



STRATEGIC ENERGY PLAN

Prepared for:
Moraga School District



Prepared by:
ARC Alternatives
April 12, 2017



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Executive Summary

This Strategic Energy Plan (SEP) identifies strategies and projects for energy conservation and clean generation. It begins with a summary of Proposition 39, the key funding source for energy efficiency projects. Moraga School District is estimated to receive \$502,000 over the course of the five year program.

With the assistance of District staff's previous efforts to identify ARC Alternatives identified and compiled over \$2.4 million in energy projects, which fall into the broad categories of:

- Interior lighting
- Exterior lighting
- Mechanical systems
- EMS/Controls

These projects are prioritized to account for available funding, establishing the basis for developing and submitting a Proposition 39 Energy Expenditure Plan to the California Energy Commission.

Moraga SD is well positioned to implement its Prop 39 program, and other energy projects as well. ARC Alternatives is seeking District feedback on this draft to further refine project options and select a scope for inclusion in the Prop 39 Energy Expenditure Plan to be submitted to the CEC.



Purpose of this report

This Strategic Energy Plan (SEP) provides the District with an overarching view of their energy project potential and a roadmap for developing and delivering a comprehensive energy program. The SEP has been developed as part of the District's Proposition 39 planning efforts and incorporates the work that makes up the District's Energy Expenditure Plan. However, the SEP is not solely focused on Prop 39, as it identifies energy project potential beyond the funding available through Prop 39. Due to its broad scope, the SEP identifies potential projects with a total implementation cost greater than the Prop 39 funding program that might be funded from future revenue sources.

The SEP starts from identifying the overarching needs and goals of the District and frames the proposed energy program in the context of District-defined outcomes. In addition to defining the proposed projects, timing, and sequencing, implementation and procurement considerations are addressed to make the plan comprehensive and actionable.





3. BACKGROUND

Prop 39 is a critical funding source

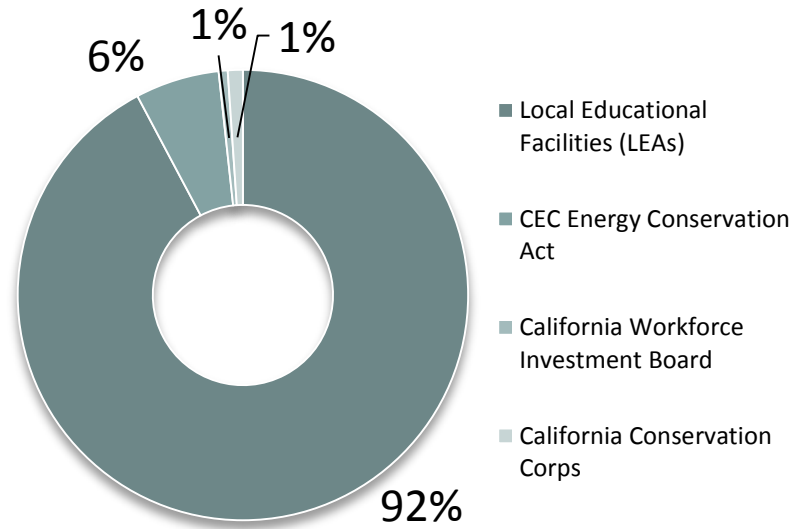
Proposition 39 History

The California Clean Energy Jobs Act was established with the passage of Proposition 39 in November of 2012, allocating approximately \$550 million annually to improve energy efficiency and expand clean energy generation. The largest share each year is awarded to local educational agencies (LEAs) for eligible projects evaluated on a formula-based method, with the following amounts made available directly to K-12 local education agencies in for project implementation:

- FY 2013-14 \$381M (Moraga SD \$100,362)
- FY 2014-15 \$279M (Moraga SD \$100,305)
- FY 2015-16 \$313M (Moraga SD \$100,378)
- FY 2016-17 \$399M (Moraga SD \$100,512)

The State Superintendent of Public Instruction (SSPI) is responsible for administering the awards for the LEAs. All school facilities; including county offices of education, school districts, charter schools, and state special schools, within an LEA are eligible for funding. Proposition 39 funding can be applied towards the six areas listed under the LEA Funding Awards diagram to the right.

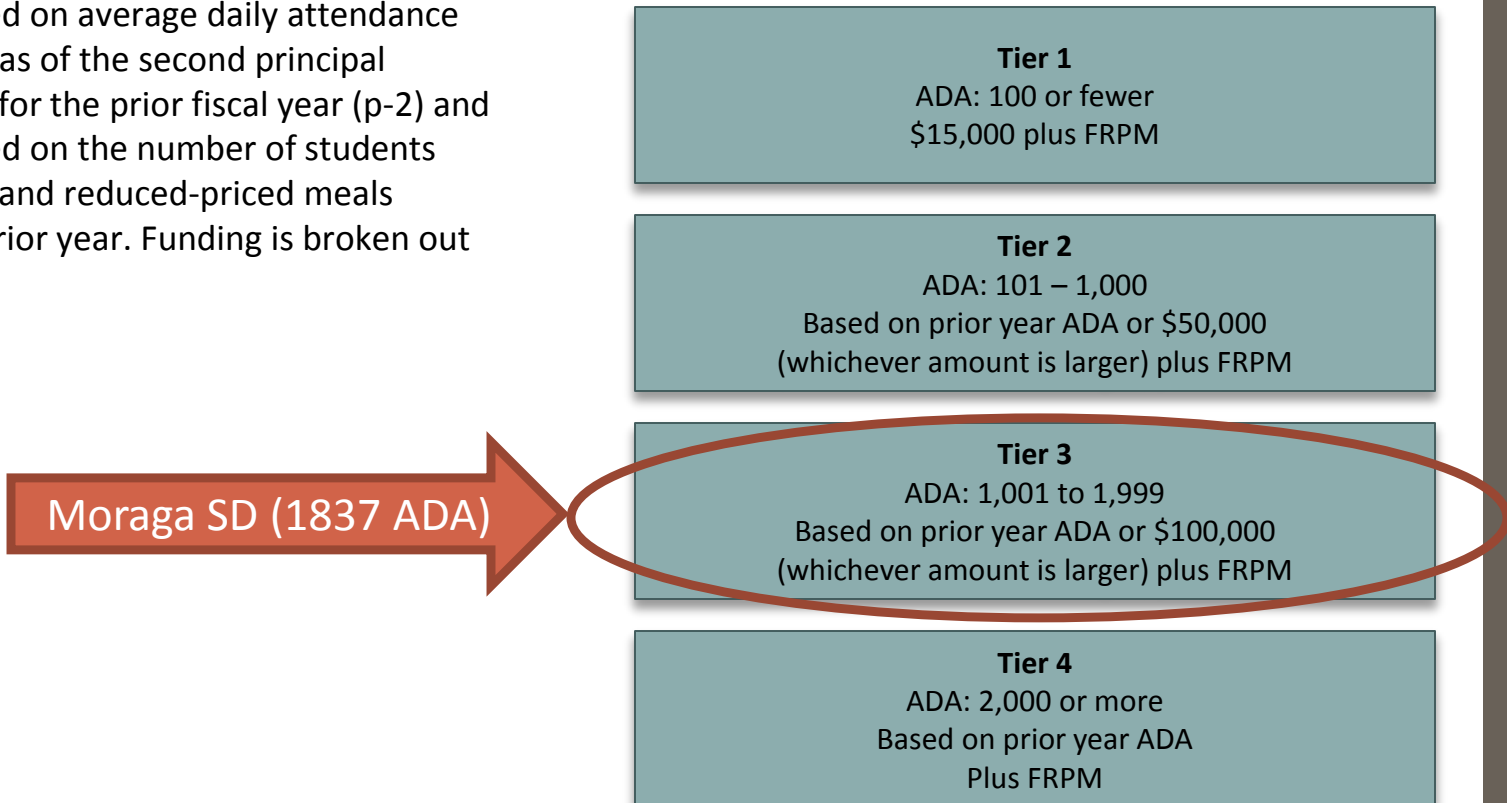
K-12 Market Funding Distribution



Prop 39 allocations based on ADA

Allocation Rules

Award calculations are conducted annually by the California Department of Education (CDE). Funding is awarded on a formula-based method: 85 percent based on average daily attendance (ADA) reported as of the second principal apportionment for the prior fiscal year (p-2) and 15 percent based on the number of students eligible for free and reduced-priced meals (FRPM) in the prior year. Funding is broken out into four tiers.



