Evaluation, Measurement & Verification Report for City of Shasta Lake Electric 2009

Energy Efficiency Programs

- Commercial Lighting
- Keep Your Cool

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ABSTRACT

The following Evaluation, Measurement, and Verification (EM&V) report for the City of Shasta Lake Electric provides a systematic review of the Commercial Lighting and Keep Your Cool programs. Recommendations were made to implement an internal quality assurance process for data entry of rebate application information.

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Executive Summary

This report provides findings from an independent Evaluation, Measurement and Verification (EM&V) for the following energy efficiency programs from the City of Shasta Lake Electric's (SL's) 2009 fiscal year: Commercial Lighting and Keep Your Cool programs.

The programs were evaluated using a continuous improvement approach with the goal of identifying and recommending areas where changes can be made to improve data management and ensure data quality. For SL, this involved a review of the overall program with particular focus on data collection for lighting rebates.

After reviewing SL's energy efficiency program, we are recommending a review of the savings figures used for one measure in the Keep Your Cool program.

Introduction & Purpose of Report

EM&V is the documentation of energy savings using direct measurements, engineering calculations, statistical analyses, and/or computer simulation modeling. EM&V is a requirement of two bills adopted during the 2005-2006 California legislative session:

SB 1037 (Kehoe): Requires all publicly-owned utilities to report to the California Energy Commission and their local governing boards about current and projected energy efficiency programs, including expenditures and savings.

AB 2021 (Levine): Reaffirms SB1037 mandates but also requires publicly-owned utilities to develop energy efficiency targets on a triennial basis and provide an independent assessment of measured savings.

This report provides unbiased, independent third-party auditing of programs selected by SL. Specifically, this report assesses 1) demand and consumption savings of the Commercial Lighting and 2) the savings calculation accuracy of the Keep Your Cool program.

Program Descriptions

Commercial Lighting

SL's Commercial Lighting program consists of three parts; 1-For-1 Lighting Upgrades, Lighting Upgrades with Delamping, and Custom Lighting projects. All lighting projects are contingent on the availability of funds and the inspection of completed projects by SL's Efficiency Services Department.

- **1-For-1 Lighting Upgrades**
  Qualifying 1-For-1 Lighting Upgrade projects are projects where the number of existing and proposed fixtures and lamps are the same. Qualifying rebates under this program do not require pre-approval from SL if the lighting measure is listed in the "1-For-1 Upgrades" section of SL's Commercial Lighting Rebates chart (Appendix B). If the job is completed as submitted, the customer will receive the rebate amount confirmed or 60% of the installed job cost, whichever is less.

- **Lighting Upgrades with Delamping**
  Lighting Upgrades with Delamping projects reduce the total number of lamps and fixtures installed in a facility. To qualify for the delamping rebate the contractor must be able to document the number of existing lamps and fixtures at the beginning of the project.

- **Custom Lighting Projects**
  Lighting projects not described in SL's Commercial Lighting Rebate chart are can also be eligible. The customer must contact the Efficiency Services Department for details.

Keep Your Cool

The *Keep Your Cool* program focuses on energy saving within the food and beverage industry, focusing on reducing electrical consumption of refrigeration equipment.

Common measures installed include:

- Door gaskets
- Strip curtains
- Auto-closers

Because this is a small city, very little program promotion is done or required. Typically, industrial/commercial customers approach SL with energy retrofit proposals and accommodations are made by SL through their Efficiency Services Department.

Evaluation Standards

The requirement for utilities to provide independent third-party assessments of measured savings is relatively new and subject to some interpretation. There are published references (such as the International Measurement and Verification Protocol and the Technical, Methodological, and Reporting Requirements for Evaluation Professionals), but it is apparent from the body of previous third-party assessments that there is a range of interpretations and application of these references.

Our stance and approach is to:
1) Provide a rigorous review of the utility's programs.
2) Meet them where they are at and identify actionable improvements.
3) Minimize costs so more public benefits funds can be devoted to energy efficiency programs.

