

**COUNCIL FINANCE COMMITTEE
AGENDA ITEM SUMMARY**

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Date: January 23, 2017

SUBJECT FOR DISCUSSION – Residential Electric Time of Use (TOU) Pilot Study

EXECUTIVE SUMMARY

The purpose of this agenda item is to provide the Council Finance Committee with the results of the residential electric time of use pilot study. The study showed that when compared to the current tiered rate structure both TOU rate structures reduced energy use by 2.5% and load was shifted from the on peak periods to the off peak periods, thereby reducing our community's contribution to the Platte River Power Authority's (PRPA) coincident peak. The additional complexity of the tiered TOU rate over the basic TOU rate did not provide any statistically significant difference from the basic TOU.

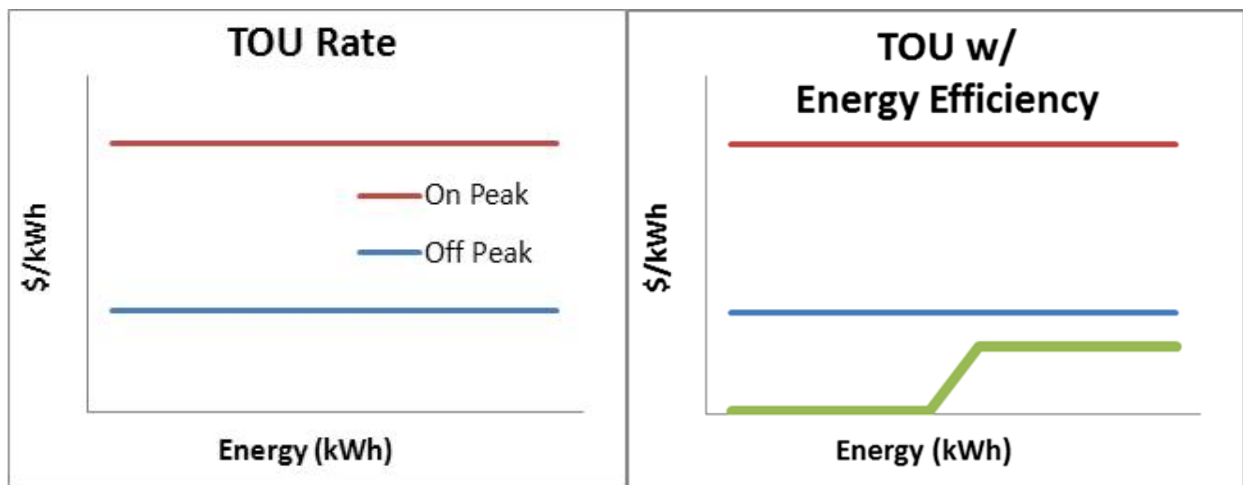
GENERAL DIRECTION SOUGHT AND SPECIFIC QUESTIONS TO BE ANSWERED

- 1) Does the Council Finance Committee support moving to a default residential time of use rate in the future?
- 2) What data or background information would be useful for including in the presentation at the Council work session on February 28th?

BACKGROUND/DISCUSSION

City Council passed Ordinance No. 078, 2015 in July 2015 to pursue a 12 month residential time of use pilot study. Customer outreach began and an open house was held in August and September of 2015. The official pilot study kicked off in November of 2015 and concluded in October of 2016. At that time a survey was sent to all participants and the best bill guarantee analysis and customer notification was completed ahead of any credits being applied to the customer's bill in December 2016.

Two time-of-use rate structures were considered during the pilot study. The first TOU was a basic time of use rate structure with an on-peak window when electricity costs more and a much wider off-peak window when electricity costs substantially less. In this TOU rate structure all of the expenses associated with energy efficiency programs were included in the on-peak window. The second rate structure, labeled below as TOU_EE, was very similar, with the same on-peak and off-peak hours, but rather than including the costs associated with the energy efficiency programs in the on-peak charge these costs were collected through an additional tiered component.



For the pilot 1,200 customers randomly selected to be on each rate. Roughly 10% of the customers opted out upfront. After removing all additional customers that moved households during the 12 month study period, approximately 850 customers remained throughout in each study group.

