

**Proposal to the  
California Energy Commission  
Regarding Prop 39 Funding for First Preference Counties**

Submitted by the:  
Calaveras Public Power Agency  
Tuolumne Public Power Agency  
Trinity Public Utilities District

**Revised, August 2015**

**Background**

Three rural California counties (Calaveras, Tuolumne and Trinity) receive a **First Preference (FP)** Federal Power rate as a result of the federal government taking taxable land away from these counties in order to build major hydroelectric projects within these counties. These are the only three counties in the state to have this designation. This FP power was granted to the counties by the U.S. Congress to mitigate, in part, the negative impacts the projects had upon the local area. These impacts included the loss of private taxable lands, loss of lands that produced food and fiber, loss of local water resources, and greater demand placed upon local services (such as police and fire protection) to serve the projects' recreational facilities.

The U.S. Congress in 1955 passed the Trinity River Division Act (Public Law 386) providing for the construction of multiple dams and reservoirs in rural Trinity County. Please see **Attachment 1**. Later, Congress passed the 1962 Flood Control Act (Public Law 87-874) which authorized the construction of New Melones dam and reservoir located in Calaveras and Tuolumne counties along the Stanislaus River. Please see **Attachment 2**.

Both the Trinity River Division and New Melones Project had significant negative impacts upon the counties. Substantial amounts of private land were acquired by the federal government for the dams, reservoirs, and area surrounding these facilities. The Trinity River Division added 20,000 acres of public land in Trinity County where public lands already comprise 80 percent of the county's total land area. The New Melones project occupies 30,000 acres in Calaveras and Tuolumne counties. 77 percent of land in Tuolumne County is owned by governmental agencies. 21 percent of the land in Calaveras County is owned by governmental agencies. These private lands were taken off the tax rolls resulting in the loss of tax revenue for local agencies including local school districts.

**The Issue**

The low power rate that the FP Power Agencies charge in these counties put the schools at a distinct disadvantage for taking full advantage of the California Clean Energy Jobs Act (Prop 39) funding. This results in many energy efficiency projects not being able to meet the Prop 39 Savings to Investment Ratio (SIR). Therefore, as it stands right now, many of these three county's schools are not able to participate or qualify for Prop 39 funding, unless they have another funding source besides Prop 39. In most cases, these rural California schools do not have another source for the amount of funding it would take to bring the SIR in line for Prop 39 funding.

**The Solution**

When meeting with the California Energy Commission (CEC) on July 7, 2015, the managers of these three FP Power Agencies and CEC staff arrived at the following solution for schools in their jurisdictions to participate in Prop 39 energy efficiency projects.

**Suggestion by the CEC:** Find a way to add a “supplemental cost” to the existing rates of all three FP Counties that is reflective of lost tax revenue, in order to offer a rate for Prop 39 that is more indicative of the “true cost” of power for these jurisdictions.

First, here is the combined average rate that these counties currently charge their schools this fiscal year:

- 8.9¢ p/kWh. We will call this the FP blended rate.

Second, County Assessors Offices were asked for lost tax revenue, in today’s dollars, due to the hydro projects in each of the counties. Here is the total lost property tax revenue for all three counties per year:

- \$655,225 per year.

Third, consumption of electrical power for all schools K-12 was totaled for the 2014 calendar year in all three counties:

- 15,282,486 kWh

A “supplemental cost” as noted above is derived by dividing the total lost tax revenue in all three counties by the total school consumption for one year:

$$\frac{\text{Total lost tax revenue } \$655,225}{\text{Total school consumption } 12,282,486 \text{ kWh}} = \$0.0429, \text{ or } 4.3¢ \text{ per kWh}$$

The supplemental cost added to the blended 3 county rate (4.3¢ + 8.9¢) = 13.2¢ p/kWh

According to energy consultants familiar with Prop 39, a rate of 13.2¢ per kWh will help most schools in these FP jurisdictions meet the SIR with regard to the projects they would like to undertake.

Prop. 39 was created, in part, as a way for California schools to pay for energy efficiency projects and produce better learning environments. Without changes made to Prop 39 guidelines, these First Preference counties will be left behind and their schools will not be able to fully partake in its many benefits and become more energy efficient.

**Proposal/Recommendation**

It is respectfully requested that the Prop 39 Guidelines be amended to permit the LEAs in First Preference counties (Calaveras, Tuolumne and Trinity) use the above proposed formula to arrive at a power rate of 13.2¢ p/kWh for their Prop 39 projects. This rate is much more reflective of the true cost of power when considering lost tax revenue due to the federal hydro projects built in these three

counties. If this change to the guidelines for these FP counties is adopted, it will enable most, if not all energy efficiency projects in these counties to meet the SIR. This one change will help assure the counties' ability to fully partake in Prop 39 funding.

### **Local Educational Agencies**

#### **Calaveras**

- Bret Harte Union High School District
- Calaveras County Office of Education
- Calaveras Unified School District
- Mark Twain Union Elementary School District
- Vallecito Union School District

#### **Tuolumne**

- Belleview School District
- Big Oak Flat-Groveland School District
- Columbia Union School District
- Curtis Creek School District
- Jamestown School District
- Sonora School District
- Sonora Union High School District
- Soulsbyville School
- Summerville School District
- Summerville Union High School District
- Tuolumne County Superintendent of Schools
- Twain Harte-Long Barn Union School District

#### **Trinity**

- Burnt Ranch School District
- Coffee Creek School District
- Douglas City School District
- Junction City School District
- Lewiston School District
- Mountain Valley Unified School District
- Southern Trinity Joint Unified School District
- Trinity Alps Unified School District
- Trinity Center School District
- Trinity County Office of Education

**Attachment 1**

**1955 Trinity River Division Act**

**PUBLIC LAW 386-AUG. 12, 1955 [69 ST AT.**

**AN ACT**

To authorize the Secretary of the Interior to construct, operate, and maintain the Trinity River division. Central Valley project, California, under Federal reclamation laws.

SEC. 4. Contracts for the sale and delivery of the additional electric energy available from the Central Valley project power system as a result of the construction of the plants herein authorized and their integration with that system shall be made in accordance with preferences expressed in the Federal reclamation laws: *Provided* That a first preference, to the extent of 25 per centum of such additional energy, shall be given, under reclamation law, to preference customers in Trinity County, California, for use in that county, who are ready, able and willing, within twelve months after notice of availability by the Secretary, to enter into contracts for the energy: *Provided further* That Trinity County preference customers may exercise their option on the same date in each successive fifth year providing written notice of their intention to use the energy is given to the Secretary not less than eighteen months prior to said date.

**Attachment 2**

**Flood Control Act of 1962**

## SAN JOAQUIN RIVER BASIN

The New Melones project, Stanislaus River, California, authorized by the Flood Control Act approved December 22, 1944 (58 Stat. 887), is hereby modified substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 453, Eighty-seventh Congress, at an estimated cost of \$113,717,000: *Provided*, That upon completion of construction of the dam and powerplant by the Corps of Engineers, the project shall become an integral part of the Central Valley project and be operated and maintained by the Secretary of the Interior pursuant to the Federal reclamation laws, except that the flood control operation of the project shall be in accordance with the rules and regulations prescribed by the Secretary of the Army: *Provided further*, That the Stanislaus River Channel, from Goodwin Dam to the San Joaquin River, shall be maintained by the Secretary of the Army to a capacity of at least eight thousand cubic feet per second subject to the condition that responsible local interests agree to maintain private levees and to prevent encroachment on the existing channel and floodway between the levees: *Provided further*, That before initiating any diversions of water from the Stanislaus River Basin in connection with the operation of the Central Valley project, the Secretary of the Interior shall determine the quantity of water required to satisfy all existing and anticipated future needs within that basin and the diversions shall at all times be subordinate to the quantities so determined: *Provided further*, That the Secretary of the Army adopt appropriate measures to insure the preservation and propagation of fish and wildlife in the New Melones project and shall allocate to the preservation and propagation of fish and wildlife, as provided in the Act of August 14, 1946 (60 Stat. 1080), an appropriate share of the cost of constructing the Stanislaus River diversion and of operating and maintaining the same: *Provided further*, That the Secretary of the Army, in connection with the New Melones project, construct basic public recreation facilities, acquire land necessary for that purpose, the cost of constructing such facilities and acquiring such lands to be non-reimbursable and nonreturnable: *Provided further*, That contracts for the sale and delivery of the additional electric energy available from the Central Valley project power system as a result of the con-

struction of the plants herein authorized and their integration with that system shall be made in accordance with preferences expressed in the Federal reclamation laws except that a first preference, to the extent as needed and as fixed by the Secretary of the Interior, but not to exceed 25 per centum of such additional energy, shall be given, under reclamation law, to preference customers in Tuolumne and Calaveras Counties, California, for use in that county, who are ready, able, and willing, within twelve months after notice of availability by the Secretary of the Interior, to enter into contracts for the energy and that Tuolumne and Calaveras County preference customers may exercise their option in the same date in each successive fifth year providing written notice of their intention to use the energy is given to the Secretary not less than eighteen months prior to said dates: *And provided further*, That the Secretary of the Army give consideration during the preconstruction planning for the New Melones project to the advisability of including storage for the regulation of streamflow for the purpose of downstream water quality control.

The Hidden Reservoir, Fresno River, California, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in Senate Document Numbered 37, Eighty-seventh Congress, at an estimated cost of \$14,338,000.

The Buchanan Reservoir, Chowchilla River, California, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in Senate Document Numbered 98, Eighty-seventh Congress, at an estimated cost of \$13,585,000.

The project for flood protection on Mormon Slough, Calaveras River, California, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 576, Eighty-seventh Congress, at an estimated cost of \$1,960,000.

Mailed 10-14-15



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**Kathy Northington**  
County Superintendent of Schools

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Calaveras County Office of Education

October 14, 2015

Mr. Joseph Wang P.E., CEM  
Proposition 39 Program  
California Energy Commission  
1516 Ninth Street, MS-29  
Sacramento, CA 95814-5512

SUBJECT: Prop 39 Funding

Dear Mr. Wang:

The Calaveras County Office of Education supports the proposal to the CEC to make an exception for Local Educational Agencies (LEAs) located in the First Preference counties (Calaveras, Tuolumne and Trinity) by accepting the formula for a blended rate when applying for Proposition 39 funding. Many LEAs in Calaveras County may not be able to receive their full funding and, therefore, may not be able to implement as many energy efficiency measures without this consideration.

Thank you for your support of this effort.

Sincerely,

Kathy Northington, County Superintendent  
Calaveras County Office of Education

KN:sc



October 9, 2015

Mr. Joseph Wang P.E., CEM  
Proposition 39 Program  
California Energy Commission  
1516 Ninth Street, MS-29  
Sacramento, CA 95814-5512

Dear Mr. Wang:

This letter is to impart the Tuolumne County Superintendent of Schools support of the proposal to the CEC to make an exception for First Preference counties by accepting the formula for a blended rate for Proposition 39. Many districts in Tuolumne County have been forced to include projects with higher SIRs in their EEP's supplanting other more major or needed projects that would otherwise qualify if the district was paying higher electricity rates.

Please let me know if there is any further information you may need in this matter.

Sincerely,



Marguerite D. Bulkin  
County Superintendent

October 6, 2015

Mr. Joseph Wang P.E., CEM  
Proposition 39 Program  
California Energy Commission  
1516 Ninth Street, MS-29  
Sacramento, CA 95814-5512

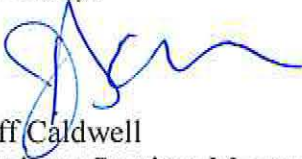
Dear Mr. Wang:

This letter is to impart the Trinity County Office of Education's support in your Proposition 39 proposal regarding counties with low electricity rates. It has been our experience that districts in Trinity County have been forced to include projects with higher SIRs in their EEPs, supplanting other more major or needed projects that would otherwise qualify if the district was paying higher electricity rates.

