Application No.:	A.21-
Exhibit No.:	Liberty-12
Witnesses:	Timothy S. Lyons Talha A. Sheikh

(U 933-E)

2022 General Rate Case

Before the California Public Utilities Commission

Chapter 12: Marginal Cost and Rate Design

Tahoe Vista, California

May 28, 2021

Liberty-12: Marginal Cost and Rate Design

Table Of Contents

List of Exhibits

Liberty-12: Marginal Cost and Rate Design

List of Tables

Table	Page

Liberty-12: Marginal Cost and Rate Design

List of Figures

Figure	Page

I. INTRODUCTION

Q. Please state your names and business addresses.

A. (Lyons) My name is Timothy S. Lyons. My business address is 1900 West Park Drive, Suite 250, Westborough, Massachusetts, 01581.

(Sheikh) My name is Talha A. Sheikh. My business address is 2626 Glenwood Ave, Suite 480, Raleigh, North Carolina, 27608.

Q. By whom are you employed and in what capacity?

A. (Lyons) I am a Partner with ScottMadden, Inc. ("ScottMadden").

(Sheikh) I am a Manager with ScottMadden.

Q. On whose behalf are you testifying in this proceeding?

A. We are testifying on behalf of Liberty Utilities (Calpeco Electric) LLC ("Liberty").

Q. Please describe your professional and educational experience.

A. (Lyons) I have more than 30 years of experience in the energy industry. I started my career in 1985 at Boston Gas Company, eventually becoming Director of Rates and Revenue Analysis. In 1993, I moved to Providence Gas Company, eventually becoming Vice President of Marketing and Regulatory Affairs. Starting in 2001, I held a number of management consulting positions in the energy industry, first at KEMA and then at Quantec, LLC. In 2005, I became Vice President of Sales and Marketing at Vermont Gas Systems, Inc. before joining Sussex Economic Advisors, LLC ("Sussex") in 2013. Sussex was acquired by ScottMadden in 2016.

I hold a bachelor's degree from St. Anselm College, a master's degree in Economics from The Pennsylvania State University, and a master's degree in Business Administration from Babson College.

(Sheikh) I have approximately 6 years of experience in the energy industry. I joined ScottMadden in 2015 as an Associate Consultant, was promoted to Senior Associate Consultant in 2016, and Managing Consultant (or a Manager) in 2019. I have supported development of more than 25 studies related to rate design, class cost of service, alternative rate mechanisms, and Cash Working Capital / lead-lag studies in seven regulatory jurisdictions, including California.

I hold a bachelor's degree in Business Administration from Institute of Business Administration, Karachi, and a master's in Business Administration degree from University of South Carolina.

Q. Have you previously testified before the California Public Utilities Commission ("Commission") or any other regulatory agency?

A. (Lyons) Yes. My testimony experience is included in Exhibit TSL/TAS-1.

(Sheikh) No.

Q. What is the purpose of your Direct Testimony?

A. The purpose of our testimony is to sponsor Liberty's proposed base rates. Our Testimony includes: (a) a description of the current rate classes; (b) development of the Marginal Cost of Service ("MCS") study; and (c) development of the proposed revenue targets, rate design, and bill impact analyses for each rate class based on Liberty's current rate design.[1] The MCS study was used to inform the proposed base rates in this proceeding.

We note that Liberty is in the process of examining how best to keep its rates affordable, especially for the most vulnerable residents in its service territory, and intends to submit revised rate design proposals as an update to this Chapter in June or July, 2021.

---

[1] *See* workpapers.

Q. Have you prepared exhibits to support this testimony?

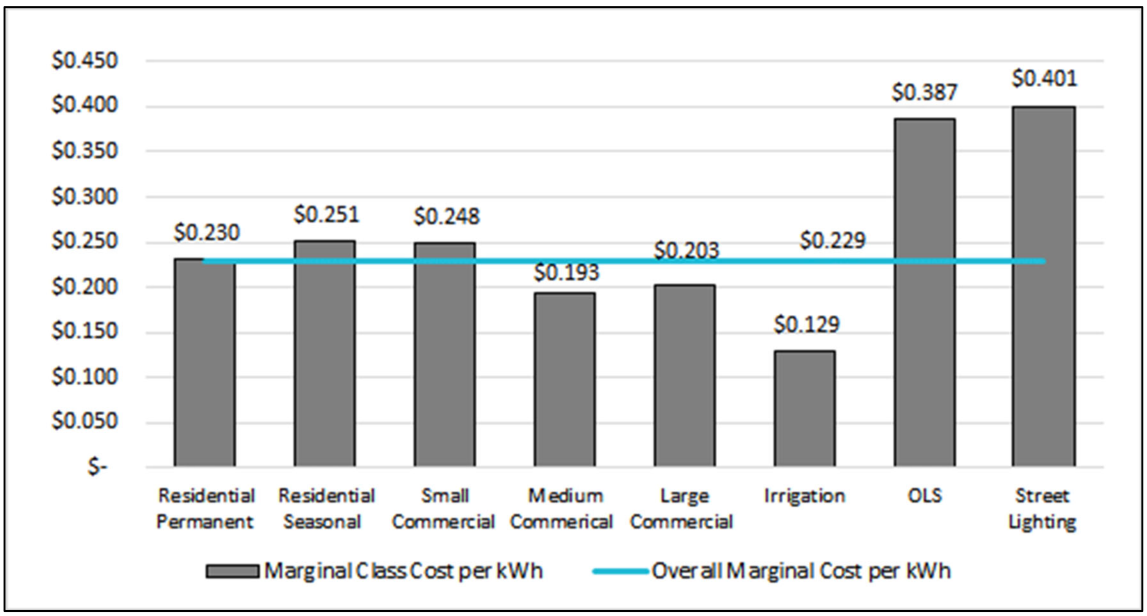
A. Yes. Exhibits TSL/TAS-2 through TSL/TAS-5 summarize the results of the MCS and rate design proposals. These Exhibits were prepared by us or under our direction.

II. SUMMARY OF FINDINGS AND RECOMMENDATIONS

Q. Please summarize your Direct Testimony.

A. The results of Liberty's marginal cost study show differences in the cost of serving Liberty's rate classes, as shown in Figure 12-1 (below).

Figure 12-1
Marginal Cost of Service by Rate Class
($ per kWh)



The Figure shows that the marginal cost of serving the Residential Permanent rate class is lower than the Residential Seasonal rate class. In addition, the Figure shows that the marginal cost of serving the Residential Permanent rate class is higher than the Large Commercial rate class. The derivation of marginal costs and allocation to rate classes is presented in Exhibit TSL/TAS-2 and TSL/TAS-3. Except as otherwise indicated, the approach to calculate the MCS study in this General Rate Case (GRC") filing is generally consistent with the approach used in the Company's most recent GRC filing (Application 18-12-001).

The proposed base rates reflect three important rate design principles: (a) rates should recover the overall cost of providing service; (b) rates should be fair, minimizing inter- and intra-class inequities to the extent possible; and (c) rate changes should be tempered by rate continuity concerns.

Liberty applied these principles by first allocating the overall cost of service to each rate class consistent with the results of the marginal cost study. In addition, Liberty established revenue targets for each rate class that were tempered by rate continuity concerns. The proposed base rates reflect a uniform increase in each rate elements based on the percent increase in revenue requirements for each rate class

Liberty prepared customer bill impacts to evaluate the impact of the proposed base rates. The customer bill impacts examined a range of customer usage. Overall, the proposed rates will increase the total monthly bill of an average use Residential Permanent customer by $42.79 per month, or 41.4 percent. The development of revenue targets, rate design, and bill impact analyses are presented in Exhibit TSL/TAS-4 and TSL/TAS-5.

Q. Does Liberty's MCS study and rate design proposals in this proceeding address certain Commission concerns in Liberty's prior GRC filing (Application 18-12-001)?

A. Yes, Liberty's MCS study and rate design proposals address two Commission directives.

1. The Commission required Liberty to evaluate marginal costs of permanent and residential seasonal customers in the next GRC filing.[2]
    a. In the most recent GRC, permanent residential customers at Public Participation Hearings ("PPH") voiced concerns that rate increases burden the permanent customers with added infrastructure costs arising due to usage demands of non-permanent (or seasonal) residents/secondary homeowners.
2. The Commission directed Liberty to conduct the MCS study without relying on NV Energy marginal costs.[3]

III. OVERVIEW

Q. Please briefly describe the Company's Service Area.

A. Liberty is a regulated utility providing electric service in California. Liberty provides electric service to approximately 50,475 customers, including 43,887 (86.9 percent) residential customers and 5,640 (11.2 percent) C&I customers as shown in Figure 2 (below).

Customers are presently served under one of seven rate classes based on type of service and load characteristics. The rate classes consist of a Residential class that includes

[2] Decision 20-08-030, p. 81: "Therefore, we require Liberty to include, in its next marginal cost study, an analysis for permanent and non-permanent residents and the cost to serve these customers. In its next rate case, Liberty shall propose whether there is merit to improve the rate structure and design for residential rate class based on its findings of the marginal cost of service study."

[3] Decision 20-08-030, Commission Order #12: "Liberty Utilities (CalPeco Electric) LLC shall provide, in its next General Rate Case testimony, an updated Marginal Cost of Service Study based on its own system distribution network level to request a revenue requirement and not use NV Energy's Marginal Cost of Service Study results."

Permanent, Non-Permanent (or Seasonal), and sub-metered customers, three C&I class, one Irrigation class, and two lighting classes.

Q. Please describe the characteristics of the Company's rate classes.

A. Table 12-1 (below) provides a breakdown of the test year customers and kWh sales for each rate class. The test year represents the forecast period January 1, 2022 through December 31, 2022.

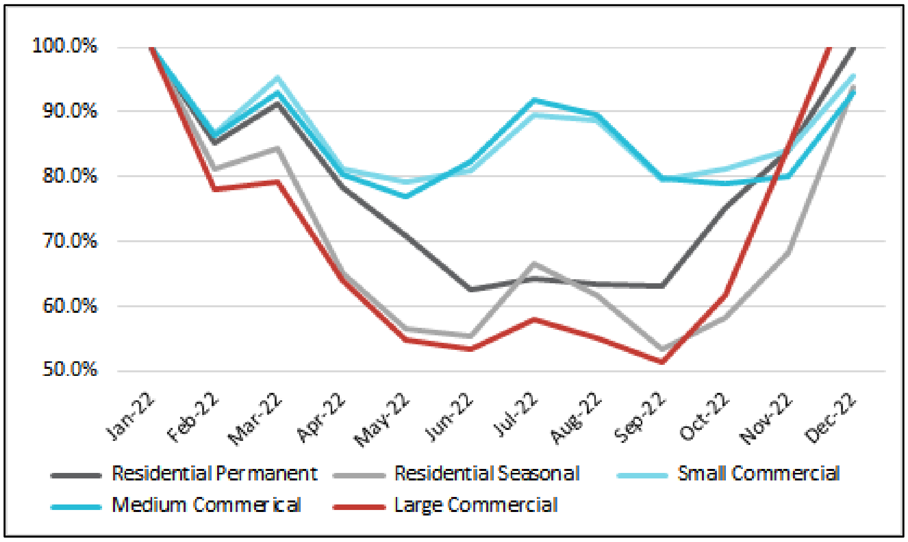
Table 12-1
Test Year Customers and Sales

Rate Classes	Number of Customers	Percentage of Customers	Sales kWh	Percentage of Sales	kWh Sales per Customer
Residential Permanent	17,656	35.0%	138,136,346	23.7%	7,824
Residential Seasonal	25,660	50.8%	156,982,485	26.9%	6,118
S-M Master Residential	571	1.1%	3,887,077	0.7%	6,813
Small Commercial	5,323	10.5%	99,099,282	17.0%	18,617
Medium Commerical	254	0.5%	67,984,366	11.7%	267,655
Large Commercial	53	0.1%	114,881,147	19.7%	2,167,569
Irrigation	10	0.0%	709,079	0.1%	71,504
OLS	920	1.8%	593,401	0.1%	645
Street Lighting	29	0.1%	347,134	0.1%	12,005
Total	50,475	100.0%	582,620,318	100.0%	11,543

The Figure shows the Residential class represents over 86.0 percent of Liberty's customers while the Large Commercial class represents only 0.1 percent of customers. The Figure also shows variations in annual use per customer among the rate classes. Permanent and Seasonal Residential customers, respectively, use on average 7,824 and 6,118 kWh per year, while Large Commercial customers use on average 2,167,569 kWh per year.

