Residential Rate OIR

PG&E Bill Calculator Model

Methodology Document

Version 5.0 FINAL

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Contents

Purpose

The purpose of this model is to allow the users to evaluate the performance of various alternative rate design scenarios in the light of a few key rate design goals. The list below provides the goals identified by the CPUC in the Residential Rate OIR.

1. Low-income and medical baseline customers should have access to enough electricity to ensure basic needs (such as health and comfort) are met at an affordable cost;
2. Rates should be based on marginal cost;
3. Rates should be based on cost-causation principles;
4. Rates should encourage conservation and energy efficiency;
5. Rates should encourage reduction of both coincident and non-coincident peak demand;
6. Rates should provide stability, simplicity and customer choice;
7. Rates should avoid cross-subsidies, unless the cross-subsidies appropriately support explicit state policy goals;
8. Rates should encourage economically efficient decision-making;
9. Incentives should be explicit and transparent; and
10. Transitions to the new rate structure should emphasize customer education and outreach that enhances customer understanding and acceptance of new rates, and minimizes and avoids the potential for rate shock.

This model will help in assessing comparative performance of alternative rate design scenarios on goals 1, 2, 3, 4, 7 and 8 with respect to the cost based bill and current multi-tiered rate.

Alternative Rate Designs

This model allows users to evaluate the rate design scenarios with the following broad structural options:

1) Customer Charge
2) Demand differentiated Fixed Charge
3) Minimum Charge in Lieu of Customer Charge
4) Flat Rates
5) Tiered Rates (Two Tiers or Multiple Tiers)
6) TOU[1] Rates with Baseline Credits

Key Results

The key results of the model are the bill impact analysis, rate equity and energy conservation.

[1] TOU – Time of Use

Bill-Impact

Bill impact information is provided in tabular and graphic form. The information is segmented based on levels of percentage bill impacts that will be experienced by customers. The information provided in the bill impact tables includes the following:

- Bill Percentage Change Groups
- Number of Customers in Each Group
- Percentage of Customers in Each Group
- Average Monthly Kwh Use of Customers in Each Group
- Average Load Factor of Customers in Each Group
- Average "On-Peak" Percentage of Customers in Each Group
- Average Current Rates for Customers in Each Group
- Average Proposed Rates for Customers in Each Group
- Average Percentage Rate Change for Customers in Each Group
- Average Current Bills for Customers in Each Group
- Average Proposed Bills for Customers in Each Group
- Average Bill Change for Customers in Each Group

Rate-Efficiency

A comparison with the cost based bill and current rate based bill at different usage level allows the user to evaluate how equitable the alternative rate design scenario is. The results include the following:

- Average Monthly Usage-Level Categories
- Average Cost-Based Rate by Usage Level
- Average Current Rates by Usage Level
- Average Non-TOU Rate by Usage Level
- Average TOU Rate by Usage Level
- Cost-Based Rate Percentage Change from Current Rates
- Proposed Non-TOU Rate Percentage Change from Current Rates
- Proposed TOU Rate Percentage Change from Current Rates

Energy Conservation

The model provides estimated consumptions changes when moving from one rate design to another. The results include the following:

- Tables Showing Estimated Annual KWh Consumption Changes for Non-CARE and CARE Customers When Moving from:
  - Current (Inclining Block) Rates to Flat Rates
  - Flat Rates to TOU Rates

Process Flow

The Figure 1 shows how the calculation flows from the available data to the resulting rates, bill amount calculation and the reports that help evaluate the performance of the rate design scenarios. A residential customer sample is used to calculate rate structure based bill amounts. Prior to calculating the bill amounts, the rates are determined based on the residential class revenue requirement. The model allows the following four bill amount calculations at a time:

1. Current rate based bill amount
2. Cost based bill amount
3. A non-TOU rate scenario based bill amount
4. A TOU based bill amount calculation

These bill amounts are then used, along with income data, to produce the following reports:

1. Various results for different ranges of bill impact, such as number of customers, average usage, average annual load factor, monthly average bill amount and bill to income ratio.
2. Rate efficiency comparison, which is a comparison of average rate of a rate design scenario with the cost based average rate at various monthly average usage levels.
3. Average bill amount and revenue collection at various usage levels.
4. Energy conservation estimation.