Please let me know how I can help or if you need any additional information.

Thank you for your work on our county's behalf.

Sincerely,



Jeff Caldwell  
Business Services Manager  
Trinity County Office of Education  
PO Box 1256  
Weaverville, CA 96093  
Ph: (530) 623-2861 ext. 224

# Freedom Energy Corporation

Energy Management, Design and Installation for Independence

## **Proposition 39 Project Report**

Prepared For:

**Summerville Elementary School District**

2015

Freedom Energy Corporation  
[freedomenergycorp.com](http://freedomenergycorp.com)

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## Freedom Energy Corporation Overview

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Freedom Energy Corporation works with businesses, individuals and agencies to develop their own energy plans and goals. We strive to work with local customers, workforce and vendors as much as possible. As a Corporation and team, we have proven success with energy modeling, competitive bidding and project management. We hold a CA C-10 Electrical Contracting License, BPI certifications, multiple collegiate degrees and have over 15 years of experience in the energy industry.

Freedom Energy Corporation is passionate about utilizing the benefits of energy conservation and generation as an economic stimulus to local communities, and customers. Freedom Energy Corporation is committed to creating long-term relationships with our customers and community, and we pride ourselves in the amount of energy as a team we have saved and created with our conservation and renewable projects.

## Acknowledgements and Contact

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Much time and effort went into collecting the information and resources needed for the Proposition 39 Project Report. Freedom Energy Corporation would like to thank the LEA staff for gathering information, answering questions and participating in the Prop 39 process. We would also like to thank the utilities for their help in providing data and supporting their local LEA. Thanks to our energy assistant, Emma Ingebretsen. Also, Freedom Energy Corporation would like to thank the CEC for their support and assistance.

For questions about this report please contact [emily@freedomenergycorp.com](mailto:emily@freedomenergycorp.com).

# 1 Executive Summary

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The on-site survey of Summerville Elementary School District was completed on June 9th, 2015 by Freedom Energy Corporation staff. During the energy survey, Freedom Energy Corporation staff made observations, measurements and data collection of all energy using equipment and buildings on the school campus. Information collected during this energy audit was used to create and produce the following:

- Utility data analysis
- Benchmarking metrics
- Executive Summary
- Inventory of lighting, and HVAC systems
- EEP measures and suggested project scope
- Tracking and reporting information

In addition to the collection of energy use data Freedom Energy Corporation interviewed school staff and collected school schedules to determine operating hours for the school and equipment. These hours and assumptions were used to come up with energy use and saving estimates in this report.

Freedom Energy Corporation staff has primarily collected the data used to develop this report. The scope of the data collected was focused primarily on addressing the recommendations or energy conservations measures listed by the California Energy Commission. For all purposes Freedom Energy Corporation collected the most accurate data possible to develop the most appropriate assumptions possible.

## *Utility Data Analysis and Benchmarking*

Based on our analysis, Summerville Elementary School District has an energy use intensity (EUI) of 73.3 (kBtu/sqft/year), and an energy cost index (ECI) of \$0.56 (cost/sqft/year). Listed in the appendices of this report are benchmarking resources with comparable EUI and ECI measurements. The resources listed in the appendices of this report have their own data set disadvantages, including comparison at a national scale and outdated data, but they are listed because they are still useful as a comparison tool. After the five-year cycle of Prop 39 there should be a good data set of energy use numbers for California schools available to compare Summerville Elementary School District's benchmarking results listed in this report.

## *Energy Use Distribution*

The distribution of energy use in Summerville Elementary School District, based on our analysis, is shown in the following figures. Lighting is assumed to be the highest use of electricity on campus, with HVAC only a little bit less. Space heating and water heating represent the largest end uses for propane. With only two HVAC units using propane, most of the energy use at Summerville Elementary School is electricity so most likely actual HVAC electric end use is higher than estimated. On campus to heat and cool classroom Building D is an open loop geothermal system. End-use results of this survey indicate that energy use for Summerville Elementary School District's is lower than most schools throughout California.

Figure 1: Summerville Elementary Propane Use Distribution, by End Use

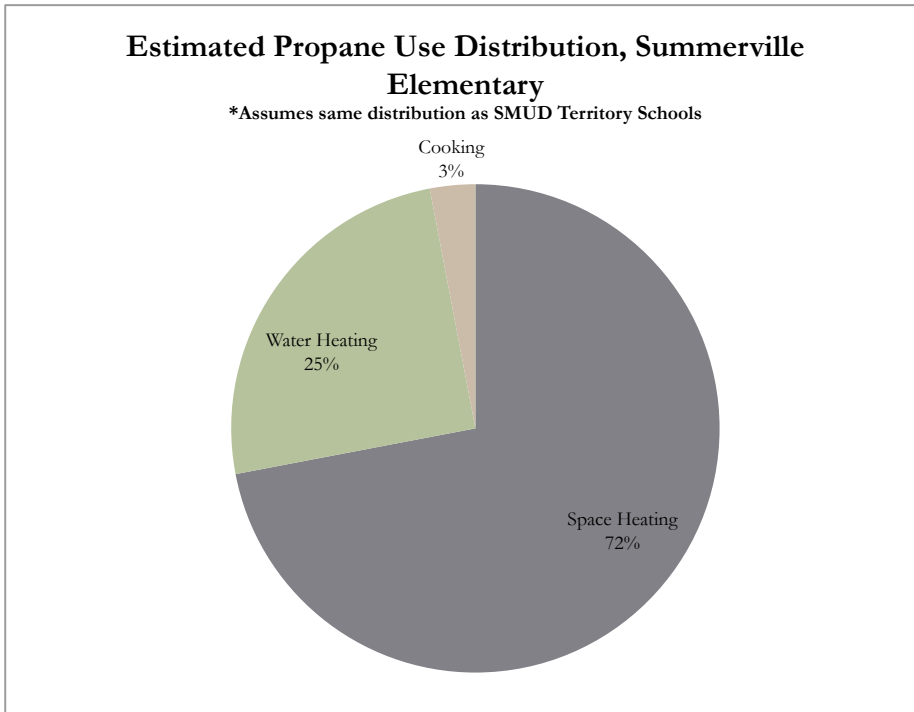
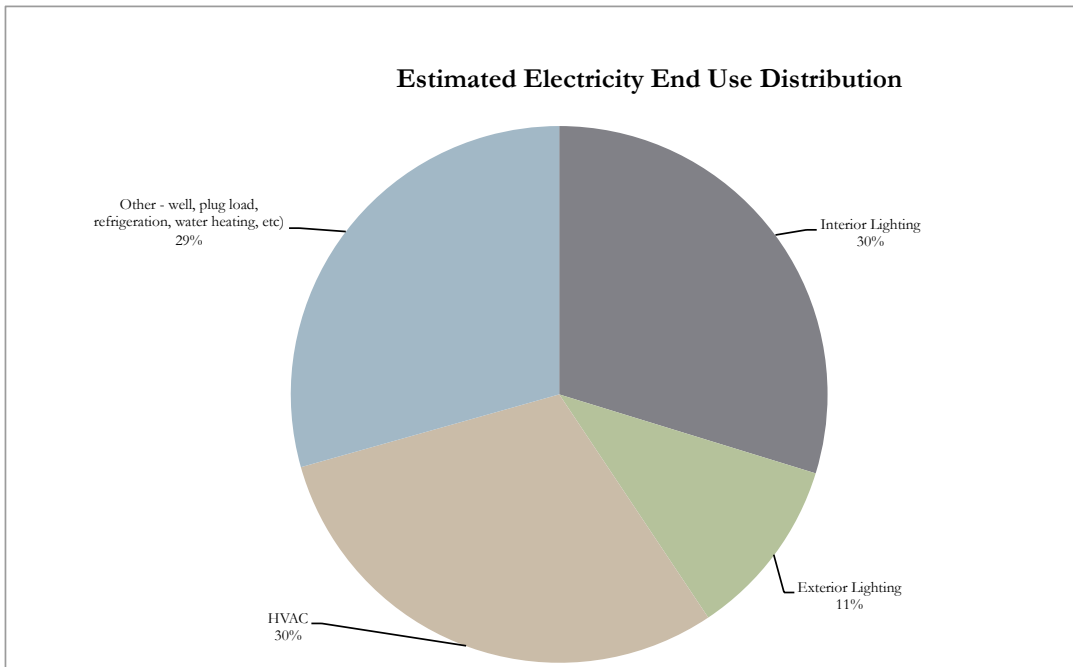


Figure 2: Summerville Elementary Use Distribution, by End Use





### *Project Analysis*

In response to the alternative electricity rate under consideration for Tuolumne, Calaveras and Trinity Counties an analysis was done for Summerville Elementary School District to compare Prop 39 project numbers at the current Tuolumne Public Power Agency rate of \$0.093 per kWh to \$0.132 per kWh. Below are comparison results. For Summerville Elementary School District a rate of \$0.132 per kWh allows the school to utilize Prop 39 funds beyond lighting, and expand the project to add additional HVAC units, LED panel fixtures for classrooms, occupancy and daylighting controls and 15 kW of solar. The results of this analysis hope to encourage an exemption for the rates of these counties, so that LEAs, like Summerville Elementary School will be able to utilize all allocated Prop 39 funds.

At \$0.093 per kWh for Summerville Elementary School District for an EEP at 1.05 SIR:

- Total allocation of Prop 39 funds is **\$137,576.29**
- Estimated savings of **84,685 kWh**
- Estimated cost of savings **\$7,875.73**

At \$0.132 per kWh for Summerville Elementary School District for an EEP at 1.09 SIR:

- Total allocation of Prop 39 funds is **\$254,898.43**
- Estimated savings of **156,133 kWh**
- Estimated cost of savings **\$16,663.42**

To be able to maximize the energy savings of Prop 39 funds, a project at the \$0.132 kWh rate would be the best option. Below are project descriptions for each rate.

### *Project Description*

At 9 cents per kWh Summerville Elementary School District's estimated total allocation of Prop 39 funds is \$137,576.29. The project plan would include the following energy efficiency measures:

- Replace Incandescent lighting and "Jelly Jars" with LED Wallpack
- Replace Halogen Floods with LED large wallpack
- Replace Gym HPS Floods with Large LED Wallpack
- Replace HID Pole Lighting with LED
- Replace HPS on Building E with Small Wallpack
- Replace Building E MH Floods with LED Large Wallpacks
- Upgrade CFL Wallpacks to LED Wallpacks
- Remove (24) T82L4' Fixtures --> replace with (9 ) high performing T81L4' Fixtures in 11 classrooms
- Delamp 4 T81L4' Fixtures in 11 classrooms
- Replace all incandescent exit signs to LED
- Replace all 23W CFL screw-in lamps to LED lamps
- Replace all Incandescent lamps to LED lamps
- Upgrade 7.5 ton heat pump that is over 30 years old to high efficiency heat pump

The energy efficiency measures in this project are estimated to save 84,685 kWh per year or an estimated \$7,875.73 of cost for utilities. Savings are based off a rate of \$0.093 per kWh, Tuolumne Public Power Agency's current rate. This project has a SIR of 1.05. Below is a table from the CEC LEA SIR worksheet that lists the measures of this project.