CEC process is complex

8 Step Process to Receive Award Funding

Step 1: Electric and Gas Usage/Billing Data

An organization must provide access to all historical (the past 12 months) and future account information for each of its school and facilities to the Energy Commission.

Step 2: Benchmarking or Energy Rating System

Through a benchmarking process each school site where Proposition 39 funds will be used must determine its energy usage intensity (EUI) as part of the project evaluation.

Step 3: Eligible Energy Project Prioritization Considerations

A total of 11 factors shall be considered when prioritizing projects, including the overall benefit, age of the facility, has it been modernized, the energy impact the facility has, etc.

Step 4: Sequencing of Facility Improvements

When considering facility improvements you first, maximize energy efficiency; second, look at clean energy generation; and last, consider nonrenewable projects.

Step 5: Eligible Energy Measure Identification

There are three methods to identifying eligible energy projects, an energy survey, ASHRAE Level 2 energy audit, and data analytics.

Step 6: Cost Effectiveness Determination

A project must have a minimum savings-to-investment ratio of 1.05 or better; meaning the project benefit will be greater than the project cost over time.

Step 7: Complete and Submit Energy Expenditure Plan(s)

An energy expenditure plan must be submitted according to the guidelines outlined in Proposition 39 and includes the information found during the 8 step award process.

Step 8: Energy Project Tracking and Reporting

Project expenditure reports must be submitted within 12 to 15 months of completed projects. Organizations must also submit annual reports until all funded projects are complete and a final report must also be submitted.

Expenditure Plan will be submitted to the CEC

Current Status

- ARC Alternatives is assisting the District in completing Steps 1-7 on the previous slide
- The underlying information for the District's Energy Expenditure Plan has been developed in parallel with this Strategic Plan and will be finalized based on staff feedback
- Upon review by staff (and Governing Board approval if needed) ARC stands ready to submit to CEC for approval
- The envisioned plan the District will submit is a multi-year plan covering all five years of the program & encumbering all funds

Moraga SD Prop 39 Allocation

- \$401,557 Total Award Allocation for Yrs 1 thru 4
 - \$100,362 available for planning activities, but not all will be used (\$60k estimated)
- Year 5 Allocation (FY 17-18)
 - To be announced each year by Nov 30
 - Subject to realization of tax revenues
 - Based on Tier and FRPM, will be ~\$100,400
- Results in approximately \$442k available for projects over 5 year program, accounting for planning funds

Important Guideline Requirements

- Follow loading order: efficiency first, then generation
- Energy Expenditure Plan (EEP) required to be submitted online (will need District's login, or to establish)
- Backup documentation (calculations & Energy Audit in some cases) required for each school site included in EEP
- Saving to Investment Ratio (SIR) > 1.01 across District
- Changes >15% from approved plan require revision w/ CEC
- Annual progress report required until all measures on EEP complete
- Final Report required 12-15 months after all measures on EEP complete
- Legislation carries a "no sole-source" procurement requirement for Prop 39 funds



4. BENCHMARKING

Benchmarking provides context and priorities

ARC Alternatives gathered utility data from PG&E to conduct preliminary analysis of the District's energy-related data. The full results of the analysis have been presented to the District in the Energy Benchmarking Report dated January 2017, which can be referenced for further detail. Select key data are included in this report for clarity and context. Benchmarking data help provide context for the energy analysis and allow us to focus on facilities and end-uses that may be driving energy use at the District.

Specifically, the benchmarking addresses the following:

- Characterization of energy use during the baseline period required for CEC Energy Expenditure Plan
- Energy use benchmarks and how they compare to other schools in California

And yielded the following observations and impact:

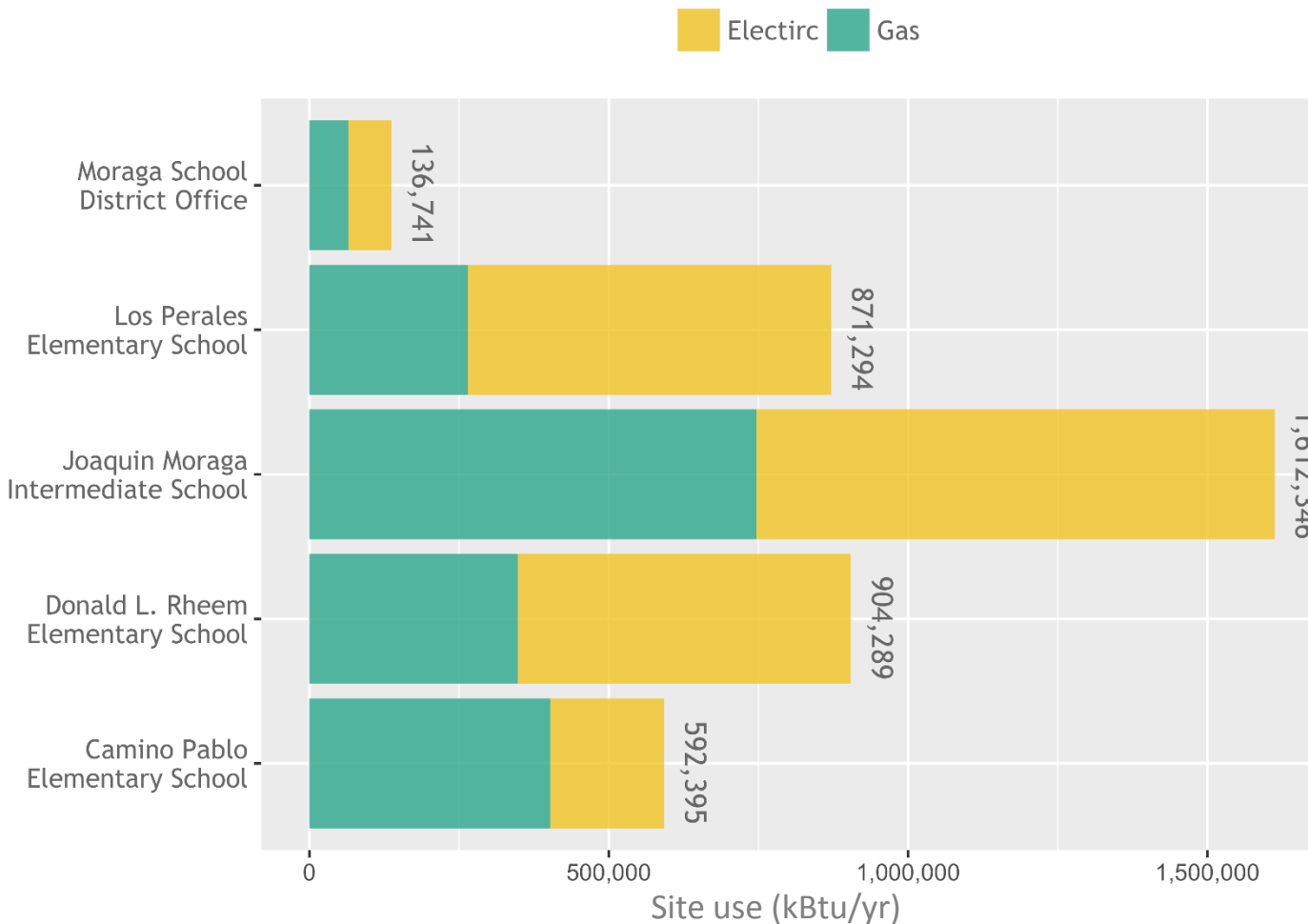
- The schools are significantly below the statewide average energy benchmarks
 - Impact: limits savings potential, already operating efficiently
 - Impact: some standard CEC savings estimates may be scaled
- The District Office has higher energy use intensities, as expected based on function (office vs school)
- The DO electricity consumption is still below the statewide average benchmark, but the natural gas consumption is greater than the statewide average benchmark.
 - Impact: high gas use represents project (or behavioral) opportunity for savings
- Although the energy intensities are higher at the DO, the absolute consumption and expense is relatively low compared to the schools.
 - Impact: DO good source for SIR boost, but not significant bill savings

Site-by-Site Energy Usage

The District office has by far the lowest total energy usage of the five sites analyzed.

