



CALIFORNIA ENERGY COMMISSION

Prop 39 (K-12) Program Energy Expenditure Plan Application

Local Assistance and Financing Office

Acting Manager: Armand Angulo

Prop 39 Program Manager: Elizabeth Shirakh

Ryan Nelson, Joseph Wang, Haile Bucaneg, Cheng Moua

Efficiency Division

California Energy Commission

October 27, 2015



Schedule

	Introduction:
9:10 AM-9:15 AM	Local Assistance and Financing Office Acting Manager- Armand Angulo
9:15 AM-9:20 AM	Workshop Introduction and Schedule
9:20 AM-10:00 AM	EEP Requirements and Methods-EEP Review Process
10:00 AM-10:10 AM	Break
10:10 AM -12:00 PM	EEP Requirements and Methods-EEP Review Process Cont.
	Questionnaire: Three questions from each attendee
12:00 PM-1:00 PM	Lunch Break
1:00 PM-3:00 PM	Questions Answered- Open Q&A Evaluation



What We Hope To Accomplish Today

- **Resources available.**
- **Explain the two main methods for completing the backup documentation for an EEP.**
- **Gain an understanding of our review process.**
- **Describe some of the issues we encounter in our review of the EEP.**
- **Review an example of Method 1 and Method 2 EEP submissions.**
- **Question and Answer session.**



California Energy Commission Website Resources

Program Implementation Guidelines

- » [New Final Guidelines - Proposition 39: California Clean Energy Jobs Act - 2015 Program Implementation Guidelines](#) (Revised December 10, 2014) (PDF file, 70 pages, 1 MB).
- » [Summary of Changes](#)

Energy Expenditure Plans (EEP)

- » [Energy Expenditure Plan Handbook](#) (Revised June 2015) (PDF file, 119 pages, 5.7 MB)
[Summary of Changes](#)
- » [Utility Data Release Authorization Form](#) - (CEC-12) (PDF File, Revised February 2015)
- » [Facility and Service Account Information Form](#) - (CEC-24) Revised June 2015. (PDF File, 6 pages, 1 MB)
- » [Listing of Utility Recipients for the CEC-12 and CEC-24 Forms](#)

EEP Resources

- » [Energy Savings Calculators, Version 7](#) (Excel file, 100 KB)
[Summary of Changes](#)
- » [PPA Calculator, Version 1](#) (Excel file, 274 KB)
- » [LEA Project SIR Worksheet Tool](#) (Excel file, 6 MB)

Other Related Content

- » [Energy-Related Resources for Schools](#) (PDF file, 14 pages, 353 KB)
- » [Senate Bill 73](#) (PDF file, 11 pages, 250KB)

Key State Agencies

The California Energy Commission collaborates with the following state agencies to implement Proposition 39:

- » California Department of Education
- » California Public Utilities Commission
- » California Workforce Investment Board
- » California Conservation Corps
- » Department of General Services, Division of the State Architect

California Clean Energy Jobs Act (Proposition 39) e-mail Listserv Automated E-Mail Notifications

Enter first name
Enter last name
Enter your e-mail

You will receive an email requesting that you confirm your subscription



California Clean Energy Jobs Act: Proposition 39 (K-12) Program Resources

[Program Implementation Guidelines](#)

[Energy Expenditure Plan Hand Book](#)

[FAQs](#)

[Energy Savings Calculators](#)

[PPA Calculator, Version 1](#)

[LEA Project SIR ^{c3} worksheet Tool](#)

c3

AIR. Typo. SIR
cmoua, 10/16/2015



Energy Expenditure Plan Submission:

Submission Overview:

- Gather fiscal year energy use utility data.
- Complete facility surveys to include envelope and all energy consuming systems.
- Use the survey and utility data information to prioritize the facilities and projects for the best use of the Prop 39 (K-12) Program funds.
- Assemble your EEP Package.
 - Fiscal Year Utility Energy Use Data (for benchmarking)
 - Audit report (if required)
 - Facility Descriptions
 - Energy Surveys
 - Energy Savings Calculations: For Each Energy Efficiency Measure.
 - For custom calculations provide any work papers to support assumptions.
- Enter the information online. Upload Backup documents

-----SUBMIT-----



What to include in the Energy Expenditure Plan

1. Utility Data Release and Facility and Service Account Information Forms (EEP Handbook Page 9)
 - Utility Data Release Authorization Form, [CEC-12](#)
 - »Print out the form and complete one for each separate utility company. Scan the forms and upload with your EEP.
 - Facility and Service Account Information Form, [CEC-24](#)
 - »Download and save to your computer. Fill out in electronic format one for each different utility company, save and upload with your EEP.