Energy Efficiency Measure	Description	Annual Electric Savings (kWh)	Annual Cost Energy Savings (\$)	Measure Cost (\$)	Rebates (\$)	Other Non-Repayable Funds (\$)
Lighting- Exterior Fixture Retrofit	Replace Incandescent "Jelly Jars" with LED Wallpacks	7,478	\$695.49	\$7,742.50		
Lighting- Exterior Fixture Retrofit	Replace Halogen Floods with LED large wallpack	1,673	\$155.57	\$650.00		
Lighting- Exterior Fixture Retrofit	Replace Gym HPS Floods with Large LED Wallpack	10,455	\$972.32	\$2,409.39		
Lighting- Exterior Fixture Retrofit	Replace HID Pole Lighting with LED	6,970	\$648.21	\$1,741.38		
Lighting- Exterior Fixture Retrofit	Replace HPS on Building E with Small Wallpack	533	\$49.57	\$303.02		
Lighting- Exterior Fixture Retrofit	Replace Building E MH Floods with LED Large Wallpacks	2,493	\$231.83	\$620.00		
Lighting- Exterior Fixture Retrofit	CFL Wall packs	369	\$34.32	\$660.00		
Lighting- Interior Fixture Retrofit	(9) T82L4' fixtures upgraded to high performing T81L4' fixtures in 11 classrooms	5,664	\$526.79	\$22,275.00		
Lighting- Interior Fixture Retrofit	Delamp (4) T81L4' Fixtures in 11 classrooms	2,518	\$234.13	\$8,800.00		
Lighting- Interior Fixture Retrofit	(24) T82L4' Fixtures -- > (9) Fixtures in 11 classrooms	18,881	\$1,755.96	\$33,000.00		
Lighting- Interior Fixture Retrofit	Upgrade all T83L4' to T81L4' high performance fixtures	25,075	\$2,331.94	\$49,275.00		
Lighting- LED Exit Signs	Replace Exit Signs to LED	1,261	\$117.31	\$320.00		
Lighting- Interior Fixture Retrofit	Upgrade 23W CFL to 9W LED	200	\$18.62	\$160.00		
Lighting- Retrofit Interior Lamps to LED	incandescent to LED	91	\$8.48	\$20.00		
HVAC- Packaged/Split System AC/Heat Pump/VRF	Upgrade 7.5 ton heat pump that is over 30 years old	1,024	\$95.20	\$9,600.00		
		<b>84,685</b>	<b>\$7,875.73</b>	<b>\$137,576.29</b>		

At 13 cents per kWh Summerville Elementary School District's estimated total allocation of Prop 39 funds is \$254,898.43. The project plan would include the following energy efficiency measures:

- Replace Incandescent "Jelly Jars" with LED Wallpacks
- Replace Halogen Floods with LED large wallpack
- Replace Gym HPS Floods with Large LED Wallpack
- Replace HID Pole Lighting with LED
- Replace HPS on Building E with Small Wallpack
- Replace Building E MH Floods with LED Large Wallpacks
- Upgrade CFL Wallpacks to LED
- (9) T82L4' fixtures upgraded to Evokit LED panels in 11 classrooms
- Delamp (4) T81L4' Fixtures in 11 classrooms
- (24) T82L4' Fixtures --> (9) Fixtures in 11 classrooms
- Replace Exit Signs to LED
- Upgrade all 23W CFL to 9W LED
- Incandescent to LED
- Smartwise accessory with Evokit LED panels for daylighting and occupancy sensors
- Replace (20) Classroom ground mounted heat pumps
- Upgrade 7.5 ton heat pump that is over 30 years old
- 15 kW

The energy efficiency measures and photovoltaic system in this project are estimated to save Summerville Elementary 156,133 kWh per year or an estimated \$16,663.42 of cost for utilities. Savings are based off a rate of \$0.132 per kWh. This project has a SIR of 1.18. Below is a table from the CEC LEA SIR worksheet that lists the measures of this project.

Energy Efficiency Measure	Description	Annual Electric Savings (kWh)	Annual Cost Energy Savings (\$)	Measure Cost (\$)	Rebates (\$)	Other Non-Repayable Funds (\$)
Lighting- Exterior Fixture Retrofit	Replace Incandescent "Jelly Jars" with LED Wallpacks	7,478	\$987.15	\$7,742.50		
Lighting- Exterior Fixture Retrofit	Replace Halogen Floods with LED large wallpack	1,673	\$220.81	\$650.00		
Lighting- Exterior Fixture Retrofit	Replace Gym HPS Floods with Large LED Wallpack	10,455	\$1,380.06	\$2,409.39		
Lighting- Exterior Fixture Retrofit	Replace HID Pole Lighting with LED	6,970	\$920.04	\$1,741.38		
Lighting- Exterior Fixture Retrofit	Replace HPS on Building E with Small Wallpack	533	\$70.36	\$303.02		
Lighting- Exterior Fixture Retrofit	Replace Building E MH Floods with LED Large Wallpacks	2,493	\$329.05	\$620.00		
Lighting- Exterior Fixture Retrofit	Upgrade CFL Wallpacks to LED	369	\$48.71	\$660.00		
Lighting- Interior Fixture Retrofit	(9) T82L4' fixtures upgraded to Evokit LED panels in 11 classrooms	5,487	\$724.33	\$37,125.00		

Energy Efficiency Measure	Description	Annual Electric Savings (kWh)	Annual Cost Energy Savings (\$)	Measure Cost (\$)	Rebates (\$)	Other Non-Repayable Funds (\$)
Lighting- Interior Fixture Retrofit	Delamp (4) T81L4' Fixtures in 11 classrooms	2,518	\$332.31	\$8,800.00		
Lighting- Interior Fixture Retrofit	(24) T82L4' Fixtures --> (9) Fixtures in 11 classrooms	18,881	\$2,492.33	\$33,000.00		
Lighting- LED Exit Signs	Replace Exit Signs to LED	1,261	\$166.51	\$320.00		
Lighting- Interior Fixture Retrofit	Upgrade all 23W CFL to 9W LED	200	\$26.43	\$160.00		
Lighting- Retrofit Interior Lamps to LED	Incandescent to LED	91	\$12.04	\$20.00		
Lighting Controls	Smartwise accessory with Evokit LED panels for daylighting and occupancy sensors	12,003	\$763.40	\$10,890.00		
HVAC- Packaged/Split System AC/Heat Pump/VRF	Replace (20) Classroom ground mounted heat pumps	59,782	\$4,766.00	\$98,000.00		
HVAC- Packaged/Split System AC/Heat Pump/VRF	Upgrade 7.5 ton heat pump that is over 30 years old	1,024	\$135.12	\$9,600.00		
Photovoltaic System	15 kW	24,915	\$3,288.78	\$42,857.14		
		<b>156,133</b>	<b>\$16,663.42</b>	<b>\$254,898.43</b>		

### CEC Measure Description

Below are further details regarding the energy efficiency measures that will be included in the Summerville Elementary School District's Prop 39 energy expenditure plan. The measures are listed as their description above, and identified by the California Energy Commission's energy efficiency measure descriptions from the LEA SIR worksheet.

To determine the kWh savings for lighting the following estimated annual operating hours were used.

Month	M-F Office Days	M-F School Days	Holidays	Minimum Days	Office/Shop Hours	Classroom/Gym Hours
July	23	0	1	0	220	0
August	21	8	0	0	210	80
September	22	22	1	2	210	206
October	23	23	0	2	230	226
November	20	20	5	1	150	148
December	23	23	8	2	150	146
January	22	22	3	2	190	186
February	20	20	1	2	190	186
March	22	22	2	1	200	198
April	22	22	3	2	190	186
May	21	21	1	1	200	198
June	22	3	0	1	220	28
<b>Totals</b>	<b>261</b>	<b>206</b>	<b>25</b>	<b>16</b>	<b>2360</b>	<b>1788</b>

Savings were calculated for lighting, the photovoltaic system and the 7.5 ton heat pump replacement. Savings for the heat pumps under 5.4 tons and lighting controls were determined from the CEC calculator. The measures and project listed in the next few pages is the \$0.132 energy expenditure plan for Summerville Elementary School District.

## Lighting- Interior Fixture Retrofits

EEM	Location	# of Fixtures	Existing Description	Existing Wattage/ Fixture	Replacement Description	Replacement Fixture Wattage	Watts Reduced	Annual Operating Hours pre Retrofit	kWh saved per year	Total Cost	Savings per year (@9.3 Cents)	Savings per Year (@ 13.2 Cents)
Lighting Interior Fixture Retrofit	Building D (Classrooms D1, D2, D3, D4, D5) Building E (Classrooms E1, E2, E3, E4, E5, E6) (9) T82L4' fixtures upgraded to Evokit LED panels	99	T82L4' Fixtures	64	T82L4' fixtures to Evokit LED panels	33	3,069	1,788	5,487	\$37,125.00	\$510.33	\$724.33
Lighting Interior Fixture Retrofit	Building D (Classrooms D1, D2, D3, D4, D5) Building E (Classrooms E1, E2, E3, E4, E5, E6) (24) T82L4' fixtures to (9) fixtures in 11 Classrooms	165	T82L4' Fixtures	64	Delamp (24) T82L4' fixtures to (9) fixtures in 11 Classrooms, cover with new ceiling panel	0	10,560	1,788	18,881	\$33,000.00	\$1,755.96	\$2,492.33
Lighting Interior Fixture Retrofit	Building D (Classrooms D1, D2, D3, D4, D5) Building E (Classrooms E1, E2, E3, E4, E5, E6) Delamp (4) T81L4' fixtures in 11 Classrooms	44	T81L4' Fixtures	32	Delamp (4) T81L4' fixtures in 11 Classrooms, cover with new ceiling panel	0	1,408	1,788	2,518	\$8,800.00	\$234.13	\$332.31
Lighting - LED Exit Signs	All Incandescent Exit Signs to LED	4	incandescent	40	Campus wide replace all incandescent exit signs to LED	4	144	8,760	1,261	\$320.00	\$117.31	\$166.51
Lighting- Retrofit Interior Lamps to LED	Building A	1	incandescent	60	Campus wide replace all incandescent lamps with LED	9	51	1,788	91	\$20.00	\$8.48	\$12.04
Lighting- CFL Lamp Retrofit	Building A, B, D	8	CFL	23	Campus wide replace all CFL lamps with LED	9	112	1,788	200	\$160.00	\$18.62	\$26.43

## Lighting Controls

ECM 10	Install occupancy control for intermittently occupied rooms	Fill in your answers
Quantity of occupancy sensors to be installed?  What is the total installed cost for this measure?  What is the utility rebate for this measure?		99  \$10,890  \$-

Adjusted Energy Savings Summary	
This measure saves and  and  or  or  or  Simple Payback is Saving to Investment Ratio	6.07 kW peak demand  12003 kWh energy use.  0.0 therms natural gas  -1.8 gallons of Propane  \$763.4 energy cost annually.  14.3 years.  0.69

On all (99) new Evokit LED panels in 11 classrooms a smartwise occupancy and day lighting sensor will be installed with each fixture.