With this approach, our goal is to provide an "optimized" assessment resulting in an actionable review at minimal cost to the utility. This Continuous Improvement approach begins with process evaluation, followed by data analysis and detailed savings verification. If we discover significant opportunities for improvement in the course of evaluating a process or analyzing the data, we will stop and document the needed improvement actions. In such cases we do not make assumptions or otherwise fill in gaps in the data.

For example, if required program data is missing then we will document this as a needed improvement activity rather than spend additional time to estimate the data which should have been provided.

Evaluation Plans

Using the approach explained above, the specific evaluation plan for SL was as follows:

Process Review

Evaluate the database for overall structure and accuracy. Conduct staff interviews to identify any specific issues with the energy efficiency program and identify improvement opportunities.

Commercial Lighting

Calculate 90 percent confidence interval for program Demand (kW) and Consumption (kWh) savings on a "per fixture" basis, review SL's database for accuracy of program savings data, and review deemed savings assumptions. Perform site verification for a portion of the installed measures.

Keep Your Cool

Evaluate third-party proposed energy savings and review deemed energy savings assumptions. Perform site verification for a portion of the installed measures.

Findings & Recommendations

Process Review - Evaluation of Database

SL recorded two (2) Commercial Lighting rebates for the 2009 fiscal year. SL holds these rebates in spreadsheet form. There are no recommendations for improving the database structure at this time due to the small size of the program.

Process Review - Staff Interviews

On Wednesday, February 24, a meeting was held with Tom Miller, the Electric Utility Director for SL. In 2009, the majority of public benefits funds were directed toward commercial and industrial projects. In the short term, there are some additional large commercial and industrial projects that will be completed. These projects have yielded excellent energy savings per dollar spent and has been well received by the business community.

In the long term, SL will begin shifting focus to apply more public benefits funds to residential weatherization projects. Many of the homes in the city date back over 50 years to the time of the construction of Shasta Dam. These homes have little or no insulation, and there will be a significant public benefit to improve the weatherization of these homes.

A barrier to this type of project is the lack of a staff resource with the time required to work with the community to educate them on the benefits of such measures. Some consideration is being given to using public benefits funds to expand the staff to include such a resource. SL may work with nearby utilities to share resources to develop this approach further.

Evaluation of Commercial Lighting

After review of the Commercial lighting program it was noted that only two (2) lighting projects were rebated during the 2009 fiscal year. Because the sample size does not lend itself well to normal distributions, a 90% confidence interval was not calculated. Instead project installations are shown in Appendix A.

Site verification was performed at the AT&T facility at 1608 McConnell Ave. 38 Fixtures were counted, as per the rebate application. These were verified as 4 foot, T-8 fixtures with 2 lamps per fixture.

Evaluation of Keep Your Cool

Most of the demand and consumption savings figures used in the Keep Your Cool program were reasonable and close to those of similar deemed savings programs.

However, one issue noted was an apparent discrepancy between kW demand reduction figures, kWh consumption reduction and reasonable hours of operation. The demand reduction figure provided by SL was 0.18 kW, and the consumption reduction provided was 2,485 kWh. These numbers should be related to one another via hours of operation. However, as can be seen in the following table, back-calculating yields an hours of operation figure that is greater than the total number of hours in a year (8760).

Measure	Unit Of Measure	Cost Per Unit	Annual kWh's Saved Per Unit of Measure	kW Reduction	Annual Hrs of Op
Auto Closers - Glass Reach-In Freezer	Per Closer	$125	2,485	0.18	13,806

This could be the result of either an assumed demand reduction that is too low, or a consumption reduction that is too high. For comparison, the consumption savings provided in KEMA's "Measure Quantification Methodology Statewide Savings and Cost" report are 2366 kWh. This is similar to the annual savings in SL's data. It should be noted that only one auto closer was installed as part of this program, so the effect of any change in assumed savings will be minimal.

This was discussed with the provider of the measure (The Bay Area Gasket Guy). It was found that the discrepancy came from using consumption and demand figures from two different KEMA reports. The provider agreed to provide revised savings figures for future installations.