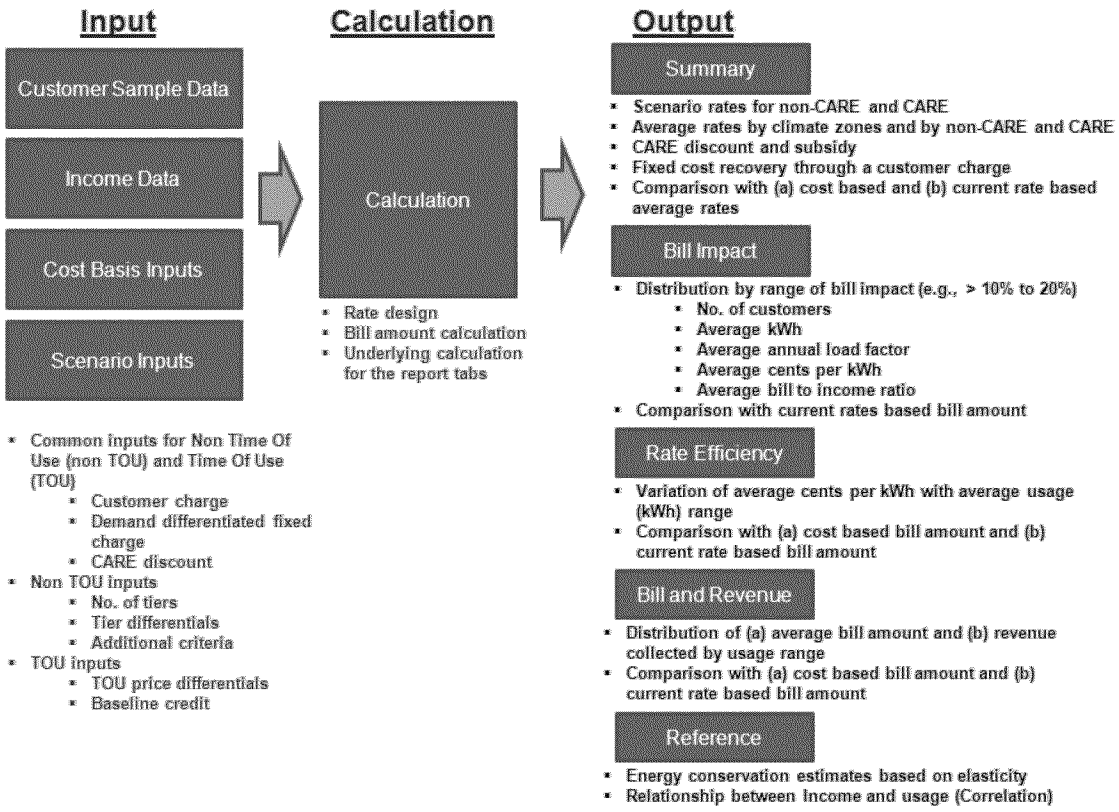

Figure 1: Shows process flow

Current Rate Based Bill Amount

Current rates refer to the rates of an effective date chosen by the model user. The rates used by the model for this purpose are based on E-1 and EL-1 rates schedules only (E-1 is for non-CARE customers while the EL-1 is for CARE customers). Most of the residential sales are in these two rate schedules. In addition, the purpose of this model is to study alternative rate structure to these two multi-tiered rate structures. Hence, the other rate schedules are ignored.
The current rate based bill amount provides the total revenue collection for the sample customers. The CARE customers receive subsidized rates, and the subsidy is provided by all non-residential customers except street-lighting, and the non-CARE residential customers on an equal cents per kWh basis.

CARE Subsidy Allocation Adjustment

The CARE subsidy amount is calculated by multiplying the CARE surcharge amount with the sum of the total non-residential sales except the street-lighting and the non-CARE residential sales. The ratio of the non-residential sales except street-lighting to the total sales that subsidize CARE is approximately 70%. The 70% of the subsidy amount is, therefore, added to the distribution component of the residential class revenue collection. In addition, 30% of the subsidy is transferred within the residential class revenue requirement from Public Purpose Program (PPP) to Distribution.

Total Revenue for Cost Based Bill

The total revenue for the cost based bill is the revenue collection based on the current rates with subsidy allocation adjustment. After the subsidy allocation adjustment, the total revenue is grouped into the following four functions:

1. Generation
2. Transmission
3. Distribution
4. Other

The function specific revenues are then used in calculating cost based bill amount.