## Lighting- Exterior Fixture Retrofits

EEM	Location	# of Fixtures	Existing Description	Existing Wattage/ Fixture	Replacement Description	Replacement Fixture Wattage	Watts Reduced	Annual Operating Hours per Retrofit	kWh saved per year	Total Cost	Savings per year (@9.3 Cents)	Savings per Year (@ 13.2 Cents)
Lighting- Exterior Fixture Retrofit	Building A (14), Building C (6), Building B (11), Gym (5), G1 and G2 (2)	38	Jelly jars	60	LED: RAB ENTRA12N 12W Fixture	12	1824	4100	7478	\$7,742.50	\$695.49	\$987.15
Lighting- Exterior Fixture Retrofit	Building A	2	Halogen Floods	300	LED: Large Wallpack	96	408	4100	1673	\$650.00	\$155.57	\$220.81
Lighting- Exterior Fixture Retrofit	Gym	3	HPS Floods	1000	LED: RAB WPLED2T15 0	150	2550	4100	10455	\$2,409.39	\$972.32	\$1,380.06
Lighting- Exterior Fixture Retrofit	Outside of Building E	2	HDD Pole Lighting	1000	LED Cobarehead: RAB RWLED 150W	150	1700	4100	6970	\$1,741.38	\$648.21	\$920.04
Lighting- Exterior Fixture Retrofit	Building E	1	HPS	150	LED: Small Wallpack. RAB WPLED20N	20	130	4100	533	\$303.02	\$49.57	\$70.36
Lighting- Exterior Fixture Retrofit	Building E	2	MH Floods	400	LED: Large Wallpack	96	608	4100	2493	\$620.00	\$231.83	\$329.05
Lighting- Exterior Fixture Retrofit	District Office (2), F2 (1)	3	CFI, small wall packs	42	LED: RAB ENTRA12N 12W Fixture	12	90	4100	369	\$660.00	\$34.32	\$48.71



## HVAC – 7.5 ton Heat Pump

### Electricity Savings Calculations (See Inputs and Assumptions Below)

Unit Type	Assumed Existing Annual Electricity Usage per Unit	Assumed Annual Savings Per Retrofit of One HVAC Unit	Savings per year (@ 9.3 Cents)	Savings per Year (@ 13.2 Cents)
HVAC Unit - 3 Tons	2,047.22	409.44	38.08	54.05
HVAC Unit - 4 Tons	2,729.63	545.93	50.77	72.06
HVAC Units - 7.5 Tons	5,118.06	1,023.61	95.20	135.12

Inputs		Assumption/Source
2014-2015 Electricity Use for this Meter (kWh)	351,440	Utility Data
HVAC Electricity Use	105,432.0	Assume 30% of Electricity usage is for HVAC End Use (CHUS Survey for SMUD area)
Electricity Use per HVAC Unit	Unit Tonnage/Total Tonnage	Proportional to Tonnage as percent of total tonnage
Savings attributed to Retrofit	20%	Assume a retrofit will result in 20% reduction of existing unit's energy use

Existing Tonnage and Electricity Use Assumptions			
Unit Type	Tonnage per Unit	Quantity	Total Tonnage
HVAC Units on this Meter - 3 Tons	3	36	108
HVAC Units on this Meter - 4 Tons	4	6	24
HVAC Units on this Meter- 7.5 Tons	7.5	3	22.5
<b>Totals</b>		<b>45</b>	<b>154.5</b>

Replacement Cost for (1) 7.5 ton Roof Top Heat Pump

Equipment Cost	Labor/Lift/Crane	Total Cost
\$7,200.00	\$2,400.00	\$9,600.00

## HVAC – under 5.4 ton HVAC Heat Pump Replacement

ECM 12	Replace old heat pump with high efficiency heat pump	Fill in your answers
<b>This calculator only applies to heat pump up to 65Kbtu/hr or 5.4 tons</b>		
	Total quantity of AC and heat pump unit at school	45
	Total tonnage of AC and heat pump unit at school	163.5
	Quantity of HP to be replaced with SEER 13 (HSPF 7.7) unit?	0
	Quantity of HP to be replaced with SEER 14 (HSPF 8.3) unit?	0
	Quantity of HP to be replaced with SEER 15 (HSPF 8.8) unit?	20
	What is the total HP tonnage to be replaced with SEER 13 unit?	
	What is the total HP tonnage to be replaced with SEER 14 unit?	
	What is the total HP tonnage to be replaced with SEER 15 unit?	72.5
	What is the IOU (or nearest IOU) area the unit is installed?	PGE
	What is the total installed cost for this measure?	\$98,000
	What is the utility rebate for this measure?	\$-
	Are there other non-repayable funds applied to this measure?	\$-

Choose your utility

Adjusted Energy Savings Summary	
This project saves and	- kW peak demand
and	59,782 kWh electricity use.
and	- therms natural gas
or	0.0 gallons of Propane
or	<b>\$4,766 energy cost annually.</b>
Simple Payback is Saving to Investment Ratio	<b>20.6 years.</b> 0.93

List and details of heat pumps being replaced are on the next page. Units being replaced are highlighted in yellow.

**HVAC – under 5.4 ton HVAC Heat Pump Replacement continued...**

Building	Unit Type	Tons	Mfr/Model #	Notes	Amount	Type	Amount of 5.4 tons units to be replaced	Equipment Cost	Labor Cost	Total Cost
Building D	Heat Pump	3	Johnson/Goothermal (Model # unknown)	2004	6	Electric				
Building E	Heat Pump	4	Unknown	1990, (1) unit is new - Replacing for age of unit	6	Electric	5	\$17,000.00	\$7,500.00	\$24,500.00
Shop	Heat Pump	3.5	Unknown	2000	1	Electric				
Building A	Package Heat Pump	3.5	Carrier/50IX-036-501	New in 2004 - benchmarking result, greatest cc opportunity and units over 10 years	7	Electric	7	\$23,800.00	\$10,500.00	\$34,300.00
Building B	Package Heat Pump	3.5	Carrier/50IX-036-501	New in 2004 - benchmarking result, greatest cc opportunity and units over 10 years	6	Electric	8	\$27,200.00	\$12,000.00	\$39,200.00
Gym	Rooftop Heat Pump	7.5	Unknown	(1) original unit from 1985, (1) replaced in 2004, (1) replaced in 2005	3	Electric				
Building A (Cafe/Kitchen)	Rooftop Split Gas/Electric Pack	4	Carrier/48HJF008-541	New in 2004	1	propane				
Building A (Cafe/Kitchen)	Rooftop Split Gas/Electric Pack	4	Carrier/48HJF008-541	New in 2004	1	propane				
Building B (Library), Building A (Kindergarten)	Rooftop Split Heat Pump Condensing Unit	3.5	Carrier/38BAG036300	New in 2004	3	Electric				
Building B (Copr Room)	Split Heat Pump	3.5	Day&Night/661B or 661N Series	?	1	Electric				
Building C	Wallmount Heat Pump	3	Intertherm/PW Series	2010	6	Electric				
Building F	Wallmount Heat Pump	3	Intertherm/PW Series	2000	4	Electric				
Building G, Portables	Wallmount Heat Pump	3	Intertherm/PW Series	80	2	Electric				
<b>Total Tons</b>		<b>171.5</b>			<b>47</b>		<b>20</b>			<b>\$98,000.00</b>

## Photovoltaic System

Size (kW AC)	Demand Savings (kW)	Year 1 Production (kWh)	Effective Useful Life	Year 1 Energy Cost Savings (\$)	Inverter Size (kW)	Measure Cost (\$)	Rebates (\$)	Other-Non-Repayable Funds (\$)
15.00		24,915	25	\$ 3,288.78		\$42,857.14		

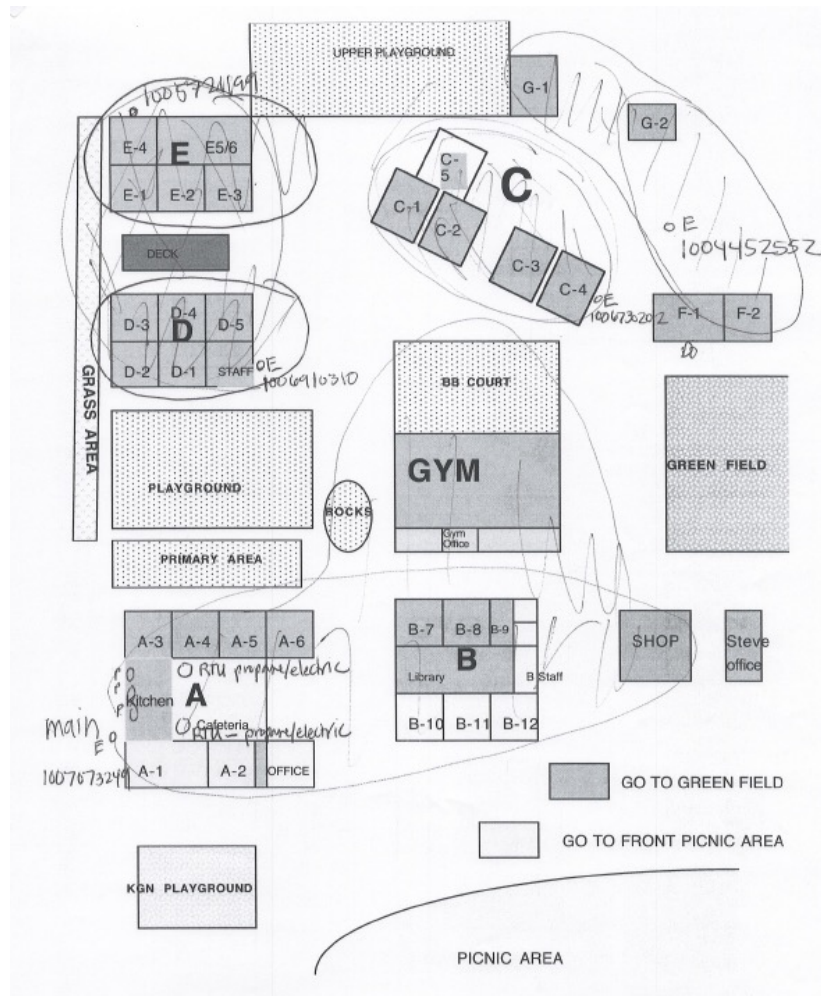
## 2 Site Details and Energy Overview

The site detail is an overview of the buildings and areas that were assessed. This section provides the overall energy performance of the school, benchmarking metrics and utility usage for the calendar year of 2014-2015.

### 2.1 Site Details and Naming Convention

During the audit the following campus maps were used to identify buildings and areas of energy and gas usage. Below is a site map of the campuses that were assessed by Freedom Energy Corporation.

Figure 3: Summerville Elementary Site Map



#### Electric & Propane Location Site Details

The table below provides the location site details, building uses, square footage of utility areas and number of stories of each building. Building areas were provided by Summerville

Elementary staff. The total combined square footage of the campus surveyed is estimated to be 52,940 sqft.

Table 1: *Electric Location Sites*

Electrical Location Sites (Utility Description)	Building(s) and Uses	Total Area (sq-ft)
Acct# 5209 - Summerville El - Kitchen	Kitchen/Cafeteria, A-Building, B-Building, Shop, Gym	30996
Acct# 5210 - Summerville El Bldg E	E-Building	5460
Acct# 5212 - Summerville El	C-Building, C-5	5360
Acct # 5213 - Summerville El	G-1, G-2, F-1(District Office), F-2	5664
Acct # 5323 - Summerville El Bldg D	D-Building	5460

Table 2: *Propane Location Sites*

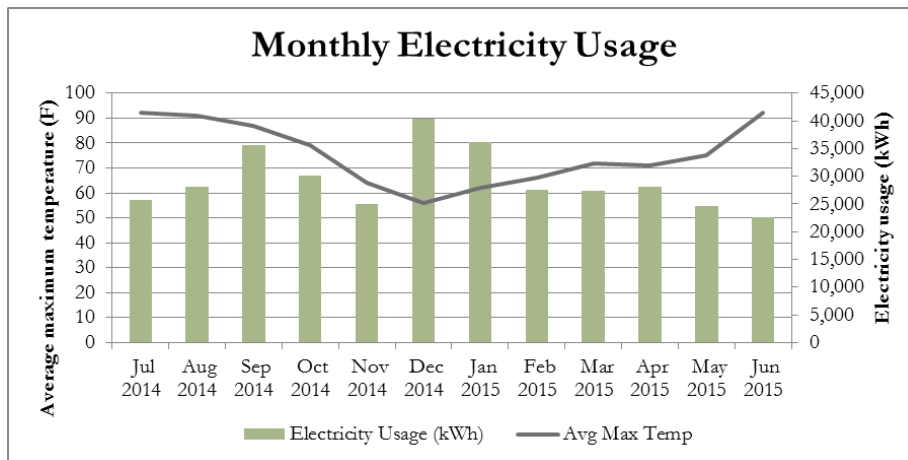
Propane Location Sites	Buildings and Uses	Total Area (sq-ft)
Main Tank	Cafeteria/Kitchen, A-Building	13280

## 2.2 Electric and Gas Usage

During the last fiscal year (July 1st, 2014 to June 30th, 2015), Summerville Elementary used a total of 351,440 kWh of electricity and 1,253.20 gallons of propane. The total cost to the school for electricity was \$28,115.20. For propane the total cost to the school was \$1,390.06.