Site verification was performed on 4 of the 9 participating business. These included the Chevron at 1725 Cascade Blvd., the Circle K at 4833 Shasta Dam Blvd., the Sentry Market at 4525 Shasta Dam Blvd., and the Valero at 1666 Cascade Blvd. Installation and approximate door size was verified for each. A complete list of locations and savings figures is available in Appendix C.

Appendix A – Commercial Lighting Installations

Customer	Location	Existing Fixture Type	Fixture Quantity	Watts Per Fixture	Annual Hours of Operation	Total Watts	Consumption Before Retrofit (kWh)	Retrofit Fixture Type	Fixture Quantity	Watts Per Fixture	Annual Hours of Operation	Total Watts	Consumption After Retrofit (kWh)
Sierra Pacific Ind.	Shop	400 HM	11	458	8,760	5,038	44,133	4' 4L T5 HB	11	229	8,760	2,519	22,066
Sierra Pacific Ind.	Infeed	1 x 8 2L HO	1	237	8,760	237	2,076	4' 4L T5 HB	1	229	8,760	229	2,006
Sierra Pacific Ind.	Planer Rm	1 x 8 2L HO	4	237	8,760	948	8,304	4' 4L T5 HB	3	229	8,760	687	6,018
Sierra Pacific Ind.	Infeed	1 x 8 2L HO	3	237	8,760	711	6,228	4' 4L T5 HB	3	229	8,760	687	6,018
Sierra Pacific Ind.	Infeed	2 x 8 4L	2	316	8,760	632	5,536	1 x 8 2L T8 HO	2	160	8,760	320	2,803
Sierra Pacific Ind.	Upstairs	250W MH	2	308	8,760	616	5,396	4' 4L T5 HB	2	229	8,760	458	4,012
Sierra Pacific Ind.	2nd Level	400W HPS	1	465	8,760	465	4,073	4' 4L T5 HB	1	229	8,760	229	2,006
Sierra Pacific Ind.	Bottom West	400W MH	1	458	8,760	458	4,012	4' 4L T5 HB	1	229	8,760	229	2,006
Sierra Pacific Ind.	Bottom West	1 x 8 2L HO	4	237	8,760	948	8,304	4' 4L T5 HB	3	229	8,760	687	6,018
Sierra Pacific Ind.	Bottom West	1 X 8 2L S	1	158	8,760	158	1,384	1 X 8 2L T8 SL	3	110	8,760	330	2,891
Sierra Pacific Ind.	Lug Loader	1 x 8 2L HO	1	237	8,760	237	2,076	4' 4L T5 HB	1	229	8,760	229	2,006
Sierra Pacific Ind.	PonyRig	250W MH	1	308	8,760	308	2,698	4' 4L T5 HB	1	229	8,760	229	2,006
Sierra Pacific Ind.	Sorter	250W MH	14	308	8,760	4,312	37,773	4' 4L T5 HB	14	229	8,760	3,206	28,085
Sierra Pacific Ind.	Outfeed	1 x 8 2L S	1	158	8,760	158	1,384	1 x 8 2L T8 SL	1	110	8,760	110	964
AT&T	Main Floor	4 ft T-12 Lamps	38	84	4,380	3,192	13,981	4 ft T8 Lamps	38	54	4,380	2,052	8,988
Total						18,418	147,361					12,201	97,893

