaign begins.
2. Second Quarter 1978: (a) Ridesharing program is officially launched; (b) first vans are assigned to vanpool groups; (c) carpool dial-in matching services are transferred from Caltrans District 4 (San Francisco Bay Area) to the corporation; (d) funding is provided for fiscal year 78-79 (July 1, 1978 through June 30, 1979).
3. Third Quarter 1978: (a) Ridesharing program continues; (b) first corporation fiscal year evaluation report is completed and released to the public.
4. Fourth Quarter 1978: (a) Ridesharing program continues; (b) program efforts are expanded to place greater emphasis on the needs of South San Francisco Bay Area (Palo Alto, San Jose) commuters.
5. Calendar years 1979 and 1980: Based on program success and evaluation, the program will continue and will be expanded as funding and opportunities dictate.

Energy Savings Estimate

Commuting accounts for about 30 percent of urban VMT, and urban VMT is about 70 percent of total state travel. Although many analysts report potential VMT reductions on the order of three percent to six percent, our experience indicates much less reduction in the absence of an energy crisis. We would estimate an upper bound of two percent of urban VMT reduction by 1980. With total travel of approximately 130×10^9 vehicle miles per year, projected energy savings at an average of 15 mpg are:

$$\frac{130 \times 10^9 \text{ vehicle miles} \times 70\% \text{ (urban portion)} \times 2\% \text{ (reduction)}}{125 \times 10^3 \text{ Btu/gallon}} \times \frac{\text{gallon}}{15 \text{ miles}} = 15.2 \times 10^{12} \text{ Btu/Year}$$

The number of car and vanpools organized will depend upon project success. Our estimate of a two percent reduction in VMT translates to the formation of 33,000 carpools with an average of 3.1 occupancy and an average round trip of 36 miles. The occupancy and trip length are values currently being measured in our carpool program. Energy savings of a direct result of EPCA funding is approximately 10 percent of the above urban potential:

$$.10 \times 15.2 \times 10^{12} \text{ Btu/Year} = 1.52 \times 10^{12} \text{ Btu/Year}$$

RIDESHARING

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
Salaries & Wages		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		
Operating Expenses		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		150,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		150,000
Total EPCA Funding		150,000
State Funding		1,520,000
Total Funding		1,670,000

Estimated Future EPCA Funding Request

1979	175,000
1980	175,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

11. SUBSTATION FEEDER VOLTAGE REDUCTION PROGRAM

Overview

This program measure is a continuation of Optional Measure No. 3 of the State's 1977 EPCA grant applications.

"Voltage Reduction" has been used many times to lower energy usage and demand during times of emergency. In 1948, feeder voltages were reduced five percent in a very dry California spring to reduce electric energy consumption and save precious hydroelectric storage. Because of the current California drought and lack of hydroelectric generating capacity, voltages are temporarily being reduced three percent at the present time.

The current practice during normal times is to set distribution feeder voltages at multiple ratios of approximately 126 volts (example: 12,600). This practice results in no-load voltages of about 125-126 volts to the customer, with the expectation that the customer line voltage will be approximately 120 volts under load. The reduction to 120 volts occurs due to transformer and line losses.

Recent tests conducted in California indicate that significant energy and demand savings can be effected by supplying carefully controlled voltages to assure that customers would receive no higher voltage than 120 volts or multiples thereof.

To accomplish this, utilities would be required to reduce feeder voltages by about five percent or about six volts when measured on the customer's side of the distribution system for 125-126 volts to 119-120 volts or multiples thereof.

Management Plan

Each electric utility has been directed to carefully conduct non-published pilot tests of five percent voltage reductions in selected substation service areas and maintain records of customer complaints occurring during the tests. Tests will be conducted for a full-year period, unless precluded by extensive customer complaints, to determine the impact of seasonal peak demand on voltage levels.

One senior utilities engineer will continue to be utilized by the Public Utilities Commission to establish guidelines for conducting tests and to maintain continuous surveillance of these tests by the major California electric utilities. Because this program confronts long-established utility policy and will meet with many customer complaints, there is reluctance to adopt representative testing programs. Therefore, a capable, knowledgeable, and authoritative senior engineer is needed to assure an adequate and safe testing program.

This measurement and evaluation activity aids in determining if certain end uses (i.e., agricultural pumping) should be exempted from the voltage reduction program and will assist in determining the impact of the measure on electric energy capacity and peak demand forecasts.

Milestones

1. First Quarter, 1978:
 - a. Continue voltage reduction tests in all utility service areas;
 - b. continue evaluation of test data;
 - c. continue hearings to adopt tariff rules and regulations;
 - d. implementation of programs with follow-up effectiveness studies.
2. Second Quarter, 1978 tests:
 - a. Conclude voltage reduction tests in all utility service areas;
 - b. continue evaluation of test data;
 - c. continue hearings to adopt tariff rules and regulations;
 - d. continue implementation of programs with follow-up effectiveness studies.
3. Third Quarter, 1978:
 - a. Continue evaluation of test data;
 - b. continue hearings to adopt tariff rules and regulations;
 - c. continue implementation of programs with follow-up effectiveness studies.
4. Fourth Quarter, 1978:
 - a. Evaluation of test data;
 - b. continue hearings to adopt tariff rules and regulations;
 - c. continue implementation of programs with follow-up effectiveness studies.
5. 1979 tariff rules and regulatory decisions adopted. Implementation complete, follow-up studies concluded.

Estimated Energy Savings

In theory, a one percent voltage reduction should result in a one percent energy savings. However, heavy industrial and agricultural users set three-phase voltage levels to their own needs. This group of users would not be subject to the measure. The best estimate of the Public Utilities Commission is that the statewide savings would be at least three percent of the electric energy sold.

$$.03 \times 164.5 \times 10^9 \text{ Kwh} = 4.94 \times 10^9 \text{ Kwh savings}$$

$$4.94 \times 10^9 \text{ Kwh} \times 11,400 \frac{\text{Btu}}{\text{Kwh}} = 56.32 \times 10^{12} \text{ Btu primary energy saved}$$

Fuel Source

The measure will have little impact on fuel sources other than a reduction in consumption of primary generating fuels.

SUBSTATION FEEDER VOLTAGE REDUCTION PROGRAM

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		28,904
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		28,904
Total EPCA Funding		28,904
State Funding		-0-
Total Funding		28,904

Estimated Future EPCA Funding Request

1979	-0-
1980	-0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

A12. STREET LIGHTING EFFICIENCY IMPROVEMENTS AND ELECTRIC SYSTEM LOAD BALANCING PROGRAM

Overview

This program measure is a continuation of Measure No. 17 in the State's previous ECPA grant application.

The street lighting efficiency improvement will involve selecting higher efficiency lighting source for new installations, conversion and derating of existing facilities, permanently turning off any unnecessary street lighting, and incorporation of a midnight until dawn turn-off procedure for all possible lighting.

Electric load balancing will survey all distribution circuits of an electric utility to determine the potential for saving energy by reducing the excess loading on any given circuit.

Street lighting represents only about one percent of all electric utility sales, but even this amount is significant, when there is a means to reduce this consumption by 50 percent with rather simple technology and retrofit methods. There are large numbers of street lights not vital for security or safety which are on all night. These lights can be reduced in number, retrofitted for reduced consumption by conversion to newer sodium vapor designs, or set to turn off from midnight until dawn or when not needed for security or safety.

Electric system load balancing is a program suggested for evaluation by one major utility in California. That utility expects to use an automated method to determine the degree of excess loading on distribution circuits which results in increased I²R line losses. When performed manually, this information often lags any initial need and awaits low-voltage indications and customer complaints. By that time, line losses are excessive and result in loss of revenue to the utility because of increased energy lost through over-heating conductors, transformers, and regulators. If the automated method works effectively, energy savings can be gained from implementation of such programs by all utilities. This test program will determine the true cost effectiveness and energy savings potential of this technique. If successful, it can be expanded to all utilities in the summer of 1978 with further monitoring and evaluation. CERCDC also will attempt to expand it to publicly-owned electric utilities during 1978-79.

Management Plan

Strategy for Street Lighting Efficiency

The CPUC will work with the major electric utilities to develop procedures to:

1. Convert inefficient street lights to efficient ones.
2. Identify any street lights which are not essential and can be permanently turned off.

3. Ensure that street lights are not lit before dusk and after dawn.
4. Turn off street lighting, where not required for security or safety, from midnight until dawn.

This effort has not been received enthusiastically by electric utilities that worked to develop spacing and intensity of street lights in the past and will require carefully calculated cost-effectiveness analyses to develop a base for establishing the justification for elimination of unnecessary lamps, conversions, and turn-off procedures.

Strategy for Electric System Load Balancing

The energy savings potential of this program may far exceed the costs of carrying it out and may significantly improve customer service, if successful on an automated basis, or semi-automated basis. If these approaches work properly, energy conservation and improved service will result.

This program is a state-of-the-art program and its success hinges on the assumption that large numbers of distribution circuits are unbalanced and thus cause excessive line losses. The effectiveness of this program must first be evaluated on the system of the major utility studying it. If successful, further studies of the use of the same program on other utilities' systems will be required to determine the value of such an effort by all electric utilities.

One Associate Utilities Engineer of the California Public Utilities Commission will continue to develop these programs with utilities and confirm the cost-effectiveness potential during the first year and direct full implementation of and surveillance of the utilities implementation of these programs during the second year.

Energy Savings Estimate

Valid cost-effectiveness calculations are difficult for street lighting efficiency improvement since numerous options are available for downgrading conversions to other more efficient types and for turn-off procedures. It now appears that a reasonable goal would be to achieve a 50 percent overall reduction of energy use representing 1/2 of one percent of all electric energy sales in California, or about 8.00×10^{12} Btu/yr savings. This would be the result of actions ranging from simple one-time turn-off actions to expensive conversions, and while the exact cost-effectiveness of these measures cannot be routinely calculated at this time, some will definitely be cost-effective.

Electric system load balancing falls in the category of the state-of-the-art program; that is, that a computerized effort directed toward total system analysis can provide early determination of overloaded circuit conditions, and can result in corrective measures much sooner than current observations and corrective actions. If these expectations are correct, then significant energy savings can result. If corrective action is not undertaken sooner with the computerized effort than now occurs, little savings of energy will occur. There

is currently a claim by one major California utility that significant energy savings will result from this semi-automated program. This measure will verify the claim.

Milestones

Street Lighting Efficiency Improvement Program:

1. First Quarter, 1978:

- a. Determine the desire for downgrades and acceptability of substitute lamps;
- b. evaluate density guidelines for potential permanent turnoff of any excess lighting.

2. Second Quarter, 1978:

- a. Request progressive tariff proposals for downgrading street lighting if acceptable to customers;
- b. work with utilities to request turnoff of any street lights which are considered excess to safety and security.

3. Third Quarter, 1978:

- a. Request design criteria for all wiring configuration for utility provided street lighting;
- b. in cooperation with utilities, work out methods for turning off all possible street lights from midnight until dawn.

4. Fourth Quarter, 1978:

- a. Begin implementation of midnight until dawn turnoff of large numbers of street lights;
- b. maintain surveillance as to public reaction to this effort;
- c. adopt tariff provisions for downgrading of street lights using conservation-oriented rates and charges.

5. Calendar Year, 1979:

- a. Expand implementation of all efforts including careful setting of photocells and timers by utilities;
- b. continue implementation with surveillance of utilities' activities;

- c. expand implementation of all efforts and resolve any problems encountered;
- d. establish criteria for utility completion of program.

6. Calendar Year, 1980: Continue program as required.

Electric System Load Balancing Program:

1. First Quarter, 1978: Maintain surveillance relative to data collected by utility involved in test program.
2. Second Quarter, 1978: Evaluate expansion of data collection and determine energy savings potentials for implementation of corrective actions.
3. Third Quarter, 1978:
 - a. Determine systemwide energy savings potential of the utility's efforts;
 - b. evaluate the overall program for potential use in other utilities' service areas.
4. Fourth Quarter, 1978 through 1979: Implementation of the above action in other utilities' service areas as appropriate in same sequence as set forth above.

STREET LIGHTING EFFICIENCY IMPROVEMENTS
AND ELECTRIC SYSTEM LOAD BALANCING PROGRAM

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Exoenses</u>		
General Exoense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		19,328
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		19,328
Total ECFA Funding		19,328
State Funding		-0-
Total Funding		19,328

Estimated Future ECFA Funding Request

1979	-0-
1980	-0-

*The indirect cost used in this budget is under negotiation.
A change in the final percentage will not alter the total
requested funding under this grant request.

A13. ENERGY/ENERGY CONSERVATION EDUCATION (K-12)

Overview

Californians are coming to realize that our sources of energy are finite and that decisions we make regarding energy have widespread environmental, social, political, and economic consequences. California's Energy Commission is aware of these relationships and recognizes the positive role California's student population can play in determining the shape of our nation's energy future. Therefore, this Commission proposes to work with all appropriate agencies to ensure that kindergarten through twelfth grade (K-12) students will develop an ethic which includes the awareness, knowledge, and skills necessary to participate intelligently in the solution of short and long-term energy problems.

The most efficient means of developing this ethic within California's 4.4 million (K-12) students is by disseminating information through the formal educational process. The major difficulty with this approach is that most teachers have not been trained to handle energy/energy conservation assignments. This lack of training is, and will continue to be, a deterrent to the integration of energy education materials into existing classroom activities.

Under this measure, numerous in-service training centers will be established to provide (K-12) teacher training relating to energy/energy conservation education. These in-service training centers will be established, out of the Commission's concern for equal education opportunities, at a variety of sites throughout the state. For the sake of effective control and economy, first-year efforts will be limited to three sites.

Management Plan

One of the most critical aspects of this project is to secure a staff of competent program coordinators; therefore, a portion of the requested funds will be used to fund these positions. These individuals will be selected on the basis of a variety of skills required for a successful implementation. Heavy emphasis will be placed on locating persons with demonstrated communicative skills and teaching backgrounds.

These program coordinators will be responsible for:

1. Assessing current energy/energy conservation education opportunities within California's 1042 (K-12) school districts;
2. Promoting energy/energy conservation education through the use of presentations, demonstrations, incentive, and performance recognition programs;
3. Managing a variety of contracts relating to the development of energy/energy conservation education training centers; and
4. Encouraging community support and participation.

Initially, the Commission's staff will develop a request for proposals (RFP) package to establish in-service training centers. This package will indicate,

in specific terms, what is expected of potential contractors. A preliminary evaluation of program development and implementation options indicates that the utilization of resources available through existing postsecondary institutions should provide one of the most cost-effective means of establishing these centers. Therefore, proposals will be only accepted from California's postsecondary institutions. Other considerations, including community involvement, will also play an important role in selecting contractors.

After reviewing responses to the RFP, the Commission will enter into contracts with the appropriate postsecondary institutions. These contracts will enable staff from these institutions to join with the Commission's staff to develop new or locate existing course materials, schedule classes, publicize center activities, conduct classes, and provide assistance to (K-12) teachers attempting to use energy/energy conservation materials within their classrooms.

Prior to the start of the in-service training classes, the Commission will make a concerted effort to stimulate interest through the use of direct mailing, personal contacts, and news releases.

After a teacher has participated in an energy/energy conservation in-service training class, his or her name will be placed on a mailing list. The purpose of this action is to enable each teacher to receive, on a continuing basis, the Commission's newsletter, which will include a section for teachers, a list of speakers available for classroom presentations, information on suggested field trips grouped by geographical regions, and other information or materials which will make classroom applications easier.

The Commission will closely monitor all in-service training activities by requiring periodic reports from the contractor. Additionally, each teacher that participates in the program will be requested to complete an evaluation form. One copy of that form will go to the participating postsecondary institution, with a second copy coming directly to the Commission. On the basis of this information, the Commission will work with the postsecondary institution to bring about any changes which may be considered necessary.

The Commission will also conduct periodic surveys to determine the number and percentage of teachers initiating in-service training programs within their classrooms. These surveys will not only identify the program's strength, but also lead to ongoing modifications. The question of program expansion will also be affected by the results of these surveys.

This program is a continuation of activities which began with funds made available through the first EPCA grant request (see pages 119-122) and through the first ECPA grant request (see pages 71-75). Program definition within these two areas has been modified to conform to that which is outlined in this proposal.

Those modifications include:

1. Third Quarter 1977:

- Delete - Convene steering group (EPCA): Add - Conduct survey of educators to determine appropriate action (EPCA): Delete - Work with school districts to arrange stipends for attending courses (EPCA).

Comment

- Although no formal steering group will be formed, educators throughout the state have been consulted about the proposed energy education program format. These consultations were held with educators from elementary and secondary schools, community colleges, state universities, the University of California, and representatives of California's Department of Education.

2. Fourth Quarter 1977:

- Delete - Draft course materials (EPCA): Add - Continue survey of educators (EPCA): Retain - Begin review, evaluation, and categorization of education material (ECPA).

3. First Quarter 1978:

- Milestones from this point forward are described later in this measure.

Milestones

1. First Quarter, 1978:

- a. Develop Request For Proposals (RFP);
- b. Evaluate responses and award contract(s);
- c. Develop two-part in-service training evaluation form;
- d. Monitor contractor's activities;
- e. Begin promotional activities.

2. Second Quarter, 1978:

- a. Continue contractor monitoring;
- b. Continue promotional activities.

3. Third Quarter, 1978:

- a. Begin classes;
- b. Review training evaluation forms and take necessary action;
- c. Continue promotional activities;
- d. Begin post-training support.

4. Calendar Year, 1979:

- a. Continue classes;

- b. Continue class evaluations;
- c. Continue promotional activities;
- d. Continue post-training support;
- e. Survey teachers;
- f. Expand program.

5. Calendar Year, 1980: Same as 1979.

Energy Savings Estimate

(NOTE: An energy savings estimate is not required for this measure under ECPA, Section 420.103(b)(1).)

Energy savings resulting from educating students are potentially very high. Not only will a significant percentage of California's 4.4 million K-12 students be educated in the principles of energy conservation, but the energy consuming habits of the students' families and friends will also be influenced. Although some energy savings will occur on a short-term basis, the most significant effect will be felt when the student assumes an adult role in society.

ENERGY/ENERGY CONSERVATION EDUCATION (K-12)

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)	12	24,720
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	36	61,488
Staff Services Analyst (\$1,422/month)	12	17,064
Graduate Student Assistant (\$987/month)	6	5,922
Stenographer (\$734/month)	20	15,680
<u>Total Salaries & Wages</u>		<u>124,874</u>
Salary Savings (5%)		-6,244
Subtotal		118,630
Staff Benefits (23.5%)		27,878
<u>Total Personnel Services</u>		<u>146,508</u>
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		4,000
Travel Out-State		
Consultant & Professional Services		85,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		23,441
<u>Total Operating Expenses</u>		<u>112,441</u>
<u>Total EPCA/ECOA Funding</u>		<u>258,949**</u>
State Funding		38,723
<u>Total Funding</u>		<u>297,672</u>

Estimated Future EPCA/ECOA Funding Request

1979 250,000
1980 350,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

**EPCA Funding: 11,078
ECOA Funding: 247,871

A14. LOCAL ACTION CONTRACTS

Overview

The purpose of this measure, a continuation of several ongoing programs, is to encourage and assist local and regional implementation of innovative energy conservation programs. This will be accomplished through two means: (1) direct contracting with cities, counties, regional, and/or special purpose government agencies, and (2) direct contracting with citizen's groups (and/or subcontracting via local governments, as appropriate.)

This program measure will be divided into two phases, as follows:

Phase 1: Local Government Contracts. Issue a Request For Proposals (RFP), select among candidate proposals, and issue contracts for local, regional, and/or special governmental agencies for changes to their land-use and environmental planning processes which recognize and effectuate energy conservation programs. Funding: \$140,000 to be encumbered during first quarter, calendar year 1978.

Phase 2: Local Action Contracts. Issue a Request For Proposals (RFP), select among candidate proposals, and issue contracts for local action energy conservation programs to be performed by community citizen action groups and/or local, regional, and/or special purpose governmental agencies, as appropriate. Funding: \$610,000 to be encumbered during the third quarter, calendar year 1978.

To these ends, the CERCDC will issue contracts for successful program proposals: these contracts will condition payments upon completion of successive tasks which demonstrate progress toward proposal goals, for fiscal control purposes.

An earlier implementation of this measure was accomplished in the State fiscal year 1976-77 using \$90,000 of State monies. Contracts were issued in June, 1977, to the County of Santa Clara, the City of Davis, and the Comprehensive Planning Organization of the San Diego Region for local and/or regional energy-conservant ministerial and discretionary planning process changes, and supportive energy resources flow and data base work. The City of Santa Barbara was funded for computer optimization of low-energy use scheduling and timing of an entire street signal system, and the Marin Municipal Water District was funded for low-energy use computer-optimization of their water pumping between system storage reservoirs.

Complementing measures were also funded, utilizing federal monies, through the Energy Conservation and Production Act (P.L. 94-385) grant request from California dated July 24, 1977. Partial funding of Phase 1, as described in this measure was achieved in Measure 4 of the above earlier grant proposal and will be initiated in State fiscal year 1977-78. Phase 2, as described herein, corresponds to the State fiscal year of 1978-79, and will combine the program aspects of Measures 4 and 5 of the earlier grant proposal.

Management Plan

Phase 1: Local Government Contracts

This phase was initiated with the issuance of a Request For Proposals (RFP) to all California cities and/or counties, all regional councils of governments, and selected special districts (i.e., some 600 agencies) in November, 1977. This RFP clearly stated that \$60,000 in funding has been received (i.e., ECPA, July, 1977), and that \$140,000 has been requested (i.e., ECPA, December, 1977). Actual contracts will, of course, be issued only up to the levels of funding received by the closing date of the three-month solicitation period, now scheduled for February 10, 1978. These funds are anticipated to be made available in \$10,000 to \$50,000 contracts between the State of California ERCDC and selected successful candidate agencies.

Specific responses will be sought which propose to undertake at least one of the following tasks to close cooperation with the CERCDC and other State agencies, as appropriate.

1. Preparation and implementation of an "energy element" of a local agency general plan and/or regional agency comprehensive planning document.

This task seeks to bring energy resources planning concerns into the mainstream of local and regional land-use, environmental, and related physical development comprehensive planning, through California's mandatory general plan conformance process and appropriate federally-mandated comprehensive planning processes (e.g., A-95 review, transportation planning, NEPA conformance, EPA standards and planning).

2. Preparation and implementation of modifications to local and/or regional agency ministerial structural permitting processes and actions for the added conservation of energy resources due to "local conditions and factors."

This task seeks to bring about greater use of an often neglected series of provisions in the California Health and Safety Code and Public Resources Code which allow cities and counties to condition the approval of building, plumbing, electrical, housing, and mechanical code permits based upon "local conditions or factors."

3. Preparation and implementation of modifications to local and/or discretionary permitting processes and actions, to enhance local and/or regional management of energy resources.

Many local agency discretionary permit processes and actions which have significant energy resources effects, such as the issuance of certain development permits, grading permits, zoning changes, and the funding and construction of public service facilities, have not traditionally been used to bring these energy considerations to the direct attention of local and regional governmental decision makers. It is therefore the purpose of this task to assist local and regional governmental agencies to modify their handling of such processes and actions, through identification, evaluation and, as pertinent, conditioning of their approval of such

discretionary permits or actions to mitigate their potential effects upon the wise and effective use of energy resources.

4. Concurrent planning and implementation of electrical and gas municipal utility and land-use planning/development regulation actions.

This task seeks to bring about further integration of municipally-owned utility regulatory functions with the parallel land-use, environmental, and public services planning functions of cities.

5. Other innovative demonstration projects involving planning processes which can be shown to have direct beneficial energy conservation effects.

Phase 2: Local Action Contracts

This phase will be instituted in the third quarter of calendar year 1978 through a Request For Proposals process. It will fund two areas: local government actions and citizen action programs.

The activities enumerated above in Phase 1, for appropriate governmental agencies, or their designated subcontractors will each, once again, be made available for funding, plus the following specific areas of governmental action.

6. Proposals to implement the State of California performance residential building standards, to be adopted in July, 1978 and normally effective statewide in July, 1979, within selected localities during 1978 as pilot programs of statewide interest and importance.
7. Proposals to plan and to implement Transportation System Management (TSM) elements of a direct and comprehensive energy management nature, in selected local and/or regional areas.

Phase 2 will also provide funding for appropriate citizen action group and/or governmental outreach programs, building on the premise that the most effective long-term impact on the energy consciousness and energy use patterns of individual consumers will occur when local governmental agencies and local citizen action groups are involved in the determination and delivery of energy services.

Evidence indicates that some of the most effective conservation programs are those which are initiated and carried out at the local level. This approach has three distinct advantages: (1) it affects an important group of energy consumers, ranging from single residential consumers to small businesses and communities. Although each uses a relatively small amount of energy, the total impact of this energy use is quite large; (2) the program optimizes the effectiveness of face to face contact, neighborhood and/or peer group orientation, and local accountability; and (3) the program complements existing CERCDC efforts by allowing citizen groups to tailor CERCDC programs and research to local needs, and to encourage innovative approaches in areas currently not being addressed by CERCDC programs.

Existing community groups and governmental agencies, therefore, will be actively utilized to promote conservation in selected regions of the state. The funding provided by this measure will be awarded to citizen groups and local agencies in

various sized increments for a variety of conservation activities. Local entities will be responsible for selecting appropriate target audiences, services to be offered, and delivery mechanisms, as well as demonstrating energy savings. Criteria for selection will include measurable energy impacts, project replicability, originality, strength of the community outreach capability, adequacy of management and the degree to which the project utilizes existing local action resources.