Monthly load profiles also vary among the rate classes, as shown in Figure 12-2 (below).

Figure 12-2
Class Usage per Customer as Percentage of January Peak Usage



The Figure shows monthly kWh sales per customer as a percentage of January kWh sales per customer. January is the month with the highest kWh sales. The Figure shows variations in rate class usage throughout the year, particularly in the winter and summer months.

The Figure also shows that Residential Permanent and Seasonal customers show a seasonal load pattern, with monthly sales higher during the winter months, reflecting heating use. By comparison, the Small and Medium Commercial rate classes show relatively consistent load patterns throughout the year. Finally, the Large Commercial class shows a seasonal load pattern with monthly sales higher during the winter months. Variations in the load patterns, as discussed below, have implications on the allocation of costs in the MCS study.

Q. Please describe Liberty's current residential base rates.

A. Liberty's current residential base rates consist of a customer charge and two energy charges that recover, respectively, the generation and distribution cost of service.

The energy charges consist of two Tiers, with Tier 1 charges for usage up to and including baseline quantity, and Tier 2 charges for usage above baseline quantity. The distribution energy charges are the same for Tier 1 and Tier 2 usage, while the generation energy charges are lower for Tier 1 usage compared to the charges for Tier 2 usage.

Q. Please describe the Commission's finding related to the Permanent and Seasonal Residential customers?

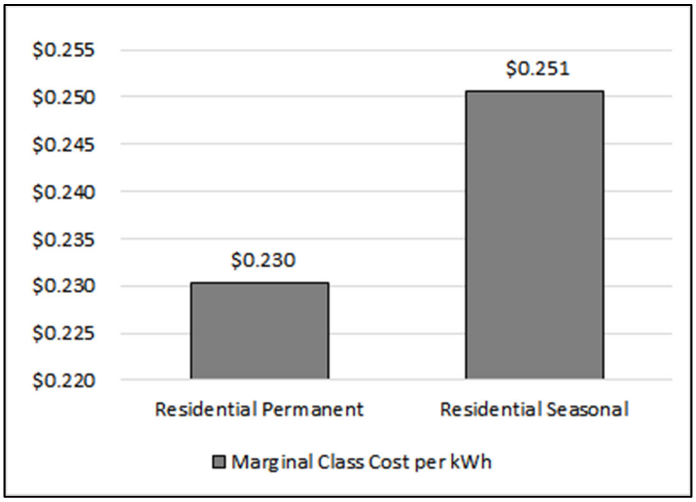
A. The Commission required Liberty to evaluate in its next GRC proceeding the cost of serving the permanent and seasonal residential customers and propose potential improvements to the rate design.

The Commission's requirement was related to concerns that permanent residential customers were subsidizing seasonal customers due to added infrastructure costs needed to service rising demand from seasonal customers. These concerns were raised by permanent residential customers at public participation hearings in Liberty's most recent GRC filing.

Q. What were Liberty's findings related to the Permanent and Seasonal rate classes?

A. Liberty found that the cost of serving the permanent residential rate class is lower than the cost of serving the seasonal residential rate class, as shown in Figure 12-3 (below).

Figure 12-3
Residential Permanent vs. Seasonal Marginal Cost of Service
($/kWh)



The Figure shows that the cost of serving the permanent residential rate class is $0.230 per kWh, while the cost of serving the seasonal residential rate class is $0.251 per kWh, or 8.85 percent higher.

Q. Is Liberty proposing any changes to the residential rates based on these findings?

A. Yes. Based on these findings, Liberty is proposing separate rates for residential permanent customers and residential seasonal customers.

IV. <u>MARGINAL COST OF SERVICE STUDY</u>

Q. Please describe the purpose of a Marginal Cost of Service Study.

A. The purpose of a MCS study is to measure the incremental cost of service to meet incremental demand requirements. The incremental cost of service includes generation capacity costs, generation energy costs, distribution demand costs and customer-related costs.

Q. Were costs allocated to time of use periods?

A. Yes. The MCS study assigned costs to five time of use ("TOU") periods: three winter (November through April) periods and two summer (May through October) periods.

Within the winter, there are three time of day periods: Peak, Mid-Peak and Off-peak. Peak is represented by the hours 5:01 p.m. to 10:00 p.m., Mid-Peak is represented by the hours 7:01 a.m. to 5:00 p.m., and Off-Peak is represented by all other hours. Within the summer, there are two time of day periods: Peak and Mid-Peak. Peak is represented by the hours 10:01 a.m. to 10:00 p.m., and Mid-Peak is represented by all other hours.

In general, costs were assigned in two steps: first, costs were assigned to each TOU period; and second, costs in each TOU period were assigned to each rate class.

Q. What changes were made to the MCS study to address the Commission's concerns in the prior GRC proceeding?

A. Liberty made several changes to the MCS study to address the Commission's concerns in the prior GRC proceeding.

First, Liberty revised derivation of the marginal cost of generation capacity. In Liberty's prior GRC, the Commission expressed concern with utilization of NV Energy's marginal costs of generation capacity. Liberty addressed this concern in the current MCS study by relying on Liberty-specific assumptions and data.

Second, Liberty revised the allocation of the marginal cost of generation capacity to seasons and TOU periods. In the prior GRC, the Commission expressed concern with application of NV Energy's marginal costs to Liberty's seasons and TOU periods. Liberty addressed this concern in the current MCS study by developing a Probability of Peak ("POP") factor based on Liberty's hourly system demands.

Third, Liberty revised derivation of the marginal cost of energy. In the prior GRC, the Commission expressed concern with utilization of NV Energy's marginal cost of energy. The Company addressed this concern in the current MCS study by relying on Liberty's 2021-2025 forecasted energy costs used in its Integrated Resource Plan ("IRP").

Q. Please describe derivation of the marginal customer costs?

A. Marginal customer costs represent incremental customer costs to serve incremental customers. There are two types of marginal customer costs: (1) common customer costs, which are costs that reflect services to all customers, and (2) specific customer costs, which are costs that reflect services to individual customers.

Common customer costs include customer account and customer service costs, such as those related to meter reading, billing, and customer records. The marginal common customer costs were based on an average cost per customer over the period of 2011 through 2024, adjusted for inflation. The average cost per customer was then apportioned to each rate class based on the results of a weightings study that compares the relative service requirements across rate classes. The weightings study determined, for example, that customer service and customer account service requirements for the Small Commercial rate class are 23 times higher than the requirements for the Residential rate class.

Specific customer costs were based on average facility investments per customer for each rate class. Average facility investments included the current installation cost of a meter, service drop and transformer. The annual cost per customer for each rate class was determined by applying general plant loadings, material and storage costs, cash working capital requirements, O&M-related costs and carrying costs to the average facility investments.

The common and specific customer costs per month are summarized in Table 12-2 (below).

Table 12-2
Marginal Customer Costs

Rate Class	Common Costs Per Customer	Specific Costs per Customer	Total Costs per Customer
Residential Permanent	5.01	5.00	10.01
Residential Seasonal	5.01	15.15	20.16
S-M Master Residential	8.37	49.10	57.47
Small Commercial	8.37	58.86	67.23
Medium Commerical	42.60	147.12	189.72
Large Commercial	842.31	216.22	1,058.53
Irrigation	8.37	5.28	13.65

The Table shows that common and specific costs per customer varies across rate classes. For example, the Figure shows the combined cost for a Permanent Residential customer is $10.01 per month while the combined cost for a Large Commercial customer is $1,058.53 per month. The differences are largely attributable to differences in meter and service investments as well as service requirements.

Q. Please describe how marginal customer costs were allocated to each time-of-use period?

A. The customer-related costs were not allocated to time of use periods since there is no seasonal or time of day differences in customer-related costs.

Q. Please describe derivation of marginal distribution demand costs?

A. Marginal distribution demand costs represent the incremental cost in distribution facilities to serve incremental peak demands. The incremental cost includes distribution and substation investments.

The incremental cost is based on the cost of adding distribution facilities to serve incremental peak demands. The marginal distribution demand cost in this MCS study is based on the relative increase in distribution facility investments and peak demands from 2000 to 2024 (i.e., 21 years of historical data and 4 years of projected data). This approach is a refinement to the Company's approach in the prior GRC filing.

The annual cost of the distribution facility investments was based on an economic carrying charge rate, general plant, O&M and A&G costs, working capital carrying costs and materials and supply costs.

Q. Please describe how marginal distribution demand costs were assigned to each TOU period and rate class?

A. Liberty determined there are two types of marginal distribution demand costs: those that change with TOU period and those that do not change with TOU periods. Liberty determined that distribution demand costs that vary with TOU periods include substation investments and 50.0 percent of incremental distribution facility investments. Liberty also determined that distribution demand costs that do not vary with TOU periods includes 50.0 percent of incremental distribution facility investments. This approach is consistent with the approach in Liberty's prior GRC filing.

Distribution demand costs that vary with TOU periods were assigned to each TOU period based on the top 100 peak load hours. These hours represent when the distribution system may experience constraints and trigger potential investments to maintain reliability. The costs were then assigned to each class based on class projected usage during the TOU periods.

Distribution demand costs that do not vary with TOU periods were assigned to each rate class based on NCP demands.

Q. Please describe derivation of the marginal generation capacity costs?

A. Marginal generation capacity costs represent incremental generation capacity costs to serve incremental peak demands.

Derivation of the marginal generation capacity costs was based on the Peaker Deferral Method, as described in the NARUC manual.[4] The method reflects the value of deferring an investment in a peaker unit and is calculated based on the Real Economic Carrying Charge associated with a peaker unit plus annual O&M expenses, including property taxes, fixed O&M expenses, general plant loader and A&G loader.

The peaker unit capital cost of $1,163 per kW was taken from the Energy Commission's 2011 cost estimates in "Estimated cost of new renewable and fossil generation in California," p. 137. The capital cost was then inflation adjusted to reflect 2022 costs. The inflation-adjusted capital cost was then adjusted to reflect AFUDC carrying costs based on a two-year construction period.

The annualized deferral value of the peaker unit was based on applying an economic carrying charge to the capital costs. An economic carrying charge measures the present value of the estimated cost over the life of the investment and reflects all costs related to the peaker unit. For purposes of the marginal cost study, an economic carrying charge measures the value of delaying the investment from one year to the next.

Q. Please describe derivation of the Economic Carrying Charge?

---

[4] NARUC Electric Utility Cost Allocation Manual, p. 116

A. The economic carrying charge represents the present value of the estimated cost over the life of the investment. The estimated cost recovers the full cost of the investment, including the cost of financing, depreciation expense, and income and property taxes.

From the present value of the estimated cost, there are two fixed charges that can be calculated with the same present value of the estimated cost: (1) a levelized fixed charge (the same nominal dollars every year), and (2) an economic carrying charge (the same real dollars every year or increasing nominal dollars at the rate of inflation).

Q. How were marginal generating capacity costs assigned to each time period and each rate class?

A. The marginal generating capacity costs were assigned to each TOU period based on a POP factor that determines each hour's likelihood of being the peak hour during each month. The costs were then assigned to each class based on class projected usage during the TOU periods.

