

Discussion Draft of Critical Peak Pricing Pilot Design

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MADRI
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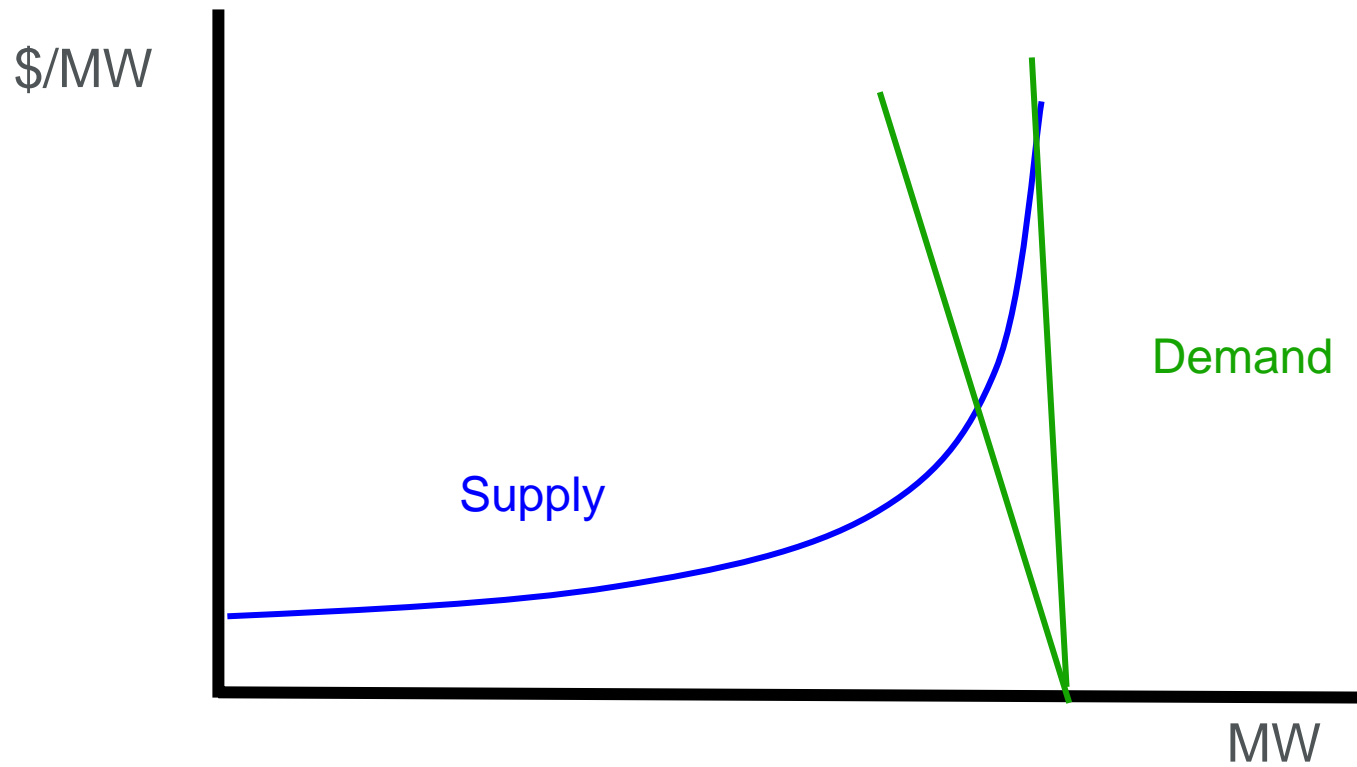
A Constellation Energy Company

BGE Presented Rationale for Smart Grid (AMI) and CPP Pilots to PSC in March 2007

Key Benefits of Smart Grid & CPP

- Smart Grid
 - Transform Service to BGE's Customers
 - Helps to Meet Resource Adequacy Needs
 - Enables CPP and other Demand Response Programs
- CPP and other DR programs
 - Reduce peak demand!
- MD PSC Approved AMI/CPP pilot on 4/13/07, conditioned on filing of detailed pilot design for AMI/CPP

Indicative Supply Curve



BGE's Smart Grid and CPP Pilot Objectives

Smart Grid Pilot Objectives:

