AUSTIN ENERGY'S TARIFF PACKAGE:	**§**	**BEFORE THE CITY OF AUSTIN**
2015 COST OF SERVICE STUDY	**§**	**IMPARTIAL HEARINGS**
AND PROPOSAL TO CHANGE	**§**	**EXAMINER**
BASE ELECTRIC RATES	**§**	

AELIC'S RESPONSE TO AUSTIN ENERGY'S FIRST REQUEST FOR INFORMATION

To Austin Energy:

Attached are AELIC's responses to Austin Energy's First Request for Information filed on May 5, 2016.

Respectfully Submitted,

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CERTIFICATE OF SERVICE

The undersigned certifies that TLSC has served a copy of the attached document upon all known parties of record by email and to the Impartial Hearing Examiner on the 9th day of May 2016

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Lanetta M. Cooper

AELIC Response to AE RFI No. 1-1

AE1-1. AE RFI No. 1-1: On page 3 under 'Adjustments to AE's Revenues' for part 1a, please provide all supporting documentation and calculations for the inputted residential customer charge revenue of $5,065,800 and base energy revenue of $3,894,831.

Answer: I relied upon Schedule H-5.2 of the rate filing package to derive the energy charge ("base rate components"). I relied upon WP H-5.1 to derive the customer charge revenue. No calculation was necessary for the $3,894,831 energy charge because it was separately identified in Schedule H-5.2. However, the CAP revenues used for the customer charge were co-mingled with the CAP rate discount. WP H-5.1 identifies the number of CAP customer charge units of 506,580. That number was multiplied by $10.

Prepared by: LMC

Sponsored by: Lanetta Cooper

AELIC Response to AE RFI No. 1-2

AE1-2. AE RFI No. 1-2: On page 5 under the topic 'Rate Design' for part 3, please provide all supporting documentation and studies for each of the statements listed below. In addition, please indicate whether each statement is a fact or opinion.

a. "An inverted block rate design promotes energy efficiency."

b. "The design of an inverted block rate requires the initial block or first two blocks, depending upon the number of rating tiers, to be priced below average cost."

c. "AE's first tier represents the most inelastic usage tier."

d. "Rates should be significantly below cost."

e. "A rate design promoting energy efficiency requires low fixed charges."

f. "Under an inverted block rate design the average price to a customer is smoothed because each price tier is incrementally added to the bill."

Answer:

a. Fact based on my general knowledge and on AE's own study. See AE Response to ICA RFI No. 1-22. See also App B to AE's rate filing package.
b. Fact based on pure mathematics. See AE's response to Rourke No. 1-5; App B to AE's rate filing package, and App M-53 to AE's rate filing package.
c. Fact based on my general knowledge of elasticity of demand studies for electric pricing. Did not rely upon specific documentation.
d. My opinion given the fact that AE has five rating tiers; that the amount of revenues that can be realized is limited to its embedded costs; that AE has a fixed charge that creates a countering effect to the inclining block nature of the first block and perhaps second blocks.; and that the first tier is the least susceptible to price changes.
e. Opinion based on general knowledge and on AE's recognition of the conservation effect of inverted block rates. For instance see executive summary of attached study; however, did not review any specific study or document to answer the rfi.
f. Fact based on general math concepts. No study or document.

Prepared by: LMC

Sponsored by: Lanetta Cooper

CHRISTENSEN
ASSOCIATES
ENERGY CONSULTING

Residential Rate Study for the Kansas Corporation Commission
Final Report

Daniel G. Hansen
Michael T. O'Sheasy

April 11, 2012

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Executive Summary

This report documents a residential rate study that Christensen Associates Energy Consulting, LLC (CA Energy Consulting) conducted on behalf of the Kansas Corporation Commission (KCC). The KCC is interested in studying rates that can encourage conservation and/or provide efficient rates. "Conservation" refers to providing customers with incentives to reduce energy consumption. "Efficient rates" are those that provide customers with prices that reflect the marginal cost to serve them, which in theory leads to the most efficient use of resources (e.g., electricity generators). These two goals do not always coincide. For example, a TOU rate may have low off-peak prices to reflect the fact that only low-cost generators are needed to serve off-peak loads. While this price is efficient, it provides less incentive to conserve in off-peak hours than an equivalent flat price (in which the price is the same across all hours).

We used data from Kansas City Power & Light (KCP&L), Westar Energy (Westar), and Midwest Energy (Midwest) to analyze several alternative residential rate structures. The rate structures included in the study are:

- Flat rate;
- Straight-fixed variable (SFV) rate;
- Inclining block rate (IBR);
- Time-of-use (TOU) rate; and
- Day-type TOU rate.