To stimulate and facilitate these local energy conservation efforts, one of the three staff positions will be designated to actively solicit and provide technical assistance to local entities in the development of their programs. Utilizing a "circuit rider" approach, the position will allow the resources and technical know-how of the CERDC to be more easily and readily available to local communities. The other two staff positions, likewise, will be utilized to solicit and to assist local agencies in implementing their energy conservation programs, also proceeding as an active "in the field," applied outreach effort by the CERDC.

Milestones

Phase 1

1. First Quarter, 1978: (a) Continue contract management from 1977.
2. Second Quarter, 1978: (a) Continue contract management; (b) prepare for summer conference for local government regarding planning powers and authorities applications to energy resources.
3. Third Quarter, 1978: (a) Continued contract management; (b) hold conference.
4. Fourth Quarter, 1978: (a) Complete contracts; (b) make final progress reports; and (c) pay out final monies.
5. 1979: (a) Initiate similar contracts; (b) continue to transfer applications to additional governmental agencies.
6. 1980: (a) Initiate similar contracts; (b) continue to transfer applications to additional governmental agencies.

Phase 2

1. Third Quarter, 1978: develop and issue RFP.
2. Fourth Quarter, 1978: select proposals to be funded; programs begin.
3. First Quarter, 1979: monthly progress reports due from local agencies.

4. Second Quarter, 1979: monthly progress reports due.
5. Third Quarter, 1979: final reports due; program evaluation by ERCDC staff.
6. Fourth Quarter, 1979, and thereafter: Energy Extension Service funds will be available to continue funding local projects.

Energy Savings Estimate

An estimate of energy savings to be realized from this measure is difficult to assess due to the variable nature of the proposals sought. However, based upon the manner of savings estimated in the Davis, Sacramento, and Indio experience with "local conditions" building codes, it should be reasonable to expect residential savings of 15% or more beyond the base case (i.e., no change, other than statewide standards). Thus savings can be expected to amount to:

$$\begin{aligned} &20\% \text{ of } 440,000 \text{ anticipated new dwelling units} \times 15\% \\ &\quad (6,000 \text{ Kwh/year}) \times 10,000 \text{ Btu/Kwh} = \\ & .79 \times 10^{12} \text{ Btu in 1980} \end{aligned}$$

Also, assume a five-mile trip reduction per day per dwelling unit due to better transportation access, reduced reliance on automobile modes, increased use of non-automotive modes, etc.

$$\begin{aligned} &20\% \text{ of } 440,000 \text{ du} \times \text{five mile/day reduction} \times 365 \text{ days/year} \\ &\quad \times \text{gallon/14 miles} \times 125,000 \text{ Btu/gallon} = 1.43 \times 10^{12} \text{ Btu in 1980} \end{aligned}$$

Indirect and induced energy savings are also anticipated of an additional 30% of the above cases due to transfer applications of the same procedures in other non-funded localities, and induced savings within funded localities (e.g., reduced commercial services, travel, etc.).

$$30\% \times (.79 + 1.43)(10^{12}) \text{ Btu} = .67 \times 10^{12} \text{ Btu in 1980}$$

For these hypothetical energy savings, assume that one other proposal would also be funded. This proposal should be for savings through application of a general or comprehensive plan "energy resources element" or through direct land-use planning/utility interface within a candidate city/municipal utility department. These savings are assumed to be in a range equal to those above, as a minimum, but deferred in time due to their need to be transferred into regulatory changes. Thus, savings are estimated to be on the range of one quarter of the electrical, gasoline, and indirect savings stated above (i.e., 5,000 dwelling units affected per year).

$$25\% (.79 + 1.43 + .67)(10^{12} \text{ Btu}) = .72 \times 10^{12} \text{ Btu}$$

The sumation of these anticipated or prospective savings are:

$$\begin{array}{rcl}
 .79 \times 10^{12} & \text{Btu} & - \text{"local conditions" (electrical)} \\
 +1.43 \times 10^{12} & \text{Btu} & - \text{"local conditions" (gasoline)} \\
 + .67 \times 10^{12} & \text{Btu} & - \text{"local conditions" (indirect)} \\
 + .72 \times 10^{12} & \text{Btu} & - \text{comprehensive changes} \\
 \hline
 3.61 \times 10^{12} & \text{Btu} & \text{in 1980}
 \end{array}$$

Also assume that major funding would go for consumer outreach programs affecting at least 20,000 households. Energy savings can be assumed at approximately 10% of annual average electrical usage or:

$$\begin{array}{rcl}
 20,000 \text{ dwelling units} & \times & 10\% \times 6,000 \text{ KWh/year} \times 10,000 \text{ Btu/KWh} = \\
 .12 \times 10^{12} & \text{Btus} & \text{in 1980}
 \end{array}$$

Thus, total expected energy savings can be, by 1980:

$$\begin{array}{rcl}
 3.61 \times 10^{12} & \text{Btu} & - \text{local governmental} \\
 .12 \times 10^{12} & \text{Btu} & - \text{community outreach} \\
 \hline
 3.73 \times 10^{12} & \text{Btu} & , \text{ in 1980}
 \end{array}$$

LOCAL ACTION CONTRACTS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	36	61,488
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	12	9,408
Total Salaries & Wages		70,896
Salary Savings (5%)		-3,545
Subtotal		67,351
Staff Benefits (23.5%)		15,827
Total Personnel Services		83,178
<u>Operating Expenses</u>		
General Expense		
Printing		2,500
Data Processing		
Travel In-State		5,000
Travel Out-State		1,200
Consultant & Professional Services		750,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		13,308
Total Operating Expenses		772,008
Total ECPA Funding		855,186
State Funding		-0-
Total Funding		855,186

Estimated Future ECPA Funding Request

1979 900,000
1980 1,200,000

*The indirect cost used in this budget is under negotiation.
1 change in the final percentage will not alter the total requested funding under this grant request.

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PUBLIC AWARENESS ELEMENT

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Bl. ENERGY SURVEY ADVERTISING

This program measure is a continuation of the Audit Advertising measure of the ECPA grant request, dated July 24, 1977.

There are two requirements for a public awareness effort in the ECPA Guidelines:

1. A campaign to promote awareness of the availability of energy surveys for business and industry; and
2. A campaign to promote general public awareness of information and technical assistance regarding planning, financing, installing, and monitoring the effectiveness of measures to conserve or promote efficiency in the use of energy.

This measure is part of a plan for promoting energy awareness in business and industry, which satisfies the first requirement above. The public is already being made aware of the effectiveness and desirability of various conservation measures through a variety of programs within the state (refer to Section IV, Mandatory Requirements, of the ECPA grant request). The latter requirement is already being satisfied. Spending on these existing programs by the utilities in the state amounts in millions of dollars, and there would be little benefit from adding a small increment from ECPA funds.

Overview

The larger utilities in California all offer free energy surveys to commercial and industrial customers. To date, the efforts have concentrated on larger businesses because the savings realized for the amount of time spent are greater. These larger enterprises are well aware of the survey programs; however, there is a great need to expand utility contact with medium-sized and small business where sheer numbers dictate some form of group approach. The utility energy survey program (EPCA 1977 Optional Measure 1) outlines a case study direct contacts approach CERCDC intends to try on an experimental basis to effect energy savings in small business. A well-conceived newspaper and trade journal advertising program should greatly enhance the effectiveness of this program.

In cooperation with a large utility, the CERCDC has prepared a short, well illustrated "success story" booklet describing how a small retail store in Long Beach took some very simple conservation actions to cut its energy use \$700 a year for a cash outlay totaling \$190. The story and booklet will be mailed and promoted by the utility among other retailers in the same area. The recipients will be encouraged to take similar actions and/or contact their utility for on-site assistance, if needed. A concentrated local newspaper advertising campaign will highlight energy and cost savings. These funds will be used to improve and expand this program.

The CERCDC will also work with the utilities to develop energy conservation business awards programs. With new funding, prominent advertisements will be placed in the local papers and trade journals explaining the awards programs,

extolling the success stories, and inviting the business reader to ask for booklets or request an energy survey. Over one-half million readers should be aware of the energy survey program in the Long Beach area as a result of this pilot program.

Management Plan

A CERCDC Office Manager will plan and coordinate the project with state utilities. \$21,000 of the funds will be used for newspaper and trade journal advertising, \$11,000 will be used to hire a market research firm to assist in designing and evaluating the program.

Milestones

1. First Quarter, 1978:
 - a. Market consulting firm contract let using ECPA I funds;
 - b. program designed; begin implementation.
2. Second Quarter, 1978:
 - a. Test made on sample market area;
 - b. contract continues;
 - c. continue implementation.
3. Third Quarter, 1978:
 - a. Decision on whether to go state-wide;
 - b. select target areas;
 - c. contract funds under this grant will be encumbered for the above-existing contract;
 - d. contract completed.
4. Fourth Quarter, 1978:
 - a. Continue program;
 - b. evaluate results.
5. Calendar Year, 1979:
 - a. Expand program;
 - b. enlarge target areas.
6. Calendar, Year 1980: Evaluate effect of program on entire commercial-industrial sector.

Energy Savings Estimate

Not required for this measure (ECPA Guideline Section 420.102(f)). Actual savings realized will appear under the Industrial and Commercial energy surveys measure.

ENERGY SURVEY ADVERTISING

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (9%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		32,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		32,000
Total ECPA Funding		32,000
State Funding		-0-
Total Funding		32,000

Estimated Future ECPA Funding Request

1979	34,000
1980	36,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

B2. CONSERVATION MARKETING AND ADVERTISING

Overview

Consumer attitudes and behavior determine the success of many program measures that could result in the reduction of residential and commercial use of electricity. Most consumers lack both the knowledge of how to reduce electricity usage in the home and the motivation to take specific, immediate steps that will result in energy conservation. They have been confused by a variety of conservation messages from various utilities, manufacturers and governmental agencies.

Problems in utility and other conservation programs have included lack of definition of marketing objectives, failure to develop a coherent marketing strategy for conservation measures, use of weak creative themes, and poor execution of these themes, utilization of a media approach that fails to meet necessary objectives of reach and frequency, and failure to adopt techniques for response measurement and criteria for success.

The purpose of this measure is to provide staff and contract funds for a series of well-defined marketing, advertising and consumer education programs designed not only to inform residential and commercial customers of the importance of conservation, but to actually motivate consumers to take specific actions to reduce energy consumption in their homes and businesses. The Conservation Division is requesting three staff positions, appropriate clerical staff, and \$95,000 for preparation of written and audiovisual materials, for the purchase of commercial television time, print advertisement space and other related consumer education materials.

The specific areas of energy conservation to be addressed are:

- Load management, including continuation of the Later Gator campaign.
- Appliance Efficiency (to complement the Appliance Efficiency Standards).
- Building Efficiency (general energy conservation techniques for small businesses and public buildings).
- A New Home Buyer's Guide.
- Opportunities for Water Conservation.
- Commercial Delamping.

Management Plan

Under the direction of the Manager of the Office of Emergency Planning and Education Programs, one associate-level and two staff analyst-level persons will be responsible for this measure. This staff will work closely with the Buildings and Appliance Office, Load Management Team and the Public Information Office. In the staff selection process, heavy emphasis will be placed on hiring persons with skills in writing, communications, marketing and marketing research.

Tasks:

1. Develop marketing strategies for specific conservation programs listed above.
2. Implement marketing and advertising campaigns. Purchase television time and newspaper space; prepare and distribute brochures.
3. Monitor campaigns, evaluate level of action taken by residential and commercial customers to reduce energy consumption.

Milestones

1. First Quarter, 1978: Develop strategies for marketing and information dissemination campaigns. Contracts will be let with marketing and advertising consultants as necessary.
2. Second Quarter, 1978: Prepare and print audio visual materials and brochures for specific conservation programs. Contracts will be let with production companies, professional writers, and other media specialists.
3. Third Quarter, 1978: Contracts with television stations, newspapers, and magazines for purchase of print advertisement space and commercial television time.
4. Fourth Quarter, 1978: Continuation of media campaigns, and brochure preparation and dissemination.
5. Calendar Years 1979 and 1980: Continuation of media campaigns, and brochure preparation and dissemination.

Energy Savings Estimate

The savings realized on the account of this measure are counted within the other measures of this application. We feel that without this measure, the effectiveness of those measures would be reduced.

CONSERVATION MARKETING AND ADVERTISING

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	12	20,496
Staff Services Analyst (\$1,422/month)	24	34,128
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	12	9,408
Total Salaries & Wages		64,032
Salary Savings (5%)		-3,202
Subtotal		60,830
Staff Benefits (23.5%)		14,295
Total Personnel Services		75,125
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		95,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		12,020
Total Operating Expenses		107,020
Total EPCA Funding		182,145
State Funding		126,575
Total Funding		308,720

Estimated Future EPCA Funding Request

1979	200,000
1980	210,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

B3. RESIDENTIAL ENERGY EFFICIENCY

Overview

Improving energy efficiency in the residential sector is a complex task requiring both a market and non-market approach. The purpose of this measure is to combine, in one program element, three key conservation strategies: communication, incentives, and regulation. The optimum mix of strategies will operate simultaneously by addressing various levels of residential market penetration for energy conservation.

Communication: Public awareness of the benefits, techniques, costs and paybacks of energy conservation will be increased through information and technical assistance programs. This increased awareness will be further stimulated by marketing techniques, and conservation actions facilitated by retrofit delivery systems wherever possible. Incentives: Financial incentives have proven useful to motivate and help consumers insulate, particularly among consumers who are aware of the need to make conservation investments but to whom the initial cost may be an obstacle. Further efforts will be undertaken to provide low-interest loan programs and develop, test and implement other conservation incentive programs. Regulation: In order to meet state insulation retrofit goals, regulatory approaches will be needed to reach those segments of the market, such as rental housing, where communication and incentive strategies have proven insufficient to encourage conservation investments. In addition, legislation is needed to establish guidelines and evaluation criteria for utility conservation programs designed to assist utility customers in reducing energy consumption.

Building on previous efforts and initiating new projects, this program measure will reduce residential energy consumption by focusing on the following conservation target areas:

- The retrofitting of ceiling insulation in existing un- and under-insulated homes to meet a five-year target of 90 percent of all economically insulatable homes.
- The improvement of the efficiency of residential space heating and cooling through the encouragement of use of additional retrofit techniques, landscaping alternatives, innovative technologies, and changes in the operation and maintenance of equipment.
- The encouragement of the use of the most energy efficient, cost-effective building design and space heating systems for new and existing homes (i.e., aiming at higher performance than that required, on a statewide basis, under the state building and appliance efficiency standards.)
- The reduction of residential use of hot water and the improvement of the efficiency of residential water heating systems.

Management Plan

Two associate-level and one analyst-level professionals will be funded to work in the Conservation Division's Office of Emergency Planning and Educational

Programs, which handles conservation information and marketing programs. Primary coordination will be with the Office of Planning and Program Development and with the Buildings and Appliance Office, which deals with standard-setting and enforcement. \$142,000 will be allocated for contracts. This program will perform four major tasks:

Task One: Expand and coordinate current residential energy efficiency marketing, information and technical assistance programs.

Under this task, staff will prepare and implement an optimum package of residential retrofit measures and practices to save consumers money and reduce energy conservation. Techniques to be marketed include attic and wall insulation, weatherstripping, water heater insulation, window shading devices, burner and flue re-sizing, intermittent ignition devices, storm windows, heat pumps, air conditioner pre-coolers, landscaping, and equipment operation and maintenance. This package will include information on delivery mechanisms and information on the availability of financing and subsidy options for conservation hardware.

Staff will (1) develop and disseminate information on residential conservation measures and life-cycle costing emphasizing the "how" to aspect of deciding on and initiating conservation actions, (2) utilize consultant help as needed to refine target group marketing strategies for use by Commission, utility and other outreach programs, (3) develop a clearinghouse for conservation information and assistance available from other sources, and (4) sponsor special promotional education projects such as neighborhood do-it-yourself clinics, exhibits, speakers, or other mechanisms.

Task Two: Ensure that residential consumers are protected against fraud and poor quality workmanship in energy conservation retrofit services or products. A subcontract will be initiated with one or more appropriate agencies or organizations to develop and publicize complaint investigation services for consumers dissatisfied with contractor services or products.

Task Three: Encourage and monitor regulatory and legislative proposals to accelerate energy conservation investments.

Staff will initiate, monitor and/or respond to PUC regulatory action to establish utility-sponsored conservation financial incentive programs, legislative action relating to mandatory requirements for ceiling and water heating insulation, and legislation to direct the ERCDC to design utility conservation programs.

Task Four: Coordinate with other Energy Commission conservation programs affecting the residential sector.

This task will require that staff specifically work with the Utility Area Service Project to assist and evaluate utility-sponsored residential outreach and marketing programs, work with the Local Action Grant program to encourage and monitor residential conservation pilot programs undertaken by local agencies or community groups, and coordinate with the Public Information Office, Office of Appropriate Technology, Department of Consumer Affairs, and with other CERCDC

programs and state agencies as necessary to ensure the efficiency of residential outreach programs.

Calendar Milestones:

1. First Quarter 1978: (a) Set up conservation information clearinghouse; (b) issue RFP and select consultant to develop marketing plan, (c) arrange for interagency agreement or subcontract to establish consumer protection mechanism; (d) respond, as necessary, to residential conservation proposals before the PUC and the Legislature.
2. Second Quarter 1978: (a) Receive and begin implementation of marketing plan prepared by consultant; (b) let contracts, as needed, with production companies, professional writers and graphic artists to assist in the preparation and printing of audiovisual materials for specific conservation program; (c) develop financial and non-financial incentive/award programs for target groups; (d) provide technical assistance, as needed, to Local Action Grant residential outreach projects.
3. Third Quarter 1978: (a) Contract with media for purchase of commercial radio/television time and print advertisement space; (b) develop alternative mechanisms for encouraging neighborhood-sponsored do-it-yourself conservation clinics and other local outreach projects.
4. Fourth Quarter 1978: (a) Continue media campaign, brochure preparation and dissemination, outreach projects, incentive programs, etc.; (b) evaluate effectiveness of consumer protection and clearinghouse systems; (c) make recommendations for expansion of residential energy audit programs, based on result of completed evaluations.
5. 1979, 1980: Continuation of marketing, outreach, program development and monitoring activities.

Estimated Energy Savings*

Since this measure is a comprehensive marketing, incentive and legislation program directed toward many different residential energy conservation techniques, it has a large potential for effectuating energy savings. To illustrate the potential magnitude of the program, the energy savings from three sample sub-programs have been estimated.

1. Retrofit Ceiling Insulation

By most estimates, there are about three million uninsulated and under-insulated dwellings in California. On the average, it should be possible to save about 25 percent of the heat loss in these dwellings and a commensurate portion of the cooling load. Since homes in California typically

*An average effective heat rate for electricity generation of 10,000 Btu's/kWh was used in estimating these savings.

change ownership every six years, perhaps one-third of the homes might turn over during that period. But, in addition, it would be expected that passage of a retrofit insulation bill would stimulate home owners to insulate soon without waiting for actual enforcement of a law. With insulating inevitable, the homeowner may well choose to insulate early to enjoy the savings as soon as possible. It is projected that 60 percent of the eligible dwellings will be insulated by the end of 1980.

The savings are estimated as follows:

Electrical Savings

	<u>% Penetration</u>		<u>Affected Units</u>		<u>UEC</u>		<u>Savings</u>	<u>Savings</u>
Uninsulated Homes	0.50	x	30,000	x	17,000 kWh	x	0.25 =	64×10^6 kWh
Underinsulated Homes	0.50	x	60,000	x	13,000 kWh	x	0.10 =	38×10^6 kWh
								103×10^6 kWh

Gas Savings

	<u>% Penetration</u>		<u>Affected Units</u>		<u>UEC</u>		<u>Savings</u>	<u>Savings</u>
Uninsulated Homes	0.50	x	2,000,000	x	1,200 therms	x	0.25 =	300×10^6 therms
Underinsulated Homes	0.50	x	1,000,000	x	890 therms	x	0.10 =	53×10^6 therms
								353×10^6 therms

2. Night Thermostat Setback

A minimum of 15 percent of electric or gas heating energy can be saved by nightly thermostat setbacks of 10°F for eight hours. Increased use of night set-back devices can be encouraged through an aggressive information and marketing program.

Electrical Savings²

	<u>Savings</u>	<u>Penetration</u>	<u>% Not Setting Back</u>	<u>% Central Systems</u>	<u>Total Electrical Space Heating Use</u>	<u>1980 Factor</u>
Low Estimate:	(0.15)	(0.67)	(0.50)	(0.20)	$(7.6 \times 10^9 \text{ kWh})(.375) = 28.6 \times 10^6 \text{ kWh/yr}$	

1. Various estimates of state utilities submitted in briefs filed with the CPUC during 1976 rate hearings.

2. Both gas and electric savings are calculated by multiplying the estimated savings per household times the penetration of the program, times the percent currently not setting back, times the percent with central systems

Gas Savings

Low Estimate: (0.15) (0.67) (0.50) $(4.5 \times 10^9 \text{ therms})(.375) = 84.8 \times 10^6 \text{ therms/yr}$

3. Residential Water Heating

Development of a program for retrofitting water use and water heating conservation devices can save both water and energy.

Electrical Savings³

	<u>Total</u> <u>Stock</u>	<u>New</u> <u>Stock</u>	<u>Pene-</u> <u>tration</u>	<u>Savings</u> <u>(kWh/yr)</u>	<u>1980</u> <u>Factor</u>
R-11 Insulation & 10" Setback:	$(1.1 \times 10^6 - 0.53 \times 10^6)$		$(0.9) \times (520)$	$(.375)$	$= 100 \times 10^6 \text{ kWh/yr}$
Flow Restrictors:					
Low Estimate:	(1.1×10^6)		$(0.9) \times (400)$	$(.375)$	$= 148 \times 10^6 \text{ kWh/yr}$

Electrical savings = $248 \times 10^6 \text{ kWh/yr}$

Gas Savings

R-11 Insulation & 10" Setback:	$(7.3 \times 10^6 - 2.287 \times 10^6)$		$(0.9) \times (30)$	$(.375)$	$= 49 \times 10^6 \text{ therms/yr}$
Flow Restrictors:					
Low Estimate:	(7.3×10^6)		$(0.9) \times (16)$	$(.375)$	$= 41 \times 10^6 \text{ therms/yr}$

Gas savings = $90 \times 10^6 \text{ therms/yr}$

3. Both gas and electric savings for water heater retrofits are calculated by taking the total stock in 1985 and subtracting out the new stock additions (which must comply with new standards) to arrive at the number of water heaters that can be retrofit with insulation. This number is then multiplied times the penetration of the program and times the yearly savings per heater insulated (and setback), times a 1980 factor.

Both gas and electrical savings for flow restrictors are calculated by taking the total stock in 1985 and multiplying it times the penetration of the program and by the yearly savings from water heater energy use reduction, times a 1980 factor.

Total savings for these projects which represent a large portion of the impact of the total program, is estimated as follows:

Retrofit Ceiling Insulation	36.33×10^{12}	Btu's
Night Thermostat Setback	8.77×10^{12}	Btu's
Retrofit Water Heating	11.48×10^{12}	Btu's
	<hr/>	
	56.58×10^{12}	Btu's

RESIDENTIAL ENERGY EFFICIENCY

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	24	40,992
Staff Services Analyst (\$1,422/month)	12	17,064
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	12	9,408
Total Salaries & Wages		67,464
Salary Savings (5%)		-3,373
Subtotal		64,091
Staff Benefits (23.5%)		15,061
Total Personnel Services		79,152
<u>Operating Expenses</u>		
General Expense		
Printing		8,000
Data Processing		
Travel In-State		1,500
Travel Out-State		
Consultant & Professional Services		142,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		12,664
Total Operating Expenses		164,164
Total EPCA Funding		243,316
State Funding		-0-
Total Funding		243,316

Estimated Future EPCA Funding Request

1979	260,000
1980	270,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

STANDARDS SETTING ELEMENT

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CI. CLIMATIC APPROPRIATE BUILDING DESIGN PROJECT

Overview

Space heating and cooling are well recognized as major depletors of our dwindling energy resources. In California, in 1975, the residential sector alone consumed roughly 500×10^{12} Btu's of energy for heating and air conditioning. Data on the energy consumption for HVAC systems in the commercial and industrial sectors is not as well documented; however, it is generally accepted that up to roughly 250×10^{12} Btu's per year were consumed in 1975 for these purposes. By and large, however, the most wasteful use of energy in the commercial/industrial sector is that associated with artificial illumination used in commercial buildings. The California CERCDC had undertaken several major programs aimed at reducing the energy consumption of new residential and non-residential buildings. Existing standards, however, are oriented primarily at increasing building thermal integrity, HVAC system efficiency, and limiting the power requirements for artificial lighting systems. While this approach to energy conservation will yield significant savings in future years, there are many additional building design strategies which may be followed to achieve not only greater conservation of our depleting energy resources, but also actually improve the environment of our new and existing structures. By designing a new building or changes to an existing building with sensitivity to the microclimate, an important "new" energy resource is uncovered. Ambient environmental conditions are no longer seen to be fully adverse elements from which the built environment must be protected. New and existing buildings in California can begin to substitute the heat sources (direct solar radiation) and heat sinks (night radiant cooling) and daylighting for conventional energy sources used in heating, cooling, and lighting our built environment.

