2008 Energy Efficiency Program Evaluation Plan

Submitted To:

Lassen Municipal Utility District

June 12, 2008

SUMMIT BLUE
CONSULTING, LLC

Submitted to: Lassen Municipal Utility District
65 S. Roop Street
Susanville, CA 96130

Contact name: Theresa Boucher
tboucher@lmud.org

Submitted by: Gary Cullen

Summit Blue Consulting, LLC
1104 Main Street, Ste. M110
Vancouver, WA 98660
360-450-4882
gcullen@summitblue.com

TABLE OF CONTENTS

1 UTILITY OVERVIEW

Two legislative bills (SB1037 and AB2021) were signed into law a year apart. SB1037 requires that the Publicly Owned Utilities (POUs), similar to the Investor Owned Utilities (IOUs), place cost effective, reliable, and feasible energy efficiency and demand reduction resources at the top of the loading order. They must now procure 'negawatts' first. Additionally, SB1037 (signed September 29, 2005) requires an annual report that describes the programs, expenditures, expected energy savings, and actual energy savings.

Assembly Bill 2021, signed by the Governor a year later (September 29, 2006), reiterated the loading order and annual report stated in SB1037 as well as expanding on the annual report requirements. The expanded report must include investment funding, cost-effectiveness methodologies, and an independent evaluation that measures and verifies the energy efficiency savings and reductions in energy demand achieved by the energy efficiency and demand reduction programs. AB2021 additionally requires a report every three years that highlights cost-effective electrical and natural gas potential savings from energy efficiency and established annual targets for energy efficiency and demand reduction over 10 years.

The legislative reports require both an on-going assessment of what is occurring within the programs along with a comparison of how much possible savings are left within the POU service territory. The goal of this 2008 energy efficiency program plan is to assist Lassen Municipal Utility District (LMUD), and its efficiency program implementer, Efficiency Services Group, to meet these requirements. This plan provides guidance and recommends Evaluation, Measurement, and Verification (EM&V) activities that will help LMUD standardize and streamline the reporting process in order to meet the legislative requirements.

This plan identifies recommended E, M&V actions based on information gathered from Efficiency Services Group, and the LMUD website. Based on this review, it is recommended that LMUD conduct the following EM&V activities:

- A limited process evaluation of LMUD's efficiency programs to ensure consistency in database tracking given the overlap in several program elements, focusing on the most active programs.
- Review of the measures included in the residential comprehensive program, and,
- Verification of the savings for residential lighting measures through a review of the installation tracking system. The utilization of the deemed and installation information within the reporting structure will be reviewed; and,

1.1 General Utility Background Information

LMUD has its headquarters in the town of Susanville in Lassen County. Susanville is the only incorporated city in and the county seat for Lassen County. It is located in the northeast corner of California, ninety miles northwest of Reno, Nevada and one hundred miles east of Red Bluff, California, at an elevation of 4,200 feet.

LMUD was established in 1988 and provides electric service to approximately 12,000 customers. About 50% of the energy sales are to the residential sector with the remaining 50% primarily commercial. Its annual energy use is about 143 gigawatt-hours (GWh). There is little difference between LMUD's winter and summer peaks.

LMUD is located in California Title 24 Climate Zone 16. Susanville is on the Susan River, at the foot of the Sierra Nevada Mountains on a high plateau. The winters are very cold but the summers are mild. Annual precipitation is about 13.7" per year with the wettest month being January with about 2.4". The summers are generally dry. Table 1 illustrates the heating and cooling degree-days for Susanville.

Table 1: Temperature Reference Points for Susanville Municipal Utility

Base Temp: 65F	Susanville
Heating Degree Days (HDD)	6,168
Cooling Degree Days (CDD)	390

1.2 Key Customer Markets

LMUD serves both residential and commercial customers with the residential lighting program providing most of the conservation savings in past years. However, non-residential lighting is been becoming more important and will account for the most energy savings for LMUD in the future.

LMUD currently offers several residential sector energy conservation programs. These include:

- **Residential Energy Efficiency Rebates** are available on a variety of Energy Star appliances, Marathon electric water heaters, and energy efficient air source and ground source heat pumps. The identified incentive levels or equipment cost are:
    - Refrigerators - $50 incentive
    - Dishwashers - $35 incentive
    - Clothes washers - $35 incentive
    - Marathon water heater (15-20 gallons) – available for $150
    - Marathon water heater (30-50 gallons) – available for $250
    - Marathon water heater (75-105 gallons) – available for $350
- **SmartBuilt Home Program** provides incentives to homeowners or contractors to build energy efficient homes or retro-fit existing ones
- **Coming Soon** is commercial lighting rebates, energy audits for small business customers, and the SmartBuilt Manufactured Home Program.

1.2.1 2007 Program Summary

LMUD spent a total of $173,304 in program costs, which led to total demand reductions of 54 kW and total annual energy reductions of 89,876 kWh. Table 2 summarizes the kW, kWh and program costs for LMUD's programs.