Of the elementary schools, Los Perales and Rheem use similar amounts of energy annually, while Camino Pablo uses about two-thirds of their total kBtu. This discrepancy may be explained by enrollment at each facility.

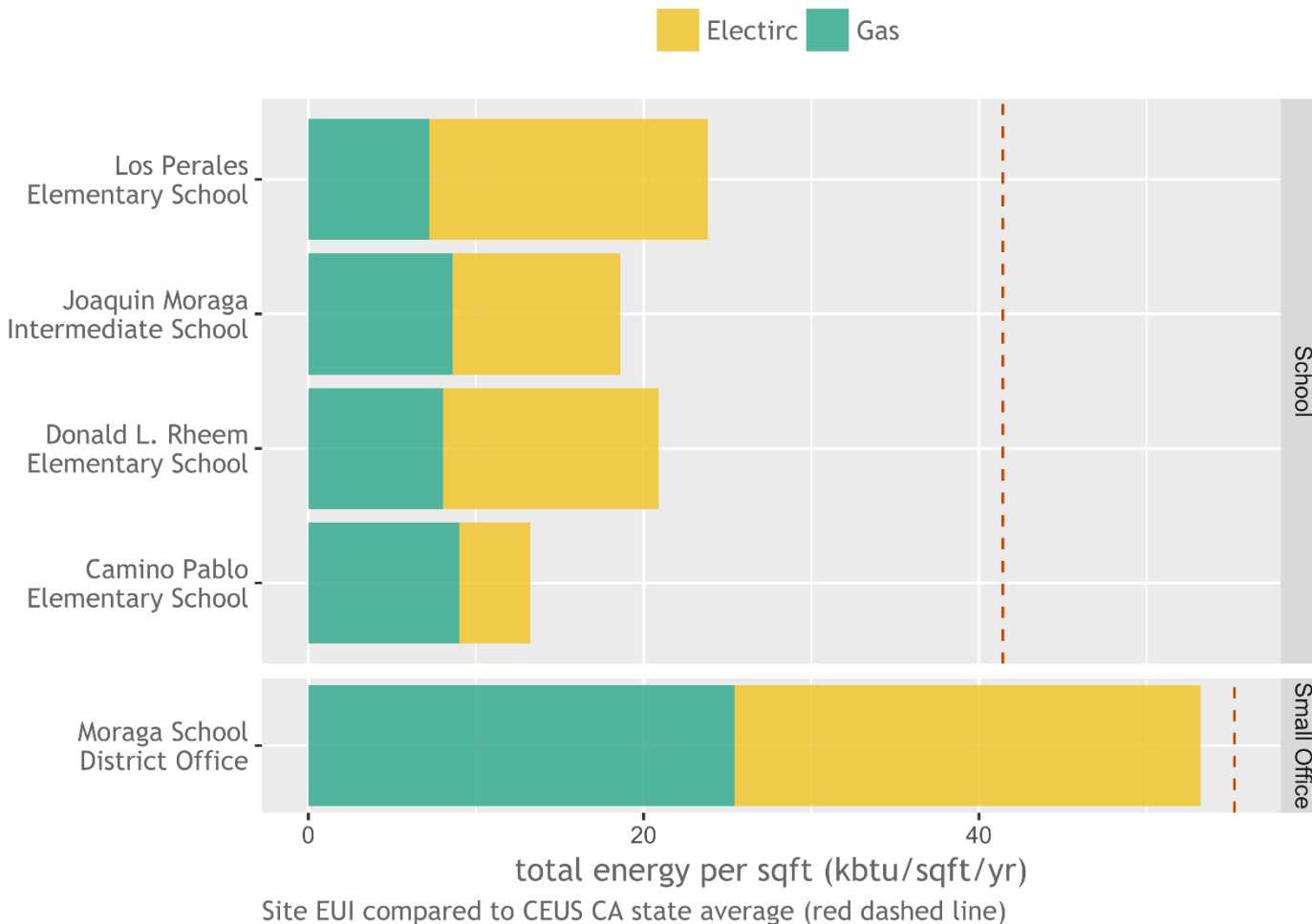
Joaquin Moraga uses the most energy annually as expected from its size.



Total Usage Benchmark

All four school combined total site EUI are well below the state average. The highest site being Los Perales, driven by its electrical use. Electrical EUI is largest at each site except for Camino Pablo indicating that electric measures should be the priority of any efficiency studies.

The District Office has a total site EUI below the state average. As discussed, the gas EUI is high at this site, indicating that gas saving measures should be considered here.





5. PROJECT IDENTIFICATION METHODOLOGY

Robust process used to identify projects

- Data Gathering & Analysis
 - Reviewed Facilities Master Plan
 - Gathered utility data
- Benchmarking
 - Included PG&E electric and gas data
 - Data to be used for Energy Expenditure Plan forms
- Site Visits & Engineering
 - Conducted by ARC in March
 - Walkthrough level audit for all schools and DO



Audits identified a variety of project types

Analysis

Energy Savings Calculations

- CEC Calculator used for all available measures, to facilitate approval (light green shade on matrix)
- Custom calculations for remainder, used conservative & documentable assumptions (light yellow shade on matrix)

Cost estimates

- Costs primarily from recent experience from competitive lighting and MEP procurements
- FMP costs primary source for EMS measure & boiler demo project
- Include ~5% allowance for soft costs & contingency
- PG&E deemed rebates accounted for

Savings to Investment Ratio (SIR) Calculation

- Prop 39 SIR Methodology incorporated into calculations
- Approximate SIR calculated for each measure using average utility rates
- Actual SIR calculated for projects, accounting for site utility rates