Q. Please describe derivation of the marginal generation energy costs?

A. The marginal generation energy costs were based on Liberty's projection of energy prices by TOU periods. Liberty's projection of energy prices was based on the 2021-2025 forecasted energy costs developed as part of the most recent IRP. The marginal energy costs for each TOU period are shown in Table 12-3 (below).

Table 12-3
Marginal Energy Costs

Generation Marginal Energy Costs	2021-2025 (IRP)
Winter TOU - Peak	$ 31.51
Winter TOU - Mid-Peak	$ 15.66
Winter TOU - Off-Peak	$ 31.57
Summer TOU - Peak	$ 19.30
Summer TOU - Off-Peak	$ 25.70

The Table shows that Liberty projects energy prices of $31.51 during the Winter Peak period and $15.66 during the Winter Mid-Peak period.

Q. How were marginal energy costs assigned to each rate class?

A. The marginal energy costs were assigned to each rate class based on their projected kWh sales.

Q. Please summarize the results of the marginal cost study.

A. The results of the marginal cost study are summarized in Table 12-4 (below).

Table 12-4
Marginal Costs of Service Summary

Marginal Cost of Service Summary	Total Costs	% Costs
Marginal Generation (Capacity)	$ 27,784,597	20.8%
Marginal Generation (Energy)	13,999,503	10.5%
Marginal Distribution (TOU)	45,920,441	34.4%
Marginal Distribution (Non-TOU)	31,330,620	23.5%
Marginal Customer (Common)	3,865,557	2.9%
Marginal Customer (Specific)	10,643,788	8.0%
Total Marginal Cost of Service	**$ 133,544,506**	**100.0%**

The Table shows that 31.3 percent of the marginal costs are related to marginal generation costs, and 68.7 percent of the marginal costs are related to marginal distribution costs (demand-related and customer-related).

The derivation of marginal costs and allocation to rate classes is presented in Exhibit TSL/TAS-2 and TSL/TAS-3.

V. <u>RATE DESIGN</u>

Q. Please describe the principles used to guide the proposed rate design.

A. The proposed rate design was guided by several principles commonly used throughout the industry, including: (a) rates should recover the overall cost of providing service; (b) rates should be fair, minimizing inter- and intra-class inequities to the extent possible; and (c) rate changes should be tempered by rate continuity concerns.[5]

Because these principles can conflict, the proposed rate design reflects a level of judgment to balance these principles.

Q. How were these principles applied in this proceeding?

A. First, rates were designed to recover the overall cost of service. This was done by developing customer, demand and energy charges based on test year bills, kW billing demands and kWh sales. In addition, rates were designed to be fair and equitable. This was done by setting revenue targets for each rate class that reflected the results of the MCS study. Another rate design objective is to moderate rate changes to address rate continuity concerns. This objective was considered while setting revenue targets.

Q. Please summarize the steps taken to develop the proposed rates.

A. The first step to develop the proposed rates was to establish the overall revenue requirement to be recovered from base rates. The next step was to set revenue targets for each rate class based on the results of the MCS study. Rates within each rate class were then designed to recover the revenue targets based on test year customer, kW demand and kWh usage data.

Q. What is the revenue requirement that you used as a starting point?

---

[5] See Bonbright, James, Danielsen, Albert, and Kamerschen, David. "Principles of Public Utility Rates." Public Utilities Reports, Inc. pp. 377-407 (2nd Ed. 1988).

A. The revenue requirement was presented in the testimony and accounting schedules of Liberty's revenue requirements witness, which indicates a sales-related general rate revenue requirement of $110.43 million.

Q. Please describe the process to set revenue targets for each rate class.

A. Revenue requirements were established for each rate class in two steps.

First, the revenue requirements were assigned to each rate class based on the Equal Percentage of the Marginal Cost (EPMC) method generally consistent with the method approved by Commission in Liberty's prior GRC proceeding. In the current study, the EPMC method is applied on costs by function. For example, demand-related distribution costs are allocated based on demand-related class marginal costs, and customer-related distribution costs are allocated based on customer-related class marginal costs.

Second, the revenue requirements were adjusted for continuity considerations by applying a cap mechanism for Residential Permanent and Small Commercial classes.

The development of revenue targets is presented in Exhibit TSL/TAS-4.

Q. Please describe the process to develop the proposed rates for each rate class.

A. The proposed rates were developed for each rate class based on a uniform increase in rate elements. The development of proposed rates is presented in Exhibit TSL/TAS-5.

Q. Please describe the process to evaluate the customer bill impact for each rate class.

A. The customer bill impacts were evaluated using base rates and total effective rates. The bill impacts were calculated for Winter and Summer seasons and evaluated customers with average usage, 25.0 percent above average usage, and 25.0 percent below average usage. Overall, the proposed rates will increase the total monthly bill of an average use Residential

Permanent customer by $42.79 per month, or 41.4 percent. The bill impact analyses are presented in Exhibit TSL/TAS-5.

VI. CONCLUSION

Q. **Does this conclude your Direct Testimony?**

A. Yes, it does.

Appendix A

Witness Qualifications

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC

QUALIFICATIONS AND PREPARED TESTIMONY

OF TALHA A. SHEIKH

Q. Please state your name and business address for the record.

A. My name is Talha A. Sheikh. My business address is 2626 Glenwood Ave, Suite 480, Raleigh, North Carolina, 27608.

Q. Briefly describe your present responsibilities.

A. I am a Manager with ScottMadden. ("ScottMadden").

Q. Briefly describe your educational and professional background.

A. I have approximately 6 years of experience in the energy industry. I joined ScottMadden in 2015 as an Associate Consultant, was promoted to Senior Associate Consultant in 2016, and Managing Consultant (or Manager) in 2019. I have supported development of more than 25 studies related to rate design, class cost of service, alternative rate mechanisms, and Cash Working Capital / lead-lag studies in seven regulatory jurisdictions, including California.

I hold a bachelor's degree in Business Administration from Institute of Business Administration, Karachi, and a master's in Business Administration degree from University of South Carolina.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to sponsor the Company's proposed base rates. The Testimony includes: (a) a description of the current rate classes; (b) development of the Marginal Cost of Service ("MCS") study; and (c) development of the proposed revenue targets, rate design, and bill impact analyses for each rate class. The MCS study was used to inform the proposed base rates in this proceeding.

Q. Was this material prepared by you or under your supervision?

A. Yes, it was.

Q. Insofar as this material is factual in nature, do you believe it to be correct?

A. Yes, I do.

Q. Insofar as this material is in the nature of opinion or judgement, does it represent your best judgement?

A. Yes, it does.

Q. Does this conclude your qualifications and prepared testimony?

A. Yes, it does.

LIBERTY UTILITIES (CALPECO ELECTRIC) LLC

QUALIFICATIONS AND PREPARED TESTIMONY

OF TIMOTHY S. LYONS

Q. Please state your name and business address for the record.

A. My name is Timothy S. Lyons. My business address is 1900 West Park Drive, Suite 250, Westborough, Massachusetts, 01581.

Q. Briefly describe your present responsibilities.

A. I am a Partner with ScottMadden, Inc. ("ScottMadden").

Q. Briefly describe your educational and professional background.

A. I have more than 30 years of experience in the energy industry. I started my career in 1985 at Boston Gas Company, eventually becoming Director of Rates and Revenue Analysis. In 1993, I moved to Providence Gas Company, eventually becoming Vice President of Marketing and Regulatory Affairs. Starting in 2001, I held a number of management consulting positions in the energy industry, first at KEMA and then at Quantec, LLC. In 2005, I became Vice President of Sales and Marketing at Vermont Gas Systems, Inc. before joining Sussex Economic Advisors, LLC ("Sussex") in 2013. Sussex was acquired by ScottMadden in 2016.

I hold a bachelor's degree from St. Anselm College, a master's degree in Economics from The Pennsylvania State University, and a master's degree in Business Administration from Babson College.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to sponsor the Company's proposed base rates. The Testimony includes: (a) a description of the current rate classes; (b) development of the

Marginal Cost of Service ("MCS") study; and (c) development of the proposed revenue targets, rate design, and bill impact analyses for each rate class. The MCS study was used to inform the proposed base rates in this proceeding. In addition, I am sponsoring the results of the lead-lag study conducted on behalf of the Company. The lead-lad study was used to determine the Company's Cash Working Capital ("CWC") requirement, which is included in the Company's rate base.

Q. Was this material prepared by you or under your supervision?

A. Yes, it was.

Q. Insofar as this material is factual in nature, do you believe it to be correct?

A. Yes, I do.

Q. Insofar as this material is in the nature of opinion or judgement, does it represent your best judgement?

A. Yes, it does.

Q. Does this conclude your qualifications and prepared testimony?

A. Yes, it does.

Exhibit TSL/TAS-1: Resume and Testimony Listing of

Timothy S. Lyons and Talha A. Sheikh

Exhibit TSL/TAS-1
Resume and Testimony Listing of:
Timothy S. Lyons
Partner

Summary

Tim Lyons is a partner with ScottMadden with more than 30 years of experience in the energy industry. He has held senior positions at several gas utilities and energy consulting firms. Mr. Lyons experience includes rate and regulatory support, sales and marketing, customer service and strategy development. Prior to joining ScottMadden, he was Vice President of Sales and Marketing for Vermont Gas. Mr. Lyons has also served as Vice President of Marketing and Regulatory Affairs for Providence Gas Company (now, National Grid), Director of Rates at Boston Gas Company, and Project Director at Quantec, LLC, an energy consulting firm. Mr. Lyons has sponsored testimony before 20 state regulatory commissions. He holds a B.A. from St. Anselm College, an M.A. in Economics from The Pennsylvania State University, and an M.B.A. from Babson College.

Areas of Specialization

- Regulation and Rates
- Retail Energy
- Utilities
- Natural Gas

Capabilities

- Regulatory Strategy and Rate Case Support
- Strategic and Business Planning
- Capital Project Planning
- Process Improvements

Testimony Listing

Sponsor	Date	Docket No.	Subject
Regulatory Commission of Alaska			
ENSTAR Natural Gas Company	06/16	Docket No. U-16-066	Adopted testimony and sponsored Lead/Lag study for a general rate case proceeding.
Arkansas Public Service Commission			
Liberty Utilities (Pine Bluff Water)	10/18	Docket No. 18-027-U	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding.
California Public Utilities Commission			
Southwest Gas Corporation (Southern California, Northern California and South Lake Tahoe jurisdictions)	8/19	Docket No. A.19-08-015	Sponsored testimony on behalf of three separate rate jurisdictions related to: revenue requirements, lead-lag/ cash working capital, and class cost of service, rate design and bill impact analysis for a general rate case proceeding.
Connecticut Public Utilities Regulatory Authority			
Yankee Gas Company	07/14	Docket No. 13-06-02	Sponsored report and testimony supporting the review and evaluation of gas expansion policies, procedures and analysis.
Illinois Commerce Commission			
Liberty Utilities (Midstates Natural Gas)	07/16	Docket No. 16-0401	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new commercial classes and a decoupling mechanism.
Iowa Utilities Board			
Liberty Utilities (Midstates Natural Gas)	07/16	Docket No. RPU-2016-0003	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new commercial classes.
Kansas Corporation Commission			
The Empire District Electric Company	12/18	Docket No. 19-EPDE-223-RTS	Sponsored testimony supporting cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding.
Maine Public Utilities Commission			
Maine Water Company	03/21	Docket No. 2021-00053	Sponsored testimony supporting a rate smoothing mechanism.