2. Project Supporting Documents Submission Methods (EEP Handbook Page 10)

“Project Supporting Documents – Each energy expenditure plan must include back-up calculations/analysis supporting the energy measures included in the energy expenditure plan. Supporting documents shall be uploaded in formats such as Microsoft Word®, PDF, Microsoft Excel®. Supporting documents shall consist of custom energy audits or Energy Commission energy savings calculators with an accompanying energy survey as described below. Use of the Energy Commission energy savings calculators without an accompanying energy survey will not be accepted.”



**Method 1:
Energy Commission Energy Savings Calculator
with Energy Survey.**

When an LEA chooses to use the Energy Commission energy savings calculators for ALL energy efficiency measures an Energy Survey is required.

Energy Survey shall contain:

- A description of the proposed energy efficiency measures and the buildings and/or facilities that will be improved by these measures.
- A description of the existing energy-using equipment (including type, age of equipment, size, number of units, operating hours, and so forth) obtained by surveying the buildings and/or facilities.
- Energy Savings estimates from the Energy Commission's energy savings calculator.
- Estimated energy efficiency measure costs.

LEA must submit CEC calculators as back-up, in it's original Excel format.

LEA is responsible for using the latest version at the time of submission.



**PROPOSITION 39: CALIFORNIA CLEAN ENERGY JOBS ACT 2015
PROGRAM IMPLEMENTATION GUIDELINES**
ECMs (Chapter 4)

Lighting Energy Efficiency Measures:

- ECM 1 Replace incandescent light with compact fluorescent
- ECM 2 Replace incandescent light with light-emitting diode (LED) light.
- ECM 3 & 4 Convert incandescent/CFL exit sign to LED exit sign
- ECM 5 & 6 Convert T12 fluorescent to T8 with electronic ballast or LED lamps
- ECM 6A Convert 4 foot 32 watt T8 fluorescent fixture to LED lamps
- ECM 7 Replace 32 watt T8 lamps with 28 watt T8 lamps
- ECM 8 & 9 Replace mercury vapor/HPS/Metal Halide with LED/induction lights
- ECM 10 Install occupancy control for intermittently occupied rooms



PROPOSITION 39: CALIFORNIA CLEAN ENERGY JOBS ACT 2015 PROGRAM IMPLEMENTATION GUIDELINES

ECMs (Chapter 4)

HVAC/Mechanical Efficiency Measures:

- ECM 11 Replace old packaged/split HVAC unit (up to 65KBtu) with high-efficiency HVAC
- ECM 12 Replace old heat pump (up to 65 kBtu) with high-efficiency heat pump
- ECM 13A Replace boiler with high-efficiency condensing boiler
- ECM 13B Replace furnace with high-efficiency condensing furnace
- ECM 14 Seal existing leaky duct
- ECM 15 Install variable speed drive for pumps and fans
- ECM 16 Replace manual thermostat with programmable thermostat
- ECM 17 Replace old motor with premium efficiency motor
- ECM 18 Replace storage water heater with gas-fired tankless water heater



Plug-Load Efficiency Measures:

- ECM 19 Install smart strip/PC management to control computers/printers
- ECM 20 Install vending machine occupancy control

Simple Photovoltaic (PV) Self-Generation Project

- ECM 21 Install PV System



Method 2: Energy Audit

When a calculation other than the Energy Commission savings calculator is used the LEA must provide an energy audit. Chapter 5 of the EEP Handbook lists the minimum requirements for an energy audit.

- » ECM energy savings calculations may be a mix of custom calculations and the Energy Commission energy savings calculator. However, this requires an Energy Audit be submitted. The Energy Audit shall discuss all EEMs regardless of calculation method.
- » Energy Expenditure Plan Handbook Chapter 5



EEP Review Process

General Review Steps:

1. LEA submits the EEP through the Proposition 39 (K-12) Program online system.
2. EEP is received by staff who then evaluate work load and assign EEPs accordingly.
3. Commission Project Manager (CPM) receives the EEP and contacts the LEA and LEA's Project Manager to inform them who their CPM will be.



EEP Review Process

4. The EEP is reviewed for containing the basic documents required to commence the review.
 - Example 1: CEC Calculator Only Method.
 - CEC Calculator Excel File
 - Equipment Survey Files
 - CEC-12 Form(s)
 - CEC-24 Form(s)
 - Example 2: Custom Calculator Method.
 - Audit Report and calculations
 - Equipment Survey Files
 - CEC-12 Form(s)
 - CEC-24 Form(s)



EEP Review Process

5. Once all the backup documentation is received and the EEP is next in the queue the CPM will start the technical and administrative review.



EEP Review Process

6. During the technical and administrative review. The CPM reserves the right to ask questions of all content within the submission and request additional information.