The following graph illustrates total electricity use at Summerville Elementary in fiscal year 2014-2015. The graph below reflects the correlation between energy usage and outdoor air temperature, as well as reduced occupancy during summer months. Like most buildings, Summerville Elementary’s electricity use increases during hotter months due to higher demand for space cooling. However, this is partially offset by reduced occupancy during the summer months when school is not in session. Additionally, since many buildings at the school use electricity for heating, rather than propane, electricity use is also increased during the colder winter months.

Figure 4: Monthly Electricity Use

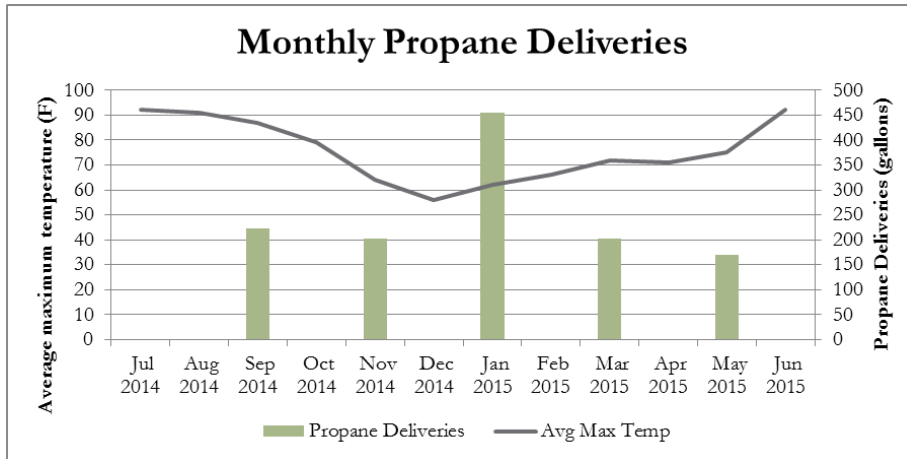


The California Energy Use Survey found that the highest percentage of electricity usage in schools typically comes from cooling, lighting, ventilation, refrigeration, and plug loads. For the Summerville Elementary School District's Prop 39 Energy Expenditure Plan, we will focus on identifying opportunities to upgrade existing lighting and replace older heating and cooling units.

**Propane Deliveries and Estimated Monthly Usage**

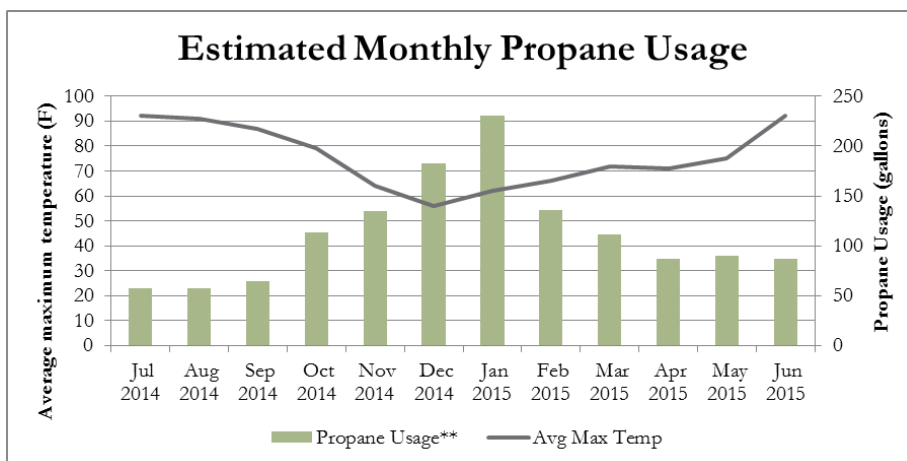
The figures below show propane deliveries and estimated monthly usage at Summerville Elementary during fiscal year 2014-2015. Actual monthly propane use was not available; instead, propane deliveries data was collected, as shown in the graph below.

Figure 5: Propane Deliveries



To approximate usage in a particular month, average daily use between purchases was calculated and then multiplied by the appropriate number of days in a given month. Propane is used in just one building, for both space heating and cooking purposes. The graph below shows that propane use followed a typical heating and cooling season, with the highest usage of gas during the winter months, and low propane use during the summer.

Figure 6: Estimated Monthly Propane Usage



Efficient heating equipment and well-performing buildings reduce the amount of gas used. For the Prop 39 Energy Expenditure Plan we will focus on the efficiency of heating units and opportunities to improve the performance of the building that is being heated with propane.

### 2.3 CEC and Building Benchmarking Metrics

Benchmarking allows schools to compare their energy performance. Listed in the appendices of this report are benchmarking resources with comparable EUI and ECI measurements for schools. The resources listed in the appendices of this report have their own data set disadvantages, including comparison at a national scale and outdated data, but they are listed because they are still useful as a comparison tool. After the five-year cycle of Prop 39 there should be a good data set of energy use numbers for California schools available to compare Summerville Elementary School District's benchmarking result.

Using the utility data that was provided the following are the EUI and ECI for Summerville Elementary School District. The EUI and ECI were determined school wide, each school site and by location specific, that are listed in the following tables.

- **TOTAL ENERGY USE INTENSITY (EUI) OF SESD: 73.3 (kBtu/sqft/yr)**
- **TOTAL ENERGY COST INDEX (ECI) OF SESD: \$0.56 (cost/sqft/yr)**
- **Total energy use intensity of electricity: 6.64 (kWh/sqft/yr)**
- **Total energy use intensity of propane: 8.73 (kBtu/sqft/yr)**

#### *Energy Cost Index*

The total ECI of \$0.56 (cost/sqft/yr) for Summerville Elementary School District shows that the school pays less for utilities than the industry standard. The tables below also show that Summerville Elementary is paying below standard for utilities in each building across the campus. From the benchmarking information it appears the best opportunities on the school campus to reduce energy cost will be in the Kitchen/Cafeteria, A-Building, B-Building, Shop and Gym, closely followed by the C-Building.

Table 3: *kWh ECI (\$/sqft)*

Location	Total Cost	square footage	ECI
<b>Acct# 5209 - Summerville EI – Kitchen</b> Kitchen/Cafeteria, A-Building, B-Building, Shop, Gym	\$17,433.60	30,996	\$0.56
<b>Acct# 5210 - Summerville EI Bldg E</b> E-Building	\$2,470.40	5,460	\$0.45
<b>Acct# 5212 - Summerville EI</b> C-Building, C-5	\$2,873.60	5,360	\$0.54
<b>Acct# 5213 - Summerville EI</b> G-1, G-2, F-1(District Office), F-2	\$2,905.60	5,664	\$0.51
<b>Acct # 5323 - Summerville EI Bldg D</b> D-Building	\$2,432.00	5,460	\$0.45

Table 4: *kBtu ECI (\$/sqft) for gallons*

Location	Total Cost	square footage	ECI
<b>Main Tank</b> Kitchen/Cafeteria, A-Building	\$1,390.06	13,280	\$0.10



### Energy Use Index

Comparing energy usage is a way to benchmark school district facilities. According to the 2006 California Commercial end-use survey interior lighting, cooling and ventilation are the largest electric end uses and space heating is the major gas usage. Summerville Elementary has below-average energy use intensity. The buildings with the highest EUI are the same buildings with the highest ECI, as listed above.

Table 5: kWh EUI (kWh/sqft/yr)

Location	total kWh	kBtu	square ft	EUI (kWh/sqft/yr)	EUI (kBtu/sqft/yr)
<b>Acct# 5209 - Summerville EI – Kitchen</b> Kitchen/Cafeteria, A-Building, B-Building, Shop, Gym	217,920	2,335,231	30,996	7.03	75.34
<b>Acct# 5210 - Summerville EI Bldg E</b> E-Building	30,880	330,910	5,460	5.66	60.61
<b>Acct# 5212 - Summerville EI</b> C-Building, C-5	35,920	384,919	5,360	6.70	71.81
<b>Acct# 5213 - Summerville EI</b> G-1, G-2, F-1(District Office), F-2	36,320	389,205	5,664	6.41	68.72
<b>Acct # 5323 - Summerville EI Bldg D</b> D-Building	30,400	325,766	5,460	5.57	59.66

Table 6: kBtu EUI (kBtu/sqft/yr)

Location	total gallons	kBtu	square footage	EUI (kBtu/sqft/yr)
<b>Main Tank</b>	1,253	115,921	13,280	8.73

### CEC Benchmarking Metrics

For reference purposes, below is the table that shows the inputs for the CEC Benchmarking Calculator and the results of the CEC Energy Use Intensity Calculator and the average utility cost based on the information collected for Summerville Elementary School District. All unavailable and non-applicable input fields are left “0”.

Table 7: CEC Benchmarking Calculator Information

<i>Electricity</i>	
Average Maximum Demand (kW):	
Annual PV Electricity Production(kWh)	0
Electricity Purchase from Utility(kWh)	351440
Total Annual Electric Use (kWh):	351440
Cost paid to PPA vendor & other supplier (\$)	\$-
Total Annual Electric Charges (\$)	28115
<i>Natural Gas</i>	
Total Annual Natural Gas Use (therms):	0
Total Annual Gas Charges (\$):	0
<i>Other Fuels (if applicable)</i>	
Total Annual Propane Use(gals):	1253
Total Annual Propane Charges(\$):	1390

**Table 7: CEC Energy Use Intensity (EUI) Calculator and Average Cost Summary**

Energy Use Intensity (EUI) Calculator					
Electricity		Natural Gas		Other Fuels	
0.00	W/SF	-	Therms/SF/Yr	0.02	Propane gal/SF/Yr
6.64	kWh/SF/Yr	\$-	Gas Cost/SF/Yr	-	Fuel Oil gal/SF/Yr
\$0.53	Cost/SF/Yr			\$0.03	Fuel Cost/SF/Yr
Energy Costs/SF/Year:	\$0.56		Energy EUI(Kbtu)/SF/Year:	73.3	

Average Cost		
Electricity	\$0.080	\$/kWh
Natural Gas	0	\$/therm
Propane	1.1	\$/gal
Fuel Oil	0.0	\$/gal

In summary the total energy use of Summerville Elementary School District is lower than the statewide average. The projects in the Prop 39 Energy Expenditure Plan that will reduce electricity and propane use will be focused on the areas with the most opportunity at Summerville Elementary, including the Kitchen/Cafeteria, A-Building, B-Building, Shop, Gym, and the C-Building.

### 3 Overview of Energy Use in California Schools

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The California Commercial End-Use Survey (CEUS) is a report that presents an analysis of the way the California commercial sector uses energy. This report contains a variety of data about typical energy use for different building types, including schools. For more information on CEUS, see Appendix A.