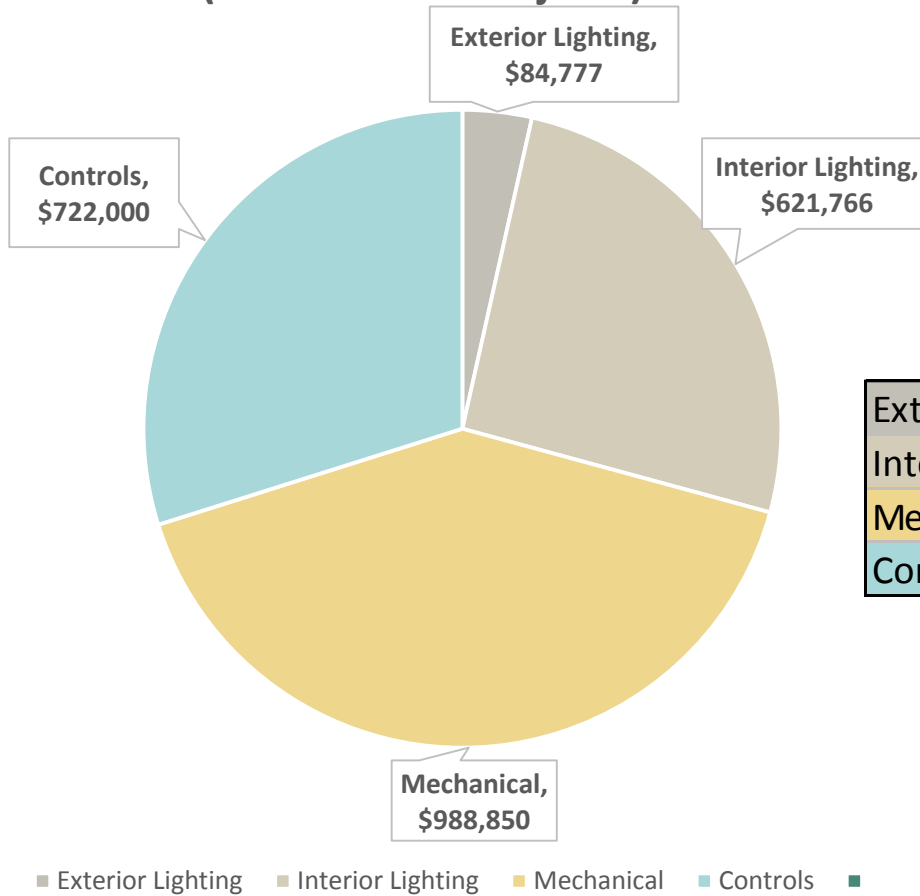
Results – Projects Identified

- Exterior Lighting HID to LED
- Interior Lighting:
 - LED Troffer Retrofit
 - LED Tube Retrofits
 - New LED Fixtures
 - Exit Signs
 - Occupancy Sensor Controls
- Mechanical:
 - Retire Boiler
 - Package Unit Replacement
 - Heat Pump Replacements
 - Miscellaneous PTAC/AC Replacement
 - Water Heater Replacement
- Controls:
 - Web enabled EMS upgrades

Identified over \$2.4M in potential projects

Total Project Potential

**Total Project Cost By Project Type
(All Potential Projects)**



**All Potential Projects
Districtwide Results**

\$2,417,393 Total Project Cost
0.91 SIR

	Project Cost (x1000)	Savings to Investment Ratio
Exterior Lighting	\$ 85	0.54 - 12.45
Interior Lighting	\$ 622	0.66 - 4.56
Mechanical	\$ 989	0.42 - 2.23
Controls	\$ 722	0.57 - 0.74

Moraga School District
 Proposition 39 Support
 Walkthrough Audit Projects
 All Projects

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(100 lamps)				(qty)	(qty)	(qty)	(qty)	(ksf)								(note)		
SCHOOLS																										
Camino Pablo	6		16			50	20		3.79	6.87	1.13	7	37	4	1				1	1	A	E		\$658	0.81	
Donald Rheem			16	1		30	20		1.71	4.95	1.78	4	29	4	1				3	1	B			\$490	0.84	
Los Perales			15	1		40	20		14.6	0.48			35		1		24		1	1	C			\$717	0.94	
Joaquin Moraga		20	8	2		40	12		3.76	16.3		1	56			6			8		D			\$545	1.02	
District Office					5			1.2					9						2					\$8	3.89	
District Total	6	20	55	4	5	160	72	1.2	23.9	28.6	2.91	12	166	8	3	6	24	2	13	3				\$2,417	0.91	
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$57	\$46	\$6	\$167	\$206	\$170	\$1	\$25	\$124	\$165	\$30	\$348	\$1	\$114	\$26						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

Alternately, with a District contribution of \$225,000 from non-repayable funds yields an SIR = 1.01 and net EEP cost = \$2,192,393

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Qty	Less real savings than Prop 39 calculates
Code	Measure included in Prop 39 Calculator (streamlines submittal)
Code	Measure savings calculated custom (extra documentation required)

Energy savings measures

Exterior Lighting: LED



SCOPE

Retrofit high pressure sodium, metal halide, incandescent and CFL fixtures with LED fixtures:

1. Pole lights retrofit with similar 'cobrahead' style fixtures
2. Wallpack fixtures replaced with new LED wallpack fixtures.
3. Floodlight & canopy fixtures replaced with like style LED fixtures

ASSUMPTIONS AND CONSIDERATIONS

- DesignLights Consortium (DLC) approved fixtures recommended
- Fixture life >50,000 hrs, great added maintenance benefit
- Measure covered by CEC Calculator
- PG&E Deemed rebates available
- One parking lot light (Donald Rheem) non-operational now

Exterior Lighting	
Total Quantity	250 fixtures
Electricity Savings	38,158 kWh/yr
Gas Savings	(66) therms/yr
Utility Cost Savings	\$9,006 /yr
Full Project Cost	\$84,707
Incentive	\$5,670
Net Simple Payback*	8.8 years
Approximate SIR	1.47

*based on energy savings alone and blended average utility rate

SCOPE

Majority of scope identified is linear fluorescents. Several variations of project types:

1. Retrofit troffer fixtures with LED 'door kits'
2. Replace existing T8 lamps with LED tube lights (wrap & strip fixtures)
3. Replace high output pendant fixtures with new LED fixtures
4. Replace T5 High bay fixtures (multi-purpose, gyms) with LED high bay fixtures
5. Replace Incandescent & fluorescent exit signs with LED
6. Occupancy sensors

ASSUMPTIONS AND CONSIDERATIONS

- DesignLights Consortium (DLC) approved fixtures/lamps recommended
- Covered by CEC Calculator, but scaled due to EUIs
- Occupancy sensors likely less real savings (lights use already managed well)
- PG&E deemed rebates available for troffer fixtures



Interior Lighting	
Total Quantity	5,746 fixtures
Electricity Savings	221,721 kWh/yr
Gas Savings	(968) therms/yr
Utility Cost Savings	\$51,681 /yr
Full Project Cost	\$621,766
Incentive	\$30,097
Net Simple Payback*	11.4 years
Approximate SIR	1.55

*based on energy savings alone and blended average utility rate

Mechanical

SCOPE

- Demo boiler and replace rooftop units with 14 SEER gas/electric package units (Camino Pablo)
- Replace existing aging package units (Los Perales) with new 14 SEER units
- Replace heat pumps (e.g. Bard units) with new 15 SEER heat pumps
- Replace 30 ton AC units serving multi-purpose rooms
- Replace storage water heaters with tankless water heaters
- Install programmable thermostats (DO)



ASSUMPTIONS AND CONSIDERATIONS

- Only considered old HVAC units (20+ yrs) as potential, and removal of boiler
- Focus on units nearing end of life; aids with future capital renewal
- Measure covered by CEC Calculator (for units up to 5.4 tons)
- Water heaters likely less real savings than CEC calculator predicts due to low use
- Programmable thermostats at DO may only be SIR boost, not true bill savings, if behavioral pattern remains

Mechanical	
Total Quantity	67 units
Electricity Savings	98,038 kWh/yr
Gas Savings	(794) therms/yr
Utility Cost Savings	\$22,444 /yr
Full Project Cost	\$988,250
Incentive	\$0
Net Simple Payback*	44.0 years
Approximate SIR	0.69

*based on energy savings alone and blended average utility rate



Project prioritization driven by funding source

Projects identified exceed expected Prop 39 funding allocation by a factor of approximately 5. Therefore, four scenarios have been developed for Prop 39 funding consideration, and a mixed funding strategy is needed if more projects to be pursued.