Sponsor	Date	Docket No.	Subject
Northern Utilities, Inc. d/b/a Unitil	06/19	Docket No. 2019-00092	Sponsored testimony supporting a proposed capital investment cost recovery mechanism.
Northern Utilities, Inc. d/b/a Unitil	06/15	Docket No. 2015-00146	Sponsored testimony supporting the proposed gas expansion program, including a zone area surcharge.
Maryland Public Service Commission			
Sandpiper Energy, a Chesapeake Utilities company	12/15	Case No. 9410	Sponsored testimony supporting the cost of service, rate design and bill impact studies for a general rate case proceeding. The testimony includes proposal for new residential and commercial classes.
Massachusetts Department of Public Utilities			
Liberty Utilities (New England Gas Company)	08/20	Docket No. DPU 20-92	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2020/2021 through 2024/2025.
Liberty Utilities (New England Gas Company)	07/18	Docket No. DPU 18-68	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2018/2019 through 2022/2023.
Liberty Utilities (New England Gas Company)	07/16	Docket No. DPU 16-109	Sponsored the Long-Range Forecast and Supply Plan filing for the five-year forecast period 2016/2017 through 2020/2021.
Boston Gas	10/93	Docket No. DPU 92-230	Sponsored testimony describing the Company's position regarding rate treatment of vehicular natural gas investments and expenses.
Boston Gas	03/90	Docket No. DPU 90-55	Sponsored testimony supporting the weather and other cost of service adjustments, rate design and customer bill impact studies for a general rate case proceeding.
Boston Gas	03/88	Docket No. DPU 88-67-II	Sponsored testimony supporting the rate reclassification of commercial and industrial customers for a rate design proceeding.
Michigan Public Service Commission			
Lansing Board of Water & Light and Michigan State University	04/20	Docket No. U-20650	Sponsored testimony evaluating Consumer Energy's cost of service and rate design proposals.
Lansing Board of Water & Light and Michigan State University	04/19	Docket No. U-20322	Sponsored testimony evaluating Consumer Energy's cost of service and rate design proposals.
Midland Cogeneration Ventures, LLC	09/18	Docket No. U-18010	Sponsored testimony evaluating Consumer Energy's cost of service and rate design proposals.
Missouri Public Service Commission			
Spire Missouri, Inc.	12/20	Docket No. GR-2021-0108	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
The Empire District Electric Company	08/19	Docket No. ER-2019-0374	Sponsored testimony supporting the cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding. The testimony also included proposals for a weather normalization mechanism.
Liberty Utilities (Midstates Natural Gas)	09/17	Docket No. GR-2018-0013	Sponsored testimony supporting the cost of service, rate design, bill impact and lead-lag studies for a general rate case proceeding. The testimony also included proposals for a revenue decoupling/ weather normalization mechanism as well as tracker accounts for certain O&M expenses and capital costs.

Sponsor	Date	Docket No.	Subject
Missouri Gas Energy	04/17	Docket No. GR-2017-0216	Sponsored testimony supporting the cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding. The testimony included support for a decoupling mechanism.
Laclede Gas Company	04/17	Docket No. GR-2017-0215	Sponsored testimony supporting the cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding. The testimony included support for a decoupling mechanism.
New Hampshire Public Utilities Commission			
Unitil Energy Systems, Inc.	04/21	Docket No. DE 21-030	Sponsored testimony supporting proposed revenue decoupling mechanism and associated tariff.
Liberty Utilities (EnergyNorth Natural Gas) Corp. d/b/a Liberty Utilities	11/17	Docket No. DG 17-198	Sponsored testimony supporting a levelized cost analysis for approval of firm supply and transportation agreements.
Liberty Utilities d/b/a Granite State Electric Company	04/16	Docket No. DE 16-383	Adopted testimony and sponsored Lead/Lag study for a general rate case proceeding.
Nevada Public Utilities Commission			
Southwest Gas Corporation	02/20	Docket No. 20-02023	Sponsored testimony supporting the class cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding.
New Jersey Board of Public Utilities			
South Jersey Gas Company	03/20	Docket No. GR20030243	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Elizabethtown Gas Company	04/19	Docket No. GR19040486	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Pivotal Utility Holdings, Inc. d/b/a Elizabethtown Gas Company	08/16	Docket No. GR16090826	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Corporation Commission of Oklahoma			
The Empire District Electric Company	03/19	Cause No. PUD 201800133	Sponsored testimony supporting the cost of service, rate design, bill impact and Lead/Lag studies for a general rate case proceeding.
The Empire District Electric Company	04/17	Cause No. PUD 201600468	Adopted direct testimony and sponsored rebuttal testimony supporting the revenue requirements for a general rate case proceeding. The testimony included proposals for alternative ratemaking mechanisms.
Rhode Island Public Utilities Commission			
Providence Gas Company	08/01 09/00 08/96	Docket No. 1673	Sponsored testimony supporting the changes in cost of gas adjustment factor related to projected under-recovery of gas costs; Filed testimony and witness for pilot hedging program to mitigate price risks to customers; Filed testimony and witness for changes in cost of gas adjustment factor related to extension of rate plan.
Providence Gas Company	08/00	Docket No. 2581	Sponsored testimony supporting the extension of a rate plan that began in 1997 and included certain modifications, including a weather normalization clause.
Providence Gas Company	03/00	Docket No. 3100	Sponsored testimony supporting the de-tariff and deregulation of appliance repair service, enabling the Company to have needed pricing flexibility.
Providence Gas Company	06/97	Docket No. 2581	Sponsored testimony supporting a rate plan that fixed all billing rates for three-year period; included funding for critical infrastructure investments in accelerated replacement of mains and services, digitized records system, and economic development projects.

Sponsor	Date	Docket No.	Subject
Providence Gas Company	04/97	Docket No. 2552	Sponsored testimony supporting the rate design, customer bill impact studies and retail access tariffs for commercial and industrial customers, including redesign of cost of gas adjustment clause, for a rate design proceeding.
Providence Gas Company	02/96	Docket No. 2374	Sponsored testimony supporting the rate design, customer bill impact studies and retail access tariffs for largest commercial and industrial customers for a rate design proceeding.
Providence Gas Company	01/96	Docket No. 2076	Sponsored testimony supporting the rate reclassification of customers into new rate classes, rate design (including introduction of demand charges), and customer bill impact studies for a rate design proceeding.
Providence Gas Company	11/92	Docket No. 2025	Sponsored testimony supporting the Integrated Resource Plan filing, including a performance-based incentive mechanism.
Railroad Commission of Texas			
Texas Gas Service Company – Central Texas and Gulf Coast Service Areas	12/19	GUD No. 10928	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – Beaumont/ East Texas Division	11/19	GUD No. 10920	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – Borger/ Skellytown Service Area	08/18	GUD No. 10766	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – North Texas Service Area	06/18	GUD No. 10739	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – South Texas Division	11/17	GUD No. 10669	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Texas Gas Service Company – Rio Grande Valley Service Area	06/17	GUD No. 10656	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Atmos Pipeline – Texas	01/17	GUD No. 10580	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
CenterPoint Energy – Texas Gulf Division	11/16	GUD No. 10567	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Public Utility Commission of Texas			
CenterPoint Energy Houston Electric, LLC	04/19	Docket No. 49421	Sponsored testimony supporting the Lead/Lag study for a general rate case proceeding.
Vermont Public Utilities Commission			
Vermont Gas Systems	12/12	Docket No. 7970	Sponsored testimony describing the market served by $90 million natural gas expansion project to Addison County, VT. Also described the terms and economic benefits of a special contract with International Paper.
Vermont Gas Systems	02/11	Docket No. 7712	Sponsored testimony supporting the market evaluation and analysis for a system expansion and reliability regulatory fund.
Virginia State Corporation Commission			
American Electric Power - Appalachian Power Company	3/20	Case No. PUR-2020-00015	Sponsored testimony supporting the Lead/Lag study for the 2020 triennial review of base rates, terms and conditions.

Exhibit TSL/TAS-1
Resume of:
Talha A. Sheikh
Manager

Summary

Talha Sheikh is a Manager with ScottMadden and has approximately 6 years of experience in the energy industry. Mr. Sheikh has supported numerous electric, gas, and water utilities throughout the U.S. in rate case filings and other regulatory proceedings. Mr. Sheikh's experience includes preparation of studies related to class cost of service, rate design and bill impacts, revenue requirements, alternative rate mechanisms, and cash working capital / lead-lag studies. Mr. Sheikh holds a bachelor's degree in Business Administration from Institute of Business Administration, Karachi, and a master's in Business Administration degree from University of South Carolina

Areas of Specialization

- Regulatory strategy and rate case support
- Class cost of service and rate design
- Revenue requirement studies
- Cash working capital studies
- Benefit-cost analyses

Recent Assignments

- Led development of studies and testimony that supported a rate case filing for a southwestern gas utility that included preparation of revenue requirements, class cost of service study, rate design analyses, and a lead-lag study for each of the utility's three rate jurisdictions.
- Led development of several class cost of service and rate design filings including:
  - Rate design studies for an electric utility as part of a rate case filing. Developed class cost of service and rate design studies. Prepared supporting testimonies and workpapers.
  - Rate design studies for an electric utility as part of a rate case filing. Developed a class cost of service study to design proposed rates, prepared support for proposed cost trackers, and developed analyses for a weather normalization mechanism. Prepared supporting testimony and workpapers.
  - Rate design studies for a gas utility as part of a rate case filings. Developed a class cost of service study and prepared supporting testimony and workpapers.
  - Rate design studies for a midwestern gas utility as part of a rate case filing. Developed a class cost of service study and prepared supporting testimony and workpapers.
  - Rate design study for a water utility. Developed a class cost of service study, designed rates, and prepared supporting testimony and workpapers.
- Supported a New York electric utility in the development and filing of its Earnings Adjustment Mechanisms (EAM) proposal as part of a rate case filing. Key tasks included: prepared research and analysis of utility incentive mechanisms; assisted in development of the EAM metrics that support utility's efforts toward deployment of DER and market transformation; evaluated the DER programs through a Benefit-Cost Analysis, and prepared testimony, supporting analyses, and workpapers.
- Prepared analysis that supported a utility's Community Solar proposal. Key tasks included preparing research and analysis on Community Solar programs throughout U.S, preparing revenue requirement analysis of the solar facility through the asset life, and preparing participant and non-participant bill impact analyses for residential, commercial, and large volume customers.
- Supported development of an alternative rates mechanism proposal for a gas utility as part of a rate case filing. The proposal included development of a Dupont Analysis to evaluate the benefits of the proposed alternative rate mechanism.