Confirm delivery of customer benefits such as ensuring hourly meter reads are collected, and are accurate, outage alerts are received, voltage data is obtained, remote turn-on/turn-off is successful, and on-demand reads are accomplished

Validate choice and compatibility of Smart Grid 2-way communication technology in areas that offer a range of technical challenges and customer characteristics, including several meter types and environments, building density, topology, and overhead vs. underground distribution

Assess customer satisfaction with deployment processes

CPP Pilot Objectives:

Assess customer satisfaction with CPP program

Validate design of CPP program

Assess energy impacts and bill savings based on a statistical sample designed to be representative of the population of BGE's residential customers; compare usage and bills before and after the pilot is initiated using a control group and a treatment group

Validate and improve strategies for educating customers on ways to benefit from CPP

The CPP Rate: Revenue Neutral Rates

- The CPP pilot design will incorporate revenue neutral rates
 - Customers with typical usage patterns, who do not change their usage, will see little immediate change in their electric bills
 - Customers who shift usage from critical periods will save on their electric bills
 - In the longer run all customers will benefit from lower wholesale prices
- One illustrative example of a revenue neutral CPP design:
 - CPP rates apply during the summer months of June - September
 - **Critical peak period:** 2 to 7 pm limited to 12 critical weekdays, communicated in advance, which is less than 1% of the hours in a year
 - **Peak period:** 2 to 7 pm on non-critical weekdays, excluding holidays, less than 5% of the hours in a year
 - **Off peak period:** All other hours

CPP Rate Design: BGE costs are determined based on PJM short run capacity costs and load-weighted LMPs

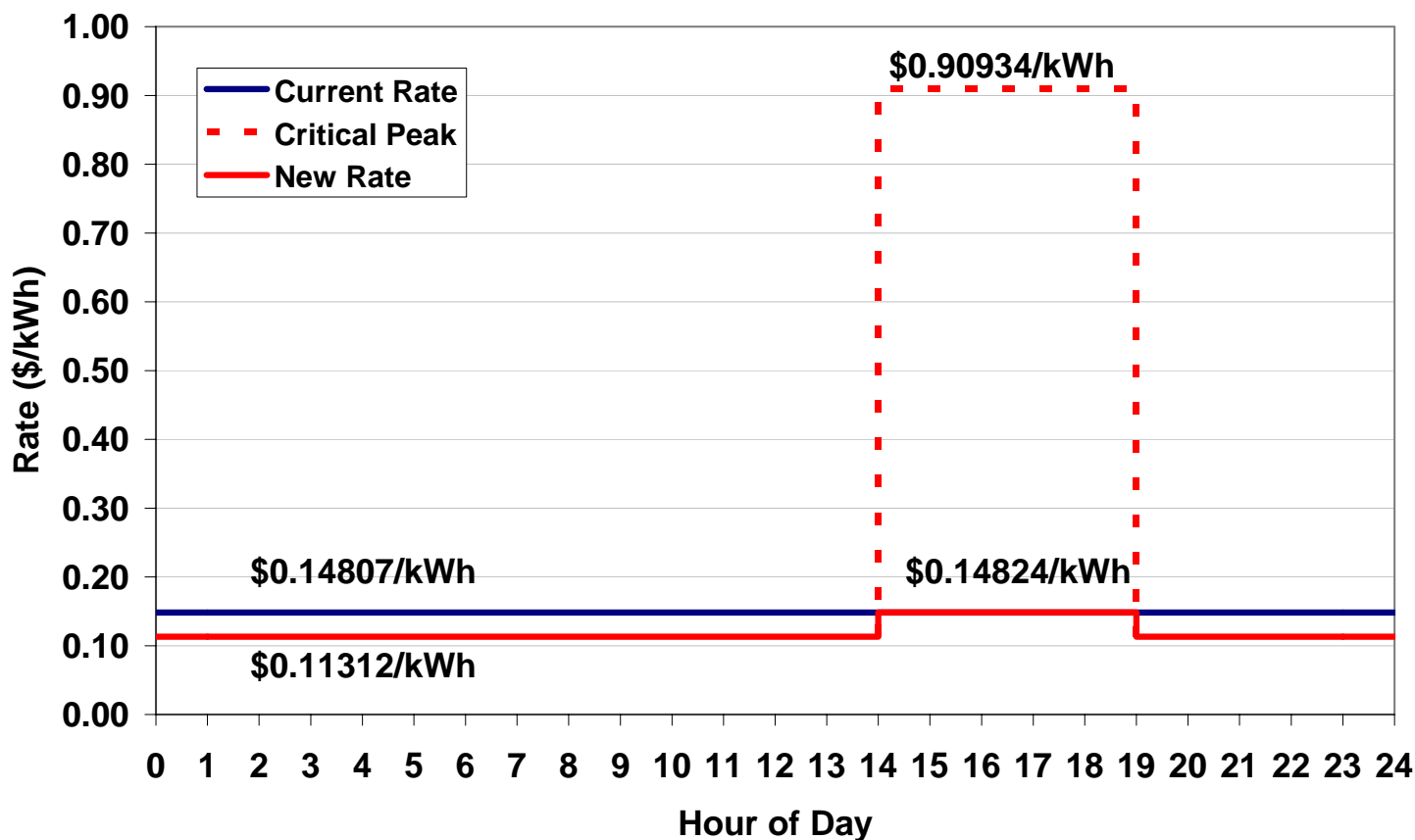
Illustrative Average Costs (\$/kWh)