Prop 39 Funded

Prop 39 is most restrictive source given the SIR and other requirements. The first major assumption is that in order to stretch resources, the District's preference is to maximize the Prop 39 funds without contributions from other fund sources. From that base plan, five primary scenarios were developed to focus Prop 39 resources and achieve the "biggest bang for the buck" while maintaining some consistency (i.e., avoid partial retrofit)

Scenarios

1. Best SIR
2. HVAC Focus
3. Controls Focus
4. FMP Focus
5. Balanced Approach

Other Funding

California Energy Commission Loans

- Zero and 1% interest loans are administered through the CEC Energy Conservation Assistance Act
- 0% interest loans available for LEAs receiving P39 funding
- Currently applications being accepted, waitlisted

District Reserve Funds

- Operational funds can be used if available
- Some measures (like exit signs) may be good candidates for District to buy and install on own

Bond Measure

- If bonds funds available, would be a good source to complete certain measures or districtwide



6. ENERGY EXPENDITURE PLAN OPTIONS

Energy Expenditure Plan Scenarios

ARC Alternatives initially developed five feasible expenditure plan scenarios to utilize funding allocated by Prop 39. Additionally, most options have 2 basic variations; first to ensure consistency (usually with a District contribution) and another to minimize the District contribution. After discussions with District leadership, a 6th scenario was developed to focus on comprehensive lighting. Each of the six scenarios are summarized below and on the next page, with details on the following pages.

Scenario	Scope Quantities			Full Project Project Cost	District Contribution	Prop 39 Funds Required	Prop 39 SIR	Utility Cost Savings (\$/yr)	Simple Payback (years)*
	Lighting (# Fixtures)	HVAC (# Units)	Other						
Scenario #1: Best SIR	5662 Interior, 0 Exterior & 12 Exits	0	0 EMS, 0 Tstats, 0 OS, 0 Water Heaters	\$550,642	\$105,000	\$445,642	2.04	\$44,982	2.3
Scenario #1a: Best SIR, less 1 School (Min Contribution)	4150 Interior, 0 Exterior & 12 Exits	0	0 EMS, 0 Tstats, 0 OS, 0 Water Heaters	\$444,699	\$0	\$444,699	1.50	\$33,503	Immediate
Scenario #2: Maximize HVAC	0 Interior, 89 Exterior & 0 Exits	32	0 EMS, 2 Tstats, 0 OS, 0 Water Heaters	\$557,437	\$115,000	\$442,437	1.12	\$20,260	5.7
Scenario #2A: Max HVAC, Minimize Contribution	120 Interior, 89 Exterior & 0 Exits	26	0 EMS, 0 Tstats, 0 OS, 0 Water Heaters	\$475,572	\$35,000	\$440,572	1.01	\$19,385	1.8
Scenario #3: Controls Focus	0 Interior, 0 Exterior & 0 Exits	0	4 EMS, 0 Tstats, 0 OS, 0 Water Heaters	\$722,000	\$280,000	\$442,000	1.04	\$10,861	25.8
Scenario #3a: Controls Focus, Minimize Contribution	120 Interior, 89 Exterior & 12 Exits	0	3 EMS, 2 Tstats, 0 OS, 0 Water Heaters	\$598,714	\$155,000	\$443,714	1.08	\$16,832	9.2
Scenario #4: FMP Focus, Districtwide	5662 Interior, 157 Exterior & 0 Exits	32	4 EMS, 2 Tstats, 166 OS, 0 Water Heaters	\$1,900,131	\$1,455,000	\$445,131	5.55	\$82,468	17.6
Scenario #4a: FMP Focus, Camino Pablo	1299 Interior, 42 Exterior & 0 Exits	8	1 EMS, 2 Tstats, 46 OS, 0 Water Heaters	\$512,544	\$70,000	\$442,544	1.08	\$21,558	3.2
Scenario #4b: FMP Focus, Donald Rheem	964 Interior, 37 Exterior & 0 Exits	0	1 EMS, 2 Tstats, 38 OS, 0 Water Heaters	\$334,879	\$0	\$334,879	1.03	\$14,112	Immediate
Scenario #4c: FMP Focus, Los Perales	1512 Interior, 36 Exterior & 0 Exits	24	1 EMS, 0 Tstats, 35 OS, 0 Water Heaters	\$629,855	\$185,000	\$444,855	1.41	\$25,479	7.3
Scenario #4d: FMP Focus, Joaquin Moraga	2127 Interior, 42 Exterior & 0 Exits	0	1 EMS, 2 Tstats, 65 OS, 0 Water Heaters	\$438,223	\$0	\$438,223	1.14	\$24,939	Immediate
Scenario #5: Balanced HVAC & Lighting	1632 Interior, 90 Exterior & 0 Exits	16	0 EMS, 0 Tstats, 35 OS, 0 Water Heaters	\$441,834	\$0	\$441,834	1.26	\$28,310	Immediate

* Calculated based on District Contribution, considering energy savings only

Energy Expenditure Plan Scenarios (continued)

Scenario	Scope Quantities			Full Project Project Cost	District Contribution	Prop 39 Funds Required	Prop 39 SIR	Utility Cost Savings (\$/yr)	Simple Payback (years)*
	Lighting (# Fixtures)	HVAC (# Units)	Other						
Scenario #6: All Lighting**	4732 Interior, 322 Exterior & 6 Exits	0	0 EMS, 0 Tstats, 166 OS, 0 Water Heaters	\$638,828	\$197,000	\$441,828	2.26	\$69,266	2.8
Scenario #6a: All Lighting; Less Gym, MPRs & CFL	4732 Interior, 90 Exterior & 6 Exits	0	0 EMS, 0 Tstats, 166 OS, 0 Water Heaters	\$535,484	\$93,000	\$442,484	2.03	\$65,003	1.4
Scenario #6b: All Lighting 3 Sites; Less Gym, MPRs & CFL^^	4612 Interior, 0 Exterior & 0 Exits	0	0 EMS, 0 Tstats, 0 OS, 0 Water Heaters	\$476,796	\$34,000	\$442,796	1.64	\$52,019	0.7

* Calculated based on District Contribution, considering energy savings only

** Recommended Scenario for implementation

^^ Recommended Scenario for CEC Submittal

Energy Expenditure Plan Scenarios

Scenario 1: Best SIR

In order to maximize utility bill savings, the highest SIR projects are targeted in this scenario, which yields a comprehensive interior LED lighting project Districtwide. The details are shown on the next page.

The resulting plan is inclusive of all school sites and the District Office. One variant, to minimize the District contribution, is to include 3 of the 4 schools and the District Office. One possibility which is shown in Scenario 1a, eliminates the District contribution to fit the District allocation closely and maintains a 1.50 SIR.

District Results

5 School Sites Included

\$551,000 Total Project Cost, 1.61 SIR

or 2.04 SIR with \$105k District contribution;

\$45k/yr utility savings yields 2.3 year SPB

	School Sites Included	Project Cost (x1000)	Scope
Exterior Lighting	0	\$0	0 Fixtures
Interior Lighting	5	\$551	5674 Fixtures
Mechanical	0	\$0	0 HVAC Units
Controls	0	\$0	0 EMS/Tstat

Pros

- All sites included
- Parity between schools
- Maximum bill savings & general fund impacts
- Plan utilizes CEC calculator, streamlines submittal & approval process

Cons

- Does not get deep into infrastructure or address capital renewal/deferred maintenance
- True savings likely smaller, CEC calculator overstates based on District EUIs
- Requires District contribution, or drop one site without contribution

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 1 (SIR)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR			
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other					
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56								
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)							(note)					
SCHOOLS																												
Camino Pablo									3.79	6.87	1.13	7													\$143	1.33		
Donald Rheem									1.71	4.95	1.78	4														\$152	1.10	
Los Perales									14.6	0.48																\$106	2.04	
Joaquin Moraga									3.76	16.3		1														\$144	2.03	
District Office								1.2																		\$6	4.30	
District Total	0	0	0	0	0	0	0	1.2	23.9	28.6	2.91	12	0	0	0	0	0	0	0	0						\$551	1.61	
Total Cost (thousands)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6	\$167	\$206	\$170	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0								

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$105,000 from non-repayable funds yields an SIR = 2.04 and net EEP cost = \$445,642