The purpose of the pilot study as outlined in Ordinance No. 078, 2015 was to assess if a TOU rate structure could better achieve each of the following objectives than the current tiered rate structure:

- Objective 1 - Determine energy conservation impacts
- Objective 2 - Measure potential demand reductions
- Objective 3 - Gauge customer preference for different rate structures
- Objective 4 - Ensure revenue requirements are met

Objective 1 - Energy Conservation

Both TOU rate structures effectively encouraged energy conservation better than the current tiered rate structure. The TOU rate realized a 2.5% reduction in energy consumption. The addition of a tier in the TOU_EE rate structure did not provide any additional energy conservation over the TOU rate without a tier.

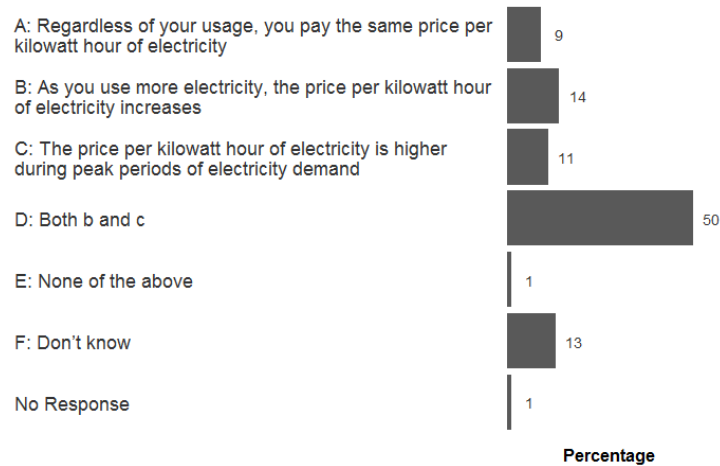
Objective 2 - Potential Demand Reductions

Both TOU rate structures reduced the probability that a residential customer's daily peak occurred in the "on peak" window. The TOU rate structure without a tier showed an 8.5% reduction in the probability that a customer's daily peak occurred in the "on peak" window. The TOU_EE rate structure showed a 2.8% reduction in the probability that a customer's daily peak occurred in the "on peak" window. This shift of the customer's daily peak reduces the contribution from the residential rate class as a whole to the system coincident peak hour used in the assessment of the wholesale demand charge each month. Specifically, looking at the single coincident peak hour during the summer months, the TOU rate showed a 7.5% reduction in the contribution to the system coincident peak.

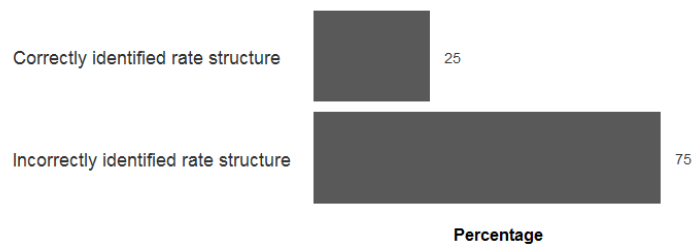
Objective 3 - Gauge Customer Preference

A survey was sent to all participants at the end of the pilot study. In total, 1,450 customer surveys were received (roughly 20% returned). Below is a summary of the responses from each of the four survey questions. Attached is another document which captures the additional comments provided by customers.

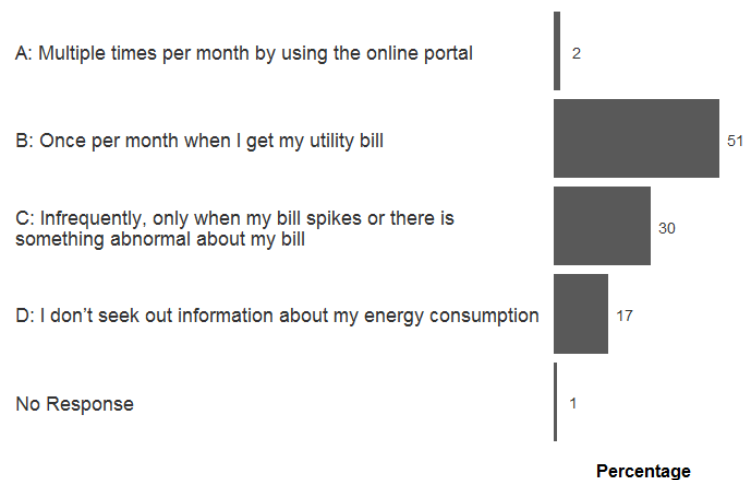
Question 1 - Select the description which you think best explains the price you pay for electricity.