The flat rate is included primarily as a reference case, in which the price does not vary by time or with the level of customer use. SFV rates address the utility's incentive to promote conservation and energy efficiency by increasing the fixed monthly customer charge and reducing the throughput volumetric rate, thereby recovering all utility fixed costs through fixed charges rather than through volumetric rates. An IBR is intended to provide an incentive to conserve by increasing the rate a customer pays as its usage level increases. TOU rates are intended to provide efficient price signals by charging rates that are based on the average cost to serve customers. TOU rates therefore give customers an incentive to reduce usage during high-cost hours (e.g., summer afternoons) and increase usage during low-cost hours (e.g., overnight hours). Day-type TOU rates add a "dynamic" component to TOU rates that provides customers with a significant incentive to reduce usage on the hottest, most costly days to serve them.

Each of these rate structures affects customers differently depending on their usage levels and patterns. The relationship between bill impacts and customer usage levels is of interest because stakeholders often wish to avoid adverse bill impacts for low-income customers, and low-income customers are often believed to use less electricity than other customers. The advantages and disadvantages of each rate structure are described in the full report.

Research Approach

The following steps were used to evaluate the alternative rate structures of interest:

1) Design revenue-neutral alternative residential rates for each utility;
2) Estimate customer-level bill impacts for each rate structure at historical loads;

3) Evaluate the relationship between bill impacts and customer usage levels;
4) Simulate the changes in customer usage levels and patterns (i.e., "demand response") in response to the new rate structures; and
5) Estimate the potential for utility revenue loss (revenue attrition) due to mispricing the new rate options.

Design revenue-neutral alternative residential rates for each utility: Separate revenue-neutral rates were designed for each utility using utility-specific residential customer usage data and Southwest Power Pool (SPP) price data (to design the TOU and day-type TOU rates). The rates were designed so that they produced the same amount of total revenue as the current rate produces.

Estimate customer-level bill impacts for each rate structure at historical loads: Each customer's bill was calculated for both their current rate and each alternative rate structure using historical loads.

Evaluate the relationship between bill impacts and customer usage levels: To evaluate the relationship between bill impacts and customer usage levels, the bill impacts are displayed as scatter plots against each customer's average monthly usage (in kWh). This allows for an easy examination of how bill impacts vary with customer usage level.

Simulate customer demand response to each rate structure: Simulation was used to estimate the changes in load that could be expected from each rate structure. We used evidence from existing studies on customer price responsiveness to provide estimates of the potential magnitude of the load changes (which, depending on the rate, could be an overall increase, an overall reduction, or shifting from high- to low-cost hours) that might be expected from each rate structure.

Estimate the potential for utility revenue loss (revenue attrition) due to mispricing the new rate options: The final step was to examine the potential for utility *revenue attrition*, or lost revenues, due to self selection and demand response. Revenue attrition due to *customer self selection* can occur when the utility sets rates without accounting for the tendency of customers to select the rate that is most beneficial for them (i.e., gives them the lowest bill). Revenue attrition due to *customer demand response* can occur when the utility sets rates using historical load profiles but customers modify their usage patterns in response to the pricing signals of their new rate.

Research Implementation

We used utility-specific customer data to calculate bill impacts for each rate structure. KCP&L and Westar provided us with 2007 hourly data from their residential load research samples. Midwest did not have a load research sample, and instead provided us with 2009 monthly billing data for its residential customers.

The rates within the alternative structures were set to produce the same total revenue as the existing base residential rate for the available sample customers. Therefore, the first step in the rate design process was to calculate the total revenue (accounting for the sample weights) from the base residential rate. The assumptions used when setting the rates were (a) all customers are on the rate (i.e., there is no customer selection issue), and (b) the historical load profiles are retained (i.e., we ignore the potential effect of demand response on customers' usage and bills).

For each of the rate structures, we calculated customer-level bills using the available customer-level load data, the "base" residential rates, and the newly designed rates. We then calculated "instant" bill impacts, which are the bill impacts before the customers modify their load profiles in response to the new price signals. For ease of analysis, scatter plots of bill impacts verses customer's average monthly usage were used. For some of the rate structures, such as IBR or SFV, the bill impacts are strongly related to customer size. For others, such as TOU, this is not the case.

Research Results

Bill Impacts

Tables ES.1 through ES.3 provide results that summarize the bill impact analyses. Four statistics are provided for each utility and rate structure:

- The share of customers that experienced a bill <u>increase</u> of 10% or more on the new rate structure;
- The share of customers that experienced a bill <u>decrease</u> of 10% or more on the new rate structure;
- The average percentage bill impact for customers who use an average of 500 kWh per month or less; and
- The average percentage bill impact for customers who use an average of 2,000 kWh per month or more.

These statistics are intended to facilitate comparisons of bill impacts across rate structures and utilities. Following are the key observations from these tables:

- The flat, TOU, and day-type TOU rates do not produce large percentage load impacts for very many customers (as shown in the "Greater than 10% column").
- The bill impacts for the flat, TOU, and day-type TOU rates are not strongly related to customer usage levels (as illustrated by the similarity of the average bill impacts in the "Low Use " and "High Use" columns).

- The high customer charge in the SFV rate leads to large bill increases for low-use customers (e.g., 27.4 percent for KCP&L's low-use customers). The percentage bill decreases for high-use customers on this rate structure are smaller in magnitude (e.g., 5.7 percent for KCP&L's high-use customers).
- Despite the fact that IBR and SFV have opposite effects by customer usage levels, combining the two rate structures is not enough to offset SFV's adverse bill impacts for low-use customers.