Exhibit TSL/TAS-2: Liberty Utilities (CalPeco Electric) LLC

Class Marginal Cost of Service Allocation

Liberty Utilities (CalPeco Electric)
Marginal Cost of Service Allocation

Marginal Cost of Service Class Allocation	Total Company	Residential Permanent	Residential Seasonal	S-M Master Residential	Small Commercial	Medium Commercial	Large Commercial	Irrigation	OLS	Street Lighting
Marginal Generation (Capacity)	$ 27,784,597	$ 7,035,364	$ 7,624,565	$ 193,089	$ 4,694,439	$ 3,181,632	$ 5,005,109	$ 24,517	$ 16,343	$ 9,537
Marginal Generation (Energy)	13,999,503	3,322,112	3,790,607	93,683	2,350,432	1,616,992	2,781,947	16,291	17,319	10,122
Marginal Distribution (TOU)	45,920,441	12,012,448	12,575,295	323,851	7,385,748	4,961,361	8,605,712	9,880	29,179	16,967
Marginal Distribution (Non-TOU)	31,330,620	7,192,101	8,991,891	222,607	5,884,333	2,755,599	6,215,140	39,301	19,404	10,244
Marginal Customer (Common)	3,865,557	1,061,652	1,542,892	57,308	534,678	129,849	535,708	996	-	2,475
Marginal Customer (Specific)	10,643,788	1,058,871	4,665,363	336,178	3,759,942	448,428	137,520	628	147,142	89,715
Total Marginal Costs	**133,544,506**	**31,682,549**	**39,190,613**	**1,226,716**	**24,609,572**	**13,093,861**	**23,281,136**	**91,613**	**229,387**	**139,059**
Total Marginal Costs %	**100.00%**	**23.72%**	**29.35%**	**0.92%**	**18.43%**	**9.80%**	**17.43%**	**0.07%**	**0.17%**	**0.10%**
MCOS (Generation)	$ 41,784,100	$ 10,357,476	$ 11,415,172	$ 286,772	$ 7,044,871	$ 4,798,625	$ 7,787,056	$ 40,808	$ 33,661	$ 19,659
Generation Allocator	100.00%	24.79%	27.32%	0.69%	16.86%	11.48%	18.64%	0.10%	0.08%	0.05%
MCOS (Distribution-Demand)	$ 77,251,061	$ 19,204,549	$ 21,567,186	$ 546,457	$ 13,270,081	$ 7,716,960	$ 14,820,852	$ 49,180	$ 48,584	$ 27,211
Distribution-Demand Allocator	100.00%	24.86%	27.92%	0.71%	17.18%	9.99%	19.19%	0.06%	0.06%	0.04%
MCOS (Distribution-Customer)	$ 14,509,345	$ 2,120,524	$ 6,208,255	$ 393,486	$ 4,294,620	$ 578,277	$ 673,228	$ 1,625	$ 147,142	$ 92,189
Distribution-Customer Allocator	100.00%	14.61%	42.79%	2.71%	29.60%	3.99%	4.64%	0.01%	1.01%	0.64%

Liberty Utilities (CalPeco Electric)
Marginal Cost of Service Allocation

Marginal Generation (Capacity)

Generation Marginal Costs ($/kW) $ 218.83
At Generation Level

Generation Marginal Costs (TOU)	POP 12 CP	TOU Allocation
Winter TOU - Peak	35.4%	$ 77.38
Winter TOU - Mid-Peak	30.5%	66.77
Winter TOU - Off-Peak	5.6%	12.25
Summer TOU - Peak	26.2%	57.31
Summer TOU - Off-Peak	2.3%	5.12

Generation Cost Allocation	Total Company	Residential Permanent	Residential Seasonal	S-M Master Residential	Small Commercial	Medium Commercial	Large Commercial	Irrigation	OLS	Street Lighting
Total Usage (MWh)										
Winter TOU - Peak	93,116	27,203	26,719	710	14,029	9,449	14,800	20	118	68
Winter TOU - Mid-Peak	177,283	42,889	46,722	1,180	30,006	20,055	36,391	37	1	1
Winter TOU - Off-Peak	144,441	30,817	39,303	924	22,831	15,855	34,234	38	277	161
Summer TOU - Peak	90,900	21,264	25,065	610	17,268	11,985	14,354	297	36	21
Summer TOU - Off-Peak	76,880	15,963	19,173	463	14,964	10,640	15,102	316	162	96
Total Usage (MWh)	**582,620**	**138,136**	**156,982**	**3,887**	**99,099**	**67,984**	**114,881**	**709**	**593**	**347**
Loss Factor Adjustment										
Generation		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Primary Distribution		1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02	1.02
Secondary Distribution		1.04	1.04	1.04	1.04	1.04		1.04	1.04	1.04
Loss Factor Adjustment		1.06	1.06	1.06	1.06	1.06	1.02	1.06	1.06	1.06
Generation Cost Allocation ($)										
Winter TOU - Peak	$ 7,585,935	$ 2,228,150	$ 2,188,471	$ 58,172	$ 1,149,119	$ 773,973	$ 1,171,148	$ 1,665	$ 9,636	$ 5,602
Winter TOU - Mid-Peak	12,442,491	3,031,239	3,302,142	83,418	2,120,698	1,417,414	2,484,860	2,603	73	43
Winter TOU - Off-Peak	1,857,468	399,506	509,518	11,973	295,980	205,545	428,775	494	3,589	2,088
Summer TOU - Peak	5,484,849	1,289,965	1,520,530	37,018	1,047,547	727,042	841,257	18,040	2,166	1,284
Summer TOU - Off-Peak	413,853	86,504	103,903	2,508	81,095	57,659	79,070	1,715	879	520
Total Generation Costs ($)	**$ 27,784,597**	**$ 7,035,364**	**$ 7,624,565**	**$ 193,089**	**$ 4,694,439**	**$ 3,181,632**	**$ 5,005,109**	**$ 24,517**	**$ 16,343**	**$ 9,537**

Liberty Utilities (CalPeco Electric)
Marginal Cost of Service Allocation

Marginal Generation (Energy)

Generation Marginal Energy Costs	2021-2025 (IRP)
Winter TOU - Peak	$ 31.51
Winter TOU - Mid-Peak	$ 15.66
Winter TOU - Off-Peak	$ 31.57
Summer TOU - Peak	$ 19.30
Summer TOU - Off-Peak	$ 25.70

Generation Cost Allocation	Total Company	Residential Permanent	Residential Seasonal	S-M Master Residential	Small Commercial	Medium Commercial	Large Commercial	Irrigation	OLS	Street Lighting
Total Usage (MWh)										
Winter TOU - Peak	93,116	27,203	26,719	710	14,029	9,449	14,800	20	118	68
Winter TOU - Mid-Peak	177,283	42,889	46,722	1,180	30,006	20,055	36,391	37	1	1
Winter TOU - Off-Peak	144,441	30,817	39,303	924	22,831	15,855	34,234	38	277	161
Summer TOU - Peak	90,900	21,264	25,065	610	17,268	11,985	14,354	297	36	21
Summer TOU - Off-Peak	76,880	15,963	19,173	463	14,964	10,640	15,102	316	162	96
Total Usage (MWh)	**582,620**	**138,136**	**156,982**	**3,887**	**99,099**	**67,984**	**114,881**	**709**	**593**	**347**
Generation Cost Allocation ($)										
Winter TOU - Peak	$ 2,933,949	$ 857,124	$ 841,860	$ 22,378	$ 442,043	$ 297,732	$ 466,311	$ 641	$ 3,707	$ 2,155
Winter TOU - Mid-Peak	2,776,124	671,617	731,640	18,483	469,873	314,050	569,859	577	16	10
Winter TOU - Off-Peak	4,559,568	972,805	1,240,685	29,154	720,717	500,505	1,080,676	1,204	8,739	5,084
Summer TOU - Peak	1,754,185	410,355	483,701	11,776	333,239	231,282	276,997	5,739	689	409
Summer TOU - Off-Peak	1,975,677	410,211	492,721	11,893	384,560	273,425	388,104	8,131	4,168	2,464
Total Generation Energy ($)	**$ 13,999,503**	**$ 3,322,112**	**$ 3,790,607**	**$ 93,683**	**$ 2,350,432**	**$ 1,616,992**	**$ 2,781,947**	**$ 16,291**	**$ 17,319**	**$ 10,122**

Liberty Utilities (CalPeco Electric)
Marginal Cost of Service Allocation

Marginal Distribution (TOU)

	Substation	Non-Revenue	Weighted Cost
Distribution Marginal Costs ($/kW)	$ 104.62	$ 512.26	$ 360.75
TOU Demand Percentage	100%	50%	

Distribution Marginal Costs (TOU)	**Top 100 Hours %**	**TOU Allocation**
Winter TOU - Peak	57.6%	$ 207.79
Winter TOU - Mid-Peak	37.8%	$ 136.36
Winter TOU - Off-Peak	4.6%	$ 16.59
Summer TOU - Peak	0.0%	$ -
Summer TOU - Off-Peak	0.0%	$ -

Distribution (TOU) Cost Allocation	Total Company	Residential Permanent	Residential Seasonal	S-M Master Residential	Small Commercial	Medium Commercial	Large Commercial	Irrigation	OLS	Street Lighting
Total Usage (MWh)										
Winter TOU - Peak	93,116	27,203	26,719	710	14,029	9,449	14,800	20	118	68
Winter TOU - Mid-Peak	177,283	42,889	46,722	1,180	30,006	20,055	36,391	37	1	1
Winter TOU - Off-Peak	144,441	30,817	39,303	924	22,831	15,855	34,234	38	277	161
Summer TOU - Peak	90,900	21,264	25,065	610	17,268	11,985	14,354	297	36	21
Summer TOU - Off-Peak	76,880	15,963	19,173	463	14,964	10,640	15,102	316	162	96
Total Usage (MWh)	**582,620**	**138,136**	**156,982**	**3,887**	**99,099**	**67,984**	**114,881**	**709**	**593**	**347**
Distribution Cost Allocation ($)										
Winter TOU - Peak	$ 19,348,743	$ 5,652,543	$ 5,551,883	$ 147,576	$ 2,915,172	$ 1,963,474	$ 3,075,215	$ 4,224	$ 24,445	$ 14,211
Winter TOU - Mid-Peak	24,174,779	5,848,512	6,371,196	160,949	4,091,702	2,734,777	4,962,396	5,023	141	83
Winter TOU - Off-Peak	2,396,919	511,394	652,216	15,326	378,874	263,110	568,100	633	4,594	2,673
Summer TOU - Peak	-	-	-	-	-	-	-	-	-	-
Summer TOU - Off-Peak	-	-	-	-	-	-	-	-	-	-
Dist. Costs (TOU) ($)	**$ 45,920,441**	**$ 12,012,448**	**$ 12,575,295**	**$ 323,851**	**$ 7,385,748**	**$ 4,961,361**	**$ 8,605,712**	**$ 9,880**	**$ 29,179**	**$ 16,967**

Liberty Utilities (CalPeco Electric)
Marginal Cost of Service Allocation

Marginal Distribution (Non-TOU)

	Substation	Non-Revenue	Weighted Cost
Distribution Marginal Costs ($/kW)	$92.29	$436.43	$ 218.22
Non-TOU Demand Percentage	0%	50%	

Distribution (Non-TOU) Cost Allocation	Total Company	Residential Permanent	Residential Seasonal	S-M Master Residential	Small Commercial	Medium Commercial	Large Commercial	Irrigation	OLS	Street Lighting
NCP Demands (MW) (Total)	143,419									
Transformer Load Study NCPs %	100.00%	22.62%	28.28%	0.73%	24.58%	8.35%	15.22%	0.13%	0.06%	0.03%
Cost Allocation (1) ($)	$ 31,296,145	$ 7,078,209	$ 8,849,498	$ 228,717	$ 7,694,106	$ 2,611,946	$ 4,764,719	$ 39,301	$ 19,404	$ 10,244
NCP Demands (MW)	143,419	33,481	41,859	992	18,672	13,286	35,128			
Cost Allocation (2) ($)	$ 31,296,145	$ 7,305,993	$ 9,134,284	$ 216,496	$ 4,074,559	$ 2,899,251	$ 7,665,562			
Dist. Costs (Non-TOU) ($)	**$ 31,330,620**	**$ 7,192,101**	**$ 8,991,891**	**$ 222,607**	**$ 5,884,333**	**$ 2,755,599**	**$ 6,215,140**	**$ 39,301**	**$ 19,404**	**$ 10,244**

Exhibit TSL/TAS-3: Liberty Utilities (CalPeco Electric) LLC

Derivation of Marginal Costs

Liberty Utilities (CalPeco Electric)
Derivation of Marginal Cost of Generation Capacity (Peaker Deferral Method)

Line No.	Description	Adjustment Factor	Combustion Turbine Proxy
	(a)	(b)	(c)
1	Peaker Capital Costs (Combustion Turbine Proxy) ($/kW)		$ 1,429
2	AFUDC ($/kW)		55
3	Total Installed Costs ($/kW)		$ 1,484
4	Annualized Deferral Value ($/kW)	11.20%	$ 166.23
5	*Calculated at Real Economic Carrying Charge (RECC)*		
6	Annualized Property Taxes ($/kW)		$ 5.46
7	Total Capital Costs ($/kW)		$ 171.69
8	Fixed O&M Expenses ($/kW)		$ 33.00
9	General Plant Loader ($/kW)	6.14%	$ 10.55
10	A&G Loader ($/kW)	2.10%	$ 3.60
11	Marginal Generation Capacity Cost ($/kW)		**$ 218.83**