#### 3.1 Energy Use Figures for California Schools

Based on CEUS data, the figures below illustrate the typical energy use distribution in schools throughout California. This can be used to compare Summerville Elementary School District's energy use to the average California school. In an average school, interior lighting, HVAC and exterior lighting represent the largest uses of electricity, while space heating and water heating are the largest uses of gas.

Figure 7: Typical electric energy usage distribution at a California School

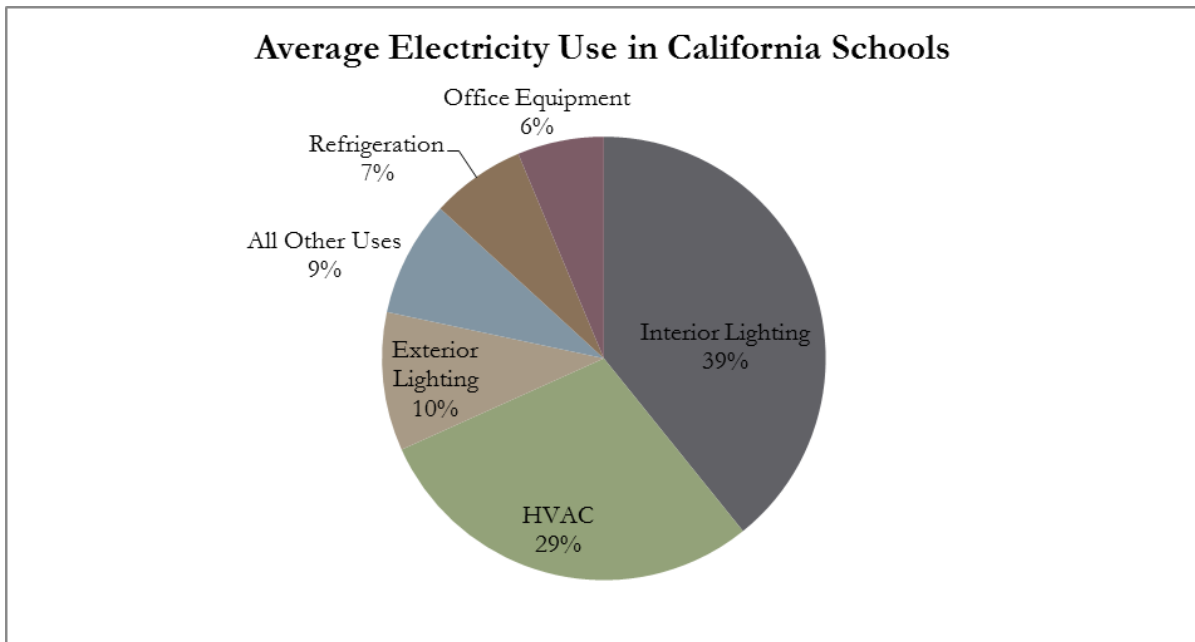
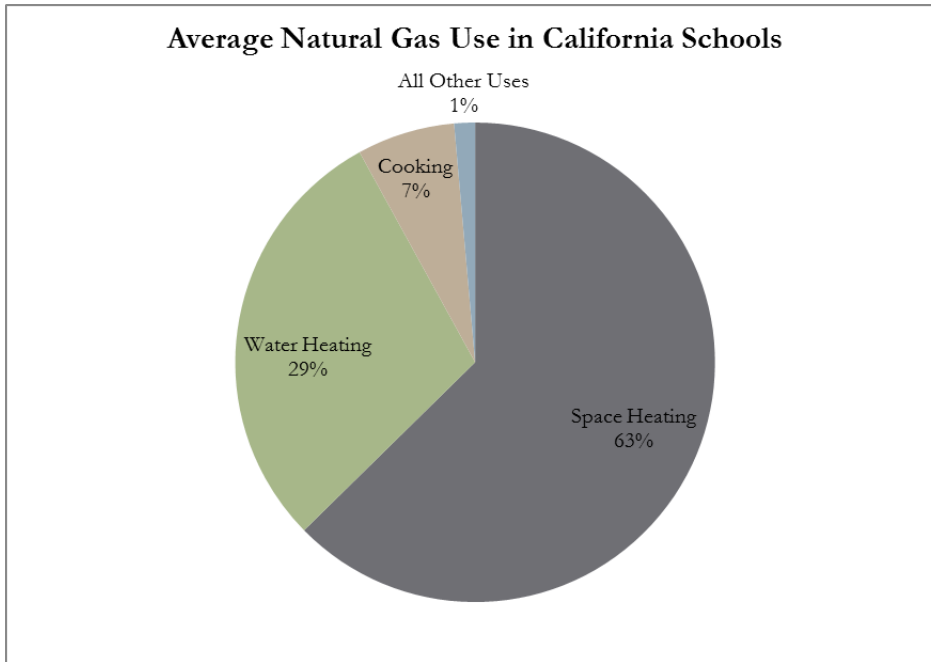


Figure 8: Average gas usage distribution at a California School



### 3.2 The Benefits of Implementing Energy Efficient Projects

There are many benefits to implementing energy efficient projects at schools. Below is a list of a few of the benefits for schools, and also beyond school grounds:

#### For Schools:

- Reduce energy cost, create revenue for future improvement projects or create funds for other school costs
- Demonstrates leadership and care of school facilities, improves learning atmosphere and campus moral
- Improves building performance and indoor air quality
- Increase security and safety by improving lighting
- Other miscellaneous: teacher retention rates, reductions in insurance cost, reduced legal liability, improved attendance of students, and the list goes on!

#### Beyond Schools:

- Overall energy efficiency investments costs are significantly less than investing in new generation and transmission.
- Energy efficiency can boost the local economy and create downward pressure on utility prices
- Energy efficiency projects improve local economy, creating jobs and local opportunities
- Energy efficiency diversifies utility resource portfolios and can be a hedge against uncertainty associated with fluctuating fuel prices and other risk factors.
- Implementing energy efficiency projects reduce greenhouse gas (GHG) emissions

## 4 Energy Efficiency Measure Identification and End Use Characteristics

This section summarizes the inventory of electric and gas end use equipment at Summerville Elementary School District. The equipment is listed by location, and type. For the equipment an estimate of total energy use is listed.

The main area of focus while collecting data in regards to equipment that uses electricity was lighting and HVAC, and for gas HVAC/space heating. In California schools lighting and HVAC are areas of the largest electricity use, while space heating uses the greatest amount of gas.

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### 4.1 Electric End Use

The following annual operating hours were used to estimate kWh hours for the electrical end use equipment identified during Summerville Elementary School's energy survey. Hours were created by considering existing conditions and past school schedules:

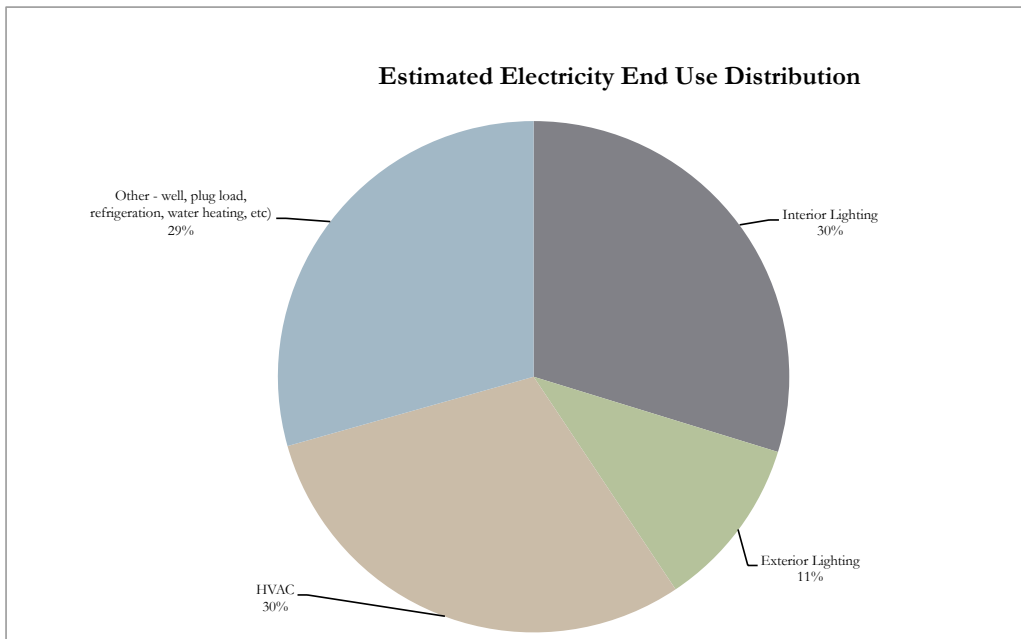
<u>Annual Operating Hours</u>		
Description	Hours	Notes/Assumptions
Exit Signs		8736 Hours/Year
Exterior		4100 Standard Exterior Operating Hours
Classroom/Gym		1788 See Calcs on School Calendar Tab
Office/Shop		2360 See Calcs on School Calendar Tab
Storage		365 Assume 1 Hour per Day

For HVAC, the percentage from the 2006 CEUS for schools in SMUD territory was used to estimate the kWh for heating and cooling.

The results for the kWh use for the electrical end use items for Summerville Elementary School District were 142,785 (kWh/yr) for lighting, and 105,432 (kWh/yr) for HVAC.

The pie chart below, which is also found in the Executive Summary, illustrates the electricity end use distribution of Summerville Elementary School District. The table shows the charts assumptions. Following is a summary of the electrical end use items that can be found on the Summerville Elementary School District campus. The summary includes a list of interior lighting, exterior lighting and a count of HVAC systems that are all electric.

Figure 9: Electricity End Use Distribution & Assumptions



Category	Est. Annual kWh	Assumptions/Calculations
Interior Lighting	104,565	Power*Operating Hours Calculations, Lighting Inventory
Exterior Lighting	38,220	Power*Operating Hours Calculations, Lighting Inventory
HVAC	105,432	Assume 30% (same percentage as in SMUD Territory Schools) of electricity usage goes to HVAC
Other - well, plug load, refrigeration, water heating, etc)	103,222.58	Total Electricity Use - (Interior Lighting + Exterior Lighting + HVAC Elec)