Table ES.1: Summary of Bill Impacts by Rate Structure, *KCP&L*

Rate Structure	Share of Customers by Bill Impact Amount		Average Bill Impact by Customer Usage	
	Greater than 10%	Less than -10%	Low Use (<500 kWh/mo.)	High Use (>2,000 kWh/mo.)
Flat rate	1.3%	0.0%	0.1%	0.6%
SFV	15.1%	0.0%	27.4%	-5.7%
IBR	4.9%	0.0%	-6.6%	10.4%
IBR + SFV	3.9%	0.0%	21.2%	2.6%
TOU	0.3%	0.0%	-0.5%	-0.2%
Day-type TOU	0.3%	0.0%	-0.5%	-0.5%

Table ES.2: Summary of Bill Impacts by Rate Structure, *Westar*

Rate Structure	Share of Customers by Bill Impact Amount		Average Bill Impact by Customer Usage	
	Greater than 10%	Less than -10%	Low Use (<500 kWh/mo.)	High Use (>2,000 kWh/mo.)
Flat rate	0.0%	0.0%	-0.1%	2.6%
SFV	35.9%	6.6%	46.6%	-10.1%
IBR	5.6%	0.0%	-1.5%	8.9%
IBR + SFV	28.8%	0.0%	42.2%	-4.8%
TOU	0.0%	0.0%	0.1%	1.9%
Day-type TOU	0.0%	0.0%	1.4%	1.5%

Table ES.3: Summary of Bill Impacts by Rate Structure, *Midwest*

Rate Structure	Share of Customers by Bill Impact Amount		Average Bill Impact by Customer Usage	
	Greater than 10%	Less than -10%	Low Use (<500 kWh/mo.)	High Use (>2,000 kWh/mo.)
Flat rate	0.0%	0.0%	-2.2%	3.9%
SFV	19.5%	0.4%	20.7%	-8.8%
IBR	6.0%	0.0%	-7.3%	17.9%
IBR + SFV	13.7%	0.0%	16.7%	1.9%

The customer-level bill impacts shown above are those that occur before customers take actions to adapt to the new rate structures (e.g., by shifting or reducing load). Of course, the goal of most of these rate structures is to provide customers with incentives to change behavior. The primary incentive goal of each rate structure can be summarized as follows:

- **SFV:** Eliminates the utility's disincentive to encourage conservation and energy efficiency. As a side effect, SFV reduces the customer-level incentive to conserve because the volumetric rate has been reduced.
- **IBR:** Discourages increases in consumption levels, particularly for high-use customers who face the high tail-block price. Note that low-use customers may experience a *decrease* in their incentive to conserve because they face the relatively low initial block price.
- **TOU:** Encourages customers to shift intra-day load from peak to off-peak hours.
- **Day-type TOU:** Builds upon standard TOU by providing added incentives to reduce usage on high-cost days.

Demand Response

To evaluate the potential magnitude of the usage changes described above, we developed simple elasticity-based models to simulate the changes in usage for each of these rate structures. The results of these simulations show that SFV leads to small increases in overall usage; IBR leads to small decreases in overall usage; TOU leads to decreases in peak-period usage and increases in off-peak period usage; and day-type TOU produces larger shifts of usage from peak to off-peak periods on higher-priced days.

Revenue Attrition

Finally, the report examined the potential for utility revenue attrition (recovering less revenue than forecast) due to customer self selection and demand response. That is, when the utility sets the rates for an optional pricing program, it does not know which customers will select the rate, or how the customers who select the rate will modify their load profiles in response to the new price signals. Our analysis provided an indication of the scale of this potential problem by assuming that customers select the rate that provides them with the lowest bill (customer self selection); and by simulating customer demand response using a range of price responsiveness parameters (i.e., price elasticities). The results indicated that both types of revenue attrition (i.e., due to customer self selection and demand response) are more pronounced for SFV and IBR than they are for TOU and day-type TOU.

AE RFI No. 1-3 to AELIC

AE1-3. On page 6 under the topic 'Rate Design' for part 5a, please provide all supporting documentation and studies related to the ERCOT market for the statement "[t]he volatility of fuel costs and market costs are not limited to seasonal time periods."

Answer: AE's discussion of 12 CP in its rate filing package, AE's response to AELIC ("TLSC) No.1-2. AE's Supp. Resp. to NXP/Samsun's 2nd RFI No. 2-6; AE's response to NXP/Samsun RFI No. 1-23; App I of the rate filing package.

Prepared by: LMC

Sponsored by: Lanetta Cooper

AE RFI No. 1-4

AE1-4. On page 7 under the topic 'Rate Design' for part 5b, please provide all supporting documentation for the statement, "AE would not be required to adjust its rates downward when it experiences an over recovery of its costs."

Answer: Appendix I to the rate filing package; p. 4-70 of the rate filing package.

Prepared by: LMC

Sponsored by: Lanetta Cooper