Liberty Utilities (CalPeco Electric)
Derivation of Marginal Cost of Distribution (Demand)

Line No.	Description	Adjustment Factor	Distribution (TOU) Substation Component	Distribution (TOU) Non-Revenue Feeder	Distribution (Non-TOU) Substation Component	Distribution (Non-TOU) Non-Revenue Feeder	Line No.
	(a)	(b)	(c)	(d)	(h)	(i)	
1	Long Run Unit Investment		$ 545.54	$ 3,355.63	$ 460.56	$ 2,832.89	1
2	General Plant Loading ($/kW)	6.14%	$ 33.51	$ 206.13	$ 28.29	$ 174.02	2
3	Annualized Deferral Value ($/kW)	10.07%	$ 58.31	$ 358.67	$ 49.23	$ 302.80	3
4	Plant-Related A&G Loading ($/kW)	2.10%	$ 12.15	$ 74.74	$ 10.26	$ 63.10	4
5	Annualized Cost ($/kW)		$ 70.46	$ 433.41	$ 59.49	$ 365.90	5
6	Demand-related O&M		$ 20.43	$ 20.43	$ 20.43	$ 20.43	6
7	With O&M-related A&G Loading	11.87%	$ 22.86	$ 22.86	$ 22.86	$ 22.86	7
8	Demand-related Costs Excl. Working Cap.		$ 93.32	$ 456.27	$ 82.34	$ 388.75	8
9	**Working Capital**						9
10	M&S	1.05%	$ 6.08	$ 37.40	$ 5.13	$ 31.57	10
11	CWC Plant-related	0.23%	$ 1.31	$ 8.04	$ 1.10	$ 6.79	11
12	O&M-related	2.49%	$ 0.57	$ 0.57	$ 0.57	$ 0.57	12
13	Total Working Capital		$ 7.96	$ 46.01	$ 6.81	$ 38.93	13
14	Revenue Requirement	9.56%	$ 0.76	$ 4.40	$ 0.65	$ 3.72	14
15	Total Demand-related		$ 94.08	$ 460.67	$ 82.99	$ 392.47	15
16	Adjusted for Losses (average)	11.20%	$ 104.62	$ 512.26	$ 92.29	$ 436.43	16
17	Final Unit Demand Cost ($/kW)		**$104.62**	**$512.26**	**$92.29**	**$436.43**	17

Liberty Utilities (CalPeco Electric)
Derivation of Marginal Cost of Distribution (Customer)

Customer-Related Investment: Transformer, Service and Metering Costs
Marginal Customer Costs Using the NCO Method

Line No.	Description	Adjustment Factor	Residential Permanent	Residential Seasonal	S-M Master Residential	Small Commercial	Medium Commercial	Large Commercial	Irrigation
1	Long Run Unit Investment		$ 1,757.74	$ 1,757.74	$ 8,382.72	$ 9,658.35	$ 18,382.17	$ 53,890.50	$ 11,856.91
2	With General Plant Loading	6.14%	$ 1,865.72	$ 1,865.72	$ 8,897.66	$ 10,251.64	$ 19,511.35	$ 57,200.89	$ 12,585.25
3	PVRR Cost	177%	$ 3,300.50	$ 3,300.50	$ 15,740.16	$ 18,135.39	$ 34,516.03	$ 101,189.68	$ 22,263.60
4	Estimated Average Annual New Hookups		-	928	10	108	8	0	-
5	Total CA customers		17,656	25,660	571	5,323	254	53	10
6	Replacements at 1.5% of 2019 customers	1.50%	265	385	9	80	4	1	-
7	PVRR of new hookups plus replacements		$ 874.63	$ 4,333.35	$ 304.23	$ 3,413.52	$ 414.77	$ 119.74	$ -
8	PVRR per customer		$ 49.54	$ 168.88	$ 533.25	$ 641.29	$ 1,632.94	$ 2,259.27	$ -
9	Plant-Related A&G Loading	2.10%	$ 1.04	$ 3.54	$ 11.19	$ 13.46	$ 34.27	$ 47.41	$ -
10	With A&G Loading		$ 50.58	$ 172.42	$ 544.44	$ 654.74	$ 1,667.21	$ 2,306.68	$ -
11	Customer Plant-Related O&M		$ 6.35	$ 6.35	$ 30.28	$ 34.89	$ 66.40	$ 194.68	$ 42.83
12	Customer Accounts and Service								
13	Customer Accounts		$ 43.94	$ 43.94	$ 54.04	$ 54.04	$ 198.16	$ 2,302.80	$ 54.04
14	Customer Service		$ 9.68	$ 9.68	$ 35.53	$ 35.53	$ 257.71	$ 6,710.62	$ 35.53
15	Subtotal Customer-related O&M		$ 59.97	$ 59.97	$ 119.86	$ 124.46	$ 522.28	$ 9,208.10	$ 132.41
16	With O&M-related A&G Loading	11.87%	$ 67.09	$ 67.09	$ 134.09	$ 139.24	$ 584.29	$ 10,301.54	$ 148.13
17	Customer-related Costs Exc. Working Capital		$ 117.67	$ 239.51	$ 678.52	$ 793.99	$ 2,251.51	$ 12,608.22	$ 148.13
18	**Working Capital**								
19	M&S	1.05%	$ 19.59	$ 19.59	$ 93.43	$ 107.65	$ 204.88	$ 600.65	$ 132.16
20	CWC Plant-related	0.23%	$ 4.21	$ 4.21	$ 20.09	$ 23.15	$ 44.06	$ 129.17	$ 28.42
21	O&M-related	2.49%	$ 1.67	$ 1.67	$ 3.33	$ 3.46	$ 14.52	$ 256.01	$ 3.68
22	Total Working Capital		$ 25.47	$ 25.47	$ 116.86	$ 134.26	$ 263.46	$ 985.83	$ 164.26
23	Revenue Requirement	9.56%	$ 2.43	$ 2.43	$ 11.17	$ 12.83	$ 25.17	$ 94.20	$ 15.70
24	Customer Common		**$ 60.13**	**$ 60.13**	**$ 100.45**	**$ 100.45**	**$ 511.22**	**$ 10,107.70**	**$ 100.45**
25	Customer Specific		**$ 59.97**	**$ 181.82**	**$ 589.24**	**$ 706.37**	**$ 1,765.46**	**$ 2,594.72**	**$ 63.38**
26	Total Customer-related		$ 120.10	$ 241.95	$ 689.69	$ 806.82	$ 2,276.68	$ 12,702.42	$ 163.82
27	Monthly Cost		$ 10.01	$ 20.16	$ 57.47	$ 67.23	$ 189.72	$ 1,058.53	$ 13.65
28	Number of Customers		17,656	25,660	571	5,323	254	53	10
29	Total Customer Common		**$ 1,061,652**	**$ 1,542,892**	**$ 57,308**	**$ 534,678**	**$ 129,849**	**$ 535,708**	**$ 996**
30	Total Customer Specific		**$ 1,058,871**	**$ 4,665,363**	**$ 336,178**	**$ 3,759,942**	**$ 448,428**	**$ 137,520**	**$ 628**

Liberty Utilities (CalPeco Electric)
Derivation of Customer-Related Lighting Investments

Customer-Related Investment: Lighting Classes

Line No.	Lamp Type	Watts	kWh/Mo.	Number of Fixtures	Annualized Customer Related Investment for Lighting Services	Annualized O&M Costs for Lighting Services	Total Customer-Related Costs
1	**High Pressure Sodium Night Guards**						
2	5800 LU 70 W	84	29	522	$ 87.06	$ 31.49	$ 61,902
3	9500 LU 100 W	118	41	518	$ 87.87	$ 31.49	61,869
4	16000 LU 150 W	194	67	188	$ 87.87	$ 31.49	22,430
5	22000 LU 200 W	247	85	8	$ 92.86	$ 31.49	940
6	New Wood			0	$ 120.09	NA	-
7	New Metal (< 22,000 Lumens)			0	$ 182.85	NA	-
8	New Metal (>= 22,000 Lumens)			0	$ 185.02	NA	-
9	Underground			0	$ 89.41	NA	-
10	**High Pressure Sodium Night Guards**						$ 147,142
11	Customer Common						$ -
12	Customer Specific						$ 147,142
13	**High Pressure Sodium Street Lights**						
14	5800 LU 70 W	84	29	62	$ 116.48	$ 43.94	$ 9,990
15	9500 LU 100 W	118	41	84	$ 116.48	$ 43.94	13,490
16	16000 LU 150 W	194	67	0	$ 116.48	$ 43.94	-
17	22000 LU 200 W	247	85	301	$ 123.10	$ 43.94	50,223
18	New Wood				$ 124.11	NA	-
19	New Metal (< 22,000 Lumens)				$ 145.50	NA	-
20	New Metal (>= 22,000 Lumens)				$ 146.58	NA	-
21	Underground			236	$ 78.39	NA	18,486
22	**High Pressure Sodium Street Lights**						$ 92,189
23	Customer Common			447		$ 5.54	$ 2,475
24	Customer Specific						$ 89,715

Exhibit TSL/TAS-4: Liberty Utilities (CalPeco Electric) LLC

Determination of Revenue Targets

Liberty Utilities (CalPeco Electric)
Determination of Revenue Targets (Excluding ECAC, VM, CEMA)

Revenue Targets	Total Company	Residential Permanent	Residential Seasonal	Small Commercial	Medium Commercial	Large Commercial	Irrigation	OLS	Street Lighting
Revenue Requirements (Generation)	$ 12,070,961								
Revenue Requirements (Distribution - Demand)	$ 85,551,155	*Demand-related Distribution Revenue Requirement*							
Revenue Requirements (Distribution - Customer)	$ 12,809,203	*Meters, Services & Transformers-related Revenue Requirement*							
Revenue Requirements (Other)	$ 519,000								
Step 1: Equal Percentage of the Marginal Cost (EPMC) Allocation									
Marginal Cost of Service (Generation)	$ 41,784,100	$ 10,493,897	$ 11,565,524	$ 7,044,871	$ 4,798,625	$ 7,787,056	$ 40,808	$ 33,661	$ 19,659
Allocation %	100.0%	25.1%	27.7%	16.9%	11.5%	18.6%	0.1%	0.1%	0.0%
Generation Revenues (Reconciled)	$ 12,070,961	$ 3,031,570	$ 3,341,151	$ 2,035,185	$ 1,386,269	$ 2,249,594	$ 11,789	$ 9,724	$ 5,679
Marginal Cost of Service (Distribution-Dem)	$ 77,251,061	$ 19,461,945	$ 21,856,248	$ 13,270,081	$ 7,716,960	$ 14,820,852	$ 49,180	$ 48,584	$ 27,211
Allocation %	100.0%	25.2%	28.3%	17.2%	10.0%	19.2%	0.1%	0.1%	0.0%
Dist. Demand Revenues (Reconciled)	$ 85,551,155	$ 21,552,996	$ 24,204,551	$ 14,695,860	$ 8,546,094	$ 16,413,250	$ 54,465	$ 53,804	$ 30,134
Marginal Cost of Service (Distribution-Cust)	$ 14,509,345	$ 2,220,706	$ 6,501,559	$ 4,294,620	$ 578,277	$ 673,228	$ 1,625	$ 147,142	$ 92,189
Allocation %	100.0%	15.3%	44.8%	29.6%	4.0%	4.6%	0.0%	1.0%	0.6%
Dist. Customer Revenues (Reconciled)	$ 12,809,203	$ 1,960,493	$ 5,739,734	$ 3,791,395	$ 510,517	$ 594,342	$ 1,434	$ 129,901	$ 81,387
Marginal Cost of Service	$ 133,544,506	$ 32,230,929	$ 39,868,948	$ 24,609,572	$ 13,093,861	$ 23,281,136	$ 91,613	$ 229,387	$ 139,059
Allocation %	100.0%	24.1%	29.9%	18.4%	9.8%	17.4%	0.1%	0.2%	0.1%
Other Revenues (Reconciled)	$ 519,000	$ 125,261	$ 154,944	$ 95,641	$ 50,887	$ 90,479	$ 356	$ 891	$ 540
Revenue Requirements (Reconciled)	**$ 110,950,319**	**$ 26,670,320**	**$ 33,440,381**	**$ 20,618,081**	**$ 10,493,768**	**$ 19,347,665**	**$ 68,044**	**$ 194,320**	**$ 117,741**
Other Operating Revenue Credit Allocation %	100.0%	41.6%	51.2%	6.6%	0.4%	0.0%	0.0%	0.1%	0.1%
Other Operating Revenue (OOR) Credit $	$ 519,000	$ 216,126	$ 265,598	$ 34,186	$ 2,044	$ 73	$ 9	$ 381	$ 583
Target Base Revenues (After OOR Credit)	**$ 110,431,319**	**$ 26,454,194**	**$ 33,174,783**	**$ 20,583,895**	**$ 10,491,723**	**$ 19,347,592**	**$ 68,035**	**$ 193,939**	**$ 117,158**
Current Revenues	**$ 67,481,040**	**$ 15,219,951**	**$ 18,703,841**	**$ 12,245,238**	**$ 8,547,432**	**$ 12,469,798**	**$ 42,051**	**$ 162,511**	**$ 90,218**
Class Revenue Increase (Step 1)	$ 42,950,279	$ 11,234,243	$ 14,470,942	$ 8,338,656	$ 1,944,291	$ 6,877,794	$ 25,984	$ 31,429	$ 26,940
Class Revenue Increase (Step 1) %	63.6%	73.8%	77.4%	68.1%	22.7%	55.2%	61.8%	19.3%	29.9%