Management Plan

CERCDC will continue to take the lead role in development of passive, "direct" solar-related amendments to the residential building standards. In addition, CERCDC will begin to investigate possible changes in the new nonresidential building standards which could encourage the use of naturally available solar heat and daylight as well as nighttime heat sinks for cooling. Major new emphasis will be placed on identifying examples, collecting and disseminating data on retrofit passive design options particularly for existing residential buildings. Staff work on "passive" direct solar building standards initiated in Phase I of EPCA will continue field monitoring and review these standards as necessary. Staff efforts in monitoring both new developments, indirect solar thermal applications, and the effects of the new direct solar thermal standards, will be aided by a series of contracts. RFP's will be sent out in June-November of 1978. Contracts will be let in the following areas:

- Residential applications of direct solar thermal for existing dwellings.
- Nonresidential applications for direct solar thermal and daylighting capabilities.

- Behavior/attitudinal studies of in-the-field implementers of building standards (building inspectors and building contractors).
- Data collection and evaluation of new and existing residential direct solar thermal applications.

Milestones

1. First Quarter, 1978: (a) Preliminary draft of new residential building standards incorporating passive design options; (b) hold workshops and hearings on proposed changes; (c) continue building performance monitoring;
2. Second Quarter, 1978: (a) Continue with workshops and hearings; (b) revise draft standards; (c) continue code development; (d) continue building performance monitoring.
3. Third Quarter, 1978: (a) Continue work on development and verification of direct thermal performance prediction tool for building inspectors and contractors; (b) continue monitoring of direct thermal homes performance; (c) RFP's; attitudinal/behavioral research building inspectors and building contractors; (d) continue review and revision of draft standards.
4. Fourth Quarter, 1978: (a) RFP's for remaining contracts; residential retrofit applications; nonresidential direct solar thermal and daylighting; (b) continue performance monitoring of direct solar thermal applications; (c) initiate trial implementation of building standards in selected local.
5. Calendar Year, 1979: (a) Hold final workshop on proposed increment to residential building standards; (b) review and disseminate products of contracts let in calendar year, 1978; (c) adopt direct solar thermal increment to residential building performance standards; (d) continue monitoring of direct solar thermal building performance; (e) evaluation of effects of direct solar thermal performance standards; (f) demonstration of direct solar thermal principles to builders and consumers; (g) investigate feasibility and make proposal for change in nonresidential building standards to incorporate direct solar thermal and daylighting application.
6. Calendar year, 1980: (a) Modify residential performance standards as necessary; (b) continue work on simplification of building thermal performance design tools; (c) continue monitoring of direct solar thermal applications; (d) adopt changes to nonresidential performance code.

Energy Savings Estimate

The goal of this program is to reduce the amount of energy used in the space conditioning of new single-family and multi-family dwelling units. Residences that are built to the current standards (which already include thermal integrity improvements) are expected to use the following amounts of energy for space conditioning:

<u>Housing Type</u>	<u>Heating Type</u>	<u>Energy Consumption</u>	<u>A/C Energy Consumption</u>
Single-Family	Electric	7300 kWh	2400 kWh
Single-Family	Gas	510 therms	2400 kWh
Single-Family	Propane*	550 gallons	2400 kWh
Multi-Family	Electric	2800 kWh	1000 kWh
Multi-Family	Gas	300 therms	1000 kWh

If 80 percent of the new dwellings built and moved into between the date of adoption of the passive direct solar thermal design approach as part of the California Residential Building Standards and 1980, and if this approach would make them at least 20 percent less dependent on conventional space conditioning energy requirements, the energy savings would amount to:

o Single-Family Dwelling Units (Electrical Heating)

$$(7300 + 2400) \text{ kWh/dwelling unit (d.u.)} \times 16,100 \text{ d.u.} \times 80\% \text{ (units using passive design)} \times 20\% \text{ (savings)} = .25 \times 10^{12} \text{ Btu's}$$

o Single-Family Dwelling Units (Gas Heating)

$$(510 \text{ therms} + 2400 \text{ kWh})/\text{d.u.} \times 92,000 \text{ d.u.} \times 80\% \times 20\% = 1.10 \times 10^{12} \text{ Btu's}$$

o Single-Family Dwelling Units (Propane Heating)

$$(550 \text{ gallons} + 2400 \text{ kWh})/\text{d.u.} \times 6,900 \text{ d.u.} \times 80\% \times 20\% = .08 \times 10^{12} \text{ Btu's}$$

o Multi-Family Dwelling Units (Electrical Heating)

$$(2800 + 1000) \text{ kWh/d.u.} \times 47,250 \text{ d.u.} \times 80\% \times 20\% = .29 \times 10^{12} \text{ Btu's}$$

o Multi-Family Dwelling Units (Gas Heating)

$$(300 \text{ therms} + 1000 \text{ kWh})/\text{d.u.} \times 57,500 \text{ d.u.} \times 80\% \times 20\% = .37 \times 10^{12} \text{ Btu's}$$

o TOTAL SAVINGS:

$$2.09 \times 10^{12} \text{ Btu's}$$

Although the above savings are important, the trend which would be initiated toward increased awareness and applications of climatic appropriate design techniques is far more significant. When actually implemented, the savings of direct solar thermal design will be measured through controlled experiments (please refer to measure D1, Direct Thermal Performance Prediction) and utilities monitoring and data reporting systems.

*Propane is a representative fuel for the six percent of California homes that are built without gas or electric heating.

CLIMATIC APPROPRIATE BUILDING DESIGN

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager 1 (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	12	22,512
Associate Level Professional (\$1,708/month)	12	20,496
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)	24	23,688
Stenographer (\$784/month)	12	9,408
Total Salaries & Wages		76,104
Salary Savings (5%)		-3,805
Subtotal		72,299
Staff Benefits (23.5%)		16,990
Total Personnel Services		89,289
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		145,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		14,286
Total Operating Expenses		159,286
Total EPCA Funding		248,575
State Funding		-0-
Total Funding		248,575

Estimated Future EPCA Funding Request

1979	220,000
1980	200,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

C2. NONRESIDENTIAL STANDARDS AMENDMENTS AND ADDITIONS

Overview

This is a continuation of the project begun in the 1977/78 state fiscal year (see the Parametric Studies for Performance Standards Program measure, a part of the first ECPA grant application). The purpose of this project is to conduct a computerized parametric study of energy use in nonresidential buildings. This portion of the study will concern itself with investigation of building-associated use of nondepletable energy.

Management Plan

CERCDC staff will analyze computer output from parametric studies (computer simulations); prepare revisions to the standards; and conduct workshops with the public, architects, engineers and building officials on the proposed revisions to the standards. Passive solar features will also be analyzed through the parametric studies. The cost-effective features will be proposed as amendments to the standards. The work under this measure will be related to the Parametric Studies for Performance Standards measures.

This work will be completed by June 1979 by the Commission staff. Federal funds will be used for a data processing contract and one staff position, while the state will fund 1.5 staff positions.

Milestones

1. First Quarter, 1978: Review standards and identify any needed revisions and items that require further study.
2. Second Quarter, 1978: Determine the scope of the computer simulation study.
3. Third Quarter, 1978: Begin computer simulations using the Cal/ERDA computer program.
4. Fourth Quarter, 1978: Continue the parameter study.
5. Calendar Year, 1979: Complete study and recommend changes to standards.

Energy Savings Estimate

The savings of this program are accounted for and appear in the Parametric Studies for Performance Standards measure.

NON-RESIDENTIAL STANDARDS AMENDMENTS AND ADDITIONS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,122/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		50,000
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		50,000
Total EPCA Funding		50,000
State Funding		57,760
Total Funding		107,760

Estimated Future EPCA Funding Request

1979 -0-
1980 -0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

C3. CAL/ERDA COMPUTER PROGRAM

Overview

The current version of the Cal/ERDA computer program can simulate 16 HVAC systems. The U.S. Department of Energy will fund the Lawrence Berkeley Laboratory (LBL) to simulate additional HVAC systems. This capacity will be added to the current version of the program by Commission staff. In addition, Commission staff will respond to program users' questions and "de-bug" or revise the program when errors are found to exist in the program. This effort was provided by contract with LBL in the 77-78 fiscal year. Proprietary computer programs will be certified by the Commission.

Management Plan

Buildings/Appliance staff and EDP programmer assigned to Cal/ERDA will "de-bug" or revise the program when errors are discovered and respond to public's questions. Federal funds will be used to staff two positions for maintenance of the computer program, to add new features to the program and to respond to users' questions concerning the computer program.

Milestones

1. First Quarter, 1978: No grant-supported activities planned.
2. Second Quarter, 1978: No grant-supported activities planned.
3. Third Quarter, 1978: Continue users office started in 1977 and make necessary revisions to the computer program and user.
4. Fourth Quarter, 1978: Continue users' office started in 1977 and make necessary revisions to the computer programs and user documentation.
5. Calendar Year, 1979: Add HVAC system program and continue users' office started in 1977.
6. Calendar Year, 1980: Continue users' office and make needed program improvements.

Energy Savings Estimate

The savings of this program are accounted for and appear in the Parametric Studies for Performance Standards measure.

CAL/ERDA COMPUTER PROGRAM

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)	12	20,436
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	4	3,136
Total Salaries & Wages		23,632
Salary Savings (5%)		-1,182
Subtotal		22,450
Staff Benefits (23.5%)		5,276
Total Personnel Services		27,726
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		
Indirect Costs (16% of Total		
Personnel Services*)		4,436
Total Operating Expenses		4,436
Total ECFA Funding		32,162
State Funding		79,166
Total Funding		111,328

Estimated Future ECFA Funding Request

1979	35,000
1980	40,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

C4. PARAMETRIC STUDIES FOR PERFORMANCE STANDARDS

Overview

The CERCDC adopted the nation's first energy-budget performance standards for nonresidential buildings on June 30, 1977. In the process of establishing these standards, the CERCDC in conjunction with ERDA sponsored the development of a public domain energy analysis computer program, called "Cal/ERDA". This program was used in conjunction with nine prototypical building models and hourly weather data to establish the energy budgets standards.

The energy budgets have been established for nine building types. The design of nonresidential building, however, is a complex process; currently there are many new energy techniques and procedures emerging in the building industry. There is currently very little information on the nature of energy use in the current building stock and the relative energy conservation potential of the various components of a building. The CERCDC staff has committed a portion of its effort to complete a large number of parametric studies on conservation potential of the standards and to provide basic analytical tools and information for designers.

Management Plan

The staff has planned to complete parametric studies for 28 building types by October, 1978. Each prototypical building will be selected by practicing members of the building industry and cycled through approximately 370 design parameters. Each building model will be studied for the sensitivity of its energy-related components. As major energy use components are identified, they will be studied further to establish new ways to improve the energy efficiency of buildings and, if possible, include them in the energy regulations.

Through the results of these parametric studies, the nonresidential regulations will be improved and building designers will receive information needed to specify building components which meet or exceed the requirements of the regulations.

The 1977-78 parametric study program will be completed in two six-month phases. The first phase will be to complete further parametric studies on the existing nine building models to evaluate them in greater detail. Also, the first-phase will include the development of 19 additional prototypical nonresidential building models, e.g., hospitals, prisons, other medical buildings, industrial buildings, shopping malls, schools and other office building configurations. Approximately five of these models will be analyzed parametrically during the first phase of this program.

The second phase of the study will be to complete the parametric studies on the remaining 14 prototypical buildings and to review the results of the parametric study in general and formulate proposed amendments to the standards.

This program was started under the first ECPA grant application. Presently, Commission staff are preparing input/output formats for the 19 building models under development. Some of the first phase parametric studies are also underway.

In 1978-79, the measure objectives are similar to the above. First, based on data continuously being gathered by the Commission staff, improvements will be made to the 28 building models. With these updated models, additional parametric studies will be done and the results analyzed to formulate further proposed amendments to the standards.

The ECPA funds will be used to contract with a major computer service bureau for computer services. The funding of staff involved in this project will be provided by the state. The preparation of the parametric studies, the conclusion drawn from the studies and the recommended changes to the energy standards will be completed by the ERCDC staff.

Milestones

1. First Quarter, 1978: Continuation of parametric studies begun during phase 1 of the project.
2. Second Quarter, 1978: (a) Completion of the parametric studies begun during phase 1 of the project; (b) start of the phase 2 parametric studies.
3. Third Quarter, 1978: (a) Completion of phase 2 parametric studies; (b) recommendation and adoption of changes to energy conservation standards for new nonresidential buildings.
4. Fourth Quarter, 1978: (a) Begin second set of model improvements; (b) Begin second set of parametric studies.
5. Calendar Year 1979: (a) Complete building model improvements; (b) complete second set of parametric studies; (c) recommendation and adoption of changes to energy conservation standards for new nonresidential buildings.

Energy Savings Estimate

Energy Conservation Standards for New Nonresidential Buildings for the State of California adopted by CERCDC in June 1977 were developed in part through the use of two sets of prototypical building models representative of buildings built both prior to and subsequent to enforcement of energy conservation building codes. The models were analyzed for energy consumption through the use of a public domain computer program developed by the ERCDC jointly with ERDA (now DOE).

The predicted energy consumption of the two sets of building models was compared and, when used in conjunction with projected building stock additions, energy savings were calculated. The building stock predictions were obtained in the following manner:

For purposes of calculating possible materials and energy requirements for producing the materials, the following building categories were used:

1. Based on Construction Industry Research Board, letter from Mr. Ben Bartolotto to Mr. Roger M. Jaks, January 9, 1976; Analysis on Nonresidential Building Projects. Their Distribution by Size and Dollar Value, State of California; Dodge reports, Structure Code Identification; Uniform Building Code (1976 Edition).

Small office buildings
 Large office buildings
 Small retail stores
 Supermarkets
 Restaurants
 Large retail stores
 Warehouses and light manufacturing
 Public assembly building--theatres, amusement, social, recreational and religious buildings.
 Educational buildings--elementary and high schools, colleges, buildings used for day care

The building projection in a report to ERCDC by the Economic Sciences Corporation² were multiplied by 100/88 in accordance with the scope of the nonresidential building standards. (The ESC report had multiplied Dodge data by .88 to exclude manufacturing.)³ However, manufacturing is included in the current scope of the proposed standards, except for the energy required in actual manufacturing processes. Warehousing and light manufacturing were estimated at about 40 million square feet--the difference between the ESC categories⁴ (excluding warehousing and manufacture) and the Dodge 1974 data estimates.

These totals were prorated in proportion to the building types as indicated in the ESC report. Data on "low-rise office buildings" and "high-rise office buildings" was applied to offices; totals for "department stores" and "retail stores" to retail categories, "school" to educational buildings, and "public", "religious", and "amusement" to public assembly buildings. These percentages are stated in Table I.

Offices were subdivided into large and small buildings, and retail stores into large and small retail stores, as follows: Large office buildings in excess of 30,000 square feet⁵ account for 72.7 percent of the total stock of office buildings, assuming an even distribution of square footage in the 20-50,000 interval; large office buildings (over 30,000 square feet) would account for about 66 percent (this was rounded to 70 percent to allow for possible nonlinearities).

Similarly, retail stores in excess of 20,000 square feet account for 61.9 percent⁶ of the total space in retail construction; assuming an even distribution of square footage in the 0-20,000 square footage interval large stores (in excess of 10,000 square feet) would be about 81 percent (this is rounded to 85 percent to allow for possible nonlinearities).

2. Data base was F. W. Dodge, Dodge Construction Potentials, Region VIII (as cited in Caughran, Raymond D., Elliot A. Green, and Richard N. Thunen, An Electrical Energy Impact Assessment of California Title 24 Building Standards; Energy Conservation in New Nonresidential Building Design. Prepared for ERCDC. Economic Sciences Corporation, May 1976 (report referred to subsequently as "ESC" report). Table 3-8, p. 100.

3. Ibid., p. 85.

4. Ibid., p. 109.

The resulting projections of building stock by type and area are stated in Table 2. They should be considered only as rough approximations.

The projections were subdivided into five smaller groups based on weather patterns. The allocation of buildings in each of the five weather zones was calculated on a population distribution basis.

Assumptions were made on the distribution of supermarkets, restaurants, within the categories of small and large retail stores within the totals listed in Table 2. Information supplied by the California Retailers Association has assisted in the following totals:

Large retail stores

Supermarkets	33%
Other	67%

Small retail stores

Restaurants	11%
Other	89%

The comparison of energy consumption for the prototypical building models resulted in the predicted savings, by building types and weather zones shown in Table 3.

The energy savings by building type were then multiplied by the number of new buildings of each type for 1981* in each weather zone and summed to achieve the total savings, of approximately 6.000×10^{12} Btu for 1980.

* Assumed to be the same as 1980.

Table 1

Allocation of Nonresidential Construction to Building Types⁸

<u>Building Type</u>	<u>Percentage of Floor Space</u>
Offices	39
Retail	36
Educational	7
Public Assembly	17
Total*	99

* Does not add to 100 because of rounding (excludes warehouses and manufacturing).

8. ESC report, p. 95.

Table 2

Estimates on Projections of Square Footage, by
Building Type (Millions of Square Feet, Per Year)⁹

Types

Small Office	
1975	11
1981	11
1985	12
Large Office	
1975	28
1981	28
1985	28
Small Retail	
1975	6
1981	6
1985	6
Large Retail	
1975	35
1981	35
1985	
Warehouses	
1975 ^a	40
Public Assembly	
1975	19
1981	20
1985	20
Educational	
1975	14
1981	14
1985	14
Total All Bldgs.*	
1975	154
1981	155
1985	156

a. Also applies to 1981 and 1985.

* Totals do not add because of rounding.

9. ESC report.

Table 3 Energy Savings* (Btu/Sq. ft./Yr.)

Climatic Thermal Zone

Building Type	1-5	6,8,9,10	7	11-13	14,15
Small Office	3,300	29,000	28,000	42,000	17,000
Small Retail	32,000	18,000	18,000	30,000	30,000
Warehouse	6,000	4,000	3,000	3,000	3,000
School	3,000	8,000	11,000	12,000	22,000
Supermarket	51,000	42,000	41,000	22,000	42,000
Restaurant	114,000	83,000	85,000	99,000	113,000
Auditorium	45,000	57,000	62,000	45,000	50,000
Large Office	63,000	60,000	60,000	72,000	73,000
Large Retail	75,000	76,000	72,000	87,000	69,000

*Includes consideration of energy used in the production of electricity by converting Kwh to Btu's at the rate of 10239 Btu/Kwh

PARAMETRIC STUDIES FOR PERFORMANCE STANDARDS

<u>Personal Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$791/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		95,000
Training		
Contracts		
Indirect Costs (16% of Total		
Personnel Services*)		
Total Operating Expenses		95,000
Total ECPA Funding		95,000
State Funding		-0-
Total Funding		95,000

Estimated Future ECPA Funding Request

1979 -0-
1980 -0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

C5. RESIDENTIAL STANDARDS VALIDATION

Overview

California has adopted energy conservation standards for all new residential buildings. The energy savings establishing the cost-effectiveness of the various standards were determined by using computer simulations. These computer simulations, being theoretical in nature, require that a number of assumptions be made concerning materials, construction practice, climatic conditions, building operation, etc. These assumptions need to be checked against the actual energy consumption occurring in residential buildings. This program will lead to additional energy saving regulations. Sections of California's energy standards require that designers estimate the annual energy consumption for the building. Verification of the calculation methodology is essential to assure that predicted energy savings due to the standards actually are being achieved and that energy estimates being made by builders and architects are accurate.

Management Plan

Phase 1

This phase involves two levels of building review. First, buildings with parameters similar to those used in our computer analysis of proposed energy standards will be identified and their energy consumption monitored. This will provide a basis for comparing the cumulative savings of the energy regulations. Second, the building will be instrumented to determine the energy use of specific building components. For instance, we have predicted the energy loss through ceilings when certain insulation R-values are used. We have also predicted increases in the seasonal efficiency of furnaces if equipment is properly sized. The instrumentation will provide the data necessary to determine the actual energy losses through the various building components.

Phase 2

After data from phase one are collected it must be analyzed to determine if the difference between the predicted and actual energy use is a result of calculation methodology or the operational characteristics of the structure.

This analysis will then lead to improved heat load prediction methods and verification of the cost-effectiveness of the regulations.

Staff will identify buildings in various climatic zones which will be constructed according to the standards being implemented in March of 1978 and which can readily be monitored and instrumented. Contracts will be let prior to actual construction so that the necessary instrumentation and provisions for monitoring can be incorporated into the building. Actual data collection will extend over an 18-month period. Data analysis will begin after the first 12 months of data has been collected.

Milestones

1. First Quarter, 1978: Standards implemented.
2. Second Quarter, 1978: Building selection.
3. Third Quarter, 1978: Complete instrumentation.
4. Fourth Quarter, 1978: Begin monitoring.
5. Calendar Year, 1979: Continue monitoring.
6. Calendar Year, 1980: (a) Data collection complete; (b) analysis complete.

Energy Savings Estimate

An analysis of buildings constructed to California's 1978 regulations for new residential buildings will provide information in two areas. One, there may be cases where the savings due to a particular prescriptive standard have been overestimated. Two, there may be cases where the savings are not being achieved due to construction or installation practices. Correction of these practices will lead to a savings by 1980 of approximately $.01 \times 10^{12}$ Btu's.

RESIDENTIAL STANDARDS VALIDATION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,709/month)	12	20,496
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	4	3,136
Total Salaries & Wages		23,632
Salary Savings (5%)		-1,182
Subtotal		22,450
Staff Benefits (23.5%)		5,276
Total Personnel Services		27,726
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		54,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		4,436
Total Operating Expenses		58,436
Total EPCA Funding		86,162
State Funding		-0-
Total Funding		86,162

Estimated Future EPCA Funding Request

1979 -0-
1980 -0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

06. INSULATION TESTING, CERTIFICATION AND RETROFIT INSTALLATION STANDARDS

Overview

California has established insulation standards for new construction which will result in considerable energy being saved. These new standards specify "R" values to prevent excessive heat loss in the winter and heat gain in the summer from occurring in this new construction. Currently there are no standards governing the insulating properties and quality of insulation sold and installed within the state. Our consumers need protection and assurance that they are receiving the full insulation value and quality paid for when they put their homes and buildings in the hands of installers. To ensure that the customer is getting good quality insulation of the proper "R" value, it is necessary for the state to develop standard test procedures to evaluate the thermal and other important properties of insulation materials, certify testing laboratories and to randomly test these materials on a continuing basis.

When existing buildings are insulated by contractors any quantity of insulation may be installed. Standards need to be formulated and a procedure developed to insure that adequate amounts of insulation are installed whenever insulation is added to existing homes and buildings.

If the above measures are carried out it has been conservatively estimated the residential heating energy savings potential of the retrofit insulation program in California will be increased by 486 billion Btu in the calendar year 1980.

This program will increase consumer confidence in insulation performance and safety and greatly promote increased insulation sales. The retrofit insulation standards will insure proper amounts are installed whenever insulation is to be installed by contractors.

After the establishment of the standards and testing criteria, all material sold or installed in the state would be required to be certified by the manufacturer to have been tested in accordance with the state requirements. The material would then bear a seal certifying that the material has been tested and approved. A procedure for certifying laboratories will be established, and continued field inspections of insulation products and actual contractor insulation installations will insure compliance to our standards.

Management Plan

This grant provides funds to continue the program started with ECPA Grant Funds requested July 24, 1977. CERCDC personnel are taking the lead role in the development of this measure, working with the California Department of Housing and Community Development, various insulation manufacturers and contractors, various trade associations and local building officials throughout the state. ECPA funds will be used to hire a contractor to test selected insulating materials at a cost of \$21,000. Reports will be prepared on the actual tests of selected materials, which will validate preliminary certification procedures in measuring properties of the selected materials. ECPA funds will also be used for paying the salaries of two CERCDC Building/Appliance Specialists, support personnel, indirect costs and related travel at a cost of \$93,069.

The CERCDC is a member of Inter-Agency Retro-Fit Task Force which provides coordination between the various state agencies involved with home insulation. Other state agencies include the Department of Housing and Community Development, Department of Consumer Affairs, home financing agencies, Business and Transporting agency, Office of the State Architect, and the Department of Employment Development. This task force will provide liaison with the other agencies as the certification program develops.

Milestones

1. First Quarter 1978: (a) Test laboratories, other agencies, building officials, and insulation manufacturers will be contacted to identify existing and recommended methods used to determine properties of insulating materials. A report will be prepared that reviews the state-of-the art and recommends materials testing and certification procedures; (b) preliminary work in the development of a manual which illustrates proper insulating methods will be accomplished.
2. Second Quarter 1978: (a) The manual illustrating proper insulating methods will be completed. Consultants may be required to assist in its preparation and completion; (b) a series of workshops will be held to gain public input into the manual and the proposed certification test methods; (c) a full public hearing before the Commission will be held prior to adoption of the final program; (d) the Commission will adopt, no later than July 1, 1978, regulations to establish insulation material standards governing the quality of all insulation material sold or installed within the state; (e) the Commission will also adopt, no later than July 1, 1978, regulations to establish minimum standards for the amount of additional insulation installed in existing buildings whenever a contractor installs insulation.
3. Third Quarter 1978: (a) A program for certifying laboratories to test insulation materials will be established; (b) a contractor will be hired to test selected insulating materials.
4. Fourth Quarter 1978: (a) A list of certified insulation testing laboratories will be published; (b) a report will be prepared on the actual testing of selected materials, covering the validity of preliminary certification procedures in measuring properties of the selected materials.
5. Calendar Year 1979: (a) A program will be developed for affixing a seal to all insulating materials which certifies that the material has been tested and approved; (b) field inspectors will visit manufacturers, distributors and retailers of insulation materials to check for a Commission seal that certifies the material meets state standards; (c) random field inspections will be made of recent contractor installed insulation jobs to check for compliance to minimum standards.
6. Calendar Year 1980: (a) The program will be maintained and continued field inspections made as described in 5b,c above.