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 1a (SIR, less one school)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR		
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other				
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56							
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)								(note)			
SCHOOLS																											
Camino Pablo									3.79	6.87	1.13	7													\$143	1.33	
Donald Rheem									1.71	4.95	1.78	4														\$152	1.10
Los Perales																										\$0	n/a
Joaquin Moraga									3.76	16.3		1														\$144	2.03
District Office								1.2																		\$6	4.30
District Total	0	0	0	0	0	0	0	1.2	9.26	28.1	2.91	12	0	0	0	0	0	0	0	0						\$445	1.50
Total Cost (thousands)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6	\$65	\$203	\$170	\$1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0							

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$0 from non-repayable funds yields an SIR = 1.50 and net EEP cost = \$444,699

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Energy Expenditure Plan Scenarios

Scenario 2: Maximize HVAC

To maximize impacts of Prop 39 on needed HVAC replacements, this scenario focuses on replacing the oldest HVAC units at Los Perales (the only ones not replaced in late 2000s) and demolition of the boiler system at Camino Pablo, both of which are identified in the FMP. In order to get the SIR up, the plan adds the exterior lighting Districtwide, and requires a District contribution of \$115,000. Alternately, in Scenario 2a less units could be completed at Los Perales and the District Office LEDs could be added to minimize the District contribution to \$35,000 for an SIR of 1.01.

District Results

5 School Sites Included

\$557,000 Total Project Cost, 0.87 SIR

or 1.12 SIR with \$115k District contribution;

\$20k/yr utility savings yields 5.7 year SPB

	School Sites Included	Project Cost (x1000)	Scope
Exterior Lighting	5	\$28	89 Fixtures
Interior Lighting	0	\$0	0 Fixtures
Mechanical	2	\$529	32 HVAC Units
Controls	0	\$0	2 EMS/Tstat

Pros

- Replaces all HVAC package units that are nearing end of life
- Addresses major HVAC needs identified in FMP
- Includes very visible exterior lighting; community impact
- Includes all schools
- Plan utilizes CEC calculator, streamlines submittal & approval process

Cons

- Lower bill savings
- District contribution required; partial project at Los Perales if minimizing contribution

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 2 (Max HVAC)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)								(note)		
SCHOOLS																										
Camino Pablo	6		16																			E		\$186	0.81	
Donald Rheem			16	1																					\$5	4.84
Los Perales			15	1													24								\$353	0.80
Joaquin Moraga		20	8	2																					\$12	2.73
District Office					4													2							\$1	5.11
District Total	6	20	55	4	4	0	0	0	0	0	0	0	0	0	0	0	24	2	0	0					\$557	0.87
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$348	\$1	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$115,000 from non-repayable funds yields an SIR = 1.12 and net EEP cost = \$442,437

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 2A (Max HVAC,Min Contrib.)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other		
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56					
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(100 lamps)				(qty)	(qty)	(qty)	(qty)	(ksf)							(note)		
SCHOOLS																									
Camino Pablo	6		16																			E		\$186	0.81
Donald Rheem			16	1																				\$5	4.84
Los Perales			15	1													18							\$266	0.81
Joaquin Moraga		20	8	2																				\$12	2.73
District Office					4			1.2																\$6	4.61
District Total	6	20	55	4	4	0	0	1.2	0	0	0	0	0	0	0	0	18	0	0	0				\$476	0.93
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$0	\$0	\$6	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$261	\$0	\$0	\$0					

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$35,000 from non-repayable funds yields an SIR = 1.01 and net EEP cost = \$440,572

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Energy Expenditure Plan Scenarios

Scenario 3: Controls Focus

As an option to address the Districtwide EMS upgrade identified in the Facilities Master plan, this option includes the web-enabled EMS at all four schools. A District contribution is required to meet the SIR requirement.

The alternate (Scenario 3a) to minimize the District contribution is to include 3 of the 4 schools in the EMS scope, but requires addition of higher SIR measures such as exterior lighting and DO LED lights while still requiring a \$280,000 contribution.

District Results

4 School Sites Included

\$722,000 Total Project Cost, 0.62 SIR

or 1.04 SIR with \$280k District contribution;

\$11k/yr utility savings yields 25.8 year SPB

	School Sites Included	Project Cost (x1000)	Scope
Exterior Lighting	0	\$0	0 Fixtures
Interior Lighting	0	\$0	0 Fixtures
Mechanical	0	\$0	0 HVAC Units
Controls	4	\$722	4 EMS/Tstat

Pros

- Addresses operational needs
- Addresses major Facilities Master Plan measure

Cons

- Large District contribution required; minimized contribution requires additional measures
- Low bill impact, existing system adequately controlling (for now)
- Long payback
- Additional documentation burden; Custom calculations & full audit required for all 4 schools

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 3 (Controls)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR		
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other				
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56							
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)											
SCHOOLS																											
Camino Pablo																									\$158	0.57	
Donald Rheem																										\$153	0.74
Los Perales																										\$153	0.61
Joaquin Moraga																										\$258	0.57
District Office																										\$0	n/a
District Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0					\$722	0.62
Total Cost (thousands)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$280,000 from non-repayable funds yields an SIR = 1.04 and net EEP cost = \$442,000

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 3a (Controls,Min Contrib.)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(100 lamps)				(qty)	(qty)	(qty)	(qty)	(ksf)							(note)			
SCHOOLS																										
Camino Pablo	6		16									7													\$5	4.77
Donald Rheem			16	1								4										B			\$158	0.85
Los Perales			15	1																		C			\$158	0.72
Joaquin Moraga		20	8	2								1										D			\$271	0.65
District Office					4			1.2										2							\$7	4.41
District Total	6	20	55	4	4	0	0	1.2	0	0	0	12	0	0	0	0	0	2	0	0					\$599	0.78
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$0	\$0	\$6	\$0	\$0	\$0	\$1	\$0	\$0	\$0	\$0	\$0	\$1	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

- Qty** Less real savings than Prop 39 calculates
- Code** Measure included in Prop 39 Calculator (streamlines submittal)
- Code** Measure savings calculated custom (extra documentation required)
- Measure** Included in Facilities Master Plan

Alternately, with a District contribution of \$155,000 from non-repayable funds yields an SIR = 1.08 and net EEP cost = \$443,714

Energy Expenditure Plan Scenarios

Scenario 4: FMP Focus, Districtwide

Scenario 4 represents a bounding condition on all the efficiency projects identified in the Facilities Master Plan, as if the goal were to utilize the full Prop 39 allocation to supplement bond funds. The resulting scenario requires a large District contribution, which drives up the SIR. Alternately, and more realistically as option to submit for CEC approval, each site could stand alone if submitted separately. These alternatives are Scenarios 4a-d.

District Results

5 School Sites Included

\$1,900,000 Total Project Cost, 0.99 SIR

or 5.55 SIR with \$1455k District contribution;

\$82k/yr utility savings yields 17.6 year SPB

	School Sites Included	Project Cost (x1000)	Scope
Exterior Lighting	4	\$27	85 Fixtures
Interior Lighting	5	\$621	5734 Fixtures
Mechanical	2	\$529	32 HVAC Units
Controls	4	\$722	2 EMS/Tstat

Pros

- Aligns with FMP priorities
- Deepest energy savings

Cons

- Significant District contribution required
- More difficult to implement; requires broad range of projects to be contracted in next year
- Additional documentation burden; Custom calculations & full audit required for all 4 schools (unless alternate scenario)

Moraga School District
 Proposition 39 Support
 Walkthrough Audit Projects
 Scen 4 (FMP)

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)								(note)		
SCHOOLS																										
Camino Pablo	6		16				20		3.79	6.87	1.13		37									A	E		\$505	0.88
Donald Rheem			16	1			20		1.71	4.95	1.78		29									B			\$327	0.97
Los Perales			15	1			20		14.6	0.48			35				24					C			\$630	0.97
Joaquin Moraga		20	8	2			12		3.76	16.3			56									D			\$431	1.10
District Office								1.2					9					2							\$8	3.58
District Total	6	20	55	4	0	0	72	1.2	23.9	28.6	2.91	0	166	0	0	0	24	2	0	0					\$1,900	0.99
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$0	\$46	\$6	\$167	\$206	\$170	\$0	\$25	\$0	\$0	\$0	\$348	\$1	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$1,455,000 from non-repayable funds yields an SIR = 5.55 and net EEP cost = \$445,131