Total Demand Savings (kW)	6.2
Total Consumption Savings (kWh)	49,468

Appendix B – Rebate Chart

City of Shasta Lake
Energy Efficienct Commercial Lighting Rebates

1-For-1 Upgrades

Existing Equipment	Proposed Equipment	Rebate	Rebate Mulitplier
4 ft T-12 Lamps	4 ft T8 Lamps (Re-Lamp or New Fixture)	$15	Rebate per lamp (tube)
8 ft T-12 Lamps	8 ft T8 Lamps (Re-Lamp or New Fixture)	$20	Rebate per lamp (tube)
250W Metal Halide or T-12	3 Tube T-5 HO (New Fixture)	$150	Rebate per Fixture
400W Metal Halide of T-12	4-Tube T-5 HO (New Fixture)	$250	Rebate per Fixture
Incandescent	Screw-In CFL (1-13W)	$5	Rebate per CFL
Incandescent	Screw-In CFL (14-26W)	$6	Rebate per CFL
Incandescent	Screw-In CFL (>=27W)	$7	Rebate per CFL
Incandescent	Hardwired CFL (1-13 Watt)	$40	Rebate per fixture
Incandescent	Hardwired CFL (14+ Watt)	$50	Rebate per fixture
No timer	Time Clock	$75	Rebate per Time Clock
Timer only	Photocell	$30	Rebate per Photocell
No Occupancy Sensor	Occupancy Sensor	$50	Rebate per Occupancy Sensor
No timer or Controls	Photocell	$100	Rebate per Photocell
Exit Sign - Incandescent	Exit Sign - LED or Electroluminescent	$50	Rebate per Fixture

Upgrades w/Delamp

Existing Equipment	Proposed Equipment	Rebate	Rebate Mulitplier
4 ft T-12 Lamps	4 ft T8 Lamps w/10% delamp (Re-Lamp or New Fixture)	$25	Rebate per lamp (tube)
4 ft T-12 Lamps	4 ft T8 Lamps w/25% delamp (Re-Lamp or New Fixture)	$30	Rebate per lamp (tube)
4 ft T-12 Lamps	4 ft T8 Lamps w/33% delamp (Re-Lamp or New Fixture)	$40	Rebate per lamp (tube)
8 ft T-12 Lamps	8 ft T8 Lamps w/10% delamp (Re-Lamp or new Fixture)	$30	Rebate per lamp (tube)
8 ft T-12 Lamps	8 ft T8 Lamps w/25% delamp (Re-Lamp or new Fixture)	$40	Rebate per lamp (tube)
8 ft T-12 Lamps	8 ft T8 Lamps w/33% delamp (Re-Lamp or new Fixture)	$50	Rebate per lamp (tube)

Note: A City of Shasta Lake lighting audit or digital photos are required to qualify for delamp rebates. Number of existing lamps must be documented and verified prior to work beginning.

Custom Lighting Projects

Lighting projects not described in the above tables may still qualify for incentives. These are considered Custom Projects, and require pre-approval by City of Shasta Lake before work can begin. Contact the City of Shasta Lake's Energy Efficiency Department at 1-888-883-9879 for more information on custom lighting projects

City of Shasta Lake lighting rebates will NOT exceed 60% of the installed job cost

Appendix C – Gasket Installations

City of Shasta Lake

Keep Your Cool Program Activity Report **FY09**

Date	Num	P. O. #	Name	Address	Amount	Gasket (feet)	Strip Curtain (SqFt)	Closers	Closer Type	Annual kWh Savings	kW Reduction
05/11/2009	9054	904160300	Sentry Market	4525 Shasta Lake Blvd.	$3,362.71	256.25	133.00	0		88,495	10.10
05/11/2009	9055	904171300	Black Oak Resturant	4161 Front St.	$523.63	65.45	0.00	0		6,807	0.78
05/11/2009	9056	904171030	Valero	1666 Cascade Blvd.	$1,755.67	219.00	0.00	0		22,776	2.60
05/11/2009	9057	904141330	Circle K	4833 Shasta Dam Blvd.	$1,272.45	120.29	19.77	1	CRC	21,703	2.48
05/11/2009	9058	904140900	Sunshine Market	4265 Shasta Dam Blvd.	$778.72	0.00	78.90	0		36,689	4.19
05/11/2009	9059	904141100	Shasta Lake Pizza Factory	4432 Shasta Dam Blvd.	$664.07	60.25	18.45	0		14,845	1.69
05/11/2009	9060	904171200	Chevron	1725 Cascade	$1,615.67	201.96	0.00	0		21,004	2.40
05/22/2009	9172	904161400	Take & Bake Pizza	4237 Shasta Dam Blvd.	$523.31	65.41	0.00	0		6,803	0.78
TOTAL					**$10,496.23**	**988.61**	**250.12**	**1**		**219,121**	**25.01**

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