Energy Savings Estimate

Additional savings to the State of California amount to $.49 \times 10^{12}$ Btu's in the calendar year 1980 as a result of the program to test and certify insulation and set minimum standards during retrofit installations. This estimate was made assuming a ten percent improvement in the effectiveness of retrofit insulation installations in the residential heating sector for that year.

HEATING - GAS

Uninsulated	Total Units	Insulation Installations	Annual Usage Therms	Savings by Retrofit	Retrofit Therm Savings	Savings by Insulation Quality Control	Additional Savings by Insulation Quality Control in Therms
Single Family	2,000,000	126,904	1,200	.25	38,071,200	.1	3,807,120
Multi-Family	200,000	12,690	550	.25	1,744,875	.1	174,487
<u>Under insulated</u>							
Single Family	1,200,000	76,142	890	.1	6,776,638	.1	677,664
Multi-Family	300,000	19,036	400	.1	761,440	.1	76,144
							4,659,279

Total Gas Additional Savings in Btu 4.66×10^{11}

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HEATING - ELECTRIC

Uninsulated

							kWh
Single Family	30,000	1,904	17,000	.25	8,092,000	.1	809,200
Multi-Family	50,000	3,173	6,400	.25	5,076,800	.1	507,680

Under insulated

Single Family	60,000	3,807	13,000	.1	4,949,100	.1	494,910
Multi-Family	100,000	6,345	4,200	.1	2,664,900	.1	266,490
							2,078,280 kWh

Total Electric Additional Savings in Btu at 10,000/kWh = 2.0783×10^{10}

Total Heating Savings in Btu $.486 \times 10^{12}$

INSULATION TESTING, CERTIFICATION
AND RETROFIT INSTALLATION STANDARDS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	12	22,512
Associate Level Professional (\$1,708/month)	12	20,496
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	8	6,272
Total Salaries & Wages		49,280
Salary Savings (5%)		-2,464
Subtotal		46,816
Staff Benefits (23.5%)		11,002
Total Personnel Services		57,818
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		5,000
Travel Out-State		
Consultant & Professional Services		21,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		9,251
Total Operating Expenses		35,251
Total ECPA Funding		93,069
State Funding		-0-
Total Funding		93,069

Estimated Future ECPA Funding Request

1979	75,000
1980	79,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

C7. APPLIANCE EFFICIENCY STANDARDS REFINEMENTS

Overview

California has the legislative authority to ... "prescribe standards for minimum levels of operating efficiency ... for all appliances...". This directive includes both residential and commercial appliances.

This measure has the major objective of continuing efforts to improve the efficiency of several high energy consuming appliances by developing more comprehensive and stringent minimum efficiency standards. The areas where improvement is possible include: electric motor efficiency, refrigerators and freezers, gas water heaters, commercial laundries. To achieve higher efficiencies for these appliances, it is proposed to collect and analyze data on the efficiencies of new appliance models, to determine what potential there is for efficiency improvement and set more stringent standards if needed.

Management Plan

The CERCDC will take the lead role in the development of improvements with these appliance efficiency standards. This role will involve the coordination of a private contract, public workshops, and interaction with American Gas Association (AGA) laboratories, Underwriters Laboratories (UL), Association of Home Appliance Manufacturers (AHAM), and Gas Appliance Manufacturer Association (GAMA).

The total contract effort will most likely be divided among several contractors. A combination bidder's conference and public workshop will be held prior to award of each of these contracts. At least one public workshop will be held during each contract to provide public review of the contractors' work. Another workshop is scheduled to be held several weeks after publication of the final report. These workshops will provide an effective critique of the contractors' work by the affected laboratories, industry and public.

The tasks to be performed for these contracts are to determine:

- (1) current stock of appliance(s)
- (2) current project annual sales
- (3) energy consumption
- (4) range of efficiencies for existing and anticipated models
- (5) technological options for improving efficiency and related codes
- (6) feasibility of implementing the technological option
- (7) time needed to implement new technology
- (8) life cycle cost based on:
 - use patterns
 - design life
 - change in purchase cost associated with improved efficiency
 - changes in maintenance cost, salvage value, insurance and taxes

- (9) potential life cycle savings at different levels for standards
- (10) potential for retrofit and associated savings
- (11) preliminary analysis of environmental and socio-economic impacts resulting from potential efficiency standards.

Management of this program will be accomplished by federal funding of six months staff time. \$40,000 in contract funds are requested to conduct the above study.

Milestones

1. First Quarter, 1978: No activities planned.
2. Second Quarter, 1978: no activities planned.
3. Third Quarter, 1978: (a) Program start date; (b) develop RFP(s).
4. Fourth Quarter, 1978: (a) Release RFP(s); (b) hold bidder's conference(s) and public workshop(s); (c) deadline for bid submission.
5. First Quarter, 1979: (a) Let contract(s); (b) commence contract(s).
6. Second Quarter, 1979: (a) First report(s); (b) public workshop(s) to review first report(s).
7. Third Quarter, 1979: (a) Deadline for final report(s); (b) hold public workshop(s) on final report(s); (c) completion of contract(s) including errata(s).

Energy Savings Estimate

Exact savings cannot be estimated due to lack of data in the areas to be studied. Best staff estimates are that improvements to these standards would result in annual savings in 1980 of approximately $.14 \times 10^{12}$ Btu's. Sample information, on which part of this estimate is based, is presented below:

1. Electric Motors - General Electric, in a May 10, 1977 internal letter, noted they sell a full line of Energy Saver motors with up to 16% higher efficiency at a 5-6% price premium. They noted they plan to introduce another line of motors in 1978 with up to 30% higher efficiency. To date their sales of high efficient motors are small, but with minimum efficiency motor standards in selected areas as much as 30% higher efficiency could be achieved, without new technology.
2. Refrigerators/Freezers - Today in California household type refrigerators and freezers consume 28% of the residential electrical consumption. The California Energy Commission adopted minimum levels of energy efficiency for refrigerator/freezers back on November 3, 1976 far below the optimum level based on a life cycle cost analysis. In other words refrigerator/freezers operate year round and consume significant amounts of energy thus allowing on a life cycle cost bases a much higher efficiency standard than has been adopted.

3. Gas Fired Water Heaters - The most efficient gas water heaters on the market today have a recovery efficiency of about 80% and a standby loss of about 3.5%. Gas water heaters do not use electricity which limits the potential efficiency improvements. For example, all gas water heaters use a continuously burning pilot light, do not have either power combustion or flue dampers, do not use heat pipes, etc. The Commission is considering adopting minimum efficiency standards for gas water heaters in December, 1977. These proposed standards do not require any of the above potential efficiency improvement options. Gas water heaters are estimated to consume 19% of all gas residential sales in California. Thus, improvements here will have major impact on the consumption of natural gas in California.
4. Commercial Laundries - The major potential for improvement in commercial laundries is the consumption of hot water. Here the potential energy savings cannot be estimated at this time.

APPLIANCE EFFICIENCY STANDARDS REFINEMENTS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	6	10,248
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	2	1,568
Total Salaries & Wages		11,816
Salary Savings (5%)		-591
Subtotal		11,225
Staff Benefits (23.5%)		2,368
Total Personnel Services		13,853
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		35,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		2,218
Total Operating Expenses		37,218
Total ECPA Funding		51,081
State Funding		179,744
Total Funding		230,825

Estimated Future ECPA Funding Request

1979 -0-
1980 -0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

C8. INTERMITTENT IGNITION DEVICE REGULATIONS IMPLEMENTATION

Overview

On March 31, 1976 the California Energy Commission adopted regulations which have the effect of restricting the use of continuously burning pilot lights in selected new gas appliances by requiring the use of intermittent ignition devices (IID's). As a result, continuously burning pilot lights cannot be sold in California in forced-air gas furnaces and most gas ranges after July 1978, and in gas clothes dryers after February 1979. These actions will result in saving annually around 20 billion cubic feet of gas in California ten years following the effective dates of the standards.

An advisory committee of consumer and industry representatives aided the Commission in its deliberations. At the time the Commission adopted the IID regulations, the consumer members expressed concern that the regulations as adopted may not have adequately considered safety implications. In the year following adoption, three outside consultants were employed to evaluate the American National Standards ANSI Z21.20 (concerning IID's) and ANSI Z21.20 (concerning forced air furnaces). They were:

<u>Organization</u>	<u>Investigator</u>	<u>Purpose</u>
Calspan Corporation	W. Bullerdiek	General Support
Institute of Applied Research	W. Bryan	Reliability Analysis
Cal Trans Laboratory	L. Welsh	Analysis of ANSI Standards

To date no evidence has arisen which indicates IID's are inherently less safe than continuously burning pilot systems. Hundreds of thousands of gas ranges equipped with IID's have been installed in homes around the country. In addition, many gas-fired forced-air central furnaces have also been installed. Arthur D. Little's report on retrofit of IID's estimated 7,000 central furnaces have been retrofitted with IID's in the field. There are no reports of any unsafe failures.

Some have argued that the good safety record with IID equipped gas dryers and roof top central furnaces would carry over to central furnaces installed inside the building. This is not necessarily true, however, because any escaping gas is vented outside the dryer and roof top units.

Nevertheless, industry, substantiated by the review of the AGA laboratories, has demonstrated an ability to produce, on a limited basis, IID's for gas appliances installed within the home without reported unsafe failures. Since the Commission mandate will cause a sudden increase in demand for IID's, the potential exists that some manufacturer may cut corners in order to obtain a competitive advantage.

The Commission staff is now proposing minimum efficiency standards for forced-air gas furnaces which will result in manufacturers completely redesigning furnaces and adding power combustion. This effort adds complexity to the IID safety concern.

Reputable manufacturers have a strong economic motivation to design and build safe products. Under the current federal law, any unsafe product defects should be reported to the United States Consumer Product Safety Commission, which has the power to effect a recall of all defective products sold. Moreover, manufacturers are under constant threat of product liability suits. More and more insurance companies are taking an active interest in the safety procedures followed by their insured manufacturer policy holders.

The staff's position has been that safety would be sufficient as long as the IID equipped gas appliances are shown to be no less safe than comparable appliances equipped with a continuously burning pilot. In a letter written January 28, 1977, while at Calspan Corporation, Mr. Bullerdiek stated:

"It is our belief that the adoption of IID's will result in a significant change in the furnace accident pattern. We would anticipate that the minor accident and total accident rate would go down sharply, but that the incidence of major accidents, i.e., explosions, would show an increase. However, we would expect the total number of major accidents to remain quite small."

The staff agrees with his conclusions.

For an IID or furnace equipped with an IID manufacturer to sell their product in California, they must meet the standards adopted by California. To do this the manufacturer must submit three prototype units of his product to either AGA or UL labs for testing. The prototype units are tested against the standard adopted by California. If the laboratory finds no problems, California certifies the product. The Commission staff with the help of consultants will recommend changes to the existing standards and believes after these changes are adopted the standards will be adequate.

After a manufacturer has certified his product he will then set up his production line and begin producing his product. Staff will make several visits a year to check the manufacturer's performance. The laboratory and manufacturer before production will develop a jointly-agreed upon quality control plan. The Commission's regulations currently do not control either the laboratory inspector's procedures nor the manufacturer's quality control program.

The primary purpose of this effort would be to analyze the adequacy of the laboratory inspector's role and the quality control programs employed by manufacturers. This effort would, in addition, review the reliability analysis submitted under the Commission's revised standards. Also this effort would include a qualitative comparison between the conventional standing pilot light and the intermittent ignition system.

The importance of this effort cannot be understated. If one furnace accident were to occur and California had not performed the above analysis, the IID and gas furnace efficiency standard effort could be set back significantly. By doing the analysis before such a potential accident, California could rationally respond at the time an accident occurred.

This effort has national importance. As of now, 14 states (in addition to California) are considering or have adopted legislation prohibiting continuously burning pilot lights. Moreover, the pending federal appliance efficiency standards will most likely cause furnace manufacturers to use IID's. Within a few years, most forced air furnaces will be equipped with IID's. Thus, it is important that this government prodded event be carefully reviewed.

Management Plan

The CERCDC will take lead role in the development and implementation of this safety analysis. This role will involve the coordination of a private contract, public workshops, and interaction with American Gas Association (AGA) laboratories, Underwriters Laboratories, and Gas Appliance Manufacturer Association (GAMA).

A combination bidder's conference and public workshop will be held prior to award of this contract. At least one public workshop will be held during the contract to provide public review of the contractors' work. Another workshop is scheduled to be held several weeks after publication of the final report. These workshops will provide an effective critique of the contractors' work by the affected laboratories, industry and public.

The tasks to be performed will analyze the following areas:

1. Review the reliability analysis submitted by manufacturers of IID-related equipment to the testing laboratories in support of certification, and make suggestions for improvement.
2. Evaluate the testing performed by the laboratories in light of the reliability analysis to make sure that unsafe failure modes are adequately evaluated in the testing program.
3. Evaluate the testing program to determine if it adequately reflects the typical residential environment.
4. Review and develop criteria for an adequate manufacturing quality control program which is now developed jointly between the testing laboratory and manufacturers.
5. Evaluate the need and advisability of additional testing following certification of prototype devices by independent laboratories.
6. Develop criteria for laboratories to follow in making periodic inspections of manufacturing facilities following certification.
7. Perform a preliminary reliability analysis of the continuous burning pilot light systems and compare to different IID systems.

8. Make recommendations as to what laboratory submittal data and testing results can be made publicly available without undue loss of competitive advantage among manufacturers.

Management of this program will be accomplished by staff funding at the level of six staff months for the period July, 1978, through June, 1979. \$35,000 in contract funds are requested to conduct the above study.

Milestones

1. First Quarter, 1978: No activities planned.
2. Second Quarter, 1978: No activities planned.
3. Third Quarter, 1978: (a) Program start date; (b) develop RFP.
4. Fourth Quarter, 1978: (a) Release RFP; (b) hold bidder's conference and public workshop; (c) deadline for bid submission.
5. First Quarter, 1979: (a) Let contract; (b) commence contract.
6. Second Quarter, 1979: (a) First report; (b) public workshop to review first report.
7. Third Quarter, 1979: (a) Deadline for final report; (b) hold public workshop on final report; (c) completion of contract including errata.

Energy Savings Estimate

1. Intermittent Ignition Device:

Most of the potential savings will result in elimination of the pilot lights on forced-air gas-fired central furnaces. Science Application Inc. (S.A.I.) estimated in their 1975 report report 2.8 million central furnaces in California. If we assume 60 percent of these furnaces will be replaced in 10 years and that a typical furnace pilot consumes 800 Btu/hr, the potential annual gas savings 10 years after prohibiting pilot lights in furnaces would be:

$$S = \frac{800 \text{ Btu/hr} \times 24 \text{ hr/day} \times 365 \text{ days/yr} \times 2.8 \times 10^6 \text{ furnace} \times 60\% \text{ replacement}}{1000 \text{ Btu/cubic foot}}$$

$$S = 11.8 \times 10^9 \text{ cubic feet of natural gas annual savings in ten years in California}$$

1980 savings would equal:

$$.25 \times 11.8 \times 10^9 \text{ cubic feet} \times 1000 \text{ Btu/cubic foot}$$

$$1980 S = 2.95 \times 10^{12} \text{ Btu's}$$

2. Gas Fan Type Central Furnaces

By setting minimum efficiency standards for gas fan type central furnaces the Commission staff, in its Staff Report dated September 1977, estimated energy savings in the tenth year at 10,370 billions of Btu or 10.3×10^9 cubic feet of natural gas annual savings in California. Savings in 1980 are estimated to equal $.11 \times 10^{12}$ Btu's.

INTERMITTENT IGNITION DEVICE STANDARDS IMPLEMENTATION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	6	10,248
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	2	1,568
Total Salaries & Wages		11,816
Salary Savings (5%)		-591
Subtotal		11,225
Staff Benefits (23.5%)		2,638
Total Personnel Services		13,863
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		35,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		2,218
Total Operating Expenses		37,218
Total EPCA Funding		51,081
State Funding		-0-
Total Funding		51,081

Estimated Future EPCA Funding Request

1979	-0-
1980	-0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

C9. LOAD MANAGEMENT STANDARDS DEVELOPMENT

Assembly Bill 4195, signed into law in September 1976, requires the Energy Commission to "adopt standards by regulation for a program of electrical load management for each utility service area" (California Public Resources Code Section 25403.5). In formulating these standards, the Energy Commission must consider alternative rate structures, mechanical load controls, and end-use storage systems that are cost-effective when compared to new electrical capacity. To carry out the law, the Commission must develop, analyze, refine, adopt and implement load management standards. EPCA funding will accelerate and expand the scope of the program.

Overview

Task 1

The Energy Commission is involved in a DOE Electric Utilities Demonstration Project (EUDP) with the California Public Utilities Commission (CPUC) and four major California utilities to conduct time-of-day pricing and load control experiments. This project addresses CPUC Decision 85559 which was issued in March 1976. This decision required: the phased implementation of Time-of-Day (TOD) pricing for all commercial/industrial customers whose demands exceeded 500 kW; experimental TOD rates for commercial/industrial customers under 500 kW; and experimental TOD and load control tariffs for residential customers.

The Energy Commission is using the data from this project to analyze the appropriateness of the various experimental strategies for load management standards.

Task 2

The Energy Commission also plans to contract for engineering analyses to evaluate measures that are not included in the EUDP. These plans include a contract analyzing end-use storage devices and a contract assessing the potential opportunities for load management in the industrial sector. These efforts should complement the EUDP and provide a balanced information base to develop load management standards.

Task 3

To appropriately evaluate the potential standards, a systematic methodology is essential. Therefore, a third element of the Commission's effort is the development of a computerized methodology for demand/supply forecasting that is sensitive to the impact of load management policies on end-use load profiles. Such an integrated methodology will ensure the systematic evaluation of the impact of load management standards upon each utility's resource plans and financial health.

This multi-pronged effort will lead to cost-effective load management standards that will benefit California and serve as a model to the rest of the country.

Management Plan

Many interested parties will participate in the execution of this program. The lead party is the Load Management/Pricing Unit in the Conservation Division's Utilities Office. This unit will work with the Buildings and Appliances Office to develop customer-oriented load management standards (e.g., chilled water storage systems as part of the building standards). This lead unit will also make recommendations to the CPUC and work closely with the Energy Assessments Division to ensure that the impact of load management measures is carefully analyzed through the supply-demand forecasting processes.

This program requires close coordination with the CPUC and the state utilities to analyze data generated by the DOE-sponsored EUDP. Various consumer groups are serving as advisors to the project, and customer attitudes are being carefully monitored to determine the social impact and marketing potential of load management.

The new EPCA funding will cover six Commission staff professionals* to develop, analyze, refine and aid in implementing load management standards and to supervise three contracts:

1. An examination of utility-controlled load management of industrial customers. Paired with a demonstration project, this contract will identify industrial load management strategies and standards.
2. Detailed analyses by irrigation engineers of the costs, potential and obstacles to agricultural pumping at non-peak times. Agricultural pumping is five percent of the need for new peaking generators in the state. (Study to be completed prior to June 30, 1978.)
3. Analysis of the technological feasibility, cost effectiveness and potential of end-use storage devices.

Milestones

1. First Quarter 1978: (a) Let contract for individual load management; (b) analyze data from EUDP; (c) begin staff reports and hearings on load management standards; (d) complete agricultural contract
2. Second Quarter 1978: (a) Complete staff reports and hearings; (b) adopt load management standards; (c) analyze results of agricultural contract
3. Third Quarter 1978: (a) Second annual EUDP report; (b) implement load management standards; (c) formulate standards to be adopted in Spring 1979.
4. Fourth Quarter 1978: (a) Implement load management standards adopted July 1978; (b) additional studies and hearings on standards to be adopted in Spring 1979.

*(Funding requested at nine months per person-year for four of the staff to avoid overlap with EUDP funding.)

5. Calendar Year 1979: (a) Annual report on EUDP; (b) let storage contract; (c) adopt additional load management studies (2nd set); (d) implement additional load management standards (2nd set).
6. Calendar Year 1980: (a) Annual report on EUDP; (b) monitor and evaluate storage contract; (c) adopt additional load management studies (3rd set); (d) implement additional load management standards (3rd set).

Estimated Energy and Capacity Savings

Load management is pursued as a desirable strategy as much for its capacity savings as for its energy savings. In 1980, the feasible savings result from the expected control of residential air conditioners and water heaters plus the installation of demand controller and energy management systems for commercial/industrial customers. Implementation of these measures might save over 1,000 MW in peak demand by 1980.

To estimate energy savings, start with the assumption that the average load management strategy yields no net change in kWh consumption; it only defers demand from peak to off-peak. In that situation, savings would come only through the difference in efficiencies between the peak and off-peak units.

Assuming heat rates of 14,000 Btu/kWh for a peaking unit and 10,500 Btu/kWh for an off-peak unit, a savings of 3,500 Btu/kWh is implied from shifting. Based on calculations done by staff, 1×10^9 kWh can be deferred in 1980, 4×10^9 kWh in 1985 and 11×10^9 kWh can be deferred in 1995 from load management.

With the above assumptions, this implies savings of 3.5×10^{12} Btu's in 1980, 14×10^{12} Btu's in 1985 and 39×10^{12} Btu's in 1995.

LOAD MANAGEMENT STANDARDS DEVELOPMENT

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	24	45,024
Associate Level Professional (\$1,708/month)	36	61,488
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	20	15,680
Total Salaries & Wages		122,192
Salary Savings (5%)		-6,110
Subtotal	9	116,082
Staff Benefits (23.5%)		27,279
Total Personnel Services		143,361
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		151,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		22,938
Total Operating Expenses		176,352
Total EPCA Funding		317,299
State Funding		218,162
Total Funding		535,461

Estimated Future EPCA Funding Request

1979	600,000
1980	600,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

SOLAR ELEMENT

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D1. DIRECT THERMAL PERFORMANCE PREDICTION

Overview

As the application of indirect or active solar systems becomes more and more commonplace, the need for the simplest possible approach to solar utilization becomes apparent. Direct thermal or passive solar is the alternative which professionals in the building field are turning to. These techniques have been practiced for thousands of years in indigenous architecture which of necessity had to adapt to the environment. The renaissance of this approach in recent years holds great promise, both in displacing most of the energy usually required for space conditioning and in improving the quality of the environment through creative structural responses to the climate resources available.

In order for widespread use of direct thermal to become a reality, those persons charged with the responsibility of designing and/or building structures must be able to predict performance. Whether direct thermal can provide the desired levels of comfort is no longer a question from a technical point of view. However, it is still a question in the minds of many in the building and design professions. Public education and information dissemination will resolve this misunderstanding. The next necessary step is to clearly deliver, to all those interested and responsible, the tools needed to design a direct thermal conditioned structure, adapted to the design program dictated by the particular project. For example, the Trombe Wall and Hay Roof Pond passive solar designs are proven solar performers, but only a few designers have seriously tried to use these systems and fewer still could claim they know they've achieved a good design. The situation becomes more complex as more people get involved.

The goal of producing a design tool prediction method is a project in which the prediction of thermal performance plays only a part. An effective design tool must be simple enough and interactive enough for a person making design decisions to use early in the design process. Yet, it must be complete and accurate enough so as to yield trustworthy information. There are hand calculation techniques for heat gains and losses, and there are hour by hour, full-scale computer programs, such as the CAL/ERDA program (see measures C3 and C4). But, there is no complete, thoroughly consistent package in which the hand calculation methods are directly traceable, in the public domain, to the highly detailed and accurate full-scale computer code which predict thermal loads. Furthermore, the computer programs and subroutines available for the prediction of direct thermal are rare, with the best one by the DOE Los Alamos Laboratory being a network simulation program which is not directly adaptable to the response factor thermal loads programs or to building construction details.

Management Plan

The project proposed will follow a two-pronged approach to the problem. The first prong is of 6 months duration and will be a contract to complete work begun on the direct thermal CAL/ERDA subroutines. This work will be verified using available prototype systems data. This effort with other work done under the direction of the CERDC will yield a complete computer code. The second prong will be a major project to a competent computing group to critique the CAL/ERDA program and approach as dictated by the goals of this project, i.e., to produce a design tool. This critique will generate a detailed workplan

for the rational and timely completion of the required tasks.

Energy Savings Estimate

The energy savings for the entire solar element, as regards to active solar systems, are described following the Professional Education measure. Energy savings resulting from the use of direct thermal (passive) building design features are incorporated within the Climatic Appropriate Building Design measure.

The products of this project shall be:

1. Complete and empirically tested direct thermal subroutines for CAL/ERDA.
2. Critical assessment of existing methods of performance prediction.
3. Developmental work on prediction techniques.
4. Draft of performance prediction techniques with initial documentation for review.
5. Revision and empirical testing of techniques.
6. Finalized procedures with necessary parameter generation studies and prepared manual.
7. Conduction of a training seminar for CERCDC professional education staff.

During the course of this program, close contact will be kept with the staff of the Conservation Division of the CERCDC to avoid program duplication and to facilitate the flow of information usable to each.