	Load-Weighted Average Summer LMP (Jun-Sep)	Capacity Cost	Total Cost
Critical	0.29	0.38	0.67
Peak	0.09	0.00	0.09
Off-Peak	0.06	0.00	0.06

Note: The capacity cost above was developed prior to the recent PJM RPM capacity auction. It is converted from \$62/MW-Day to \$22.63/kW-yr, and then divided by 60 (the number of critical peak hours). The capacity costs will be updated to reflect the most recent RPM auction prices.

CPP Example: The “all-in” rate includes the distribution charge and the customer charge on a \$/kWh basis, results in an increase from the energy rate by about \$0.03/kWh

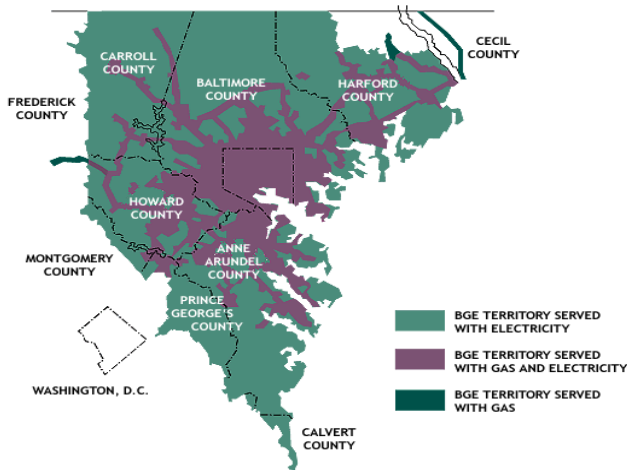
Current Residential Rate vs. Cost-Based CPP/TOU All-In Rate



The Components of a Valid Critical Peak Pricing Pilot: Experiments require variation and a basis for comparison

- Design experiment: Identify sample size and randomly assign customers to treatment and control groups
- Design revenue neutral CPP rates and introduce variation in rates
- Introduce one or more enabling technologies (e.g., smart thermostat)
- Determine appropriate communication options
- Conduct sound statistical analysis of program effects

General Proposal for CPP Pilot Design: Two Summers



**Summer 2007
Pre-treatment Data**

**Summer 2008
Treatment Data**

Test	Control
Pilot participants	Non-participants
Pilot participants	Non-participants

- Randomly select customers from BGE’s residential class R
- Based on Summer 2007 hourly load data, place customers into treatment and control groups
- Estimate energy impacts as the difference in usage between the two summers within the test group as compared to the control group

Potential Enabling Technologies

- Offer one of two enabling technologies. Give customers a choice between:
 - Switch
 - Smart thermostat
- Based on California statewide pricing pilot, enabling technology results in 100% increase in reduction in peak demand.

Possible Sample Design: 625 Metered “R” Class Customers Stratified by Usage and Treatment*

BGE Critical Peak Pricing Pilot: Sample Design

Track A: Load Research Sample: Standard approach (enrollment)						
Time	Sample Size	CPP Treatment Groups				Control Group
		Low CPP with ET	Low CPP without ET	High CPP with ET	High CPP without ET	Meter, No rate
Summer 2007 (meter only, no rate)	625	125	125	125	125	125
Summer 2008 (meter and rate)	625	125	125	125	125	125

Note: Each cell is stratified by usage group.