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 4a (FMP-CP)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)								(note)		
SCHOOLS																										
Camino Pablo	6		16				20		3.79	6.87	1.13		37												\$505	0.88
Donald Rheem																									\$0	n/a
Los Perales																									\$0	n/a
Joaquin Moraga																									\$0	n/a
District Office								1.2					9					2							\$8	3.58
District Total	6	0	16	0	0	0	20	1.2	3.79	6.87	1.13	0	46	0	0	0	0	2	0	0					\$513	0.92
Total Cost (thousands)	\$1	\$0	\$4	\$0	\$0	\$0	\$13	\$6	\$27	\$50	\$66	\$0	\$7	\$0	\$0	\$0	\$0	\$1	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$70,000 from non-repayable funds yields an SIR = 1.08 and net EEP cost = \$442,544

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 4b (FMP-DR)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(100 lamps)				(qty)	(qty)	(qty)	(qty)	(ksf)							(note)			
SCHOOLS																										
Camino Pablo																								\$0	n/a	
Donald Rheem			16	1			20		1.71	4.95	1.78		29									B			\$327	0.97
Los Perales																									\$0	n/a
Joaquin Moraga																									\$0	n/a
District Office								1.2					9						2						\$8	3.58
District Total	0	0	16	1	0	0	20	1.2	1.71	4.95	1.78	0	38	0	0	0	0	2	0	0					\$335	1.03
Total Cost (thousands)	\$0	\$0	\$4	\$1	\$0	\$0	\$13	\$6	\$12	\$36	\$104	\$0	\$6	\$0	\$0	\$0	\$0	\$1	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$0 from non-repayable funds yields an SIR = 1.03 and net EEP cost = \$334,879

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 4c (FMP-LP)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR		
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other				
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56							
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)											
SCHOOLS																											
Camino Pablo																									\$0	n/a	
Donald Rheem																										\$0	n/a
Los Perales			15	1			20		14.6	0.48			35				24					C			\$630	0.97	
Joaquin Moraga																										\$0	n/a
District Office																										\$0	n/a
District Total	0	0	15	1	0	0	20	0	14.6	0.48	0	0	35	0	0	0	24	0	0	0					\$630	0.97	
Total Cost (thousands)	\$0	\$0	\$4	\$1	\$0	\$0	\$13	\$0	\$102	\$3	\$0	\$0	\$5	\$0	\$0	\$0	\$348	\$0	\$0	\$0							

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

- Qty** Less real savings than Prop 39 calculates
- Code** Measure included in Prop 39 Calculator (streamlines submittal)
- Code** Measure savings calculated custom (extra documentation required)
- Measure** Included in Facilities Master Plan

Alternately, with a District contribution of \$185,000 from non-repayable funds yields an SIR = 1.41 and net EEP cost = \$444,855

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 4d (FMP-JM)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR		
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other				
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56							
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)								(note)			
SCHOOLS																											
Camino Pablo																									\$0	n/a	
Donald Rheem																										\$0	n/a
Los Perales																										\$0	n/a
Joaquin Moraga		20	8	2			12		3.76	16.3			56									D			\$431	1.10	
District Office								1.2					9						2						\$8	3.58	
District Total	0	20	8	2	0	0	12	1.2	3.76	16.3	0	0	65	0	0	0	0	2	0	0					\$438	1.14	
Total Cost (thousands)	\$0	\$8	\$2	\$2	\$0	\$0	\$8	\$6	\$26	\$118	\$0	\$0	\$10	\$0	\$0	\$0	\$0	\$1	\$0	\$0							

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$0 from non-repayable funds yields an SIR = 1.14 and net EEP cost = \$438,223

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Energy Expenditure Plan Scenarios

Scenario 5: Balanced HVAC & Lighting

As a more balanced option between energy savings and addressing aging HVAC units, this scenario completes all of the exterior lighting Districtwide and one school of interior lighting to support the boiler demolition at Camino Pablo, and adds as many package units as possible at Los Perales without a District contribution.

The resulting plan is inclusive of all school sites, and has the necessary SIR with no District contribution

District Results

5 School Sites Included

\$442,000 Total Project Cost, 1.26 SIR

or 1.26 SIR with \$0k District contribution;

\$28k/yr utility savings yields immediate SPB

	School Sites Included	Project Cost (x1000)	Scope
Exterior Lighting	5	\$28	90 Fixtures
Interior Lighting	2	\$117	1632 Fixtures
Mechanical	2	\$297	16 HVAC Units
Controls	0	\$0	0 EMS/Tstat

Pros

- Balances bill savings and infrastructure
- Replaces Camino Pablo boiler system
- No District contribution required
- Plan utilizes CEC calculator, streamlines submittal & approval process

Cons

- Only completes partial HVAC at Los Perales

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 5 (Balanced Approach)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)								(note)		
SCHOOLS																										
Camino Pablo	6		16																			E		\$186	0.81	
Donald Rheem			16	1																					\$5	4.84
Los Perales			15	1					14.6	0.48			35				8								\$232	1.43
Joaquin Moraga		20	8	2																					\$12	2.73
District Office					5			1.2																	\$6	4.69
District Total	6	20	55	4	5	0	0	1.2	14.6	0.48	0	0	35	0	0	0	8	0	0	0					\$442	1.26
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$0	\$0	\$6	\$102	\$3	\$0	\$0	\$5	\$0	\$0	\$0	\$116	\$0	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

- Qty Less real savings than Prop 39 calculates
- Code Measure included in Prop 39 Calculator (streamlines submittal)
- Code Measure savings calculated custom (extra documentation required)
- Measure Included in Facilities Master Plan

Alternately, with a District contribution of \$0 from non-repayable funds yields an SIR = 1.26 and net EEP cost = \$441,834

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Energy Expenditure Plan Scenarios

Scenario 6: All Lighting

After discussion of options and priorities with the District, this sixth scenario was developed to complete exterior and interior lighting Districtwide. The full lighting package, less buildings subject to possible seismic renovation, requires a \$197k district contribution (2.26 SIR), which can be reduced a few ways.

Incrementally, the alternate scenarios:

1. Scale back the two low SIR measures (exterior CFLs, Gym High Bay lights). This reduces the District contribution to \$93k with a 2.03 SIR (Scenario 6a)
2. Remove DO & exterior lights. This reduces District contribution to \$34k with a 1.64 SIR (Scenario 6b). This is the scenario recommended to submit for the EEP since it encumbers all the projected funding and reduces the amount of backup information required (one less site, interior lighting only). The sites can still be concurrently implemented with District funds, but it is recommended to do them “outside” of Prop 39.

District Results

5 School Sites Included

\$639,000 Total Project Cost, 1.49 SIR

or 2.26 SIR with \$197k District contribution;

\$69k/yr utility savings yields 2.8 year SPB

	School Sites Included	Project Cost (x1000)	Scope
Exterior Lighting	4	\$85	85 Fixtures
Interior Lighting	5	\$554	281.42 Fixtures
Mechanical	5	\$0	174.9 HVAC Units
Controls	0	\$0	0 EMS/Tstat

Pros

- Addresses District priorities
- Plan utilizes CEC calculator, streamlines submittal & approval process
- Encumbers full allocation

Cons

- Potentially leaves CFLs (minor inconsistency in appearance), and Gym lights (fairly new fixtures, but would be last remaining linear fluorescents in District). Both could be done concurrently with District funds.