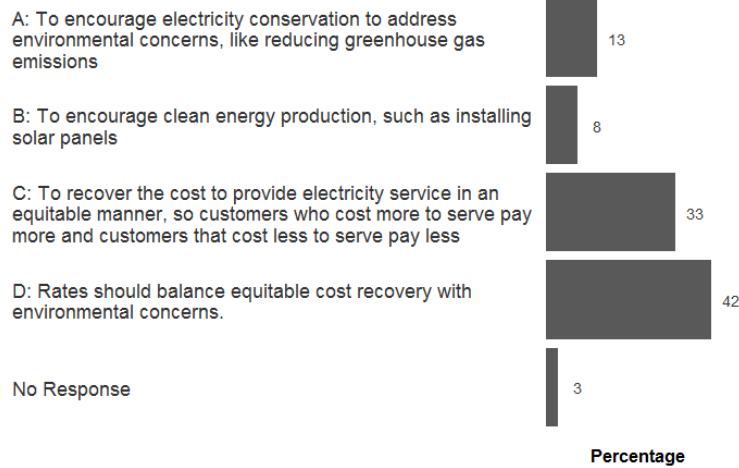
From the results of Question 1, where customers were asked to identify their rate structure:



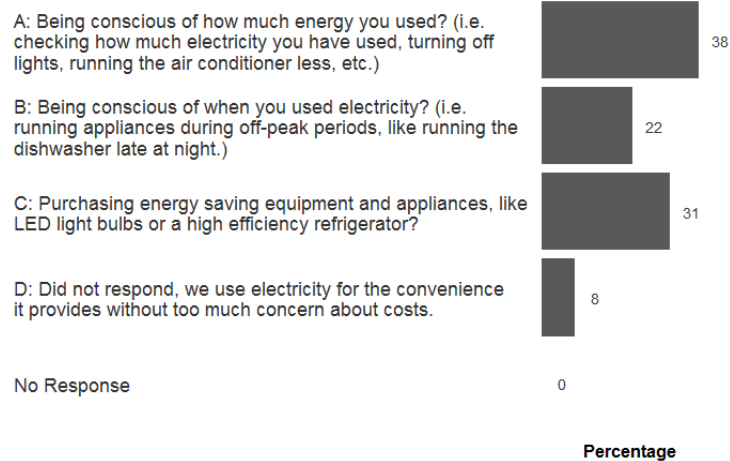
Question 2 - Select the description which best describes how frequently you seek out information about your energy consumption



Question 3 - In your view, what should be the primary objective of electricity rates (please choose one)



Question 4 - During the last 18 months, did you respond to your electricity bill by (choose all that apply)



Objective 4 – Revenue Adequacy

The TOU rate structures, like the tiered rate structure, were designed to pass through the full wholesale generation and transmission charges and to collect adequate revenue to maintain the distribution system. Both TOU rate structures resulted in less revenue than the current tiered rate structure. However, because 30% of wholesale energy charges are determined by Fort Collins Utility’s contribution to the system coincident peak and that contribution was reduced, adequate revenues were still generated to meet the cost of service for the residential rate class. Below is a table summarizing the revenue impacts separating out the impact to those residential customers who either have all electric heat and are on the Residential Demand (RD) rate or have rooftop solar installed (Net Metering customers):

	Final Count of Customers Enrolled	Revenue on TOU Rate	Revenue on Tiered or RD	\$ Difference	% Difference
TOU to Tiered	880	\$ 745,878	\$ 757,974	(\$12,096)	-1.6%
TOU EE to Tiered	851	\$ 728,914	\$ 742,996	(\$14,082)	-1.9%
TOU to RD	18	\$ 29,323	\$ 28,797	\$526	1.8%
TOU EE to RD	16	\$ 26,901	\$ 24,929	\$1,971	7.9%
Net - TOU to Tiered	5	\$ 2,094	\$ 1,368	\$726	53.1%
Net - TOU EE to Tiered	9	\$ 2,718	\$ 2,052	\$666	32.5%

SUMMARY OF IMPACTS

Summary of Rate Structure Impacts			
	Rate Structure		
	Tiered	TOU	TOU w/tier
Revenue Requirements Met	✓	✓	✓
Promotes Energy Conservation	No	2.5%	2.5%
Promotes Load Shifting	No	8%	3%
Considered Equitable (cost-basis)	No	✓	✓✓
Benefits Low Income Households	✓		✓✓
Net Metering	No	✓✓	✓
Electric Heat	No	✓	No
Addresses Electric Vehicle Charging	No	✓✓	✓

STAFF RECOMMENDATION

Staff proposes implementing the standard TOU rate as a default rate to all residential customers, including current tiered rates customers, demand rate customers, and net metering customers, with an effective date of January 1, 2018.