Including but not limited to:

- Costs
- Energy savings
- PV Performance
- Deemed Savings
- Custom Calculations Etc....

While it is the intent of the CPM to send as few emails as possible there may be considerable back and forth gathering information or clarifying items in the EEP.



EEP Review Process

7. The backup documentation including calculations and costs estimates will be checked for reasonableness. Updates/Corrections will be approved by the LEA representative or project manager entered in the EEP. Sometimes the CPM will be able to make the updates other times the updates are substantial and it is more effective to “Reactivate” the EEP and have the PM make the updates.
8. The Project Costs, Grant Amount Requested, Planning Funds Budget and Amount Spent will checked along with the other EEP online entries such as Senate District.



EEP Review Process

9. Once the CPM has concluded the review, a final pdf of the EEP values and entries will be sent to the LEA representative and PM for review and approval. Once approval is received the CPM will move to approve the EEP.



Common Issues

Administrative:

- Incomplete EEPs
 - Missing backup documentation
 - Audit reports
 - Calculations
 - Utility forms
 - Energy Survey etc...
- Quality Control
 - Data entered into the EEP does not match supporting calculations and/or audit report.
 - Calculations should match the audit. Which should match the EEP online submission.



Common Issues

Administrative (cont.):

- Communication
 - There have been occurrences where the LEA is not aware of what is submitted or approved.
 - Communication between the consultant and the LEA prior to submission is paramount.
 - The CPM keeps the LEA copied on important communications. The CPM may not copy the LEA on back and forth email until a solution is achieved as this may inundated the LEA with emails.



Common Issues

Technical:

- Outdated CEC Calculators (not the current version)
- Audit Report does not follow Chapter 5
 - No facility background
 - No summary table
 - No calculations Provided.
 - Every measure at every site needs to have a calculation included.



Common Issues

Technical (cont.):

- Calculation methodology
 - Only shows results and no inputs and assumptions
 - Incorrect use of ratings
 - Misapplication of calculations
 - Building Energy Modeling without inputs and assumptions
 - High heating and cooling hours
 - High lighting use hours



Common Issues

Technical (cont.):

- High energy savings
 - Often times we will find EEPs with energy savings 80%, 90%, 100%+ of baseline consumed data.
 - We are reviewing the EEPs for sound methodology and reasonableness of the total savings.
 - Energy Balance required if any of the following are true:
 - If the lighting baseline kWh exceeds 35%
 - If the HVAC baseline kWh exceeds 50%



Common Issues

Technical (cont.):

- Controls-EMS-Variable Speed Drives
 - Many people use the “Average Cost of Energy” The demand charge should be removed from the cost as the controls do not guarantee a permanent demand reduction.
 - Zero demand savings should be claimed.
- Lighting
 - Lighting retrofits and lighting controls are claimed in the same ECM.
 - They have different EULs. They may be calculated in the same spreadsheet, however, they should be treated as separate ECMs.



Common Issues

Technical (cont.):

- Energy Modeling:
 - Provide the inputs
 - Building materials
 - Schedule
 - Equipment efficiencies
 - Provide the outputs in a clear and concise format.
 - May be directly output from the model software, however, it should clearly labeled.
 - Calibrate the Model:
 - Calibrate the model to the existing utility energy use data.



Common Issues

- Solar: Photo Voltaic Systems Effective Useful Life (EUL)
 - 20 years or 25 years?
 - To select and EUL of 25 years. A written warranty of the entire PV system is required. This includes all components and not just the PV panels.
 - Recommend sizing a PV system for 70% of the site consumption to allow for future Energy Efficiency Measures.



Common Issues

- Power Purchase Agreements:
 - Letter of Intent
 - Performance Guarantee
 - 5 year Roof warranty



Common Issues

- Using the CEC Calculator for Vertical Wall Mounted Heat Pumps (HP) (Typical on portable units)
 - You may use the CEC calculator for Vertical Wall Mounted Heat Pumps.
 - Select the proper calculator ECM for HPs
 - Use the SEER 13 rating for the new HPS
 - Install EER 11.5 HPS



Common Issues

- EER or SEER?
 - Depending on the type of equipment and the Title 24 Part 6 rating requirements.
 - SEER and EER are two different rating methods and are not directly relatable. When performing a custom calculation for HVAC replacement use consistent ratings. Many older pieces of equipment were rated in EER. When comparing EER and SEER ratings convert SEER to EER. One such conversion is $SEER * 0.9 = EER$.



Common Issues

- HVAC Equipment performance degradation:
 - The Commission allows a 10% performance degradation from the equipment's required efficiency when manufactured.
 - Previous equipment efficiencies can be found here:
http://www.energy.ca.gov/appliances/previous_regulations.html
 - If greater than 10% degradation is used data logging of the equipment kW or voltage and current draw (AMPS) is required.