Milestones

1. First Quarter, 1978: No grant-supported activities planned.
2. Second Quarter, 1978:
 - a. Project leader hired;
 - b. Thermal subroutines RFP prepared and issued;
 - c. Start solar subroutine work.
3. Third Quarter, 1978:
 - a. Thermal subroutines contract awarded;
 - b. Solar subroutines work continues;
 - c. Contact with the staff of the Conservation Division of the CERCDC continues to identify possible areas of program duplication (continuing program function).
4. Fourth Quarter, 1978:
 - a. Subroutine work completed by both staff and contractor;
 - b. CAL/ERDA Program and Approach Critique RFP prepared, issued, and awarded.
5. First Quarter, 1979:
 - a. Draft of prediction methods assessment prepared by staff and incorporated with work being done by the contractor under the critique contract;
 - b. Working document prepared of possible approaches to improve solar system prediction methods.

6. Second Quarter, 1979:

- a. Critique contract completed;
- b. Recommendations are made to the Commission (CERCDC) on the best approach to take to improve prediction techniques.

7. Third Quarter, 1979 through 1980:

- a. Empirical testing of techniques for performance prediction started and continued, in cooperation with other CERCDC and federal laboratory staffs;
- b. Information feedback mechanisms established in order that information from this project can be incorporated within other solar and conservation programs;
- c. Further studies are conducted as required to further refine the prediction models.

DIRECT THERMAL PERFORMANCE PREDICTIONS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		70,000
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		70,000
Total EPCA Funding		70,000
State Funding		5,000
Total Funding		75,000

Estimated Future EPCA Funding Request

1979	70,000
1980	85,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

D2. SOLAR EQUIPMENT TESTING

Overview

The California Energy Commission is currently developing a Testing and Inspection Program for Solar Equipment (TIPSE) that will take effect in December of 1977. The program was developed at a cost of \$250,000. Its intent is to compile and disseminate previously unavailable, reliable, comparative information on solar equipment as they are available in the marketplace. The data collected will be distributed to potential solar consumers as well as to lending officials, building officials, realtors and others. TIPSE is designed to remove one of the major barriers to extensive solar utilization by assuring potential solar users of product dependability. The program will include state certification of solar products satisfactorily completing testing and inspection procedures.

Under TIPSE, it is currently planned that solar equipment will be tested for thermal performance by private testing laboratories and that specifications and drawings will be inspected by the State. The latter inspection is to insure that a manufacturer's claim about the life, reliability, maintainability, and safety of the equipment are valid. If the product meets TIPSE requirements, the solar equipment will be certified by the State.

With the passage of AB 1558 (solar 55% state tax credit incentive legislation), the need for a solar testing program has become immediate and increasingly significant. Although there have been efforts to develop a national certification and testing program (see the DOE/FEA request for proposal #70311), TIPSE is currently the only means of insuring that the tax credit is given for quality solar equipment, properly installed. The testing program must be expanded upon to handle the increased demands that AB 1558 (and other solar incentive legislation) will place upon it. For this reason, it is proposed that the inspection portion of TIPSE be handled by an agency other than CERCDC with a greater plan-checking capability. The other portions of the grant funded solar equipment testing program are to develop a data bank to store information concerning solar systems installed under the tax credit, and a program to integrate the TIPSE program with the implementation of the solar state tax credit legislation.

Management Plan

The CERCDC will take the lead role in the development and implementation of TIPSE measures, working with the California Department of Housing and Community Development (HCD).

A. General Management Description

1. HCD currently provides plan-checking services to local agencies within the state. Their current staff and expertise in this area could be built upon to enable their performance of the inspection of specifications and drawings aspects of the solar testing and inspection program.
2. CERCDC is currently charged, via state bill AB 1512, to develop and implement a testing and certification program. CERCDC is also charged, through AB 1558, with developing guidelines for administering the 55% tax credit provided for by that bill. CERCDC is at this time developing the TIPSE program, and will assume responsibility for expanding the

program to meet the anticipated increased expectations of such a program resulting from the solar incentive legislation.

B. Tasks

1. Certification procedure for TIPSE will be expanded upon to include certification of components (not currently covered under the testing program) as well as complete solar systems. This work will be done by CERCDC.
2. Inspection procedures will be developed by CERCDC, with HCD, and staff will be trained to inspect the drawings and specifications of solar equipment which has been submitted by manufacturers for certification. Inspection work will then be carried out by HCD.
3. A data bank will be developed, with some input also from the Franchise Tax Board, to provide ready access to detailed information on system cost, reliability, longevity and performance. The data bank will support consumer protection efforts by providing valuable system feedback. CERCDC will develop and implement this work.
4. A liaison position will be established between CERCDC and DOE to insure that the California TIPSE program meshes effectively with a national testing and certification program as it develops. This is necessary if California TIPSE is to be phased into a national program.
5. Information pamphlets are currently planned under TIPSE to provide information on the results of the testing program. These written materials will be expanded upon to include information on those added components which are evaluated as the testing program proceeds.

Milestones

1. First Quarter, 1978:

- a. Liaison established with DOE (Conservation and Solar Applications Administration) on the subject of solar equipment testing and certification;
- b. Feedback information loop established between the Solar Equipment Testing program and the Solar Public Information program.

2. Second Quarter, 1978:

- a. Equipment testing begins;
- b. Initial groundwork is laid for the inspection of solar equipment by the Department of Housing and Community Development;
- c. Development of a solar data bank started.

3. Third Quarter, 1978:

- a. Development of a component testing and certification program started;
- b. Development of the solar data bank continues;
- c. Inspections of solar equipment specifications and drawings by HCD begins;
- d. Equipment testing continues.

4. Fourth Quarter, 1978:

- a. Development of a component testing and certification program continues;
- b. Solar data bank development completed and put into operation;

- c. Inspections of solar equipment specifications and drawings continues;
- d. Equipment testing program continues.

5. Calendar Years 1979-1980:

- a. Development of the component testing and certification program completed;
- b. Component testing and certification begins;
- c. Equipment testing and certification continued and expanded;
- d. Solar data bank continued;
- e. If, during this period, a national testing and inspection program is developed, the California Testing and Inspection Program will be phased into the national program.

Energy Savings Estimate

The energy savings for the entire solar element are described following the Professional Education measure. This has been done to avoid double counting problems which might occur if a separate estimate was made for each measure of this element.

SOLAR EQUIPMENT TESTING

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	12	22,512
Associate Level Professional (\$1,708/month)	12	20,496
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		43,008
Salary Savings (5%)		-2,150
Subtotal		40,858
Staff Benefits (23.5%)		9,602
Total Personnel Services		50,460
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		91,000
Indirect Costs (16% of Total Personnel Services*)		8,074
Total Operating Expenses		99,074
Total EPCA Funding		149,534
State Funding		139,000
Total Funding		288,534

Estimated Future EPCA Funding Request

1979	100,000
1980	115,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

D3. SOLAR WATER HEATER OPTIMIZATION

Overview

There are currently three generic types of solar water heating systems being marketed in California. The most common system, the "pumped" system, uses an electric pump to circulate water from the solar collector to the storage tank. A second type, the "thermosyphon" system, utilizes thermal convection to circulate water from the collectors to the storage tank. The third type of system, the "integral" system, integrates the collector and storage tank into one component. These systems vary greatly in cost and degree of complexity. We want to find the best combination of solar system and user to optimize the dollar per Btu spent by the consumer.

Currently, over 85% of solar water heating systems marketed in California are the pumped type—the most complex and, in most cases, the most expensive system. Our preliminary research into determining the relative life cycle costs of the three types of water heating systems has shown that there is currently no information on their relative performance characteristics under residential load conditions. This information must be developed immediately, in order to determine the relative system life cycle cost, to provide information which will allow the solar consumer the opportunity to make an informed choice and will encourage manufacturers to further optimize their systems.

This program will test several generic solar water heaters under identical conditions and develop computer models of these generic types of systems, based on these system performance tests. These models will provide system performance characteristics for each system under a wide variety of residential use patterns and weather conditions. The proposed program will also evaluate the use of solar water heating backup units to determine which type and size of backup heating is most efficient for various applications and geographic areas. The final results will be presented in simple charts for use by potential buyers in the various population zones in the state. These charts will compare energy saving for various system types versus use patterns, such as single family unit user in apartment complex versus a family use in a single family detached home.

Management Plan

The project involves three tasks, each of which requires specific areas of expertise. The CERCDC will take the lead role in the development and management of this project. Substantial portions of the work will be done under contract for CERCDC.

A. General Management Description

1. Developing computer models and testing the various types of solar water heating systems will be done under one contract by an organization that has expertise in both solar system testing and computer modeling. The system hardware will be purchased with CERCDC funds.
2. Evaluation of entire water heating systems, as outlined in Task 3 below, will be performed under subcontract with an organization that has expertise in energy system evaluation.
3. The primary contractor in the program will develop a complete solar water heater manual. Once developed, the manual will be published and distributed by CERCDC to manufacturers, contractors, designers and solar system buyers.

B. Tasks

1. Accurate computer models representing three to five generic types of systems will be developed. These models will be based on actual system tests and will be capable of providing year-round system performance predictions in any climate and under large variety of residential conditions.
2. Several (3-5) generic types of solar water heating systems will be instrumented and tested under identical climatic conditions and residential water use patterns for an extended period of time (one year) to determine and compare the year-round performance characteristics of each system. These results will be published and made available to solar consumers.
3. The entire domestic water heating system, including the solar portion, will be evaluated to determine:
 - a. what size and type of solar collector and storage tank is most effective for a specific use pattern;
 - b. what size and type of backup heater is most efficient for use with solar; and
 - c. how altering use patterns affect the performance of each type of solar water heater.

Recommendations will be made to designers, contractors and consumers based on these findings.

4. The results of Tasks 1-3 will be developed into a manual to be used by manufacturers, designers and contractors as a design guide for further system optimization.

Milestones

1. First Quarter, 1978: No grant-supported activities planned.
2. Second Quarter, 1978: No grant-supported activities planned.
3. Third Quarter, 1978:
 - a. Development of preliminary computer models for solar water heating systems;
 - b. First results obtained from system testing.
4. Fourth Quarter, 1979:
 - a. Final development of computer models;
 - b. System testing continues;
 - c. Preliminary report on total system evaluation.
5. First Quarter, 1979:
 - a. Preliminary results of computer modeled solar performance evaluations;
 - b. System testing continues;
 - c. Draft of total system evaluation report;
 - d. Draft of design manual.

6. Second Quarter, 1979:

- a. Final report on computer modeled solar system performance evaluations;
- b. System tests continue;
- c. Final report of total water heating system evaluations;
- d. Completed water heating design manual.

7. Third Quarter, 1979 through 1980:

- a. System tests continue;
- b. Design manual updated as new data becomes available.

Energy Savings Estimate

The energy savings for the entire solar element are described following the Professional Education measure. This has been done to avoid double counting problems which might occur if a separate estimate was made for each measure of this element.

SOLAR WATER HEATING OPTIMIZATION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)	6	10,218
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		10,218
Salary Savings (5%)		-512
Subtotal		9,736
Staff Benefits (23.5%)		2,288
Total Personnel Services		12,024

<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		27,000
Indirect Costs (16% of Total Personnel Services*)		1,924
Total Operating Expenses		28,924
Total EPCA Funding		40,948
State Funding		70,000
Total Funding		110,948

Estimated Future EPCA Funding Request

1979	32,000
1980	35,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

DA. MODEL SOLAR BUILDING CODE

Overview

As a result of several solar incentive bills passed in 1977, more Californians than ever before will now purchase and install solar equipment. Anticipating this increase in solar utilization, CERCDC has developed the Testing and Inspection Program for Solar Equipment (TIPSE), at a cost of \$250,000, to provide consumers with reliable, comparative information on the quality of solar products currently on the market.

To build upon this program, there is a need to develop comprehensive model standards for use by designers, contractors and building officials to insure that solar equipment is adequate, is properly installed and is properly incorporated into a building's total energy system. Evidence for this need exists in the fact that problems have on occasion come to the attention of CERCDC which relate to the lack of appropriate codes for solar installations. Building inspectors and local planning departments have already on a few occasions been forced to effectively discourage solar utilization due to a lack of information and standards relating to solar systems on which to base their decisions and/or recommendations.

This program will develop a model solar energy ministerial* code to be used in California by building professionals and building officials as a comprehensive model standard on solar energy systems. This program will also provide for educating these groups in the use of the model solar energy code.

Management Plan

The CERCDC will work with the California Department of Housing and Community Development (HCD) in the development and implementation of this program.

A. General Management Description

HCD is currently responsible for the administration of the State Housing Law and has substantial expertise in the development of codes and standards relating to all aspects of housing.

The CERCDC currently has staff expertise in solar energy and has developed general sizing, system integration and installation procedures for solar equipment in conjunction with TIPSE program planning.

The combination of the respective expertises of HCD and CERCDC will allow for joint development of a model solar ministerial code. This effort will be complemented by the kindred activities of the Conservation Division's Local Government Planning and Transportation Assistance Team in the changes and general and/or comprehensive planning programs.

B. Task Areas of Ministerial and Discretionary Planning Process

1. The CERCDC and HCD shall both review existing standards and codes to determine how they can interface or contribute to the development of a model solar code. This will provide a sound development base for producing an effective solar code which can be smoothly integrated with existing codes and normal building processes.

*eg., building, plumbing, mechanical, electrical, and housing codes managed by local building officials

2. With technical input from CERCDC, HCD will draft a model solar code which most effectively interfaces other codes and standards that currently make up the State Housing Law. CERCDC will review this draft and will provide additional needed information and direction toward final development by HCD of a completed solar model code.
3. After the code has been developed, seminars will be organized and held to educate building professionals and inspectors in the use of the solar code. Written materials explaining the code and its implementation will be provided those attending the seminars. HCD will assume responsibility for furnishing these materials and for holding the seminars, as both are activities in which the department has previous experience.

Milestones

1. First Quarter, 1978: No grant-supported activities planned.
2. Second Quarter, 1978: Preparation of the Model Solar Building Code begins.
3. Third Quarter, 1978:
 - a. Review of existing codes and standards;
 - b. Complete draft of model solar code.
4. Fourth Quarter, 1978:
 - a. Complete review of existing codes and standards;
 - b. Complete final version of model solar code.
5. First Quarter, 1979:
 - a. Complete development of building professionals and building inspector training workshops;
 - b. Begin holding workshops for building inspectors.
6. Second Quarter, 1979:
 - a. Complete training workshops;
 - b. Develop mechanism to periodically update model solar code.
7. Third Quarter, 1979 through 1980:

The solar code will be periodically updated and training workshops will be held as required.

MODEL SOLAR BUILDING CODE

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	6	10,248
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		10,248
Salary Savings (5%)		-512
Subtotal		9,736
Staff Benefits (23.5%)		2,288
Total Personnel Services		12,024
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		15,670
Indirect Costs (16% of Total Personnel Services*)		1,924
Total Operating Expenses		17,494
Total EPCA Funding		29,518
State Funding		65,000
Total Funding		94,518

Estimated Future EPCA Funding Request

1979	32,000
1980	35,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

D5. SOLAR PUBLIC INFORMATION

Overview

"FEA surveys indicate that the vast majority of American people recognize the need to conserve energy. At the same time, they reveal lack of knowledge about the best means of achieving conservation . . ."

"96 percent want the government to provide information on how to cut down on their energy use. Consumers feel that they themselves can help solve the energy problem if the government provides them with the information and incentives they need and want."

(F.E.A. Energy Reporter. February, 1977)

With the passage of several incentives bills and increasing general interest in solar energy, the public is demanding pertinent and objective information to direct them to the most practical solar applications. Recent consumer studies have indicated that the public trusts governmental agencies and looks to them for objective information.

Activities in the solar public information area which the CERCDC has already completed or initiated are:

- California Solar Information Packet - completed
- Wind Information Packet (Draft) - completed
- 10 Specific Solar Application Information Packets - contract awarded
- List of the Solar Community (Architect/Engineers/Consultants, Builder/Developers, Manufacturers and Distributors) in California - completed and continuously updated
- California Sunshine (Consumer Guide to Solar) - completed
- Solar for your present home (San Francisco Bay Area Edition) - completed
- Continuous Response to Public Inquiry - ongoing
- Solar for Santa Barbara Public Meeting/Workshops - contract awarded
- Solar Switchboard - development is in progress
- 6 month Funding for Media/Public Information Consultant to Develop Media Outreach Plan - consultant position approved and filled
- Information Transfer at Public Events - ongoing

To build upon past and present CERCDC efforts, additional information must be developed, packaged and distributed via the most effective information transfer/educational mechanism available. This program will have two major areas of emphasis.

1. Develop solar information packets, publications and resource lists for specific solar applications.
2. Develop a publication that will focus on Consumer Education (solar for new homes, retrofit applications and do-it-yourself solar) and the curriculum for a course that can be offered through various educational institutions (focusing at the community college level).

The solar information packets which will include resource lists for specific solar applications will complement the CERCDC Public Information Outreach Program, as well as ongoing staff efforts to develop particularly timely and useful information. For example, the California Solar Information Packet, which has been met with considerable popularity, will need to be continuously updated. Additionally, consultant assistance would be useful to improve the publications format and production. Additional information packets will be developed by the Solar Office staff, to the extent that contract money and staffing levels will allow.

The curriculum and corresponding publication for the proposed consumer education course will be geared toward solar from the perspective of the consumer. The publication will stand alone as a document that is comprehensible by the average reader and is suitable for distribution in bookstores. Additionally, it will provide the core for courses that can be offered through community colleges, regional training centers, universities, etc. The publication and course will present information about the most practical direct and indirect solar applications, will alert the public to potential consumer protection concerns and will cover all aspects of interest to potential consumers; including, but not limited to, criteria for selection of the most practical solar applications; how to choose a solar contract; where to go for a loan; how to maintain a solar water heating system, etc.

Management Plan

The Solar Information Packet work will be an ongoing in-house effort to develop and update particularly relevant information for public distribution. Additionally, it will be necessary to continuously update the solar community and resource lists for CERCDC mailing and public distribution.

The CERCDC will be the lead agency on a management team composed of the CERCDC, the California Community College System, Regional Training centers, the State Universities, and the University of California. Other educational institutions wishing to participate will be on an advisory committee. The development of the "Consumer Education - Solar for New Homes and Retrofit Applications and Do-It-Yourself Solar" publication and course curriculum will be carried out under the direction of the management team. The CERCDC will be the lead agency in the development of the publication and will accept input from all of the educational institutions. The curriculum development portion of the program will be carried out with the leadership of the California Community College Administration and with input from the other educational institutions and the CERCDC. The RFP process will be utilized to select the contractor(s) who is (are) best qualified to assist the management team in carrying out the program.

Tasks

The management team will oversee all phases of the publication and curriculum development, which will include:

1. Definition of the publication contents.
2. Definition of the curriculum content and magnitude of course(s).

3. RFP preparation.
4. Contractor(s) selection.
5. Evaluation and critique of all drafts; including final.
6. Training of course instructors.
7. The ERCDC will be responsible for printing and distribution of the publications.
8. The educational institution will be responsible for offering the courses.
9. Evaluation of publication and course effectiveness.
10. Adjustments to course content based on results of evaluation.

The course would be ongoing like any other course at the educational institution offering the course. Standard evaluation procedures will be employed.

Contract Products

The contract(s) will buy:

1. A comprehensive publication for solar consumers.
2. Training of instructors for the solar consumers course.
3. Curriculum for a solar consumers course.
4. Solar Information Packet and Information delivery.

The contract(s) will produce the above in a one year period (from the time that the CERCDC gets an additional staff person on board to carry out the contracts). Once the work is completed the course will be an ongoing program at the educational institution adopting it. It will require no additional funding.

Milestones

1. First Quarter, 1978: No grant-supported activities planned.
2. Second Quarter, 1978: No grant-supported activities planned.
3. Third Quarter, 1978:
 - a. Management team composed of CERCDC and educational institutions formed.
 - b. Draft and let RFP;
 - c. Select contractor(s);
 - d. Work plan (including publication outline) agreed upon with contractor;
 - e. Staff work to update the solar information packets begins.

4. Fourth Quarter, 1978:

- a. Expanded outline;
- b. First draft of the solar consumer information curriculum completed;
- c. Solar information packets updating continues.

5. First Quarter, 1979:

- a. Drafts of information curriculum and other information documents reviewed and revised by staff;
- b. Information packets completed and released.

6. Second Quarter, 1979:

- a. Solar consumers textbook and course curriculum development completed and released;
- b. Planning for incorporation of the course into regular institutional curriculum started;
- c. Training for instructors of solar consumers course started;
- d. Completed solar information packets distribution continues.

7. Third Quarter, 1979 through 1980

- a. Solar consumers course ongoing in over 50 educational institutions;
- b. Completed solar information packets updated periodically and released for distribution.

Energy Savings Estimate

The energy savings for the entire solar element are described following the Professional Education measure. This has been done to avoid double counting problems which might occur if a separate estimate was made for each measure of this element.

SOLAR PUBLIC INFORMATION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
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Salaries & Wages

Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)	12	20,496
Staff Services Analyst (\$1,422/month)	12	17,064
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		37,560
Salary Savings (5%)		-1,878
Subtotal		35,682
Staff Benefits (23.5%)		8,385
Total Personnel Services		44,067

Operating Expenses

General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		39,000
Indirect Costs (16% of Total Personnel Services*)		7,051
Total Operating Expenses		46,051
Total EPCA Funding		90,118

State Funding	55,000
Total Funding	145,118

Estimated Future EPCA Funding Request

1979	66,000
1980	60,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

D6. SOLAR ENERGY CONSUMER PROTECTION

Overview

"Consumer confidence in the solar energy alternative is low, largely due to the infancy of the solar industry. Much more information is needed by all parties concerned with solar energy implementation if the industry is to grow.

". . . Fraud and misrepresentation can always pose a problem in a new and developing industry such as the commercial solar energy industry. While there have not been widespread consumer protection problems, there are many reported instances of allegations of misrepresentation in advertising."

(California Solar Equipment Pilot
Testing Program - November, 1976)

As a result of several solar incentive bills passed in 1977, more Californians than ever before will now purchase and install solar equipment. Anticipating this increase in solar utilization, CERCDC has developed the Testing and Inspection Program for Solar Equipment (TIPSE), at a cost of \$250,000, to provide consumers with reliable, comparative information on the quality of solar products currently on the market.

To protect consumer interest, the CERCDC will take the actions necessary to provide an immediate response to consumer complaints about solar energy problems. Prosecution of fraudulent businesses and contractors will be pursued where appropriate. This will be accomplished by providing a toll-free "hot-line" and a staff of trained experts who are able to respond to consumer complaints. Additionally, the toll-free "hot-line" will allow an immediate determination of where fraudulent or improper solar product marketing is taking place in order to enable a quick response. Efforts will be made to educate potential solar product consumers about the most cost effective solar applications and about potential problems which they should avoid. This will be accomplished by public service announcements and brochures designed to emphasize consumer concerns.

A major element of the entire consumer protection effort will be to interact with TIPSE by providing new information as it becomes available and by getting all parties up to speed on recent developments as they occur.

Management Plan

1. General Management Description

The CERCDC will take lead responsibility, working with the California Department of Consumer Affairs, the California Attorney General's Office and other consumer protection interests throughout the state, to provide an immediate response to consumer complaints about solar energy products. This will be accomplished by establishing a "solar hot-line" in conjunction with an "Energy Conservation hot-line" to be physically located at and staffed by the Department of Consumer Affairs. Prosecution of

fraudulent businesses and contractors will be pursued through the Department of Consumer Affairs and/or the State Attorney General's Office. Funding and support will come from both the Energy Conservation and Alternatives Divisions of the ERCDC as well as the Department of Consumer Affairs and the California Attorney General's Office if necessary. All of the above organizations will have input into the development of the "Solar and Energy Conservation hot-lines".

2. Tasks

The "Solar/Energy Conservation hot-line" will consist of a program manager, two complaint handlers and a clerical. A toll-free watts line will be provided. Management of the "hot-line" will be carried out by the Department of Consumer Affairs who will report to the CERCDC. The CERCDC will take lead responsibility for training and TIPSE interfacing. This will include training of regional consumer protection agencies.

Prosecution for fraudulent or other improper activity will be carried out by the Department of Consumer Affairs with the assistance of the State Attorney General's Office when appropriate. Program evaluation and modification will be conducted by the Department of Consumer Affairs with major direction from the CERCDC.

There will be a mechanism established to address, record and seek to minimize consumer problems with solar energy. This will be accomplished by providing a toll-free phone number and a staff to address potential consumer protection problems.

Calendar Milestones

1. First Quarter, 1978: No grant-supported activities planned.
2. Second Quarter, 1978: No grant-supported activities planned.
3. Third Quarter, 1978:
 - a. Staff person on board at CERCDC;
 - b. Form management team composed of CERCDC and Department of Consumer Affairs representatives;
 - c. Define work plans and areas of responsibility for.
 - Solar hot-line
 - Energy Conservation hot-line (funded separately)
 - Regional Consumer Protection Agencies training
 - Public Service Announcements
 - d. Develop mechanism to input TIPSE.
4. Fourth Quarter, 1978:
 - a. Set up and operate Solar and Energy Conservation hot-lines, information transfer mechanism and powers of prosecution;
 - b. Develop and let RFP for Public Service Announcements;

- c. Select contractor for Public Service Announcements;
- d. Outline logistics plan for Regional Consumer Protection Agencies Training Programs.