There are many considerations in proposing the standard TOU rate, which is ultimately considered a fair and equitable rate structure. The pilot study shows this rate provides a reduction in the probability that a customer's peak happens during the on peak hours, and also realized energy conservation over the current tiered rate structure. In general, a TOU rate structure is easy for customers to understand, as well as react to. A TOU rate also encourages

the use of electric vehicles and provides an incentive to charge during off peak hours, which is in line with the City's climate goals.

A TOU rate structure would negatively impact those customers who are on the Residential Demand rate. This rate structure is available only to customers in all electric housing and is intended to recognize the increased electric demand of such housing. It does not distinguish when that increased demand occurs. A TOU rate structure could encourage energy efficiency improvements by providing a price signal that recognizes when heating is primarily done.

Both TOU rates better align with the marginal cost of electricity than the current tiered rate structure. Either TOU rate would reduce the compensation to net-metering customers for energy pushed back onto the distribution system in the off peak hours of the early afternoon. A TOU rate would encourage configuring solar arrays to generate more energy when the community needs it the most.

The study shows that adding the energy efficiency tier to the standard TOU rate structure does not statistically improve the energy conservation and load shifting objectives. Thus, staff is recommending the standard TOU rate structure without the additional tiered component.

NEXT STEPS

Staff will be presenting the results of the study at the Council Work Session on February 28th. Discussion from that meeting will determine future rate implementations. If Council supports implementing a TOU rate, staff would return to Council in March or April to ask for Council direction and approval (possibly in the form of a Resolution) in order to begin the public outreach process. The actual rate ordinance would be brought to Council in the fall, along with all other general rates and fees changes, normally in October or November. Again, staff would propose that the TOU rates take effect in January 2018 to allow for the proper outreach and education process to bring all residential customers up to speed on TOU rates ahead of deployment.

ATTACHMENTS

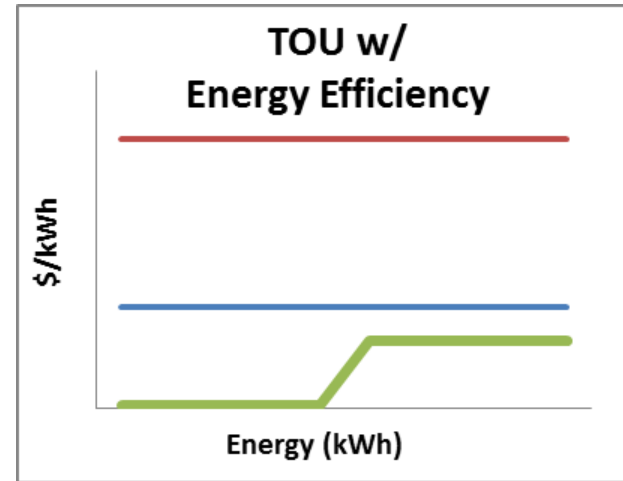
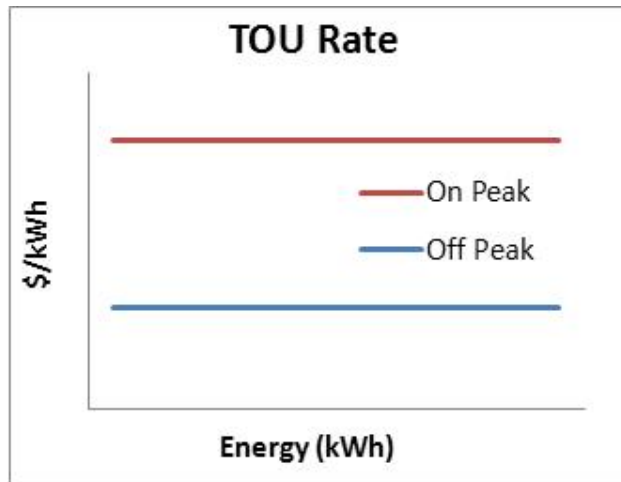
PowerPoint Presentation