Moraga School District
 Proposition 39 Support
 Walkthrough Audit Projects
 Scen 6 (Lighting)

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(100 lamps)				(qty)	(qty)	(qty)	(qty)	(ksf)							(note)			
SCHOOLS																										
Camino Pablo	6		16			50	20		3.05	2.77	1.12	3	37												\$148	1.14
Donald Rheem			16	1		30	20		1.13	1.08	1.78	2	29												\$153	0.96
Los Perales			15	1		40	20		14.6	0.48			35												\$143	1.86
Joaquin Moraga		20	8	2		40	12		3.76	16.3		1	56												\$187	1.87
District Office					5			1.2					9												\$7	3.99
District Total	6	20	55	4	5	160	72	1.2	22.6	20.6	2.9	6	166	0	0	0	0	0	0	0					\$639	1.49
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$57	\$46	\$6	\$158	\$149	\$170	\$0	\$25	\$0	\$0	\$0	\$0	\$0	\$0	\$0						

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

Alternately, with a District contribution of \$197,000 from non-repayable funds yields an SIR = 2.26 and net EEP cost = \$441,828

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Qty	Less real savings than Prop 39 calculates
Code	Measure included in Prop 39 Calculator (streamlines submittal)
Code	Measure savings calculated custom (extra documentation required)

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 6a (Lighting,less CFL&Gym)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR		
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other				
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56							
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)											
SCHOOLS																											
Camino Pablo	6		16						3.05	2.77	1.12	3	37												\$118	1.26	
Donald Rheem			16	1					1.13	1.08	1.78	2	29													\$130	0.99
Los Perales			15	1					14.6	0.48			35													\$116	2.11
Joaquin Moraga		20	8	2					3.76	16.3		1	56													\$165	2.04
District Office					5			1.2					9													\$7	3.99
District Total	6	20	55	4	5	0	0	1.2	22.6	20.6	2.9	6	166	0	0	0	0	0	0	0						\$535	1.64
Total Cost (thousands)	\$1	\$8	\$14	\$4	\$0	\$0	\$0	\$6	\$158	\$149	\$170	\$0	\$25	\$0	\$0	\$0	\$0	\$0	\$0	\$0							

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

Alternately, with a District contribution of \$93,000 from non-repayable funds yields an SIR = 2.03 and net EEP cost = \$442,484

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Qty	Less real savings than Prop 39 calculates
Code	Measure included in Prop 39 Calculator (streamlines submittal)
Code	Measure savings calculated custom (extra documentation required)

**Moraga School District
Proposition 39 Support
Walkthrough Audit Projects
Scen 6b (Lighting, less scope)**

Project Potential

	EL1	EL2	EL3	EL4	EL5	EL6	IL1	IL2	IL3	IL4	IL5	IL6	IL7	M1	M2	M3	M4	M5	M6	M7	Custom			Total Cost (thousands)	Estimated SIR	
	70W HID to LED	150W HID Canopy to LED	150W HID Wallpack to LED	250W HID to LED	Inc/Halogen to LED	CFL to LED Canopy	Gym/MPR High Bay LED	T12 to LED	F32T8 to LED Tube	F32T8 to LED Fixture	T8HO to LED Fixture	LED Exit Signs	Occupancy Sensor	Replace Heat Pump	Replace MPR AC	Replace PTAC Units	3 Ton Pkg Units	Programmable Tstat	Water Heater-Elect	Water Heater-Gas	Other	Other	Other			
Approx SIR:	3.72	2.5	5.6	1.92	12.5	0.54	0.99	4.56	1.9	2.15	0.66	3.04	1.41	0.42	0.68	0.88	0.72	2.23	0.76	0.56						
	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)	(fixt)		(100 lamps)			(qty)	(qty)	(qty)	(qty)	(ksf)								(note)		
SCHOOLS																										
Camino Pablo									3.05	2.77	1.12														\$107	1.12
Donald Rheem									1.13	1.08	1.78														\$120	0.84
Los Perales									14.6	0.48															\$106	2.04
Joaquin Moraga									3.76	16.3															\$144	2.03
District Office																									\$0	n/a
District Total	0	0	0	0	0	0	0	0	22.6	20.6	2.9	0	0	0	0	0	0	0	0	0					\$477	1.52
Total Cost (thousands)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$158	\$149	\$170	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0					

EEP Target = \$442k

Custom Projects

Approx SIR Cost (thousands)

Key

Alternately, with a District contribution of \$34,000 from non-repayable funds yields an SIR = 1.64 and net EEP cost = \$442,796

A - EMS-Camino Pablo	0.57	\$158
B - EMS-Donald Rheem	0.74	\$153
C - EMS-Los Perales	0.61	\$153
D - EMS-JM	0.57	\$258
E - Demo Boiler & Replace Pkg Units	0.74	\$181

Qty	Less real savings than Prop 39 calculates
Code	Measure included in Prop 39 Calculator (streamlines submittal)
Code	Measure savings calculated custom (extra documentation required)



7. IMPLEMENTATION CONSIDERATIONS

Procurement options

Considerations

- Type of work
- Size of potential contract or contracts
- Industry competitiveness
- Defensibility
- Consistency with codes and regulations, and in particular Prop 39 requirements
- Trade-offs between desired outcomes and difficulty (administrative burden) of process

Solicit proposals informally

- Small school Districts often get “3 bids” for small projects
- Usually local emphasis, known contractors
- Often favorable pricing due to less GCs and upfront investment

Contracting Options

- Informal Bid Process (under Uniform Building Construction Act)
- Lease-Leaseback (under California’s Ed Code section 17406)
- Performance and energy services contract (ESCO)
- Design-build
- Design-Bid-Build

Sole Source – GC 4217

- Government Code 4217 allows school districts and other public agencies to enter into energy-related contracts without a competitive solicitation if the savings from the project are greater than the costs
- Prop 39 requires competitive solicitations, so this option is only available to projects not using this funding source
- Sole source contracts also can present legal and political challenges

Competitive – GC 4217

- A school district may conduct a competitive solicitation utilizing the flexibility provided by GC 4217
- This approach permits selection based on “best value,” use of RFPs for construction and services contracts, and use of design-build contracting methodology
- Most appropriate for large, complex projects or projects where lowest price is not the only determinant of project success

Competitive – Public Contract Code

- Process fully compliant with the public contract code
- Familiar to most District staff, as it is used for the majority of construction work performed in the State
- Can be less flexible than other methods
- Requires more detailed specifications
- Most appropriate for simpler construction projects, equipment purchases or replacements, or projects being combined with other construction projects

Phasing and timing considerations

Sequencing of projects may consider several factors

- Limiting construction activities to the summer when school is not in session, & when summer cleaning occurs
- When campuses will be undergoing other construction projects, if scheduled
- Packaging similar energy efficiency measures into projects that can be successfully put out to bid
- Availability of financing
- Cash flow implications: complete as Prop 39 funding vs accelerating implementation and using Prop 39 allocations as reimbursement



8. NEXT STEPS

Next Steps

Recommendation

- Recommended Energy Expenditure Plan (EEP) Option is Scenario 6 based on District feedback:
 - Recommend implementing full lighting scope (Scenario 6), by supplementing Prop 39 funding with District contribution.
 - Recommend submitting Scenario 6b to the CEC as the basis for the EEP, which minimizes the documentation and approval by the CEC, while encumbering the whole allocation.
 - The District will maintain flexibility to implement the measures not included in the EEP since they will be paid for out of District funds. This includes CFL replacements, gym lights, lighting in seismic candidate buildings & District Office, occupancy sensors, and exterior lights.

Procedural

- Get Access to District's account in Online System
- Finalize Calculations
- Compile Energy Expenditure Plan (EEP) Documents
- Review with District for Approval (Governing Board approval required?)
- "Electronic Signature" and self-certification
- ARC can submit EEP on behalf of Moraga SD
- List ourselves as PM so we handle the questions from CEC