5. First Quarter, 1979:

- a. Continue operation of hot-lines;
- b. Evaluate progress of hot-lines and TIPSE developments. Make appropriate adjustments to Consumer Protection Programs;
- c. Begin Public Service Announcements;
- d. Conduct Training of Regional Consumer Protection people;
- e. Incorporate developments of TIPSE into Consumer Protection Program.

6. Second Quarter, 1979:

- a. Continue operation of hot-lines;
- b. Evaluate progress of hot-lines and TIPSE developments. Make appropriate adjustments to Consumer Protection Program;
- c. Continue Public Service Announcements;
- d. Conduct Training Regional Consumer Protection Programs;
- e. Incorporate developments of TIPSE into Consumer Protection Program.

The hot-line and consumer protection activity will periodically be updated and training workshops will be held as required, pursuant to developments, including the progress of TIPSE.

Federal funding will not be required beyond state fiscal year 1979/80. The Department of Consumer Affairs will incorporate this activity into their normal mode of operation.

Energy Savings Estimate

The energy savings for the entire solar element are described following the Professional Education measure. This has been done to avoid double counting problems which might occur if a separate estimate was made for each measure of this estimate.

SOLAR ENERGY CONSUMER PROTECTION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)	12	20,496
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		20,496
Salary Savings (5%)		-1,025
Subtotal		19,471
Staff Benefits (23.5%)		4,576
Total Personnel Services		24,047
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		3,848
Total Operating Expenses		3,848
Total EPCA Funding		27,895
State Funding		125,000
Total Funding		152,895

Estimated Future EPCA Funding Request

1979	50,000
1980	-0-

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

D7. PROFESSIONAL EDUCATION

Overview

"There is a tremendous need to begin instituting practical solutions to our energy problems NOW. Currently, there are many ... professionals considering implementation of actions that would facilitate solar applications on a larger scale. The problem is that most of them don't know where to start. Information is lacking.

"Unavailability of information is a critical barrier ... The major types of information that are lacking, thus causing this barrier to exist are ... technical information and specific user information."

(California Solar Mobilization Plan,
February 1977)

With the passage of several incentives bills and increasing general interest in solar energy, including increasing consumer demand, there are many more professionals seeking to educate themselves about the practicality of solar energy application. The CERDC recently initiated activity in this area (with local governments and financial institutions). Currently, the CERDC is preparing for a major effort in the information transfer and workshop development are in order to focus information delivery at specific professional target groups.

Current CERDC activities will relate to Professional Education are:

1. Local Government Workshops (including elected officials, city and county planners and building inspectors) - a contract for this is being negotiated.
2. Working with California Builder's Council to provide input and lectures for regular meetings. (This initial working relationship will assist in future workshop development.)
3. Formation of a President's Committee of the California Builder's Council to work with CERDC Solar Office.
4. Solar Equipment Testing Program (will provide information of use to designers, installers, manufacturers, building inspectors, etc.) - being implemented.
5. Santa Barbara Solar Workshops for Professionals (building, architects, lending institutions, building inspectors and educators) - Contract awarded.
6. Solar Loan Programs available in California (Information Packet) - work nearing completion.

Currently, there is a major shortage of useful information that is available to meet the specific needs of the professions (except perhaps architects and engineers). The overwhelming majority of the information that does exist describes high cost solar applications which are in many cases overly complex and in some cases totally inappropriate.

The Professional Education program will present information about direct solar applications and low cost, simple solar water heating systems, along with the more "conventional solar energy systems," in order to allow a more objective presentation of the range of possibilities (much of which has been totally left out of the picture until now). The workshops and workbooks will be designed to deliver the specific information necessary to provide decision-makers with the important criteria and input necessary to evaluate the practicality of solar energy applications from their own unique perspectives. The information will be targeted to reach the following user groups and provide them with the specific information that they need to make decisions about solar applications as they relate to:

- o Builder/Developers
- o Solar Installers
- o Architect/Engineers
- o Financial Institutions

The workshops and workbooks will focus on describing cost-effective, proven solar applications that are ready for utilization today.

Management Plan

The CERCDC will take the lead role and work with the established associations that represent the target professional groups. The main thrust will be through workshops directed by CERCDC staffs. Informal advisory groups will be established in each professional area so that the materials developed for the workshops and the format for their delivery will be appropriate, efficient, and effective. These groups will be set up in close coordination with existing professional organizations, with memberships composed of people who are able to work with the Solar Office on delivering the materials after they are developed. The Solar Office staff persons will have overall responsibility to manage contracts, exercise quality control of products, and handle any and all necessary logistical problems.

The workshops will be conducted with the support of the professional organizations that represent the particular target professional groups, i.e., the California Builder's Council, American Institute of Architects, ASHRAE, California Savings and Loan League, California Mortgage Banker's Association, etc. The professional organizations will be encouraged to input into the workshop development at all stages. The professional organizations will assume the lead responsibility for putting on the workshops and will be encouraged to have their people participate in the workshops. The contractor will provide training to key personnel in the professional organizations.

The workshops will be incorporated into the ongoing activities of the professional organizations and through community colleges, regional training centers or appropriate educational institutions. Once the workshops and curriculum are developed, it will be essentially a matter of logistics to put on the workshops.

The ERDC staff involvement will be critical to keep the focus of the workshops on the right course; consistent with the preceding overview description. The emphasis will be on direct (passive) solar and low cost solar water heating. Additionally, developing the information for the specific users is new territory and it will require a significant amount of very demanding work.

Milestones

1. First Quarter, 1978: No grant-supported activities planned.
2. Second Quarter, 1978:
 - a. Define and implement management plans for workshops for builder/developers, architects/engineers, installers, and financial institutions;
 - b. RFP let for builder/developer workshops, architect/engineer workshops, financial institution workshops.
3. Third Quarter, 1978:
 - a. Contractor selection for: builder/developer, architect engineer, installer and financial institution workshops;
 - b. RFP let for solar system installers;
 - c. Work statement agreement, contract and begin work on builder/developer, architect/engineer, installer and financial institution workshops;
 - d. Financial institutions detailed outline developed as contract product.
4. Fourth Quarter, 1978:
 - a. Detailed outlines for builder/developers, architects/ engineers, solar installers workshops developed;
 - b. First draft for workshops as mentioned above.
5. First Quarter, 1979:
 - a. Second draft for workshops mentioned above;
 - b. Final workbook and workshop curriculum for financial institutions;
 - c. At least four workshops in the four major population centers (commensurate with areas of major new construction for financial institutions).
6. Second Quarter, 1979-1980:
 - a. Final workbook and workshop curriculum for builder/developer workshops, architect/engineer workshops, financial institution workshops and solar installer workshops;
 - b. At least four workshops in the four major population centers for: builder/developers, architect/engineers, solar installers;
 - c. Evaluation report on the four workshops to allow constructive changes for improvements.

Energy Savings Estimate

The energy savings for the entire solar element are described following this measure. This has been done to avoid double counting problems which might occur if a separate estimate was made for each measure of this element.

PROFESSIONAL EDUCATION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	12	20,496
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		20,496
Salary Savings (5%)		-1,025
Subtotal		19,471
Staff Benefits (23.5%)		4,576
Total Personnel Services		24,047
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		3,848
Total Operating Expenses		3,848
Total EPCA Funding		27,895
State Funding		25,000
Total Funding		52,895

Estimated Future EPCA Funding Request

1979	150,000
1980	220,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

Energy Savings Estimate for the Solar Element

The installations of solar heating equipment are projected to increase due to state and federal legislation, higher energy costs, and the increasing level of reliability and efficiency of solar equipment. The programs described in this element attempt to sustain and increase these installations by setting out to improve public knowledge and confidence about and in solar technology. The energy savings estimated below are based on this assumption of the increasing penetration of solar-assisted space conditioning and water heating systems into the new dwelling units construction market.

• Assumptions

1. All energy estimates are given for each unit per household, or otherwise known as the unit energy consumption (UEC).
2. UEC for space heating:
 - a. Single-family dwelling unit:
 - 1) 7300 kWh - electric heating
 - 2) 510 therms - gas heating
 - b. Multi-family dwelling unit:
 - 1) 2800 kWh - electric heating
 - 2) 300 therms - gas heating
3. UEC for water heating (same for both single-family and multi-family units).
 - a. 3344 kWh - electric water heating
 - b. 250 therms - gas water heating
4. Housing construction - 440,000 new single-family and multi-family units are expected to be constructed and moved into in the period 1978 through 1980.
 - a. Single-family: 230,000 units
 - 1) 14% will be electric = $.14 \times 230,000 = 32,300$ dwelling units
 - 2) 80% will be natural gas = $.80 \times 230,000 = 184,000$ dwelling units
 - 3) 6% will be other energy sources (wood, propane, etc.) = $.06 \times 230,000 = 13,800$
 - b. Multi-family dwelling units: 210,000 units
 - 1) 45% will be electric = $.45 \times 210,000 = 94,500$ dwelling units
 - 2) 55% will be natural gas = $.55 \times 210,000 = 115,500$ dwelling units

5. Energy savings per solar-assisted unit: 70% of the UEC
6. Expected market penetration (average percentage of dwelling units that will be constructed with solar space conditioning and/or solar water heating between now and 1980): 10%

- Single Family Dwelling Units (Electrical Savings)

$$(7300 + 3344) \text{ kWh/d.u.} \times 32,200 \text{ d.u.} \times .70 \times .10 \times 10,000 \text{ Btu/kWh} = .24 \times 10^{12}$$

- Multi-Family Dwelling Units (Electrical Savings)

$$(2800 + 3344) \text{ kWh/d.u.} \times 94,500 \text{ d.u.} \times .70 \times .10 \times 10,000 \text{ Btu/kWh} = .41 \times 10^{12} \text{ Btu}$$

- Single-Family Dwelling Units (Gas Savings)

$$(510 + 250) \text{ therms/d.u.} \times 184,000 \text{ d.u.} \times .70 \times .10 \times 100,000 \text{ Btu/therm} = .98 \times 10^{12} \text{ Btu}$$

- Multi-Family Dwelling Units (Gas Savings)

$$(300 + 250) \text{ therms/d.u.} \times 115,000 \text{ d.u.} \times .70 \times .10 \times 100,000 \text{ Btu/therm} = .44 \times 10^{12} \text{ Btu}$$

- Single-Family Dwelling Units (Other Energy Sources)

$$795 \text{ gallons (propane)/d.u.} \times 42 \text{ gal./barrel} \times 13,800 \times .70 \times .10 \times 4,011,000 \text{ Btu/BBL} = .07 \times 10^{12} \text{ Btu}$$

Total savings due to this element* are:

$$.24 \times 10^{12} + .41 \times 10^{12} + .98 \times 10^{12} + .44 \times 10^{12} + .07 \times 10^{12} = 2.14 \times 10^{12}$$

*The "passive" (i.e., direct thermal) savings are counted in the measure entitled "Climatic Appropriate Building Design" (#C1); thus these savings are not again counted here.

RESEARCH/ANALYSIS/EVALUATION ELEMENT

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E1. TECHNOLOGY ASSESSMENT

Overview

The marketplace is being deluged with new energy conservation related technology. These new developments relate not only to new, more efficient "appliances" or process machinery but to retrofit of existing hardware for improved energy efficiency. It is crucial that the Energy Commission staff be kept abreast of all significant new developments in energy conservation hardware for both new and retrofit applications. Unfortunately, the saturation of the marketplace with new energy conservation technology has been accompanied by widely variant quality and accuracy in documenting the performance and potential problems associated with deployment of the new technologies. Good public energy policy must be based on sound, technically adept and accurate assessments of current and future options in energy conservation technology. In order to maximize the near and medium term energy conservation potentials, staff must be able to access a comprehensive, reliable data bank on existing and developing energy conservation technology. The technology assessment program will fill precisely this requirement. It will draw together resources within the Energy Commission, keep abreast and initiate research and documentation of new energy conservation technologies, and assist and provide recommendations to research entities outside the State Energy Commission. In particular, private industry, state and federal research agencies will be encouraged to assess productive new energy conservation technology.

Management Plan

CERCDC staff will work to develop a data bank in three distinct areas of energy conservation technology research, namely:

- o Compilation and review of existing documentation of energy conservation hardware as researched by private industry and governmental research and development programs.
- o In-field survey and physical documentation of existing applications of energy conservation technology as well as follow-up performance verification monitoring.
- o Laboratory testing of new energy conservation hardware developments.

Technology assessment staff will work with existing energy conservation staff members in outlining the research schedule for fiscal year 78-79. An advisory committee will be formed in mid-78 comprised of Conservation and Alternatives Division staff of the Energy Commission currently responsible for residential and nonresidential buildings standards, appliance efficiency standards, and solar collector performance standards. In addition to in-house staff committee members will be a group selected from private industry and university research organizations who are directly concerned with energy conservation technology. The advisory committee will review and critique staff-prepared documents and provide some direction for new research and documentation efforts.

Following initial staff recommendations and preliminary literature research RFP's will go out to locate laboratory facilities to undertake a series of technical performance evaluations of selected conservation hardware. Additional contracts may be let to various research facilities possessing technical monitoring or staff expertise capabilities specific to certain energy conservation technologies. Existing field applications of energy conservation products will be assessed and technical data collection contracts awarded as necessary.

Milestones

1. First Quarter, 1978: Preliminary personnel search.
2. Second Quarter, 1978: Recruitment of technology assessments staff.
3. Third Quarter, 1978: (a) Organization of in-house advisory committee; (b) adoption of first quarter technical assessments work schedule; (c) recruitment of outside positions on advisory committee; (d) compilation and review of past or current research in relevant areas; (e) RFP for lab facility.
4. Fourth Quarter, 1978: (a) Meeting of full advisory committee; (b) a reporting of results of initial research documentation; (c) RFP's for technical evaluation contracts to lab facilities awarded; (d) adoption of third and fourth quarter technology assessment work schedule.
5. Calendar Year, 1979: (a) Continued reporting and dissemination of research products; (b) continued meeting and direction from advisory committee; (c) letting of remaining contracts for energy conservation technology assessment; (d) summary and review of first year technology assessment products; input to standards setting staff with possible changes to residential and nonresidential building standards, and appliance efficiency standards.
6. Calendar Year, 1980: (a) Ongoing work and contracts in technology assessments; (b) selection of new advisory committee; (c) continued literature research of existing energy conservation research.

Estimation of Energy Savings

Specific impacts of technology assessment program on energy consumption in California by 1980 are at this time inestimable. However, the focus of the technology assessments program is to provide assurance that public policy set by the Energy Commission for recommendations for action to the Legislature incorporates an up-to-date and accurate familiarity with new technological developments. In this way, the Energy Commission will assure that the lead times associated with commercialization of promising new energy conservation technologies are not unduly hindered by its own standards or other state government regulations. Indeed the most promising of the new technologies will be encouraged by public dissemination of research on hardware performance. In addition, energy savings associated with both existing conservation programs and new programs should be significantly increased by the knowledgeable encouragement of the most current "state of the art" in conservation technology.

TECHNOLOGY ASSESSMENT

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	12	22,512
Associate Level Professional (\$1,708/month)	24	40,992
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)	24	23,688
Stenographer (\$784/month)	12	9,408
Total Salaries & Wages		96,600
Salary Savings (5%)		-4,830
Subtotal		91,770
Staff Benefits (23.5%)		21,566
Total Personnel Services		113,336
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		190,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		18,134
Total Operating Expenses		208,134
Total EPCA Funding		321,470
State Funding		-0-
Total Funding		321,470

Estimated Future EPCA Funding Request

1979	400,000
1980	350,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

E2. INDUSTRIAL FORECASTING

Overview

The industrial sector in California accounts for over one-third of all the energy consumed in the state. To determine the effects of conservation measures on industrial (manufacturing) energy demand over the next 20 years, a forecast of that demand must be made at a level of detail equal to that of the conservation measures. In the industrial sector, the appropriate level of detail of disaggregation is the industrial process or end-use (such as wet and dry processing in the cement industry). With rising fuel costs, continuing fuel supply problems, and the adoption of stringent air quality standards, it has become imperative that the fuel uses of industrial processes be delineated. Not only must the anatomy of each of California's major three-digit industries be determined, but a means of forecasting energy demand by industrial end-uses in those twelve to fifteen three-digit codes developed. To achieve this goal, it is proposed that data be collected through comprehensive surveys and that a methodology be developed to make projections of energy demand and reductions to that demand through conservation.

Management Plan

The CERCED will take a lead role in the development and implementation of this measure, working with the California gas and electric utilities and contractors selected through competitive bids.

A. General Management Description

The CERCDC staff will draw up an RFP stating the nature of the project and accept bids on the proposal. The contractor or contractors will work under the direction of the CERCDC staff and in cooperation with the utilities.

B. Tasks

1. Survey design. Development of a complete questionnaire covering industrial processes and equipment and economic properties of the firm.
2. Development of a stratified sampling technique to ensure an adequate representation of all the major three-digit industries.
3. Computer data processing of the collected information will provide cross-tabulation and summary statistics.
4. Construction of an industrial end-use data base sufficient for analysis of the major conservation measures proposed over the next ten to twenty years.
5. Development of a methodology to use the industrial data base for forecasting. Emphasis will be placed on optimizing models that incorporate energy prices.

C. EPCA/ECPA Fundings

EPCA/ECPA Funding (\$150,000) will be used to pay the contractor or contractors involved in the survey and model development.

Milestones

1. First Quarter, 1978: (a) Develop questions to be administered to major industrial energy users; (b) Develop sampling techniques.
2. Second Quarter, 1978: (a) Complete questions and sampling strategy; (b) develop RFP.
3. Third Quarter, 1978: (a) Complete RFP; (b) award contract; (c) develop modeling procedures.
4. Fourth Quarter, 1978: (a) Preliminary analysis of survey data; (b) preliminary development of industry-by-industry simulation models.
5. Calendar Year, 1979: (a) Simulation models for major industries made fully operational; (b) forecasts for each industry (gas and electricity) and the effects of conservation measures in each industry energy demand will be made.
6. Calendar Year, 1980: (a) Refinement of models to provide a total energy use picture of industrial sector.

Energy Savings Estimate

Accurate savings cannot be calculated at this time for this measure because of lack of data and the potential of double-counting the savings due to price effects. However, there is great potential for indirect energy savings resulting from the input in the conservation program planning effort of information produced by this program measure. Examples of programs that can be impacted include cogeneration, energy surveys, and load management.

Further, a detailed process-oriented forecasting model would be able to capture the energy-savings realized through improvements or changes in existing technology. A process-oriented forecasting model would also be able to determine if there were an increase in a particular fuel with a switch between two other fuel types. For example, the cement industry has recently switched from natural gas to coal because of rising gas prices and declining gas supplies. This fuel switch has necessitated an increase in electricity consumption to run pollution control equipment.

INDUSTRIAL FORECASTING

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		150,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		150,000
Total EPCA Funding		150,000
State Funding		-0-
Total Funding		150,000

Estimated Future EPCA Funding Request

1979 -0-
1980 -0-

*The indirect cost used in this budget is under negotiation.
A change in the final percentage will not alter the total
requested funding under this grant request.

E3. REMOVING CO-GENERATION BARRIERS

Overview

Co-generation is the joint production of electricity and process steam or heat. Heat being wasted or used solely for process can potentially perform the second function of electric generation. Electricity produced by co-generation may be used within the producing facility or made available for sale, or perhaps "wheeled" to another plant site.

Testimony* before the California Public Utility Commission (CPUC) received on February 10, 1977, reveals that in one California utility's service area alone, upwards of 3,000 megawatts of equivalent electric generation capacity, at approximately 50 locations, is currently not being utilized. Four of these locations involve projects totaling 855 megawatts. Despite all of this potential, no new co-generation plants were brought on-line by that utility from World War II to February 1977, and none are expected to be brought on-line for the next two years. Continued inaction in developing the California co-generation potential is unacceptable as statewide co-generation potential may exceed 4,000 megawatts. If the institutional and other barriers can be identified and removed, it is reasonable to expect co-generation to provide several thousand megawatts over the next decade.

This measure represents a continuation and expansion of measure 16 of the first ECPA application. CPUC effort, identified under that measure's writeup, will continue under state funding.

Management Plan

The California Energy Commission program for co-generation involves three major subprograms. In all, there are four contracts (which will be funded through this grant) and three person-years of staff time (two of which will be funded by the State).

Subprogram One - Site Location and Analysis

In addition to information gained from utility testimony before the CPUC, a JPL contract study has surveyed 12 potential co-generation sites within the state.

The purpose of contract 1A is to further study and analyze four possible co-generation sites within the state defined in the above study. Energy Commission staff will monitor the contract and work closely with the selected consultant or contractor in the course of the study. A contract will be let to a consultant or contractor who specializes in engineering studies for co-generation facilities and related types of projects. Each potential project site candidate will be examined against a series of criteria including:

1. Engineering feasibility and type of co-generating arrangement including hardware.

* Application No. 55509 (Phase II) Tr. 4667.

2. Economics of proposed plant.
3. Perceived institutional barriers.

The final task of this study will be a set of recommendations that concern the four sites examined in the study. The results of this study will be published and made available for use by the candidates and the general public.

The purpose of contract 1B will be to gather specific data about a recently-installed co-generation facility. This contract will provide valuable information concerning actual efficiencies, economics, and institutional problems associated with operating a modern co-generation facility in California. Energy Commission staff will monitor the contract and work closely with the selected consultant or contractor.

The co-generation facility selected will be monitored for a period of six months to one year. This examination will include:

1. Facility efficiency and fuel use.
2. Operating and overall economics.
3. Problems experienced, categorized between those which are equipment related, and those which are non-equipment related (personnel, institutional, other).

With the information developed in this subprogram, the Energy Commission staff will have a well-documented information base which details potential co-generation sites, project feasibility, and actual working conditions. This information will provide the basis for Commission advocacy of specific site development as well as support for other related testimony.

Subprogram Two - Institutional Barriers

Current utility operations policies and some state regulations slow or prevent the development of technically feasible co-generation sites. Site location and technical feasibility studies alone are not sufficient for optimum implementation of the state's co-generation potential. A major portion of the Energy Commission's efforts are addressing these problems of institutional barriers to co-generation.

To support these efforts, contract 2A will assess policies that would encourage and develop co-generation without causing adverse effects upon utility revenue requirements or overall system integrity. This contract will be let to a multi-disciplinary research group or firm to examine and assess the types of policies which are necessary for the rapid commercialization of co-generation facilities and their impact upon utilities. Some of the policies that might be assessed include:

1. Economic measures required to encourage both industrial and utility ownership of co-generating facilities.

2. Regulatory issues that may affect industrial and utility ownership of such facilities.
3. Policies which are designated to alleviate institutional constraints and barriers.
4. Wheeling policies which affect power distribution within utility districts, both within the state (intrastate) and between states (interstate).
5. How might the above policies impact utility systems economics.

The study will conclude with policy recommendations to be acted upon by the state.

The Energy Commission staff will play a major role in this study, working side by side with the selected consultant(s) and/or contractor.

Contract 2B will examine the issue of wheeling, discussed as Item 4 of the above contract in greater detail. "Wheeling" refers to the use of one or more utilities' electrical distribution grid to deliver electricity co-generated at one private (i.e., nonutility) facility to some third party (i.e., other than the serving utility). The utility(s) neither buy nor sell the electricity but merely provide the means of transfer. Wheeling of co-generated power is a critical issue in California and for this reason, a specific study will be made. Material developed in this study will also be used in contract 2A above. This contract will help to develop guidelines by which potential co-generation wheeling arrangements may be measured.

There are many variables associated with the wheeling of power, either for industrial or municipally owned co-generating facilities. They include stability, load flows, and capacity problems. Thusly, they will be addressed within a broad framework, so that all potential candidates can be measured by a similar yardstick. A contract will be let to a multi-disciplinary research group or firm to examine and assess the issues in order to develop wheeling guidelines. Primary issues to be examined include:

1. System stability requirements.
2. Load flow requirements (some wheeling arrangements will improve load flows).
3. Capacity requirements (additional facilities).
4. Transmission charge requirements (basic issues).

Overall guidelines addressing the above requirements will be developed as part of this study.

Contract 2C will fund an interagency agreement between the Energy Commission and the CPUC. This contract will continue to fully fund a Senior Utilities Engineer on the staff of the CPUC's Conservation Team. This CPUC staffer will continue to work closely with the Energy Commission's staff, and be devoted solely to issues of co-generation. Because institutional barriers are so central in the development and implementation of co-generation within California, it is critical that there be close and constant coordination between the staffs of these two regulatory Commissions. The CPUC staffer will, in general, work with the Energy Commission's co-generation staff, but the interagency contract will specify the following work areas:

1. Rate Study

a. Develop guidelines for co-generation rates in the following rate areas:

- Standby rates;
- Energy and Demand Charges;
- Sale price of excess power to utility which reflects time-of-day pricing;
- Wheeling charges (if allowed).

The idea is to develop a set of guidelines that, when applied, would reflect the economics and generating characteristics of particular utilities.

b. Identify and recommend mitigating measures, for rates or tariffs filed with the CPUC or with the FPC which may constrain co-generation projects.

2. Regulation

a. Develop guidelines for CPUC regulation of these aspects of co-generation:

- 1) various ownership combinations;
- 2) rate-setting;
- 3) contract approval;
- 4) the control or dispatching of power.

3. Wheeling

Develop guidelines for wheeling arrangements between utilities and industry, between public utilities and private utilities, and other possible arrangements.