Table 2: 2007 Summary of LMUD's Energy Efficiency Programs

1.3 Evaluation Priorities

As shown in Table 2, in 2007, nearly 50% of LMUD's net annual energy savings came from its residential lighting program. However, over 70% of the incentives paid and 63% of its net peak demand savings came from their residential comprehensive program. The residential comprehensive program includes a variety of different measures.

Evaluation priorities should be based on a combination of relative size of the savings achieved as well as the degree of uncertainty with anticipated (*ex ante)* estimates of the savings. The cost of different evaluation approaches also is a key element in determining priorities. Savings resulting from residential lighting make up most of the energy savings for LMUD. Fortunately, the anticipated (*ex ante)* energy savings for residential lighting are strong especially when compared to other types of measures, such as HVAC and shell measures where savings estimates are derived from building simulation modeling with the building characteristics being an average across all vintages and home sizes. Residential lighting is easily characterized on an average basis since base and replacement wattages are generally well defined and operating hours are generally homogeneous across the residential sector. What is uncertain with the LMUD programs is the composition of measures that constitute the residential comprehensive program. The energy savings are small, less than 7%, but the net peak demand impacts are large and the share of incentive payments is also large.

The evaluation budget for LMUD is small and limits the extent of evaluation efforts that can be undertaken. It is our recommendation that both a limited process evaluation be performed as well as an impact evaluation. Fortunately, for the process evaluation, LMUD is one of five utilities that utilize the services of Efficiency Services Group to implement their programs and therefore the process evaluation can encompass all five utilities with the cost shared among the five.

Based on the facts outlined above, the following are our evaluation recommendations:

1. A limited process evaluation of all energy efficiency programs to ensure consistency in database tracking given the overlap in several programs. This evaluation would be across all five of the utilities whose program implementation is managed by Efficiency Services Group.
2. Verification of the savings for residential lighting measures through a review of the installation tracking system. The utilization of the deemed and installation information within the reporting structure will be reviewed.
3. Review of the measures included in the residential comprehensive program.

2 PROCESS EVALUATION PLAN

LMUD has only recently secured the services of the Efficiency Services Group as the manager of its energy efficiency programs. However, it is expected that the Efficiency Services Group will implement a tracking system for LMUD similar to what it does for the other four utilities whose energy efficiency programs they manage and that the promotion of LMUD's programs will continue as it has in the past. To insure that proper data is being collected in the tracking system and that program promotion is being conducted efficiently, we recommend that a limited process evaluation be performed. It would be one that:

- reviews the current tracking system and the information gathered and recorded by that system,
- reviews the marketing materials and customer recruitment processes, and
- reviews the measures targeted in LMUD's residential portfolio to determine cost-effectiveness and identify potential alternatives.

2.1 Task 1: Review Tracking Systems

Given that these programs are generally cross-promoted, the consulting team should review the ways the program data are tracked as well as insure that certain variables, such as lighting measure hours of operation for non-residential lighting, are gathered at the time of implementation.

Based on our preliminary review of the current tracking, provided by the Efficiency Services Group, the process evaluation could identify ways to simplify and streamline the data tracking process currently used. Moreover, this review would also identify more expedient ways to measure program impacts, which will streamline the reporting process to the CEC.

2.2 Task 2: Review Program Procedures and Relationships

This process evaluation would include a review of the materials and events currently used for recruiting customers to the LMUD efficiency programs. This review would also identify additional messages that LMUD may want to include in future program marketing efforts. This information would be supplemented by interviews with program staff, both at LMUD and Efficiency Services Group, focusing specifically on the ways on the following topics:

- Program process flow and relationships.
- Program metrics including current enrollment, customer satisfaction, and savings estimates.
- Marketing and outreach activities.
- Areas for improvement.

3 IMPACT EVALUATION PLAN

The primary objectives of an impact analysis are to assess gross and net demand and energy savings and the cost-effectiveness of the installed systems. An impact evaluation verifies measure installations, identifies key energy assumptions and provides the research necessary to calculate defensible and accurate savings attributable to the program.

3.1 Impact Evaluation Research Issues and Objectives

The primary objectives of an impact analysis are:

1. Conduct a preliminary uncertainty analysis and identify and rank those factors that contribute to overall uncertainty regarding program gross and net kW and kWh savings.

2. Review engineering assumptions.

3. Develop an analysis approach designed to minimize uncertainty of reported savings.

4. Verify measure installations.

5. Calculate verified gross demand and energy savings.

6. Calculate net-to-gross factors and verified net demand and energy savings.

7. Assess program costs, including incremental costs associated with measures installed through the program.

8. Determine the cost-effectiveness of the program based on Total Resource Cost (TRC) test.[1]

[1] As defined in the California Standard Practice Manual, Economic Analysis of Demand Side Programs and Projects, October 2001

3.2 Methods and Data Sources

A useful construct for thinking about the range of efficiency measures covered by the Program is the International Performance Measurement and Verification Protocol (IPMVP), Table 3 presents a listing of the IPMVP protocols, the nature of the performance characteristics of the measures to which M&V options typically apply, and an overview of the data requirements to support each option. Our approach to selecting M&V strategies follows these guidelines.