Liberty Utilities (CalPeco Electric)
Determination of Revenue Targets (Excluding ECAC, VM, CEMA)

Revenue Targets	Total Company	Residential Permanent	Residential Seasonal	Small Commercial	Medium Commercial	Large Commercial	Irrigation	OLS	Street Lighting
Step 2: Cap Mechanism									
Class Revenues subjected to cap	$ 44,946,211	$ 24,907,133		$ 20,039,078					
Revenue to be re-allocated	$ 2,091,878	$ 1,547,061		$ 544,817					
MCOS Allocation % Remaining Classes	100.0%		47.7%		19.8%	32.1%	0.2%	0.1%	0.1%
Class share of re-allocated Revenue	$ 2,091,878		$ 997,869		$ 414,023	$ 671,864	$ 3,521	$ 2,904	$ 1,696
Class Revenue Target (Step 2)	$ 110,431,319	$ 24,907,133	$ 34,172,652	$ 20,039,078	$ 10,905,747	$ 20,019,456	$ 71,556	$ 196,843	$ 118,854
Class Revenue Increase (Step 2)	$ 42,950,279	$ 9,687,182	$ 15,468,811	$ 7,793,840	$ 2,358,315	$ 7,549,658	$ 29,505	$ 34,333	$ 28,636
Class Revenue Increase (Step 2) %	63.6%	63.6%	82.7%	63.6%	27.6%	60.5%	70.2%	21.1%	31.7%
Step 3: No Class gets revenue decrease									
Class Revenues subjected to condition	$ -								
Increase to Current Revenues	$ -								
Revenue Increase to be re-allocated	$ -								
MCOS Allocation % Remaining Classes	100.0%	25.1%	27.7%	16.9%	11.5%	18.6%	0.1%	0.1%	0.0%
Class share of re-allocated Revenue Increase	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Class Revenue Target (Step 3)	**$ 110,431,319**	**$ 24,907,133**	**$ 34,172,652**	**$ 20,039,078**	**$ 10,905,747**	**$ 20,019,456**	**$ 71,556**	**$ 196,843**	**$ 118,854**
Class Revenue Increase (Step 3)	$ 42,950,279	$ 9,687,182	$ 15,468,811	$ 7,793,840	$ 2,358,315	$ 7,549,658	$ 29,505	$ 34,333	$ 28,636
Class Revenue Increase (Step 3) %	63.6%	63.6%	82.7%	63.6%	27.6%	60.5%	70.2%	21.1%	31.7%
Class Revenue Allocation %	100.0%	22.6%	30.9%	18.1%	9.9%	18.1%	0.1%	0.2%	0.1%
Allocation of Other Discounts/ Charges (Matrix_Solution)									
Class Revenue Targets (Proposed)	**$ 110,534,301**	**$ 24,930,360**	**$ 34,204,519**	**$ 20,057,765**	**$ 10,915,917**	**$ 20,038,125**	**$ 71,622**	**$ 197,027**	**$ 118,965**
Class Revenue Increase	$ 43,053,261	$ 9,710,409	$ 15,500,678	$ 7,812,527	$ 2,368,485	$ 7,568,327	$ 29,572	$ 34,516	$ 28,747
Class Revenue Increase %	63.8%	63.8%	82.9%	63.8%	27.7%	60.7%	70.3%	21.2%	31.9%
After Allocation of Other Discounts / Charges									

Exhibit TSL/TAS-5: Liberty Utilities (CalPeco Electric) LLC

Rate Design and Bill Impact Analyses

Liberty Utilities (CalPeco Electric)
Residential Permanent Rate Design

Base Revenues	Base Rates
Target Base Rates	24,930,360
Current Base Rates	15,219,951
$ Difference	9,710,409
% Difference	63.8%

Residential Permanent Proposed Rates	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates								
Customer Charge	$ 15.84			214,666	$ 3,400,203			$ 3,400,203
Tier 1 Energy		$ 0.13427	$ 0.01492	92,999,141		12,486,743	1,387,754	13,874,497
Tier 2 Energy		$ 0.13427	$ 0.02753	47,314,942		6,352,849	1,302,811	7,655,660
Revenue at Proposed Rates					**$ 3,400,203**	**$ 18,839,592**	**$ 2,690,565**	**$ 24,930,360**
Current Rates								
Customer Charge	$ 9.67			214,666	$ 2,075,819			$ 2,075,819
Tier 1 Energy		$ 0.08197	$ 0.00911	92,999,141		7,623,140	847,222	8,470,362
Tier 2 Energy		$ 0.08197	$ 0.01681	47,314,942		3,878,406	795,364	4,673,770
Revenue at Current Rates					**$ 2,075,819**	**$ 11,501,545**	**$ 1,642,586**	**$ 15,219,951**

Residential Permanent Class

Bill Impact Analysis Total Charges	Month Usage (kWh)	Tier 1 Usage (kWh)	Tier 2 Usage (kWh)	Proposed Bill $	Current Bill $	Increase / (Decrease) $	Increase / (Decrease) %
Winter Season							
25% Below Avg. Usage	535.8	535.8	-	$ 125.75	$ 88.45	$ 37.30	42.2%
Average Usage	714.4	577.9	136.5	$ 166.15	$ 117.80	$ 48.35	41.0%
25% Above Avg. Usage	893.0	577.9	315.1	$ 207.71	$ 148.10	$ 59.61	40.2%
Summer Season							
25% Below Avg. Usage	395.3	395.3	-	$ 96.94	$ 67.80	$ 29.14	43.0%
Average Usage	527.1	441.0	86.1	$ 126.34	$ 89.12	$ 37.22	41.8%
25% Above Avg. Usage	658.9	441.0	217.8	$ 157.00	$ 111.47	$ 45.53	40.8%

Baseline: kWh	Per Day	Per Month
Winter	19.00	577.92
Summer	14.50	441.04
Average # of Days	30.42	

Liberty Utilities (CalPeco Electric)
Residential Seasonal Rate Design

Base Revenues	Base Rates
Target Base Rates	34,204,519
Current Base Rates	18,703,841
$ Difference	15,500,678
% Difference	82.9%

Residential Seasonal Rate Design	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates								
Customer Charge	$ 17.68			311,972	$ 5,516,896			$ 5,516,896
Energy		$ 0.14990	$ 0.03074	158,808,179		23,805,674	4,881,949	28,687,623
Revenue at Proposed Rates					**$ 5,516,896**	**$ 23,805,674**	**$ 4,881,949**	**$ 34,204,519**
Current Rates								
Customer Charge	$ 9.67			311,972	$ 3,016,769			$ 3,016,769
Energy		$ 0.08197	$ 0.01681	158,808,179		13,017,506	2,669,565	15,687,072
Revenue at Current Rates					**$ 3,016,769**	**$ 13,017,506**	**$ 2,669,565**	**$ 18,703,841**

Residential Seasonal Rate Design

Bill Impact Analysis Total Charges	Month Usage (kWh)	Proposed Bill $	Current Bill $	Increase / (Decrease) $	Increase / (Decrease) %
Winter Season					
25% Below Avg. Usage	411.9	$ 121.29	$ 79.56	$ 41.74	52.5%
Average Usage	549.2	$ 155.83	$ 102.85	$ 52.98	51.5%
25% Above Avg. Usage	686.5	$ 190.36	$ 126.15	$ 64.22	50.9%
Summer Season					
25% Below Avg. Usage	323.3	$ 98.99	$ 64.51	$ 34.48	53.4%
Average Usage	431.0	$ 126.09	$ 82.79	$ 43.30	52.3%
25% Above Avg. Usage	538.8	$ 153.19	$ 101.08	$ 52.12	51.6%

Liberty Utilities (CalPeco Electric)
A-1 Class Rate Design

Base Revenues	Base Rates
Target Base Rates	20,057,765
Current Base Rates	12,245,238
$ Difference	7,812,527
% Difference	63.8%

A-1 Class Rate Design	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates (A-1 > 20kW)								
Customer Charge	$ 28.47			59,375	$ 1,690,305			$ 1,690,305
Energy		$ 0.15291	$ 0.03058	61,420,183		9,391,625	1,878,325	11,269,950
Proposed Rates (A-1A <= 20 kW)								
Customer Charge	$ 28.47			4,500	128,122			128,122
Energy		$ 0.15291	$ 0.03058	37,982,522		5,807,824	1,161,565	6,969,388
Revenue at Proposed Rates					$ 1,818,427	$ 15,199,448	$ 3,039,890	$ 20,057,765
Current Rates (A-1 > 20kW)								
Customer Charge	$ 17.38			59,375	$ 1,031,929			$ 1,031,929
Energy		$ 0.09335	$ 0.01867	61,420,183		5,733,574	1,146,715	6,880,289
Current Rates (A-1A <= 20 kW)								
Customer Charge	$ 17.38			4,500	78,219			78,219
Energy		$ 0.09335	$ 0.01867	37,982,522		3,545,668	709,134	4,254,802
Revenue at Current Rates					$ 1,110,148	$ 9,279,242	$ 1,855,848	$ 12,245,238

A-1 Class Rate Design

Bill Impact Analysis Total Charges	Month Usage	Proposed Bill	Current Bill	Increase / (Decrease) $	Increase / (Decrease) %
Winter Season					
25% Below Avg. Usage	616.6	$ 201.84	$ 146.68	$ 55.15	37.6%
Average Usage	822.1	$ 259.63	$ 189.79	$ 69.84	36.8%
25% Above Avg. Usage	1,027.6	$ 317.42	$ 232.89	$ 84.53	36.3%
Summer Season					
25% Below Avg. Usage	235.1	$ 94.57	$ 66.68	$ 27.89	41.8%
Average Usage	313.5	$ 116.61	$ 83.12	$ 33.49	40.3%
25% Above Avg. Usage	391.8	$ 138.64	$ 99.55	$ 39.09	39.3%

Liberty Utilities (CalPeco Electric)
A-2 Class Rate Design

Base Revenues	Base Rates
Target Base Rates	10,915,917
Current Base Rates	8,547,432
$ Difference	2,368,485
% Difference	27.7%