Calculation of Cost Based Bill Amount

The calculation is done separately for the four components: Generation, Transmission, Distribution and Others.

Generation Cost

The generation cost has two components: generation energy cost and capacity cost. The generation energy cost is based on the marginal cost of generation energy (GMEC), which has three TOU rates

with summer and winter rate distinction. The generation capacity cost is calculated at an annual level by multiplying the Generation Marginal Capacity Cost (GMCC) with the annual capacity calculated as a weighted sum of monthly coincident peak demand. The weights are obtained from an external model (E3's July 27, 2012 update). The current values provide zero weightage to the winter months' coincident peak demands. Planning Reserve Margin is applied when calculating the generation capacity cost.
The revenue based on the marginal cost may not match the revenue requirement. The marginal cost based revenue is multiplied by a factor (Equal Percent Marginal Cost, EPMC) to match the revenue requirement. The model optimizes this factor (Generation EPMC) for this purpose.

Transmission Cost

The transmission cost is based on the Transmission Marginal Cost (TMC). It is calculated at an annual level by multiplying the TMC with the annual capacity calculated as a weighted sum of monthly coincident peak demand. The weights are assumed to sum to 90% for all summer months and to 10% for all winter months. The weights are same for all summer months. Within the winter months, the weights are same as well.
The revenue based on the marginal cost may not match the revenue requirement. The marginal cost based revenue is multiplied by a factor (Equal Percent Marginal Cost, EPMC) to match the revenue requirement. The model optimizes this factor (Transmission EPMC) for this purpose.

Distribution Cost

The distribution cost has three components: primary, secondary, new business and customer access costs. Primary cost corresponds to the costs associated with the primary voltage level, the secondary charge corresponds to the costs associated with the secondary voltage level, the new business marginal costs corresponds to the costs associated with connecting the new customers, while the customer access charge include a portion of Final Line Transformer (FLT), the connection from FLT to the Customer's service point and the metering and servicing costs.
The primary, secondary and new business marginal distribution costs are applied based on annual non-coincident peak demand at Distribution Planning Area (DPA) Level. Line loss and PCAF to FLT factors are applied to calculate marginal cost based bill amount and revenue collection.
The revenue based on the marginal cost may not match the revenue requirement. The marginal cost based bill amount and revenue are multiplied by a factor (Equal Percent Marginal Cost, EPMC) to match the revenue requirement. The model optimizes this factor (Distribution EPMC) for this purpose.

Other Costs

The other costs include Public Purpose Program, Nuclear Decommissioning, DWR Bond, Competition Transition Charge, Energy Cost Recovery Amount, Power Charge Indifference Adjustment, and Conservation Incentive Adjustment. These costs are fairly constant with respect to the overall usage. While these charges can either be recovered as a fixed charge across all customers or volumetric, PG&E believes that a fair way to recover these costs is to apply a fixed

monthly amount for all customers. The model, however, provides the flexibility to treat these costs either fixed or volumetric.

Rate and Bill Calculation of Alternative Rate Design Scenarios

The model allows the user to choose non-TOU and TOU rate design scenarios. User provides scenario specific inputs including number of tiers, pricing relationship across different tiers and TOU, CARE discount rate, baseline credit for the TOU rate structure, customer charge, demand differentiated fixed charge and minimum charge amounts. Using these inputs and the total revenue requirement for the cost based billing the model calculates the CARE subsidy. An appropriate portion (70% based on the sales volume) of the CARE subsidy is then allocated to the non-residential class. The rates are designed so that the revenue requirement with appropriate subsidy allocation is achieved in a revenue neutral manner across all rate design scenarios.

Revenue Collection Adjustment for the Sample

The revenue collection for the alternative rate scenarios will depend upon the total usage based on the sample of customers. The model accounts for this while calculating the revenue requirement net of subsidy for the marginal cost based bill amount calculation and alternative rate structure scenarios.

Source of Input Data

The Bill Calculator uses RASS (Residential Appliances Saturation Survey) 2009 sample for the PG&E customers. The sample weight, income and number of household member information are used from the RASS 2009 data. This data is merged with PG&E's internal customer usage and billing data, which is then used in the Bill Calculator model.