Common Issues

- Charter School and Public School Occupy Same Site:
 - May the charter schools and an public school combine together in one EEP?
 - No, they may not. Each entity is a LEA, has a separate CDS code and Prop 39 Allocation.
 - May the charter school and public school submit an EEP for the same site?
 - Yes! The charter school may apply for the areas that it occupies and the public school the other areas.
 - We encourage communication and cooperation between these LEAs.



Commonly Used Terms

The following are some terms often used in the completion of and Audit Report and EEP.

This list is strictly informational and is not a recommendation.

- **ENERGY EFFICIENCY RATIO (EER)** is the ratio of net cooling capacity (in Btu/hr) to total rate of electrical energy input (in watts), of a cooling system under designated operating conditions, as determined using the applicable test method. (Units: Btu/Wh)

$$EER = Q_{cooling} (Btu/h) / Watts Input$$



Commonly Used Terms

- **SEASONAL ENERGY EFFICIENCY RATIO (SEER)** is the total cooling output of an air conditioner in Btu during its normal usage period for cooling divided by the total electrical energy input in watt-hours during the same period, as determined using the applicable test method in the Appliance Efficiency Regulations. (Units: Btu/Wh)

$$SEER = h_{heating} (Btu) / Wh$$



Commonly Used Terms

- **HEATING SEASONAL PERFORMANCE FACTOR (HSPF)** is the total heating output of a central air-conditioning heat pump (in Btu) during its normal use period for heating divided by the total electrical energy input (in watt-hours) during the same period, as determined using the applicable test method.

$$HSPF = h_{heating} (Btu) / Wh$$



Commonly Used Terms

- **COEFFICIENT OF PERFORMANCE (COP)**, is the ratio of the rate of net heat removed /added to the rate of total energy input, calculated under designated operating conditions and expressed in consistent units, as determined using the applicable test method

$$COP = Q_{useful} (Watts) / E_{in} (Watts)$$

- kW/TON = 12/EER
- EER = 12/kW/TON
- $Q = UA (T_{in} - T_{out})$ (heat transfer across a surface)
- $Q = 1.08 * (CFM) * (Delta T)$ (Coil Sensible Cooling)



EEP Example 1

Commission Energy Saving Calculation EEP

EEP Requirements:

- A description of the proposed energy efficiency measures and the buildings and/or facilities that will be improved by these measures.
- A description of the existing energy-using equipment (including type, age of equipment, size, number of units, operating hours, and so forth) obtained by surveying the buildings and/or facilities.
- Energy Savings estimates from the Energy Commission's energy savings calculator.
- Estimated energy efficiency measure costs.



EEP Example 1

- Total-Summary Page
- [Energy Survey](#)
- [Energy Commission's Energy Savings Calculator](#)
- [Online System Entry](#)



EEP Example 1

Benchmarking:

- Electricity:
- Average kW demand: 100 kW
- Annual PV Electricity Production: 0 kWh
- Electricity Purchase from Utility (Fiscal Year): 300,000 kWh
- Total Annual Electrical Use: 300,000 kWh
- Total Annual Electrical Charges: (\$0.15/kWh) \$45,000



EEP Example 1

Benchmarking:

- Natural Gas:

- Total Annual Natural Gas Use: 3000 Therms
- Total Annual Gas Charges:(\$1.75/ Therm) \$5,250

- Other Fuels:

- Propane
- Fuel Oil



EEP Example 1

ECMs:

- 1) Re-lamp Fluorescent Lighting Fixtures: The existing lighting systems in the class rooms are T-8 32Watt lamp-4 lamps per fixture. It is recommended that the fixtures be re-lamped with LED linear lamps.
 - » 6 classrooms
 - » 20 fixtures per classroom
 - » 4-32 W lamps per fixture
 - » 480 total lamps
 - » Cost \$15,000
 - » Rebate \$1000



EEP Example 2

Custom Calculation EEP (Handbook Chapter 5)

- 1) [Audit Report I](#)
- 2) [Audit Report II](#)
- 3) Custom Calculations
 - [BIN Data Sorted](#)
 - [Equivalent Full Load Hours](#)
 - [Lighting Survey I](#)
 - [Lighting Survey II](#)
 - [TRACE 700 Building Load Profile Sorted](#)
 - [Boiler Calculation](#)
 - [Chiller Calculation](#)
 - [HVAC Calculation](#)



Conclusion

Thank you for attending and participating in our training workshop!

Prop 39 (k-12) Program Hotline:

Prop39@energy.ca.gov

- Toll-free for those in California: 855-380-8722
- Toll line for those out of state: 916-653-0392