## Summerville Elementary Electricity End Use Inventory

**Table 8: Interior Lighting Inventory**

Building	Use/Location /Desc	Fixture Type	Lamp type	Wattage	Lamps per Fixture	Number of Fixtures	Total kW Power	Operating Hours	Total Annual Energy Use (kWh)
A-Building	Cafeteria	CFL, Screw-In	CFL	42	1	36	1.512	Classroom/Gym	2,703
A-Building	Cafeteria	T83L4'_Troffer	F32T8	32	3	8	0.768	Classroom/Gym	1,373
A-Building	Cafeteria	Exit Sign	Incandescent	40	1	4	0.16	Exit Signs	1,398
A-Building	A-1	T83L4'	F32T8	32	3	14	1.344	Classroom/Gym	2,403
A-Building	A-1, Hallway	CFL	CFL	23	1	1	0.023	Classroom/Gym	41
A-Building	A-1, Restroom	CFL	CFL	23	2	1	0.046	Classroom/Gym	82
A-Building	A-2	T83L4'	F32T8	32	3	9	0.864	Classroom/Gym	1,545
A-Building	Office/Copy	T82L4'	F32T8	32	2	6	0.384	Office/Shop	906
A-Building	Conference	T82L4'	F32T8	32	2	6	0.384	Office/Shop	906
A-Building	Hallway	T82L4'	F32T8	32	2	1	0.064	Classroom/Gym	114
A-Building	Hallway	CFL	CFL	23	1	1	0.023	Classroom/Gym	41
A-Building	Restroom	T82L4'	F32T8	32	2	1	0.064	Classroom/Gym	114
A-Building	Office	Hardwire LED2L4'	LED	14	2	8	0.224	Office/Shop	529
A-Building	Principal	T82L4'	F32T8	32	2	2	0.128	Office/Shop	302
A-Building	Nurse	T82L4'	F32T8	32	2	2	0.128	Office/Shop	302
A-Building	Storage	T82L4'	F32T8	32	2	2	0.128	Storage	47
A-Building	Storage	Inc,Screw-In	Incandescent	60	1	1	0.06	Storage	22
A-Building	A-3	T83L4'	F32T8	32	3	9	0.864	Classroom/Gym	1,545
A-Building	A-3, Restrooms	T82L4'	F32T8	32	2	4	0.256	Classroom/Gym	458
A-Building	A-3, Hallway	CFL	CFL	23	1	2	0.046	Classroom/Gym	82
A-Building	A-4	T83L4'	F32T8	32	3	9	0.864	Classroom/Gym	1,545
A-Building	A-5	T83L4'	F32T8	32	3	9	0.864	Classroom/Gym	1,545
A-Building	A-6	T83L4'	F32T8	32	3	9	0.864	Classroom/Gym	1,545
Shop	Main	T82L4'	F32T8	32	2	2	0.128	Office/Shop	302
Shop	Main	T82L4'	F32T8	32	2	6	0.384	Office/Shop	906
Shop	Canopy	T82L4'	F32T8	32	2	3	0.192	Office/Shop	453
Gym	Main	Highbay, T54L4'	F54T5	54	4	21	4.536	Classroom/Gym	8,110
Gym	Main	Exit Sign	Incandescent	40	1	4	0.16	Exit Signs	1,398
Gym	Coach's	T82L4'	F32T8	32	2	6	0.384	Classroom/Gym	687
Gym	Coach's	T82L2'	F17T8	17	2	2	0.068	Classroom/Gym	122
Gym	2 Restrooms	T82L4'	F32T8	32	2	4	0.256	Classroom/Gym	458
C-Building	Annex	T83L4'_Troffer	F32T8	32	3	6	0.576	Classroom/Gym	1,030
C-Building	C-1	T83L4'_Troffer	F32T8	32	3	12	1.152	Classroom/Gym	2,060
C-Building	C-2	T83L4'_Troffer	F32T8	32	3	12	1.152	Classroom/Gym	2,060
C-Building	C-3	T83L4'_Troffer	F32T8	32	3	12	1.152	Classroom/Gym	2,060
C-Building	C-4	T83L4'_Troffer	F32T8	32	3	12	1.152	Classroom/Gym	2,060
C-Building	C-5	T83L4'_Troffer	F32T8	32	3	12	1.152	Classroom/Gym	2,060
C-Building	C-1	Exit Sign	LED	5	1	1	0.005	Exit Signs	44
C-Building	C-2	Exit Sign	LED	5	1	1	0.005	Exit Signs	44
C-Building	C-3	Exit Sign	LED	5	1	1	0.005	Exit Signs	44
C-Building	C-4	Exit Sign	LED	5	1	1	0.005	Exit Signs	44
C-Building	C-5	Exit Sign	LED	5	1	1	0.005	Exit Signs	44

Building	Use/Location /Desc	Fixture Type	Lamp type	Wattage	Lamps per Fixture	Number of Fixtures	Total kW Power	Operating Hours	Total Annual Energy Use (kWh)
C-Building	Restroom	T82L4'	F32T8	32	2	4	0.256	Classroom/Gym	458
D-Building	D-1	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
D-Building	D-2	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
D-Building	D-3	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
D-Building	D-4	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
D-Building	D-5	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
D-Building	D-1	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
D-Building	D-2	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
D-Building	D-3	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
D-Building	D-4	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
D-Building	D-5	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
D-Building	Staff, Hallway	T82L4'	F32T8	32	2	2	0.128	Classroom/Gym	229
D-Building	Staff	T82L4'	F32T8	32	2	6	0.384	Classroom/Gym	687
D-Building	Restroom	T84L4'	F32T8	32	4	2	0.256	Classroom/Gym	458
D-Building	Restroom	CFL	CFL	23	1	2	0.046	Classroom/Gym	82
B-Building	Library	T82L4'	F32T8	32	2	20	1.28	Classroom/Gym	2,289
B-Building	Copy Room	T82L4'_Troffer	F32T8	32	2	14	0.896	Classroom/Gym	1,602
B-Building	Kitchen	CFL	CFL	23	1	1	0.023	Classroom/Gym	41
B-Building	Counselor	T83L4'_Troffer	F32T8	32	3	4	0.384	Classroom/Gym	687
B-Building	B-7	T83L4'_Troffer	F32T8	32	3	9	0.864	Classroom/Gym	1,545
B-Building	B-8	T83L4'_Troffer	F32T8	32	3	9	0.864	Classroom/Gym	1,545
B-Building	B-9	T82L4'_Strips	F32T8	32	2	12	0.768	Classroom/Gym	1,373
B-Building	B-12	T83L4'_Troffer	F32T8	32	3	9	0.864	Classroom/Gym	1,545
B-Building	B-11	T83L4'_Troffer	F32T8	32	3	9	0.864	Classroom/Gym	1,545
B-Building	B-10	T83L4'_Troffer	F32T8	32	3	9	0.864	Classroom/Gym	1,545
B-Building	Restrooms	T82L4'	F32T8	32	2	4	0.256	Classroom/Gym	458
E-Building	E-1	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
E-Building	E-2	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
E-Building	E-3	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
E-Building	E-4	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
E-Building	E-5	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
E-Building	E-6	T82L4'	F32T8	32	2	24	1.536	Classroom/Gym	2,746
E-Building	E-1	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
E-Building	E-2	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
E-Building	E-3	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
E-Building	E-4	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
E-Building	E-5	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
E-Building	E-6	T81L4'	F32T8	32	1	4	0.128	Classroom/Gym	229
G1	Main	T82L4'	F32T8	32	2	12	0.768	Classroom/Gym	1,373
G2	Main	T82L4'	F32T8	32	2	12	0.768	Classroom/Gym	1,373
District Office	Lobby	T83L4'	F32T8	32	3	12	1.152	Office/Shop	2,719
District Office	Office 1	T83L4'	F32T8	32	3	2	0.192	Office/Shop	453
District Office	Kitchen	T83L4'	F32T8	32	3	2	0.192	Office/Shop	453
District Office	Restrooms	T82L4'_Recessed	F32T8	32	2	4	0.256	Office/Shop	604
District Office	Storage	T82L4'	F32T8	32	2	2	0.128	Storage	47



Building	Use/Location /Desc	Fixture Type	Lamp type	Wattage	Lamps per Fixture	Number of Fixtures	Total kW Power	Operating Hours	Total Annual Energy Use (kWh)
District Office	Conference	T82L4'	F32T8	32	2	6	0.384	Office/Shop	906
District Office	Leigh's Office	T83L4'	F32T8	32	3	3	0.288	Office/Shop	680
F2	Main	T83L4'_Recessed	F32T8	32	3	12	1.152	Classroom/Gym	2,060
F2	Kitchen	T83L4'	F32T8	32	3	2	0.192	Classroom/Gym	343
F2	Restroom	T83L4'	F32T8	32	3	2	0.192	Office/Shop	453
F2	Restroom	T82L4'	F32T8	32	2	2	0.128	Office/Shop	302
F2	Office	T83L4'	F32T8	32	3	2	0.192	Office/Shop	453
									<b>104,565</b>

**Table 9: Exterior Lighting Inventory**

Building	Use	Fixture Type	Lamp type	Lamp Wattage	Lamps per Fixture	Number of Fixtures	Total kW Power	Operating Hours	Total Annual Energy Use (kWh)
Building A	Exterior	Halogen,Flood	Halogen	300	1	2	0.6	Exterior	2,460
Building A	Exterior	Jelly Jars	Incandescent	60	1	14	0.84	Exterior	3,444
Gym	Exterior	HPS Floods	HPS	1000	1	3	3	Exterior	12,300
Gym	Exterior	Jelly Jars	Incandescent	60	1	5	0.3	Exterior	1,230
Building C	Exterior	Jelly Jars	Incandescent	60	1	6	0.36	Exterior	1,476
Building B	Exterior	Jelly Jars	Incandescent	60	1	11	0.66	Exterior	2,706
Building E	Exterior, Canopy	Recessed 6" CFL	CFL	26	1	8	0.208	Exterior	853
Building E	Exterior	MH Flood	MH	400	1	2	0.8	Exterior	3,280
Building E	Exterior	HPS	HPS	150	1	1	0.15	Exterior	615
G1	Exterior	Jelly Jars	Incandescent	60	1	1	0.06	Exterior	246
G2	Exterior	Jelly Jars	Incandescent	60	1	1	0.06	Exterior	246
Exterior	Pole Lighting	Pole Lighting	HID	1000	1	2	2	Exterior	8,200
District Office	Exterior	LED	LED	42	1	1	0.042	Exterior	172
District Office	Exterior	Small Wall Pack	CFL	100	1	2	0.2	Exterior	820
F2	Exterior	Small Wallpack	CFL	42	1	1	0.042	Exterior	172
									<b>38,220</b>

**Table 9: Electric HVAC Equipment Inventory**

Building	Unit Type	Tons	Mfctr/Model #	Notes	Amount	Type
Building D	Heat Pump	3	Johnston/Geothermal (Model # unknown)	2004	6	Electric
Building E	Heat Pump	4	Unknown	1990, (1) unit is new - Replacing for age of unit	6	Electric
Shop	Heat Pump	3.5	Unknown	2000	1	Electric
Building A	Package Heat Pump	3.5	Carrier/50JX-036-501	New in 2004 - benchmarking result, greatest ee opportunity and units over 10 years	7	Electric
Building B	Package Heat Pump	3.5	Carrier/50JX-036-501	New in 2004 - benchmarking result, greatest ee opportunity and units over 10 years	6	Electric
Gym	Rooftop Heat Pump	7.5	Unknown	(1) original unit from 1985, (1) replaced in 2004, (1) replaced in 2005	3	Electric
Building B (Library), Building A (Kindergarten)	Rooftop Split Heat Pump Condensing Unit	3.5	Carrier/38B4G036300	New in 2004	3	Electric
Building B (Copy Room)	Split Heat Pump	3.5	Day&Night/661B or 661N Series	?	1	Electric
Building C	Wallmount Heat	3	Intertherm/PW Series	2010	6	Electric

	Pump					
Building F	Wallmount Heat Pump	3	Intertherm/PW Series	2000	4	Electric
Building G, Portables	Wallmount Heat Pump	3	Intertherm/PW Series	80	2	Electric
<b>Total Tons</b>		<b>163.5</b>			<b>45</b>	

Other electricity using equipment not listed in end use tables: water heaters, plug load, ventilation and walk-in/refrigeration.