Table 3: Overview of M&V Options

IPMVP M&V Option	Measure Performance Characteristics	Data Requirements
Option A: Engineering calculations using spot or short-term measurements, and/or historical data	Constant performance	• Verified installation • Nameplate or stipulated performance parameters • Spot measurements • Run-time hour measurements
Option B: Engineering calculations using metered data.	Constant or variable performance	• Verified installation • Nameplate or stipulated performance parameters • End-use metered data
Option C: Analysis of utility meter (or sub-meter) data using techniques from simple comparison to multi-variate regression analysis.	Variable performance	• Verified installation • Utility metered or end-use metered data • Engineering estimate of savings input to SAE model
Option D: Calibrated energy simulation/modeling; calibrated with hourly or monthly utility billing data and/or end-use metering	Variable performance	• Verified installation • Spot measurements, run-time hour monitoring, and/or end-use metering to prepare inputs to models • Utility billing records, end-use metering, or other indices to calibrate models

As stated earlier, evaluation priorities should be based on a combination of relative size of the savings achieved as well as the degree of uncertainty with anticipated (*ex ante)* estimates of the savings. Based on the anticipated (*ex ante)* estimates of the savings and the level of achieved savings in 2007, the highest evaluation priority is to evaluate the savings from the residential lighting program. However, because of the large net demand impacts and large share of incentives provided, we also recommend that the mix of measures being implemented within the residential comprehensive program also be performed. This review would not be an impact evaluation but rather an assessment of whether an impact evaluation for this program would be warranted for the next fiscal year.

For residential lighting measures, it is our recommendation that M&V Option "A" is the most appropriate methodology. The methodology recommended is primarily a review of how the measure installations are tracked and verified. The deemed savings per measure need not be reviewed but its application in conjunction with identified installations to develop program impacts will be reviewed.

3.3 Task 3: Installation Verification

Verification that measures have actually been installed is an important part of an impact evaluation. However, site visits to visually verify installation are a costly means of doing so. In lieu of on-site verification, it is recommended that verification consist of a review of the verification records kept in the program tracking database and a phone call to the participant to verify installation. As part of the process evaluation, the current process of verifying installation and recording that verification did occur will be reviewed and any needed changes identified and made.

The telephone verification survey will be performed on a sample of lighting program participants. The total number of participants in the program for FY 2008 is unknown. However, if, for example, there were 200 participants and the sample was drawn in order to achieve a level of precision and confidence of 90% +/-10% a sample of about 50 would be required.

3.4 Task 4: Review of the Residential Comprehensive Program Measure Mix

This review will not be an impact evaluation but rather an identification and assessment of the measures included in the residential comprehensive program. It is the goal of this review to determine if this program should be a candidate for the next round of impact evaluations for FY 2009 programs. The reason to perform the review is the large (63%) share of net peak demand savings reported for this program and the large share of the incentives (over 70%) provided through this program.

3.5 Task 5: Calculate Gross Energy and Demand Impacts

There will be no change in the E^3 Calculator method of determining residential lighting program energy and peak demand savings. Rather, the emphasis of this impact evaluation is to insure that the variables used to develop these estimates, especially the reported number of installations, are correct.

3.6 Task 6: Process and Impact Evaluation Report

The evaluation consultant will issue a final report to the utility summarizing the results from the process and impact evaluations and describing any recommendations that come from the evaluations. These recommendations will assist LMUD in meeting the requirements with the AB2021 requirements and assist them to develop the reports required to be submitted to the California Energy Commission (CEC).

The final report will include:

E: Executive Summary

1. Introduction and Selected Evaluation Issues
    1.1. Program Overview
    1.2. Program Objectives
2. Process Evaluation Plan
    2.1. Research Issues and Objectives
    2.2. Description of Evaluation Efforts
3. Impact Evaluation Plan
    3.1. Research Issues and Objectives
    3.2. Methods & Data Sources
    3.3. Sample Design
4. Data Collection Plan
5. Process Evaluation Results
    5.1. Findings
    5.2. Recommendations
6. Impact Evaluation Results
    6.1. Findings
    6.2. Recommendations
7. Evaluation Based Recommendations

4 EVALUATION PLAN TIMING

The recommended methodology for the impact evaluation does not require any billing data or on-site metering work. Therefore, the 2008 Energy Efficiency Program Evaluation can begin immediately upon the completion of FY 2008.

5 ESTIMATED BUDGET

Since the program administrator for LMUD is Efficiency Services Group, some and possibly much of the work effort could be combined among the five utilities for which Efficiency Services Group is the program administrator. For instance, Task 1 and Task 2 would be about the same cost in total for the entire group of five as it would be for just LMUD. By task, the cost range should be:

- Task 1: Review Tracking System - $1,500 - $3,000
- Task 2: Review Program Procedures and Inter-Relationships (costs depend on the evaluation team selected) - $1,500 - $3,000
- Task 3: Installation Verification - $3,000 - $5,000
- Task 4: Review of the Residential Comprehensive Program Measure Mix - $500 - $1,000
- Task 5: Calculate Gross Energy and Demand Impacts - $500 - $1,000
- Task 6: Process and Impact Evaluation Report - $5,000 - $6,000