Subprogram Three - Co-generation Testimony

Testimony before the Energy Commission's power plant siting proceedings and the CPUC's rate hearings and specific co-generation hearings is an important part of implementing co-generation in California. The Co-generation Program staff will be responsible for preparing the input for this testimony and also the more detailed and technical backup documentation to support that testimony.

Milestones

1. First Quarter, 1978:

- a. Initial draft guidelines established;
- b. Continue liaison and report exchanged between CPUC and Energy Commission

- b. staffs. (This is an ongoing procedure and will continue quarterly for the lifetime of this grant);
 - c. Energy Commission co-generation staff will provide input into testimony/hearings on topics affecting co-generation before the CPUC and Energy Commission (also an ongoing procedure—will continue quarterly for the lifetime of this grant).
- 2. Second Quarter, 1978:
 - a. Items 1b and 1c continued;
 - b. Draft rate study report released by the CPUC.
- 3. Third Quarter, 1978:
 - a. Items 1b and 1c continued;
 - b. Develop and issue a Request for Proposals (RFP) for a policy assessment and utility impacts study (contract 2A);
 - c. Develop and issue a RFP for a "wheeling" guideline study (contract 2B);
 - d. Develop and issue a RFP for an engineering and economic study of four particular candidate co-generation facility sites (contract 1A);
 - e. Funds transferred to the CPUC to continue and expand upon the work started under the first ECPA grant (contract 2c);
 - f. Draft co-generation guidelines, based upon the draft rate study report, proposed.
- 4. Fourth Quarter, 1978:
 - a. Continuation of Items 1b and 1c discussed above;
 - b. Interim report due for contracts 2A and 2B;
 - c. Final draft due for contract 1A;
 - d. Develop and issue a RFP for a Demonstration Project Study (contract 1B);
 - e. Adopt co-generation guidelines, based on the CPUC rate study
- 5. Calendar Year, 1979:
 - a. Continuation of Items 1b and 1c;
 - b. Completion of contracts 1A, 1B, 2A, 2B and 2C;
 - c. Develop policy decisions and measures of implementation based upon contracts 2A, 2B and 2C;
 - d. Distribute contract information;
 - e. Reassess and define issues that require further study or effort;
 - f. Second version of co-generation guidelines, based upon the second portion of the work being done by the CPUC (contract 2C), are adopted.
- 6. Calendar Year, 1980:
 - a. Develop supportive studies for programs defined above.

Energy Savings Estimate

About 4,000 megawatts might be available statewide if the full co-generation potential could be developed. The goal is to realize about 20 percent of this potential during the decade of the 1980's. By 1980, a realistic goal might be to implement projects totaling one percent of the ten year goal, or:

$$= 1\% \times 20\% \times 70\%* \times (4 \times 10^6 \text{ kWh}) \times 24 \text{ hrs} \times 365 \text{ days} \times 5,000 \text{ Btu's**}$$

$$= 49.1 \times 10^6 \text{ kWh} \times 5,000 \text{ Btu's}$$

$$= .25 \times 10^{12} \text{ Btu's (in 1980)}$$

* Assumes 70 percent Operating Factor. (Present economic limit; Time-of-day pricing may permit a lower percentage to be economical.)

** Assumes savings of 5,000 Btu's per kWh through co-generation as opposed to the 11,500 heat rate of regular generation.

REMOVING CO-GENERATION BARRIERS

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)	12	24,720
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	4	3,136
Total Salaries & Wages		27,856
Salary Savings (5%)		-1,393
Subtotal		26,463
Staff Benefits (23.5%)		6,219
Total Personnel Services		32,682
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		82,725
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		5,229
Total Operating Expenses		87,954
Total ECPA Funding		120,636
State Funding		105,000
Total Funding		225,636

Estimated Future ECPA Funding Request

1979	80,000
1980	90,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

E4. RESOURCE RECOVERY

Overview

Each year Californians generate approximately 20 million tons of residential and commercial solid waste which contains the following potentially recyclable components: (1) 8.6 million tons of paper; (2) 1.8 million tons of glass; (3) 1.2 million pounds of ferrous metal; and (4) 140,000 tons of aluminum. The Solid Waste Management Board has been designated as the state agency with the prime responsibility for developing and implementing measures which will: (1) divert waste materials from conventional landfill disposal into secondary materials markets and re-use; (2) reduce the amount of post-consumer waste generated in California; (3) provide an alternative source of energy by converting solid waste into a refuse based fuel; and (4) develop solid waste management practices which promote optimum efficiency while at the same time minimizing environmental degradation.

In response to the four areas of responsibility, the California Solid Waste Management Board (CSWMB) has developed four programs dealing with resource recovery and conservation which can be summarized as follows:

1. Materials Recovery: This includes the identification of cost effective energy effective systems for waste oil, paper, steel, aluminum, and glass recycling; encouraging the use (especially by governments) of recycled materials such as paper, and the development and implementation of community materials recycling centers. Demonstration of a source separation system as a resource recovery alternative is proposed under Phase II of the Bay Area Solid Waste Management Project.
2. Waste Reduction: Involves such items as container deposit policy, possible product durability requirements, package reduction regulations, and waste reduction incentives and disincentives.
3. Energy Recovery Technical Assessment: Monitoring of resource recovery technology as well as site specific feasibility studies for refuse/energy resource recovery programs underway in San Diego, Humboldt, and San Francisco Bay Area counties. The feasibility studies represent a comprehensive analysis of all factors pertaining to the economic, environmental, and social impacts and practicability of instituting resource recovery.
4. Solid Waste Operations Efficiency: This includes attainment of optimally efficient solid waste transportation methods through placement of transfer stations, development of optimal collection route patterns and equipment selection.

The four programs all represent areas in which considerable energy savings can be accrued thereby affecting energy conservation. The potential energy savings associated with the above-mentioned programs, although important, have not been a primary area of analysis. The goal of this program is to determine the energy savings impact of resource recovery by investigating the energy and economic impacts of alternative source separation and collection alternatives,

the secondary material market potentialities, optimizing the efficiency of energy use in solid waste collection and management, and then determining and implementing through legislative action and local governments the most cost effective/energy saving (i.e., efficient) measures. The Energy Commission will serve as a support agency to the Solid Waste Management Board assisting and directing it in analyzing the energy impacts of resource recovery.

EPCA funds will allow the CSWMB to expand and accelerate the analysis of energy conservation accrued through improved solid waste management, and thereby speed implementation of energy conserving materials re-use. Current federal support, supplied by the EPA, is limited to the enforcement of solid waste disposal standards, solid waste management planning, and some implementation assistance to community recycling projects. Currently, no large-scale federal funding is expected for any projects dealing with resource recovery as an energy conservation measure.

Management Plan and Staff Justification

During the first year of EPCA funding, a study was launched to determine the energy and cost implication of improved solid waste management and possible options for source separation of recyclable materials. Five specific tasks comprise this study:

- Task 1: Collection and analysis of the energy and material conservation benefits of utilizing secondary materials when correlated with a range of secondary material collection, transportation, processing and remanufacturing options specific to regions of California.
- Task 2: Cost-analysis of the above options.
- Task 3: Identification and analysis of the secondary materials market economics and capacity, including the key variables which affect these factors.
- Task 4: Analysis and identification of solid waste collection and transportation strategies which are designed for optimized efficiency of energy use, which thereby result in energy savings.
- Task 5:
 - 1. Identification of feasible scenarios for California that quantify the total potential energy conservation benefits of resource recovery implementation.
 - 2. Identification and implementation of strategies identified above. Such strategies might include:
 - a. Information and training programs for local government, including workshops.

- b. Requirements to include energy conservation as a mandatory element in the state-required county solid management plan updates.
- c. Legislation setting up an authority to stabilize the secondary material market.

Due to program operation delays imposed by the California Department of Finance, the original milestones for completion of this study have been delayed to the third quarter of 1978.

The program funds under this and future EPCA funding will allow the results of the above study to be combined with information developed both by the California Solid Waste Management Board and the CERCDC and disseminated to regional and local officials and interested public in a series of solid waste management/resource recovery/energy recovery from solid wastes workshops. These workshops will be designed to not only brief the officials and interested public on the area's current state-of-the-art, but to give the audience the tools to achieve energy conservation savings in their solid waste actions and programs. These actions include procedural operational, and engineering changes.

Project staffing at the CSWMB will include two full-time staff and four months of student time to conduct the workshops and to continuously update the project data base. Management of the project will be exercised by both Commission staff and by the division chief of the Resource Recovery Division of the CSWMB. Within its management role, the CERCDC staffer will provide support to the program and act as a liaison between the CSWMB and the CERCDC on related programs and activities.

Milestones

1. First Quarter 1978:

- a. Complete draft report on the first two elements of the study;
- b. Complete market profile for secondary materials in California.

2. Second Quarter 1978:

- a. Complete final report on the first element of the study;
- b. Complete draft two report on third and fourth elements of program.

3. Third Quarter 1978:

- a. Complete evaluation and analysis phase of program;
- b. Develop in-house planning and implementation strategy;
- c. Coordinate and include implementation strategy into the State Resource Recovery Program;

- d. Issue final report on program study;
- e. Transfer new EPCA funding.

4. Fourth Quarter 1978:

- a. Conduct information and training seminar for local governments and industry pertaining to energy conservation opportunities in solid waste management;
- b. Develop legislative recommendations which will promote energy conservation through increased resource recovery.

5. First Quarter 1979:

- a. Initiate training program to local governments to ensure the inclusion of energy conservation elements within the mandated county solid waste management plan updates;
- b. Update information in response to needs of local governments;
- c. Provide technical assistance as requested by local governments and local recycling groups.

6. Second Quarter 1979 through 1980:

- a. Update seminar materials and continue technical assistance to local governments and recycling groups;
- b. Develop legislative and/or administrative action which will promote secondary materials usage;
- c. Determine the role which the state should play in providing secondary materials market stability and in capital financing of resource recovery programs.

Energy Savings Estimate

Table 1 lists a series of potential energy savings achieved through improvements in solid waste management and resource recovery. The waste stream estimates are based on studies done by the CSWMB and discussions between the Board and the Commission. The energy conservation estimates listed as the results of this program should be considered as conservative. They are based on what is expected to be accomplished by the study and implementation of resource recovery projects. Exact accounting of the energy savings are almost impossible at this point due to the dispersed nature of the solid waste collection, disposal, and recycling industry. Further, intrastate savings are distorted by the interstate transfers of the recycled materials (e.g., recycled aluminum to foundaries in Oregon and Texas). Additional reductions in fossil fuel consumption, not shown on the table, would be achieved through refuse combustion to produce electricity, and through conversion to refuse-based gas and oil.

TABLE 1
POTENTIAL ENERGY SAVINGS FROM IMPROVED RESOURCE RECOVERY

Material of Action	Energy Savings Per Ton	Waste % Stream	Energy Savings by 1980			
			Percent of Waste Stream That is Expected To Be Recovered With Current State Funding	Current SWMB Programs Only	Expected Increase in Percent of Waste Stream Recovery Due To EPCA Funding	Current SWMB Programs With EPCA
Steel	42.25×10^6 BTU's	1,195,290 tons	.5% = 5,976 tons	$.2515 \times 10^{12}$ BTU's	1%	$.7575 \times 10^{12}$ BTU's
Aluminum	241.50×10^6	139,450	15% = 20,918	5.0501×10^{12}	5%	6.7354×10^{12}
Glass	7.28×10^6	1,792,935	0% = 0	0	2%	$.2611 \times 10^{12}$
Newsprint	1.5×10^6	1,800,000	1% = 18,000	$.0405 \times 10^{12}$	2%	$.1215 \times 10^{12}$
Improved Solid Waste Collection, Transfer, and Disposal	$.0728 \times 10^6$	20,000,000	5% = 1,000,000	$.0728 \times 10^{12}$	1%	$.0874 \times 10^{12}$
TOTALS				5.4153×10^{12} BTU's		7.9629×10^{12} BTU's
			NET SAVINGS DUE TO EPCA : 2.55×10^{12} BTU's			

RESOURCE RECOVERY

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		63,900
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		63,900
Total EPCA Funding		63,900
State Funding		490,000
Total Funding		553,900

Estimated Future EPCA Funding Request

1979	80,000
1980	90,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

E5. GAS FURNACE PILOT LIGHT TURN-OFF AND RE-LIGHT PROGRAM

Overview

This program measure is a continuation of Optional Measure No. 2 of the State's 1977 EPCA grant application.

If gas pilot lights in furnaces were turned off in early summer and turned on in early winter, approximately 5 to 10 percent of California residential gas usage would be saved. The natural gas used by the pilot light in a gas-fired, forced-air furnace represents lost energy, except for the period when the furnace burner and the heat circulating blower fan are actually operating. An average furnace pilot light will use about 1200 Btu's of energy per hour, or:

$$1,200 \times 24 \text{ hr} \times 365 \text{ days} = 10,512,000 \text{ Btu's per year, approximately} \\ 105 \text{ therms.}$$

In California's more populated areas which enjoy moderate climates, the pilot light wastes about 98 of the 105 therms of gas each year. In colder climates, the gas waste is about 85 therms per year. (18)

It is apparent that significant amounts of natural gas can be saved by turning off the furnace pilot light during the summer months. In most of California, the pilot light can be turned off for four months, from June through September, without causing discomfort. For well-insulated homes or homes in the southern part of the state, the pilot light may be left off for about six months without serious comfort problems. The resulting savings at 20 cents per therm of gas would be as follows:

1. Four-month pilot off period:
 $4/12 \times 105 \times \$0.20 = \7.00
2. Six-month pilot off period:
 $6/12 \times 105 \times \$0.20 = \10.50

If gas customers were instructed to turn off the gas to their furnaces at the beginning of summer, it would cost approximately \$4.93 to have utilities re-light each of the same pilot lights four to six months later on a scheduled basis.* It appears reasonable to have utility customers shut off their furnace pilot lights at the beginning of summer and ask these customers to re-light them when heat is needed in the fall. The utility would provide assistance to customers only when required. This would undoubtedly create problems for the gas utilities the first one or two years.

Such a program to re-light pilot lights in the fall, if successful, would somewhat mitigate the need for retrofit electric pilotless ignition which currently costs approximately \$95.00 per installation. However, electric ignition of gas furnaces would potentially save the full 98 therms wasted by the pilot light during a 12-month period.

* PUC estimate based on 1976 San Diego Gas & Electric pilot program.

In "Panel Ray" type wall furnaces, the pilot light contributes heat to the dwelling 365 days a year at the rate of about 800 to 1200 Btu's per hour. In the winter, this heat helps warm the home. In summer, it adds to the hot weather discomfort and to the air conditioning load. Such added air conditioning load from one "Panel Ray" heater can be as much as 24,000 Btu's per day. If the pilot light is turned off in the summer and on in the winter, substantial gas energy would be saved. Pilotless ignition would not be necessary at all in the case of "Panel Ray" type heaters.

Management Plan

EPCA funds will continue to support a senior engineer from the Public Utilities Commission to initiate and evaluate several utilities' large-scale furnace pilot light turnoff and re-light test program and oversee their implementation. These test programs were in effect from May through November of 1977 and involved turning off at least 600,000 residential furnace pilot lights (10 percent of the state total) in 1977. The programs are being carefully analyzed to ensure that customers are properly instructed on the proper method of turning off and re-lighting furnace pilots, and that the information provided to customers is adequate.

The staff engineer also maintains continuous surveillance of the program for appropriate safety considerations, and evaluates the relative success of the furnace pilot turnoff and re-lighting program. A statewide massive pilot turnoff and re-light program will be implemented in the summer of 1978.

The State Energy Commission will evaluate the measurements and energy savings impact of the program so that the data utilized can be incorporated in future energy forecasts and demand requirements for the State of California. This activity would be state-funded.

Milestones

1. First Quarter 1978:

- a. Consumer education program on relighting continued;
- b. Large-scale testing of pilot light turnoff program begun;
- c. Hearing continued on tariff rule revision;
- d. Full-scale implementation begins.

2. Second Quarter 1978:

- a. Consumer education program on relighting continued;
- b. Large-scale testing of pilot light turnoff program begun;
- c. Hearing continued on tariff rule revision;
- d. Full-scale implementation begins.

3. Third Quarter 1978:

- a. Hearing continued on tariff rule revision;
- b. Full-scale implementation continued.

4. Fourth Quarter 1978:

- a. Hearing continued on tariff rule revision;
- b. Full-scale implementation continued;
- c. Evaluation of first summer of full-scale implementation. Final tariff rules adopted, ongoing implementation and program evaluation continues.

- 5. Calendar 1979-80: Gas furnace program is made a permanent feature of the conservation program of gas-supply utilities.

Estimated Energy Savings

The energy savings resulting from a pilot light turnoff program among approximately 7.5 million gas heated dwellings could be substantial. Assuming that ten percent of dwelling occupants already turn off their gas furnace pilots in the summer, and assuming 75 percent of the remaining occupants cooperate in the effort, the savings accrued over a five-month average non-heating season would be:

$$(90\%)(75\%)(7.5 \times 10^6 \text{ units})(1200 \text{ Btu/hr})(24 \text{ hrs})(150 \text{ days a year}) =$$

$$22.00 \times 10^{12} \text{ Btu}$$

This is about two percent of the firm gas sales in 1975.

GAS FURNACE PILOT LIGHT TURN-OFF AND RE-LIGHT

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
Salaries & Wages		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		-0-
Salary Savings (5%)		
Subtotal		
Staff Benefits (23.5%)		
Total Personnel Services		-0-
Operating Expenses		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		28,904
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		
Total Operating Expenses		28,904
Total EPCA Funding		28,904
State Funding		-0-
Total Funding		28,904

Estimated Future EPCA Funding Request

1979 -0-
1980 -0-

*The indirect cost used in this budget is under negotiation.
A change in the final percentage will not alter the total requested funding under this grant request.

E6. RATE DESIGN RESEARCH

Overview

The price of electricity may be the most significant determinant of the types of uses and quantity of electricity consumption. The price of electricity must be considered in almost all Energy Commission (CERCDC) studies and decisions. The cost-effectiveness of building and appliance standards, projections of future demand and the need to build additional power plants, the value of electrical load programs, and other Commission business depend critically on electrical prices.

The Commission must also make recommendations to the Legislature, the California Public Utilities Commission (CPUC), and all publicly owned utilities "...designed to reduce wasteful, unnecessary, or uneconomic energy consumption resulting from practices including, but not limited to, differential rate structures, cost-of-service allocations...peak-load pricing, and other pricing measures." (Section 25403, Public Resources Code).

Other statewide activities include the March 1976 CPUC Decision 85559, which required consideration of innovative rate designs in each rate case.

Another recent CPUC decision, Case No. 9988, July 13, 1976, complied with the Miller-Warren Energy Lifeline Act, which ordered the PUC to "...designate a lifeline volume of gas and a lifeline quantity of electricity which is necessary to supply the minimum energy needs of the average residential user" for certain end uses, and to "...require that every electrical and gas corporation file a schedule of rates and charges providing a lifeline rate."

As a result of these circumstances, the Energy Commission adopted the pricing policies included in the staff paper entitled "Electricity Pricing Policies for California" in July 1977. The Energy Commission is the State's lead agency in determining and implementing California's energy pricing policies. Future Commission objectives include investigation and intervention in electricity rate cases before the PUC and public bodies on behalf of adopted policy; investigation of pricing structures for other forms of energy, particularly natural gas; analysis of demand effects of innovative pricing structures; and statewide implementation of common cost analysis and rate design methodologies. A longer term objective is incorporation of price demand effects into the State's energy forecasts.

Achieving these objectives will improve utility system load factors and conserve scarce fossil fuels by slowing energy consumption growth. They are also related to the Energy Commission's mandate to adopt standards which are cost-effective for buildings, appliances and load management efforts.

Management Plan

The CERCDC is currently receiving DOE funding (non-EPCA/ECPA) to develop and implement common cost analysis and rate design methodologies based upon marginal cost principles. This project includes the CPUC and the State's major utilities as participants.

CPUC will support CERCDC with programmatic knowledge from CPUC experience in the regulation of electricity rates, and will serve as an important forum for the implementation of experimental rates designed as a result of the proposed research.

The major California utilities have agreed to provide the necessary cooperation and will assist in research design and the resulting data collection.

In addition, several important constituent groups, such as the California Retailer's Association, the Sierra Club, and the California Farm Bureau, have agreed to participate in the project as interested public, and will contribute to meetings and report review.

EPCA/ECFA funds will be used to help develop the ERCDC's in-house rate analysis tools and staff capability. This will greatly speed the Commission's ability to implement much needed pricing reforms. EPCA funds will specifically be used for two CERCDC staff professionals and for contract research. The two staff people will immediately begin intervention in rate cases and will direct contract research to develop automated, standardized programs and methodologies for analysis of utility rate proposals and rapid evaluation of the impacts of alternative ERCDC and PUC proposals.

Milestones

1. First Quarter, 1978: (a) Evaluation of Electric Utilities Demonstration Project results; (b) begin implementation of electricity pricing policy (includes intervention in rate cases and required responses to policy paper); (c) begin preparation of rate-related load management standards.
2. Second Quarter, 1978: Continue demonstration project evaluation.
3. Third Quarter, 1978: (a) Complete rate-related load management standards; (b) begin development of cost analysis and rate design procedures to speed up, improve accuracy, and lower the cost of conservation-oriented ratemaking.
4. Fourth Quarter, 1978: (a) Implement load management standards; (b) begin development of a natural gas pricing policy.
5. Calendar Year 1979: (a) Begin development of pricing policies for other forms of energy; (b) implement natural gas pricing policy.
6. Calendar Year 1980: Implement pricing policies for other forms of energy.

Energy Savings Estimate

It is impossible to precisely forecast the gas or electricity savings or demand effects of various rate designs at this time due to many uncertainties regarding various price elasticities of demand and the particular rate designs to be employed. However, it is possible to develop reasonable estimates of both the peak demand and total energy savings which will result from the institution of

marginal cost-based time-of-use electricity prices based on elasticity information which is becoming available and the CERCDC electricity demand forecasts. Using very conservative assumptions regarding price elasticities and savings due to more efficient heat rates of non-peaking power plants, it is estimated that the implementation of improved electricity pricing structures will result in a net savings in 1980 of 7.31×10^{12} Btu's.

Btu savings are derived from two sources:

1. The better heat rate of off-peak power plants.
2. The decrease of use due to price conservation effects (i.e., higher tail blocks and marginal cost pricing).

Assumptions:

1. All non-residential users on time-of-day pricing.
2. All customers on flat or inverted rates.
3. Marginal costs considered in setting tail blocks.
4. Expected peak demand, 1980 = 37,540 Mw.
5. Expected sales, 1980 = $13,002 \times 10^9$ Mwh.
6. Heat rates: on peak = 14,000 Btu/Kwh
off peak = 10,000 Btu/Kwh

Savings: Type 1

Nonresidential peak demand = 70 percent = 26,280 Mw
Pricing causes a 7.5 percent shift off-peak $\frac{1,971}{24,309}$ Mw
New peak

Approximately 1,500 peak hours per year with a shift of 980 Mw ($1,971 \times 1/2$) or 1,470,000 Mwh. Difference in peak versus off-peak heat rate = 4×10^6 Btu per Mwh or 5.88×10^{12} Btu's.

Type 2

Assume: .1 elasticity on 50 percent of total Kwh sales and a 20 percent increase in price

= 1 percent decrease in total Kwh sales

$13,002 \times 10^9 \times .01 = .13 \times 10^9$ Kwh savings

$.13 \times 10^9$ Kwh x system avg. heat rate 11,000 Btu/Kwh =

1.43×10^{12} Btu's

Type 1 Savings = 5.88×10^{12} Btu's

Type 2 Savings = 1.43×10^{12} Btu's

Total Savings for the Rate Design Research Measures = 7.31×10^{12} Btu's

RATE DESIGN RESEARCH

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)	24	45,024
Associate Level Professional (\$1,703/month)		
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	8	6,272
Total Salaries & Wages		51,296
Salary Savings (5%)		-2,565
Subtotal		48,731
Staff Benefits (23.5%)		11,452
Total Personnel Services		60,183
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		87,681
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		9,629
Total Operating Expenses		97,310
Total EPCA Funding		157,493
State Funding		78,358
Total Funding		235,851

Estimated Future EPCA Funding Request

1979	175,000
1980	175,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

E7. UTILITY CONSERVATION PROGRAM MONITORING AND EVALUATION

Overview

The private and public utilities serving gas and electricity customers in California are now providing over 175 separate programs in all fields of energy conservation (e.g., insulation, load management, cogeneration, etc.). While a great amount of customer money is being spent on these programs, there is virtually no central data-collecting on, or detailed evaluation of, these programs by either the California Public Utilities Commission (CPUC), or the California Energy Resources Conservation and Development Commission (CERCDC).

In addition, there have been only limited attempts by either Commission to monitor the actual conservation activities in the field. Both Commissions now rely on written reports submitted by the utilities. Reliance on these reports greatly jeopardizes their ability to judge whether such programs are working effectively and, more importantly, whether they are truly saving energy.

There is an ongoing Utility Service Area Project (USAP) in the Conservation Division of CERCDC which monitors utility conservation programs and intervenes in CPUC rate cases dealing with conservation issues under the authority of California Public Resources Code Section 25403. In addition, the staff of the USAP acts as the regulatory arm of the Conservation Division in the CERCDC power plant siting process. In this function, the staff estimates the future effects that utility, state-mandated, and other conservation programs may have on the need for future power plants and other energy facilities proposed to be built in this and other states.