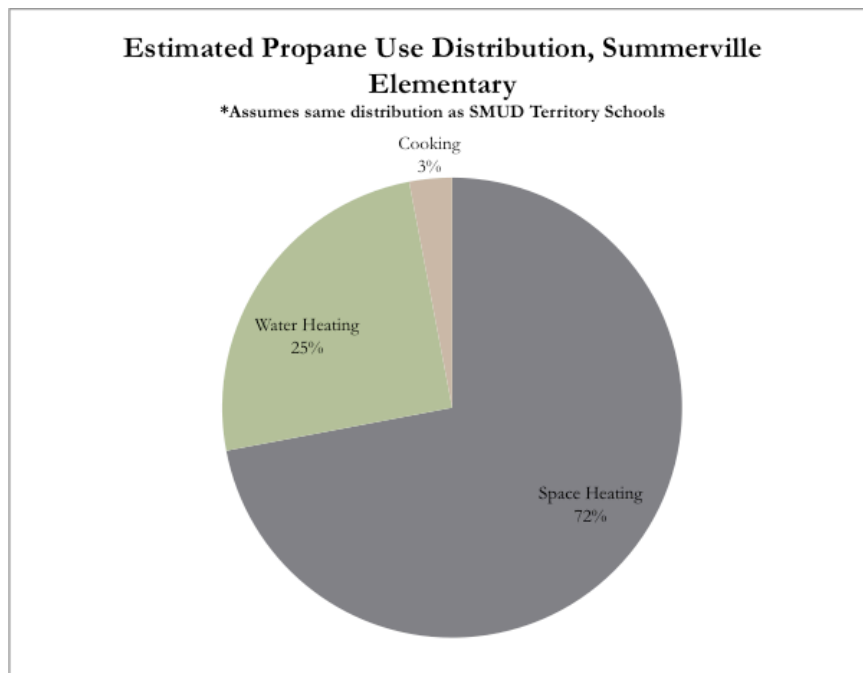
## 4.2 Gas End Use

For estimating the gas use of HVAC systems on the Summerville Elementary School District's campus the percentage from the 2006 CEUS for schools in SMUD territory was used.

The results for gas usage is that heating results in 1,253.2 gallons of propane or 10,818 (kWh/yr).

The pie chart below illustrates the gas end use distribution of Summerville Elementary School District. The table shows the charts assumptions. Following is the gas end use equipment that can be found on the Summerville Elementary School District campus.

Figure 10: Propane End Use Distribution & Assumptions



Estimated Propane Distribution		
Assume Same Percentage Usage as SMUD Region Schools, CEUS		
End Use Category	Summerville	kWh
Space Heating	902.304	7,789
Water Heating	313.3	2,704
Cooking	37.596	325

### Summerville Elementary Gas End Use Inventory

**Table 1: Gas End Use Inventory**

Building	Unit Type	Tons	Mfctr/Model #	Notes	Amount
Building A (Café/Kitchen)	Rooftop Split Gas/Electric Pack	4	Carrier/48HJF008-541	New in 2004	2
<b>Total Tons</b>		<b>8</b>			<b>2</b>

Other gas using equipment not listed in table: water heaters and cooking.

## 5 Energy Expenditure Plan Summary

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### *Overview of Energy Use in California Schools & Summerville Elementary School District*

In result, Summerville Elementary School District's energy use was similar to the end use averages of schools in California, except we expect that actual HVAC electricity end use may be higher than the final numbers of this report. Based on CEUS data, the typical energy use distribution in schools throughout California for electricity is 39% interior lighting, 10% exterior lighting, 29% HVAC and 22% other. For Summerville Elementary School District it was found to be 30% interior lighting, 11% exterior lighting, 30% HVAC and 29% other. Gas use distribution in schools throughout California is 63% heating, 29% water, 7% cooking and 1% other. For this report Freedom Energy Corporation used the same gas percentage usages as SMUD region schools, 72% space heating, 25% water heating and 3% cooking, which completing other background assumptions of hours of HVAC these percentages seem accurate.

### *Benchmark Results*

Using the last fiscal year of utility data (July 1st, 2014 to June 30th, 2015) for Summerville Elementary School District the total use of electricity was found to be 351,440 kWh, and the total use of propane 1,253.20 gallons. The total cost for electricity was \$28,115.20. The total cost of propane was \$1,390.06. The EUI measured for Summerville Elementary School District was 73.3 (kBtu/sqft/yr). The ECI was found to be \$0.56 (cost/sqft/yr). Benchmarking results indicate that Summerville Elementary School District is a low energy using school, and pays a lower cost for energy that comparison of other school districts. Results from benchmarking also identified that the areas with the most opportunity at Summerville Elementary, include the Kitchen/Cafeteria, A-Building, B-Building, Shop, Gym, and the C-Building.

### *Project Overview*

For the Prop 39 project that Summerville Elementary School District would like to submit for their energy expenditure plan the estimated savings are 156,133 kWh. The cost of those savings is estimated to be \$16,663.42 at \$0.132 per kWh. The cost of the Prop 39 project is expected to be \$254,898.43.

The estimated savings for lighting for the \$0.132 per kWh project would be 70,412 kWh, under 50% of the actual kWh determined for lighting at Summerville Elementary School District. The estimated savings of HVAC determined for this project are 60,806 kWh, approximately 54% of the kWh used by Summerville Elementary School District. We believe these HVAC savings work, as the actual electricity used for HVAC at Summerville Elementary is most likely higher than what is listed in this report. In summary, the Prop 39 project for Summerville Elementary School District mostly meets savings and project requirements with an SIR of 1.18.

## 6 Reporting & Tracking

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The following information has been summarized to give LEAs an idea of what to be expected regarding reporting and tracking for their Prop 39 projects. More details and information can be found on pages 31-33 of the Proposition 39: California Clean Energy Jobs Act – 2015 Program Implementation Guidelines. It is suggested that LEA staff refer to this section to be clear and understand the requirements for reporting and tracking. Freedom Energy Corporation will be available to help with any reporting or tracking questions, and is available to complete required information for an additional cost if schools request the additional help.

### *Notes regarding reporting and tracking*

As a condition to receiving funds schools will be expected to report results from their Prop 39 projects between 12-15 months after the project was completed. There will be an online reporting system that will allow schools to submit the required eligible energy project information. Please be aware and communicate during your project that the Energy Commission may request the LEAs and contractors to submit required jobs and workforce data regarding the projects on this online reporting system 12-15 months after the completion of the project.

*Prepare and keep the following documentation to provide this final reporting information to the CEC a year after the project is complete:*

1. Records that confirm final gross project costs. This will be the final cost before deduction of any incentives or other non-repayable funds.
2. There will need to be a record of the estimated amount of energy saved, accompanied by specified energy consumption and utility bill cost data for the school or site where the project is located.
3. Nameplate rating information of new clean energy generation if installed.
4. The number of trainees if applicable.
5. The number of direct full-time equivalent employees and the average number of months or years of utilization for each of these employees.
6. The amount of time of receiving energy expenditure plan award deposit and the completion of the project or training activities.
7. The facility's energy intensity before and after project completion, as determine from an energy rating or benchmark system.

### *Energy savings reporting requirements*

LEAs are required to report the actual energy savings 12-15 months after the completion of each energy expenditure plan. There will be two required levels of energy reporting: 1) school site level energy intensity and 2) individual eligible energy project level energy savings.

See Proposition 39: California Clean Energy Jobs Act – 2015 Program Implementation Guidelines for more information and details on page 31-32 and to read more details, or methods allowed by the CEC to submit this required information. Freedom Energy Corporation will be available to gather all required data and create these measurements upon request for an additional fee, or is available to assist LEAs with questions if they decide to gather this information on their own.

### *Job creation reporting requirements*

By hiring contractors that are registered as public work contractors, the Department of Industrial Relations will have certified payroll reports furnished by contractors. LEAs should collect verifiable self-reported employee wage records for workers directory employed by LEAs to quantify total employment affiliated with projects. These reports should include new trainee, apprentice, and full-time jobs resulting from funded projects. The Labor and Workforce Development Agency and the Department of Industrial Relations will work with LEAs to support reporting by contractors and subcontractors working on funded projects. See Proposition 39: California Clean Energy Jobs Act – 2015 Program Implementation Guidelines for more information and details.

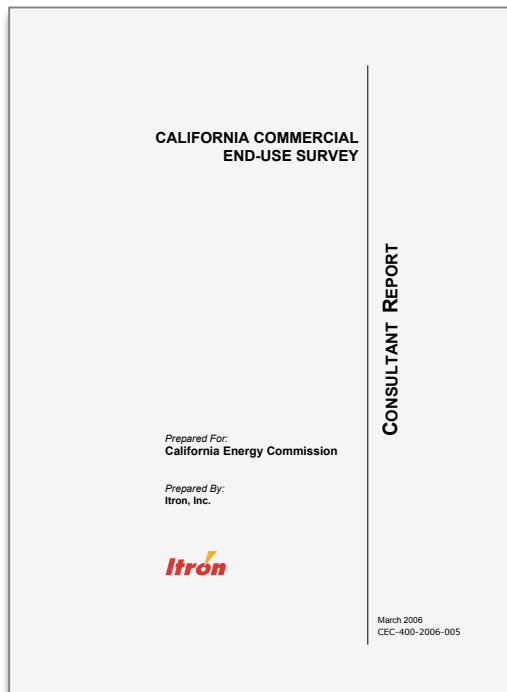
### *Potential audits*

LEAs can only use Proposition 39 funding for the eligible energy projects approved in their energy expenditure plans. Please refer to the Proposition 39: California Clean Energy Jobs Act – 2015 Program Implementation Guidelines page 32-33 for more details regarding rules and regulations pertaining to school's Prop 39 projects. A copy of the audit guide and audit procedures that auditors will follow if the annual audit is requested can be found at: <http://eaap.ca.gov/audit-guide/current-audit-guide-booklet/>.

## Appendix A: California Energy Commission – California Commercial End-Use Survey

The California Commercial End-Use Survey (CEUS) is a study of commercial sector energy use, primarily designed to support the state's energy demand forecasting activities. Itron performed the survey under contract to the California Energy Commission. The survey captures detailed building systems data, building geometry, electricity and gas usage, thermal shell characteristics, equipment inventories, operating schedules, and other commercial building characteristics.

Link: <http://www.energy.ca.gov/2006publications/CEC-400-2006-005/CEC-400-2006-005.PDF>

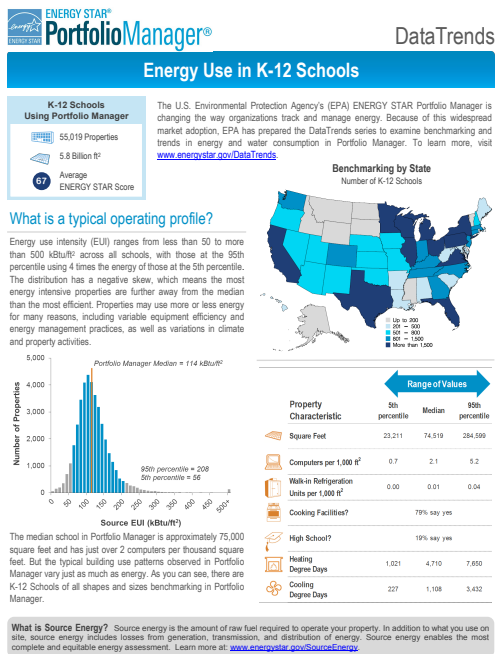


## Appendix B: ENERGY STAR Data, Publications and Websites

The U.S. Environmental Protection Agency's (EPA) ENERGY STAR Portfolio Manager is changing the way organizations track and manage energy. EPA has prepared DataTrends series to examine benchmarking and trends in energy and water consumption in Portfolio Manager. See links below for more information.

Link: [http://www.energystar.gov/sites/default/files/tools/DataTrends\\_K12Schools\\_20150129.pdf](http://www.energystar.gov/sites/default/files/tools/DataTrends_K12Schools_20150129.pdf)

Link: <http://www.energystar.gov/buildings/tools-and-resources/energy-star-building-upgrade-manual-chapter-10-k-12-schools>



## 10. Facility Type: K-12 Schools

Revised November 2006

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