A-2 Class Rate Design Proposed Rates	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates (A-2)								
Customer Charge	$ 55.91			3,048	$ 170,418			$ 170,418
Winter Energy		$ 0.06414	$ -	45,574,506		2,922,969	-	2,922,969
Summer Energy		$ -	$ 0.05442	21,720,176		-	1,181,953	1,181,953
Winter Demand		$ 16.56	$ -	303,482		5,026,879	-	5,026,879
Summer Demand		$ -	$ 10.77	132,310		-	1,424,447	1,424,447
Power Factor				0.00561%	$ 10	$ 446	$ 146	602
V/T Discount				-0.00539%	$ (9)	$ (428)	$ (140)	(578)
Proposed Rates (A-2 TOU)								
Customer Charge	$ 177.72			-	$ -			$ -
Winter Energy - On-Peak		$ 0.06414	$ -	131,045		8,405	-	8,405
Winter Energy - Mid-Peak		$ 0.06414	$ -	187,889		12,050	-	12,050
Winter Energy - Off-Peak		$ 0.06414	$ -	194,953		12,503	-	12,503
Summer Energy - OnPeak		$ -	$ 0.05442	236,540		-	12,872	12,872
Summer Energy - Off-Peak		$ -	$ 0.05442	196,029		-	10,667	10,667
Winter Demand - On-Peak		$ 16.56	$ -	3,044		50,422	-	50,422
Winter Demand - Mid-Peak		$ 16.56	$ -	3,204		53,074	-	53,074
Summer Demand - OnPeak		$ -	$ 10.77	2,717		-	29,256	29,256
Non-TOU Maximum		$ -	$ -	3,854		-	-	-
Revenue at Proposed Rates					$ 170,418	$ 8,086,303	$ 2,659,196	$ 10,915,917

Liberty Utilities (CalPeco Electric)
A-2 Class Rate Design

A-2 Class Rate Design Current Rates	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Current Rates								
Customer Charge	$ 43.78			3,048	$ 133,441			$ 133,441
Winter Energy		$ 0.05022	$ -	45,574,506		2,288,752	-	2,288,752
Summer Energy		$ -	$ 0.04261	21,720,176		-	925,497	925,497
Winter Demand		$ 12.97	$ -	303,482		3,936,162	-	3,936,162
Summer Demand		$ -	$ 8.43	132,310		-	1,115,375	1,115,375
Power Factor				0.00561%	$ 7	$ 349	$ 114	471
V/T Discount				-0.00539%	$ (7)	$ (336)	$ (110)	(453)
Current Rates (A-2 TOU)								
Customer Charge	$ 139.16			-	$ -			$ -
Winter Energy - On-Peak		$ 0.05022	$ -	131,045		6,581	-	6,581
Winter Energy - Mid-Peak		$ 0.05022	$ -	187,889		9,436	-	9,436
Winter Energy - Off-Peak		$ 0.05022	$ -	194,953		9,791	-	9,791
Summer Energy - OnPeak		$ -	$ 0.04261	236,540		-	10,079	10,079
Summer Energy - Off-Peak		$ -	$ 0.04261	196,029		-	8,353	8,353
Winter Demand - On-Peak		$ 12.97	$ -	3,044		39,482	-	39,482
Winter Demand - Mid-Peak		$ 12.97	$ -	3,204		41,558	-	41,558
Summer Demand - OnPeak		$ -	$ 8.43	2,717		-	22,908	22,908
Non-TOU Maximum		$ -	$ -	3,854		-	-	-
Revenue at Current Rates					$ 133,442	$ 6,331,775	$ 2,082,216	$ 8,547,432

Liberty Utilities (CalPeco Electric)
A-3 Class Rate Design

Base Revenues	Base Rates
Target Base Rates	20,038,125
Current Base Rates	12,469,798
$ Difference	7,568,327
% Difference	60.7%

A-3 Class Rate Design Proposed Rates	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates (A-3)								
Customer Charge	$ 829.51			636	$ 527,566			$ 527,566
Winter Energy - On-Peak		$ 0.05175	$ -	17,245,812		892,402	-	892,402
Winter Energy - Mid-Peak		$ 0.04420	$ -	34,278,478		1,515,202	-	1,515,202
Winter Energy - Off-Peak		$ 0.02332	$ -	32,556,978		759,181	-	759,181
Summer Energy - OnPeak		$ 0.06853	$ -	16,441,052		1,126,709	-	1,126,709
Summer Energy - Off-Peak		$ 0.03703	$ -	14,679,055		543,533	-	543,533
Winter Demand - On-Peak		$ 11.48	$ 2.98	360,936		4,144,663	1,075,185	5,219,848
Winter Demand - Mid-Peak		$ 3.40	$ 2.05	424,779		1,442,244	870,789	2,313,034
Summer Demand - OnPeak		$ 4.80	$ 19.09	117,999		566,944	2,252,658	2,819,602
Non-TOU Maximum		$ 9.32	$ -	463,582		4,321,049	-	4,321,049
Power Factor				0.03612%	191	5,531	1,517	7,238
V/T Discount				-0.37120%	(1,958)	(56,838)	(15,585)	(74,382)
Revenue at Proposed Rates					$ 527,566	$ 15,311,928	$ 4,198,632	$ 20,038,125

Liberty Utilities (CalPeco Electric)
A-3 Class Rate Design

A-3 Class Rate Design Current Rates	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Current Rates (A-3)								
Customer Charge	$ 517.94			636	$ 329,410			$ 329,410
Winter Energy - On-Peak		$ 0.03231	$ -	17,245,812		557,212	-	557,212
Winter Energy - Mid-Peak		$ 0.02760	$ -	34,278,478		946,086	-	946,086
Winter Energy - Off-Peak		$ 0.01456	$ -	32,556,978		474,030	-	474,030
Summer Energy - OnPeak		$ 0.04279	$ -	16,441,052		703,513	-	703,513
Summer Energy - Off-Peak		$ 0.02312	$ -	14,679,055		339,380	-	339,380
Winter Demand - On-Peak		$ 7.17	$ 1.86	360,936		2,587,911	671,341	3,259,252
Winter Demand - Mid-Peak		$ 2.12	$ 1.28	424,779		900,531	543,717	1,444,249
Summer Demand - OnPeak		$ 3.00	$ 11.92	117,999		353,998	1,406,550	1,760,548
Non-TOU Maximum		$ 5.82	$ -	463,582		2,698,045	-	2,698,045
Power Factor				0.03612%	119	3,453	947	4,519
V/T Discount				-0.37120%	(1,223)	(35,489)	(9,731)	(46,444)
Revenue at Current Rates					$ 328,306	$ 9,528,669	$ 2,612,824	$ 12,469,798

Liberty Utilities (CalPeco Electric)
PA Rate Design

Base Revenues	Base Rates
Target Base Rates	71,622
Current Base Rates	42,051
$ Difference	29,572
% Difference	70.3%

PA Rate Design	Customer Charge	Distribution Rate	Generation Rate	Billing Determinants	Customer Revenues	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates								
Customer Charge	$ 29.60			119	$ 3,523			$ 3,523
Energy		$ 0.04689	$ 0.04491	741,788		34,783	33,317	68,100
Revenue at Proposed Rates					$ 3,523	$ 34,783	$ 33,317	$ 71,622
Current Rates								
Customer Charge	$ 17.38			119	$ 2,068			$ 2,068
Energy		$ 0.02753	$ 0.02637	741,788		20,421	19,561	39,982
Revenue at Current Rates					$ 2,068	$ 20,421	$ 19,561	$ 42,051

Liberty Utilities (CalPeco Electric)
HPS Outdoor Lights Rate Design

Base Revenues	Base Rates
Target Base Rates	197,027
Current Base Rates	162,511
$ Difference	34,516
% Difference	21.2%

HPS Outdoor Lights Rate Design	Distribution Rate	Generation Rate	Billing Determinants	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates (OLS)						
Existing, Overhead Pole Rates by Lumen						
5,800 Lumen Light @ 29 kWh/mo.	$ 12.62	$ 0.12	6,266	79,056	735	79,791
9,500 Lumen Light @ 41 kWh/mo.	12.95	0.21	6,220	80,574	1,276	81,850
16,000 Lumen Light @ 67 kWh/mo.	13.50	0.31	2,255	30,434	694	31,128
22,000 Lumen Light @ 85 kWh/mo.	14.35	0.35	91	1,301	32	1,333
These Poles/Service add to the Existing Pole Rate (above)						
New Wood Pole	$ 9.89	$ -	74	732	-	732
New Metal Pole (< 22,000 lumens)	13.06	$ -	111	1,451	-	1,451
New Metal Pole (=> 22,000 lumens)	13.86	$ -		-	-	-
Underground Service	6.68	$ -	111	742	-	742
Revenue at Proposed Rates				$ 194,291	$ 2,736	$ 197,027
Current Rates (OLS)						
Existing, Overhead Pole Rates by Lumen						
5,800 Lumen Light @ 29 kWh/mo.	$ 10.41	$ 0.10	6,266	65,206	606	65,812
9,500 Lumen Light @ 41 kWh/mo.	10.68	0.17	6,220	66,459	1,053	67,511
16,000 Lumen Light @ 67 kWh/mo.	11.13	0.25	2,255	25,103	572	25,675
22,000 Lumen Light @ 85 kWh/mo.	11.83	0.29	91	1,073	26	1,100
These Poles/Service add to the Existing Pole Rate (above)						
New Wood Pole	$ 8.16		74	604	-	604
New Metal Pole (< 22,000 lumens)	10.77		111	1,197	-	1,197
New Metal Pole (=> 22,000 lumens)	11.44		-	-	-	-
Underground Service	5.51		111	612	-	612
Revenue at Current Rates				$ 160,254	$ 2,257	$ 162,511

Liberty Utilities (CalPeco Electric)
HPS Street Lights Rate Design

Base Revenues	Base Rates
Target Base Rates	118,965
Current Base Rates	90,218
$ Difference	28,747
% Difference	31.9%

HPS Street Lights Rate Design	Distribution Rate	Generation Rate	Billing Determinants	Distribution Revenues	Generation Revenues	Total Revenues
Proposed Rates (SL)						
Existing, Overhead Pole Rates by Lumen						
5,800 Lumen Light @ 29 kWh/mo.	$ 20.75	$ 0.09	747	15,504	71	15,574
9,500 Lumen Light @ 41 kWh/mo.	20.81	0.16	1,009	20,998	159	21,157
22,000 Lumen Light @ 79 kWh/mo.	22.49	0.30	3,608	81,155	1,079	82,234
These Poles/Service add to the Existing Pole Rate (above)						
New Wood Pole	$ 11.16					
New Metal Pole (< 22,000 lumens)	15.38					
New Metal Pole (=> 22,000 lumens)	15.63					
Underground Service total	7.56					
Total, poles			5,729			
Underground Service			2,830			
Revenue at Proposed Rates				$ 117,656	$ 1,308	$ 118,965
Current Rates (SL)						
Existing, Overhead Pole Rates by Lumen						
5,800 Lumen Light @ 29 kWh/mo.	$ 15.73	$ 0.07	747	11,757	54	11,811
9,500 Lumen Light @ 41 kWh/mo.	15.78	0.12	1,009	15,924	120	16,044
22,000 Lumen Light @ 79 kWh/mo.	17.06	0.23	3,608	61,545	818	62,363
These Poles/Service add to the Existing Pole Rate (above)						
New Wood Pole	$ 8.47					
New Metal Pole (< 22,000 lumens)	11.66					
New Metal Pole (=> 22,000 lumens)	11.85					
Underground Service total	5.73					
Total, poles			5,729			
Underground Service			2,830			
Revenue at Current Rates				$ 89,226	$ 992	$ 90,218