Management Plan

Funds from this grant will support one associate economist in the Utility Service Area Project of the Conservation Division of the CERCDC to initiate a data collection and evaluation system for all utility-operated energy conservation programs in the state (except commercial-industrial energy surveys, audits, and load management programs, which have their own systems). Programs such as residential retrofit insulation, new energy-efficient home programs for builders and consumers, water heater retrofit insulation and shower restrictor kits, night thermostat setbacks, agricultural pump testing, mobile energy conservation exhibits, etc., will be studied and evaluated. This staff person will work closely with the staff who are monitoring and evaluating the Commission's own projects in the development of common methodologies for program monitoring.

These funds will also support one associate level energy conservation specialist who will travel in the various utility service areas in the state and spot check the validity of the reports filed on conservation activities by the utilities. Consumers who have participated in these programs will be selectively interviewed and their billing data examined to confirm the energy savings reports made by the utilities.

CPUC 84902

In several unprecedented decisions (Nos. 84062 and 84902) the California Public Utilities Commission has instructed the investor-owned utilities that in the future their rates-of-return will be adjusted according to the "vigor, imagination, and effectiveness" of their energy conservation activities. This change in the rate-making process has large implications for the utilities, their stockholders, and on the monitoring and evaluation procedures of the CPUC Energy Conservation Team and the CERCDC Utility Service Area Project. The total impact of these decisions needs to be studied by experts in utility rate economics so that all the effects can be seen in all jurisdictions: the public, regulatory commissions, utility management, stockholders, and bond-rating houses. CERCDC needs this information to greatly expedite its participation as an intervener in the CPUC rate-making process. The study should also be helpful to the CPUC staff and consumer and environmental groups (e.g., Environmental Defense Fund, etc.) who are intervening in the same rate cases.

Funds in the amount of \$35,000 will provide for an outside consultant to study in detail this new CPUC rate setting criteria which in turn will be used in the CERCDC power plant siting process to make state policies fully operational. Staff of both the CPUC Energy Conservation Team and the CERCDC Utility Service Area Project will work closely with this consultant during the study process to make the study as useful as possible.

Milestones

1. First Quarter, 1978:

- a. Drafting of evaluation and monitoring criteria begun; and
- b. discussion with CPUC staff begun.

2. Second Quarter, 1978:

- a. Final draft of evaluation and monitoring criteria completed;
- b. first field spot checks of utility conservation programs are done; and;
- c. request for proposals distributed for study of rate-setting criteria, based on energy conservation efforts of regulated utilities.

3. Third Quarter, 1978:

- a. Utilities begin submitting data based on evaluation and monitoring criteria to both CERCDC and CPUC; and
- b. field spot checks continue.

4. Fourth Quarter, 1978:

- a. Annual report on evaluation and monitoring of utility programs due end of this quarter (to include report of field spot check work for the year).

5. Calendar Year, 1979:

- a. The 1978 work will be used as input to both CPUC energy conservation rate cases and CERCDC power plant applications; and
- b. evaluation and field monitoring of utility programs will continue.

6. Calendar Year, 1980:

- a. The 1979 work will be used as input to both CPUC and CERCDC regulatory processes;
- b. continue evaluation and field monitoring of utility programs; and
- c. final report to be provided to National Association of Regulatory Utility Commissioners for use in other states in utility rate evaluation proceedings.

Energy Savings Estimate

Since the sole purpose of this measure is to improve program effectiveness, and to verify the energy savings of virtually all the utility energy conservation programs in the state, the savings potential of this measure can be enormous. This measure is vital in ensuring that all utility programs actually save energy; that the effort is optimally allocated among competing conservation programs; and that the utility programs complement programs sponsored by the CERCDC, the CPUC, and other agencies and organizations.

As such, the energy savings of this program are accounted for in other direct, operational, implementation programs which are funded under the ECPA/EPCA State Conservation Plans grant process.

UTILITY CONSERVATION PROGRAM MONITORING AND EVALUATION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	24	40,992
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	8	6,272
Total Salaries & Wages		47,264
Salary Savings (5%)		-2,363
Subtotal		44,901
Staff Benefits (23.5%)		10,552
Total Personnel Services		55,453
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		35,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		8,872
Total Operating Expenses		43,872
Total EPCA Funding		99,325
State Funding		-0-
Total Funding		99,325

Estimated Future EPCA Funding Request

1979	65,000
1980	72,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

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COORDINATION OF MANAGEMENT ELEMENT

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TALLY SHEET
OF REDUCTIONS IN EMISSIONS, ETC.
(OTHER)

	Thermal Reject	Occupational Death	Occupational Injury	Occupational Man-day Lost	Solid Waste
1 TOTAL	9,622.77	3.17	78.73	13,123.76	64,754.8
2 GASOLINE VEH.	—	—	—	—	—
3 DIESEL BUS	—	—	—	—	—
4 REFINERY, VEH. FUEL	—	.00	.21	10.60	201.52
5 S.H. COMMERCIAL GAS	79.82	.02	2.69	8,322.30	—
6 S.H. COMMERCIAL D. OIL	—	.02	1.79	89.68	1,721.76
7 S.H. COMMERCIAL R. OIL	—	.04	2.64	135.60	2,583.96
8 S.H. COMMERCIAL, COAL	—	.00	.00	.00	.00
9 S.H. RESIDENTIAL, GAS	74.63	.02	2.52	75.47	—
10 S.H. RESIDENTIAL, D. OIL	—	.00	.00	.00	.00
11 ELEC. GEN - GAS T. - GAS	12.16	.01	.33	12.29	—
12 ELEC. GEN - GAS T. - OIL	—	.01	.28	14.03	269.28
13 ELEC. GEN - STEAM - GAS	10.97	.01	.99	40.69	—
14 ELEC. GEN - STEAM - OIL	146.93	.21	17.99	828.75	7,924.32
15 ELEC. GEN - STEAM - COAL	9,297.66	2.83	49.29	3,594.35	52,051.96

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Table IV-D(2)

State: California

Date: 1/16/78

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Fl. INTERGOVERNMENTAL COORDINATION

Overview

This measure continues an ECPA mandated program for coordinating energy conservation activities among various governmental agencies. The activities of a number of Departments, Boards and Commissions in California affect the development and location of energy-related facilities, impose fuel penalties, conserve energy, determine the type of energy used, and influence future energy needs. The CERCDC can effectively fulfill its charge to promote the efficient use of energy only if: (1) it is aware of the policies, plans and regulations of the other agencies; (2) the agencies consider the effect of their decisions on energy resources; and (3) impacts of decisions on energy resources and other goals are properly balanced. This requires close coordination among the Federal Government, the CERCDC, and other state and local agencies using several means:

o Informal working relations (staff level)

Under this approach, ERCDC staff will keep informed of the activities of other state agencies by maintaining contacts with their counterparts in these agencies, and will regularly analyze the energy impact of proposed actions. Staff at the same time will inform other agencies of the CERCDC's programs and goals. Conflicts that cannot be resolved at the staff level will be referred to management and policy personnel, through formal meetings, letters to the agency and testimony at public hearings on proposed regulations, or other means.

o Formal agreements between CERCDC and other agencies

Under this arrangement, the Chairman of the CERCDC and the Chairman or Director of other key agencies will sign joint letters of understanding to establish formal cooperative arrangements. The staffs will still work closely together, but a formal procedure will exist to consider energy and other goals when they appear to be in conflict. The agreement will also outline steps to be taken to resolve any differences. In some cases, differences might not be resolved because of legislative mandates which do not permit the CERCDC or other agencies to balance competing goals.

If formal agreements under a joint letter of understanding are not adequate to resolve differences, legislation may be proposed to require cooperative programs between the CERCDC and other agencies, amend existing law to permit other agencies to consider the energy impact of their actions, or require reports to the Legislature to resolve conflicts.

Management Plan

One associate-level professional will be funded to work in the Conservation Division of the CERCDC. An equivalent associate professional will work in the Governor's Office of the Appropriate Technology (OAT) through an interagency agreement. The Office Manager of the Conservation Division's Office of Planning and Program Development will supervise the staffwork and the OAT agreement.

The ERCDC staff person will carry out formal and informal activities. Formal activities will include a series of product-oriented interagency agreements negotiated between the Energy Commission and other State agencies. This will enable the Commission to maintain knowledge of current operations, future policy directions and potential conservation opportunities in State agency programs. There are some 53 major departments, agencies and commissions at the State level in California. Primary attention will be focused on the State Office of Planning and Research, the State Office of Appropriate Technology, Water Resources, Consumer Affairs, Housing and Community Development, Transportation, General Services and Business and Transportation.

Contacts with local and regional governments will be maintained through informal channels. Many State agencies carry out their programs through local and regional governments. The Commission's interagency coordinator will emphasize to State agencies the importance of local government involvement with energy-related programs. In addition the coordinator will consult regularly with other ERCDC staff who administer programs dealing with local governments. These programs include:

- local government energy conservation grants (ECPA),
- local government energy audit team (ECPA),
- workshops on the conduct of energy analysis for Environmental Impact Reports,
- development of energy element guidelines for local general plans,
- technical assistance through local government conferences and seminars,
- development of an active public information and outreach program on energy conservation.

The OAT staff person will serve as an independent advocate who can help the ERCDC expand the level of energy resource conservation in state agencies' programs and policies. The OAT activities will be coordinated with the ERCDC staff's work. OAT was created in 1976 to educate the state and private sectors and to facilitate the development of resource conserving technologies in California. It does this through information services, demonstration projects, and technical assistance to state agencies.

Tasks of ERCDC Staff:

1. Prepare working agreements and staff relations with those state agencies whose policies and programs have the greatest impact on energy use and conservation. Coordinate technical expertise and program assessments needed to apply conservation objectives.
2. Change policies of other agencies and propose legislation needed to support the goals of energy conservation mandated in AB 1575 (the Act creating the CERCDC and defining its responsibilities and powers).
3. Recommend interagency policy for the 1979 Biennial Report to the Governor and Legislature.

4. Promote maximum involvement of local agencies with state agencies' policies and programs.

Tasks of OAT Staff:

5. Identify selected state agencies with greatest potential for adopting energy resource conservation policies.
6. Conduct interviews and briefings with these agencies.
7. Advise the Energy Commission on needed analysis, research, and/or legislation for state policy issues.

Milestones

1. First Quarter, 1978: Working agreements and staff contacts arranged and monitored among federal, state, and local agencies as determined by needs and opportunities.
2. Second Quarter, 1978: Outline of new legislative proposals needed to facilitate energy conservation in State agency programs. Preparation of interagency policy direction for 1979 Biennial Report.
3. Third and Fourth Quarters, 1978: Documentation and dissemination of initial results of state agency projects.

Energy Savings Estimate

Not required for this measure under ECPA Section 420.103(b). However, indirect savings will occur from a more effective, coordinated energy conservation effort by the state.

INTERGOVERNMENTAL COORDINATION

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,708/month)	9	15,372
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)		
Total Salaries & Wages		15,372
Salary Savings (5%)		-768
Subtotal		14,604
Staff Benefits (23.5%)		3,432
Total Personnel Services		18,036
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		31,621
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		2,886
Total Operating Expenses		34,507
Total EOPA Funding		52,543
State Funding		-0-
Total Funding		52,543

Estimated Future EOPA Funding Request

1979	55,000
1980	57,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

F2. PROGRAM PLANNING, COORDINATION, EVALUATION, MONITORING AND ENFORCEMENT

Overview

The Conservation Division of the CERCDC has primary responsibility for planning and implementing projects related to conserving energy resources in the State. These responsibilities include not only coordinating the planning of each project, but also assuring the successful performance of each implemented project through periodic informal monitoring and by developing and applying methodologies and mechanisms for enforcement of project goals. In addition to most of the projects submitted under EPCA and ECPA, the Conservation Division plans and implements several other major conservation programs funded by state and/or other federal funds.

Within the Conservation Division, the Office of Planning and Program Development has the prime responsibility for development of new programs, evaluation of ongoing programs, and coordination between programs. This program measure requests funds for such work to be performed in conjunction with EPCA/ECPA grants within the Office of Planning and Program Development.

Management Plan

EPCA/ECPA funding is central to the work of the Conservation Division. This program measure will fund two basic tasks related to processing and monitoring EPCA/ECPA funded projects by the Office of Program Planning and Development. The tasks will be accomplished by CERCDC staff, and by professional consultants through contractual arrangements with the Energy Commission. The in-house staff will perform on-going program planning, development, and evaluation functions, while consultants will be hired as needed, or when circumstances dictate. These tasks are focused on planning, development, and evaluation activities as opposed to strictly administrative activities listed in ECPA Measure No. 1, and its continuation submitted herein (see Measure F3).

A. Program Planning, Development, and Coordination

Activities in this group include developing and coordinating on-going programs, and new program proposals and strategies related to energy conservation efforts for the CERCDC. Two professional positions will be funded to carry out these activities; one of these positions is at the staff level, and the other is at the associate level. Their responsibilities include identifying new conservation opportunities, planning new programs, coordinating and preparing grant documents, and developing contacts with other government and non-government organizations interested in energy conservation.

An amount of \$30,000 is to be used to contract for specialized professional services in the area of analyses of programs or potential programs. Such a contract is necessary for certain services because of a need for skills not available from the current staff, and for the necessary independent perspective that only a consultant may provide.

B. Program Monitoring, Evaluation and Enforcement

Activities in this section include developing and applying mechanisms for evaluating and monitoring programs which the Conservation Division undertakes. Three staff professionals will carry out these activities. The two Associate-level professionals will report directly to the Senior-level professional, who, in turn, reports to the Office Manager of the Office of Program Planning and Development. Their responsibilities include developing a data base for program evaluation, and to continually monitor on-going programs.

An amount of \$40,000 will fund contractual services in the areas of developing and applying an up-to-date monitoring, evaluative and assessment methodology, in subareas where skills do not exist in the present staff, or where objectivity is of great concern.

Milestones

- A. First Quarter 1978: (1) Follow-up on EPCA/ECPA grant request; (2) develop methodologies for program monitoring and evaluation; (3) draft Conservation Division's section of the Biennial Report of the CERCDC - strategies, policies, programs; (4) hire professional consultants as necessary.
- B. Second Quarter 1978: (1) Monitor and evaluate on-going programs; (2) continue drafting Conservation Division's section of the Biennial Report of the CERCDC; (3) develop new program concepts for energy conservation; (4) hire professional consultants as necessary.
- C. Third Quarter 1978: (1) Develop and plan potential programs for the next EPCA/ECPA funding cycle; (2) edit Conservation Division's section of the Biennial Report of the CERCDC; (3) continue to monitor and evaluate on-going conservation programs; (4) hire professional consultants as necessary.
- D. Fourth Quarter 1978: (1) Prepare and submit third-round EPCA/ECPA grant request; (2) continue to monitor and evaluate on-going conservation programs; (3) complete Biennial Report; (4) hire professional consultants as necessary.
- E. Calendar Year 1979: (1) Monitor and evaluate on-going conservation programs; (2) follow up EPCA/ECPA grant request; (3) develop and plan new energy conservation programs; (4) hire consultants as necessary.
- F. Calendar Year 1980: (1) Monitor and evaluate on-going conservation programs; (2) prepare and follow up EPCA/ECPA grant request; (3) develop and plan new energy conservation programs; (4) hire consultants as necessary.

Energy Savings Estimate

Indirect energy savings from this measure, due to improved performance of existing programs and identification of additional conservation opportunities, will appear in other measures and programs.

This measure also provides for administrative coordination with the U. S. Department of Energy, and arrangements for audits and financial reporting.

PROGRAM PLANNING, COORDINATION,
EVALUATION, MONITORING AND ENFORCEMENT

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)		
Senior Level Professional (\$2,060/month)	12	24,720
Staff Level Professional (\$1,876/month)	12	22,512
Associate Level Professional (\$1,703/month)	27	46,116
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$937/month)	12	11,844
Stenographer (\$784/month)	20	15,680
Total Salaries & Wages		120,872
Salary Savings (5%)		-6,044
Subtotal		114,828
Staff Benefits (23.5%)		26,985
Total Personnel Services		141,813
<u>Operating Expenses</u>		
General Expense		
Printing		1,000
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		70,000
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		22,690
Total Operating Expenses		93,690
Total EPCA Funding		235,503
State Funding		166,720
Total Funding		402,223

Estimated Future EPCA Funding Request

1979	200,000
1980	225,000

*The indirect cost used in this budget is under negotiation.
A change in the final percentage will not alter the total
requested funding under this grant request.

F3. GRANT MANAGEMENT

Overview

The Conservation Division of the California Energy Resources Conservation and Development Commission has primary responsibility for the successful performance of the measures in this grant proposal. Most measures are directly administered by the Division and a few are performed by other Commission divisions and state agencies on agreements with the Division. In addition to EPCA and ECPA measures, the Conservation Division has several other major conservation programs funded by state and/or other federal funds.

Within the Conservation Division, the Administrator's Office has primary responsibility for the management review and direction and the administrative procedures necessary to comply with various state control agency requirements. In the specific case of ECPA and EPCA programs, the Division will ensure proper management, cost reporting, contracting, and staffing to maximize program effectiveness.

This is a continuation of the Grant Management measure of the first ECPA application, filed July 24, 1977.

Management Plan

California's EPCA/ECPA proposal is central to the work of the Conservation Division. Measures in this request will increase the professional staff in the Division by approximately 60 (which augments a like number of state-funded professionals) and, as such, increases the administrative review and coordination responsibilities of the Division's management staff.

This measure funds one Office Manager position to ensure policy and program implications are fully considered and to provide the necessary management review and direction. This measure continues to fund one worker at a full journey-person level who is responsible for all contracts, budget controls, and personnel needs of EPCA/ECPA programs. This position is strictly administrative as distinguished from the planning and evaluation function of Measure F2, Program Planning, Coordination, Evaluation, Monitoring and Enforcement. This position reports to the Assistant Conservation Division Chief (Office Manager mentioned above) who has final authority on all administrative matters. The incumbent will assist each program manager in meeting contract and hiring dates and will ensure all appropriate costs are submitted promptly for federal reimbursement.

Included in this measure is the funding necessary (\$41,250) for the required audit of the Grant Program. The audit will be performed by the California State Department of Finance.

Energy Savings Estimate

Indirect energy savings from this measure, due to improved management and administrative performance, are incorporated in the other measures and programs.

GRANT MANAGEMENT

<u>Personnel Services</u>	<u>Person Months</u>	<u>Dollars</u>
<u>Salaries & Wages</u>		
Office Manager I (\$2,263/month)	12	27,156
Senior Level Professional (\$2,060/month)		
Staff Level Professional (\$1,876/month)		
Associate Level Professional (\$1,703/month)	12	20,496
Staff Services Analyst (\$1,422/month)		
Graduate Student Assistant (\$987/month)		
Stenographer (\$784/month)	8	6,272
Total Salaries & Wages		53,924
Salary Savings (5%)		-2,696
Subtotal		51,228
Staff Benefits (23.5%)		12,039
Total Personnel Services		63,267
<u>Operating Expenses</u>		
General Expense		
Printing		
Data Processing		
Travel In-State		
Travel Out-State		
Consultant & Professional Services		41,250
Training		
Contracts		
Indirect Costs (16% of Total Personnel Services*)		10,122
Total Operating Expenses		51,372
Total ECPA Funding		114,639
State Funding		-0-
Total Funding		114,639

Estimated Future ECPA Funding Request

1979	125,000
1980	135,000

*The indirect cost used in this budget is under negotiation. A change in the final percentage will not alter the total requested funding under this grant request.

VI. DECREASE IN ENVIRONMENTAL RESIDUALS STATEMENT

An additional benefit of implementing this energy conservation plan is the reduction of environmental degradation that results from the conversion, distribution, and use of energy. This section makes a quantified estimate of these benefits (with the exception of those associated with manufacturing process fuel consumption and residential gas-fired water heating). The method used is contained in the Federal Energy Administration (now DOE) Grant Program Guidelines.

The estimated reduction of environmental residuals depends on the change in energy use by primary fuel type. The estimation begins by summarizing the estimated energy savings of this conservation program/grant request plan, and then relating these savings to the changes in fuel use by type. The reduction in environmental residuals is calculated directly from these changes in fuel use.

Estimated Energy Savings From the Proposed Program*

A. Non-Electrical Savings:

1. Transportation - 4.24×10^{12} Btu reduction in gasoline consumption.

- No other increases or decreases in other transportation fuels use.

2. Commercial and Industrial

- Space Heat

- Natural Gas = 89.68×10^{12} Btu

- Distillate Oil = 35.87×10^{12} Btu

- Residual Oil = 53.81×10^{12} Btu

- Coal = $.00 \times 10^{12}$ Btu

- Subtotal: 179.36×10^{12} Btu

- Process Fuel Consumption (amount of savings, which are not already counted above) = 33.95×10^{12} Btu

- Subtotal, Commercial and Industrial = 213.29×10^{12} Btu

3. Residential
 - Space Heat = 83.85×10^{12} Btu reduction in natural gas consumption.

- Water Heating = 10.62×10^{12} Btu reduction in natural gas consumption.

- Subtotal, Residential = 94.47×10^{12} Btu

4. Total, Non-Electrical Savings: 309.07×10^{12} Btu

B. Electrical Savings**:

1. Gas Turbine (gas-fired) - 13.66×10^{12} Btu

2. Gas Turbine (oil-fired) - 5.61×10^{12} Btu

3. Steam (natural gas-fired) - 12.33×10^{12} Btu

4. Steam (residual oil-fired) - 155.09×10^{12} Btu

5. Steam (coal-fired) - 37.34×10^{12} Btu

6. Total, Electrical Savings: 234.03×10^{12} Btu

C. Grand Total: 546.05×10^{12} Btu

* Estimate is for both those programs proposed for funding under this grant request, and those which were funded in 1977, but which no additional EPCA/ECOA grant funding is requested for in 1978.

** It is assumed that all savings will be from fossil sources (i.e., hydroelectric and nuclear generation not affected)

TALLY SHEET
OF REDUCTIONS IN EMISSIONS, ETC.
(WATER)

	ACIDS	BASES	DIS. SOLIDS	SUS. SOLIDS	NON-DEG. ORG	BIO. O.D.	CHEM. O.D.
1 TOTAL	451.81	37.34	2,370.79	407.44	278.00	71.38	437.66
2 GASOLINE VEH.	—	—	—	—	—	—	—
3 DIESEL BUS	—	—	—	—	—	—	—
4 REFINERY, VEIL. FUEL	—	—	1.70	3.22	10.22	3.22	19.76
5 S.H. COMMERCIAL GAS	—	—	—	—	1.79	—	—
6 S.H. COMMERCIAL D. OIL	—	—	14.35	27.26	86.09	27.26	167.15
7 S.H. COMMERCIAL R. OIL	—	—	20.99	40.90	129.68	40.90	250.75
8 S.H. COMMERCIAL, COAL	—	.00	.00	.00	—	—	—
9 S.H. RESIDENTIAL, GAS	—	—	—	—	1.68	—	—
10 S.H. RESIDENTIAL, D. OIL	—	—	.00	.00	.00	.00	.00
11 ELEC. GEN - GAS T. - GAS	—	—	—	—	—	—	—
12 ELEC. GEN - GAS T. - OIL	—	—	—	—	—	—	—
13 ELEC. GEN - STEAM - GAS	—	—	—	—	—	—	—
14 ELEC. GEN - STEAM - OIL	—	—	—	—	—	—	—
15 ELEC. GEN - STEAM - COAL	451.81	37.34	2,333.75	336.06	48.54	—	—

State: CaliforniaDate: 1/16/78

TALLY SHEET
OF REDUCTIONS IN EMISSIONS, ETC.
(AIR)

	Particulates	Ox. of Nitro.	Sulfur Dioxide	Hydro-Carbons	CO	CO ₂	Aldehydes
1 TOTAL	16,649.31	134473.67	142257.2	11,175.31	16,123.55	34,836,246	3,004.97
2 GASOLINE, VEH.	262.88	1263.52	63.60	852.24	8,988.80	315,880	—
3 DIESEL BUS	.00	.00	.00	.00	.00	0	.00
4 REFINERY, VEH. FUEL	13.57	110.24	99.64	25.44	12.72	—	17.60
5 S.H. COMMERCIAL GAS	829.54	13636.74	28.16	354.24	811.69	5,470,180	439.43
6 S.H. COMMERCIAL D. OIL	2,053.92	8715.69	4930.33	1333.29	2690.25	3,048,950	408.92
7 S.H. COMMERCIAL R. OIL	4,308.03	12209.49	29084.31	1958.68	186.72	4,573,850	403.58
8 S.H. COMMERCIAL, COAL	.00	.00	.00	.00	.00	0	.00
9 S.H. RESIDENTIAL, GAS	774.77	10690.88	25.99	332.05	811.67	5,114,850	407.51
10 S.H. RESIDENTIAL D. OIL	.00	.00	.00	.00	.00	0	.00
11 ELEC. GEN - GAS T. - GAS	628.36	6147.00	87.42	107.91	241.78	723,980	—
12 ELEC. GEN. - GAS T. - OIL	196.35	1851.30	706.86	173.91	976.14	415,140	22.44
13 ELEC. GEN - STEAM - GAS	91.24	3625.02	3.70	242.90	2.47	752,130	41.92
14 ELEC. GEN - STEAM - OIL	5,018.74	63229.47	91955.13	5480.99	478.76	14,032,650	1,238.18
15 ELEC. GEN - STEAM - COAL	2,471.91	12994.32	15272.06	313.66	862.55	388,336	25.39

U-516-S-1
Table IV-D(1)

State: California

Date: 1/16/78