Backup slides - Powerpoint

Residential Time of Use Pilot Rate Study

- July 2015 – 2nd Reading Ordinance No. 078, 2015
- August 2015 – customer notification & outreach
- September 2015 – open house
- November 2015 – pilot study started
- April 2016 – reminder of new summer season & rates
- October 2016 - pilot study ended – sent customer survey
- Nov/Dec 2016 – comparison of rates calculated and communicated to customers
- Dec 2016 – best bill guarantee credits on bills; statistical analysis performed

- Determine energy conservation impacts.
- Measure potential demand reductions.
- Gauge customer preference for different rate structures.
- Ensure revenue requirements are met.



Groups	Treatments				
	Study	Peak Information	Best Bill	TOU Peak Period	TOU Tier
Study Control	X				
Peak Information Control	X	X			
TOU Best Bill Control	X	X	X		
TOU w/Tier Best Bill Control	X	X	X		
TOU	X	X	X	X	
TOU w/Tier	X	X	X	X	X

- Opt-out study, 1200 customers randomly assigned to each group
- ~ 850 customers in each group after opt-outs and customer turnover
- Study design allows us to measure components of study and rates separately

Objective 1 : Energy Conservation

- Standard TOU rate showed a 2.5% reduction in energy consumption
- Adding a tier to TOU rate had no statistical impact on energy consumption
- Previous analysis did not show any effective conservation signal from the current tiered rate, likely because ~65% of energy sales are below cost of service (to offset higher tier charges)

Objective 2 : Demand Reductions

- Standard TOU rate showed an 8.5% reduction in the probability that a customer's daily peak occurs "on peak"
- TOU w/EE tier showed a 2.8% reduction in the probability that a customer's daily peak occurs "on peak"
- In the summer months, the TOU rate showed an 7.5% reduction in the coincident peak hour kW (adding the tier to TOU did not have a statistically significant impact to the coincident peak hour kW)

Objective 3: Customer Survey

October 2016 - Survey sent to all 7,000 participants, with roughly 1,450 responding (~20%)

Outcomes

- Only 25% of customers correctly identified their rate structure
- 51% of customers say they only seek out information about their consumption once per month when they receive their bill, while 47% of customers infrequently or never seek out information about their energy consumption
- 42% (highest response) of customers agree rates should balance equitable cost recovery with environmental concerns
- 38% of customers are conscious of their energy use, while another 31% had energy efficient bulbs and / or appliances, and another 8% of customers use electricity for the convenience, without concern for the cost.

Objective 4: Revenue Requirements

- Standard TOU
 - 37% of customers saved an average of \$77 for the year, or ~\$6 per month
 - Average credit was \$24 for the year
- TOU w/EE tier
 - 62% of customers saved an average of \$38 for the year, or ~\$3 per month
 - Average credit was \$20 for the year
 - RD (demand) customers were impacted more due to the tiered component and higher consumption (electric heat)

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Transition to a standard TOU rate for all residential customers, including residential demand and net metering customers, in January 2018

- Study shows the standard TOU rate realized a 2.5% reduction in energy consumption, as compared to the tiered rate
- Study shows the standard TOU rate provides an 8% reduction in the probability that a customer's peak happens during the on peak hours
- TOU rate helps to better align benefits of solar production with wholesale costs
- Easier rate structure for customers to understand and react to
- Encourages use of electric vehicles and charging during off-peak hours, which is in line with community climate goals
- TOU rate is considered a more "fair and equitable" rate structure

Summary of Rate Structure Impacts			
	Rate Structure		
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Considered Equitable (cost-basis)	No	✓	✓✓
Benefits Low Income Households	✓		✓✓
Net Metering	No	✓✓	✓
Electric Heat	No	✓	No
Addresses Electric Vehicle Charging	No	✓✓	✓

- February 28 - Council work session
- March / April 2017 - Council action (possibly a resolution)
- Summer 2017– begin outreach if direction is to implement TOU
- Fall 2017 – include TOU rates in 2018 rate ordinance updates
- January 2018 – potential TOU implementation

Direction Sought:

- Does Council support moving to a Time of Use rate structure?
- Does Council support doing so in January 2018?

THANK YOU!