Notes:

ET = enabling technology (switch or programmable thermostat).

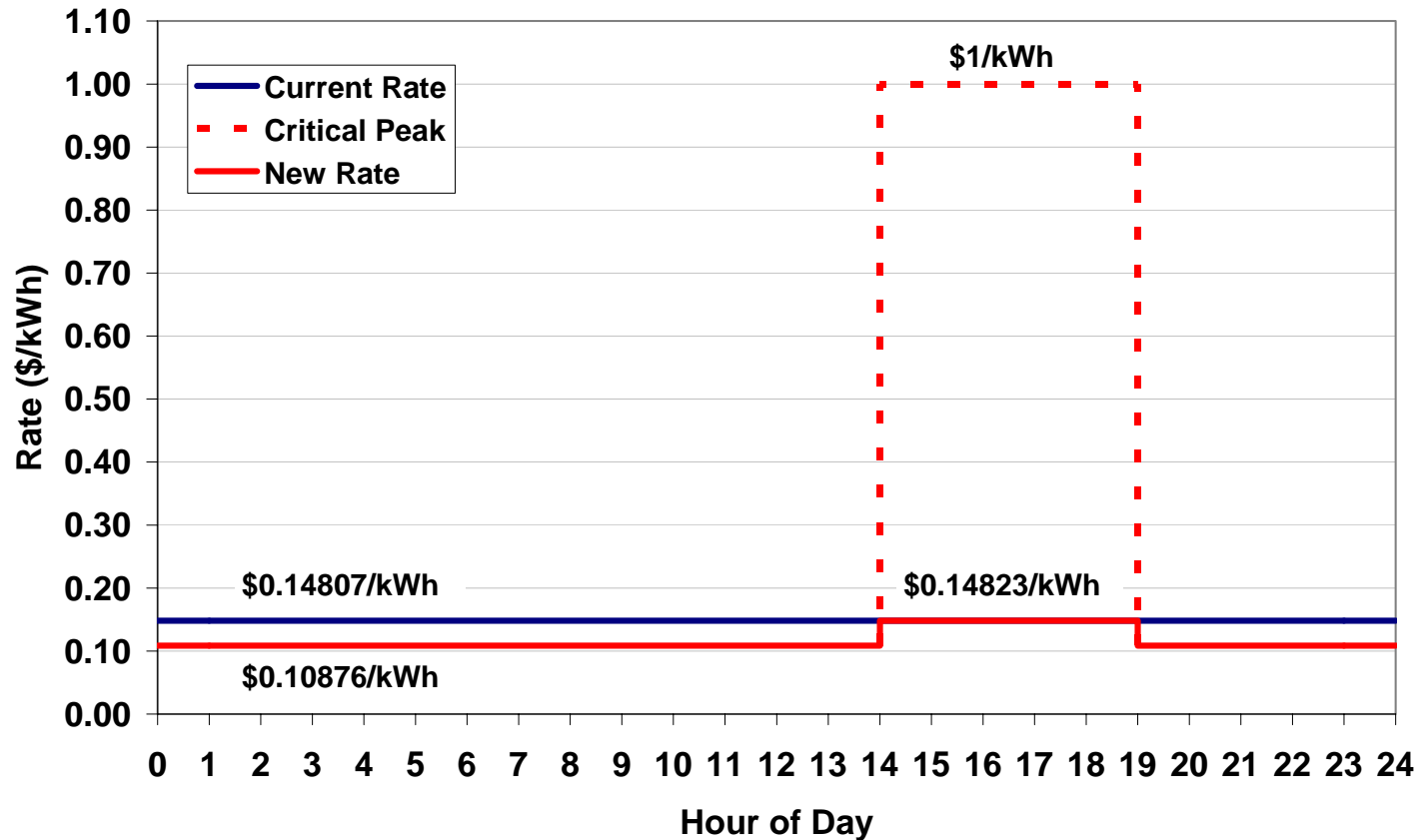
CPP = CPP with time of use rate

Load research sample = R and RH customers.

May supplement with the RL and RLH customers.

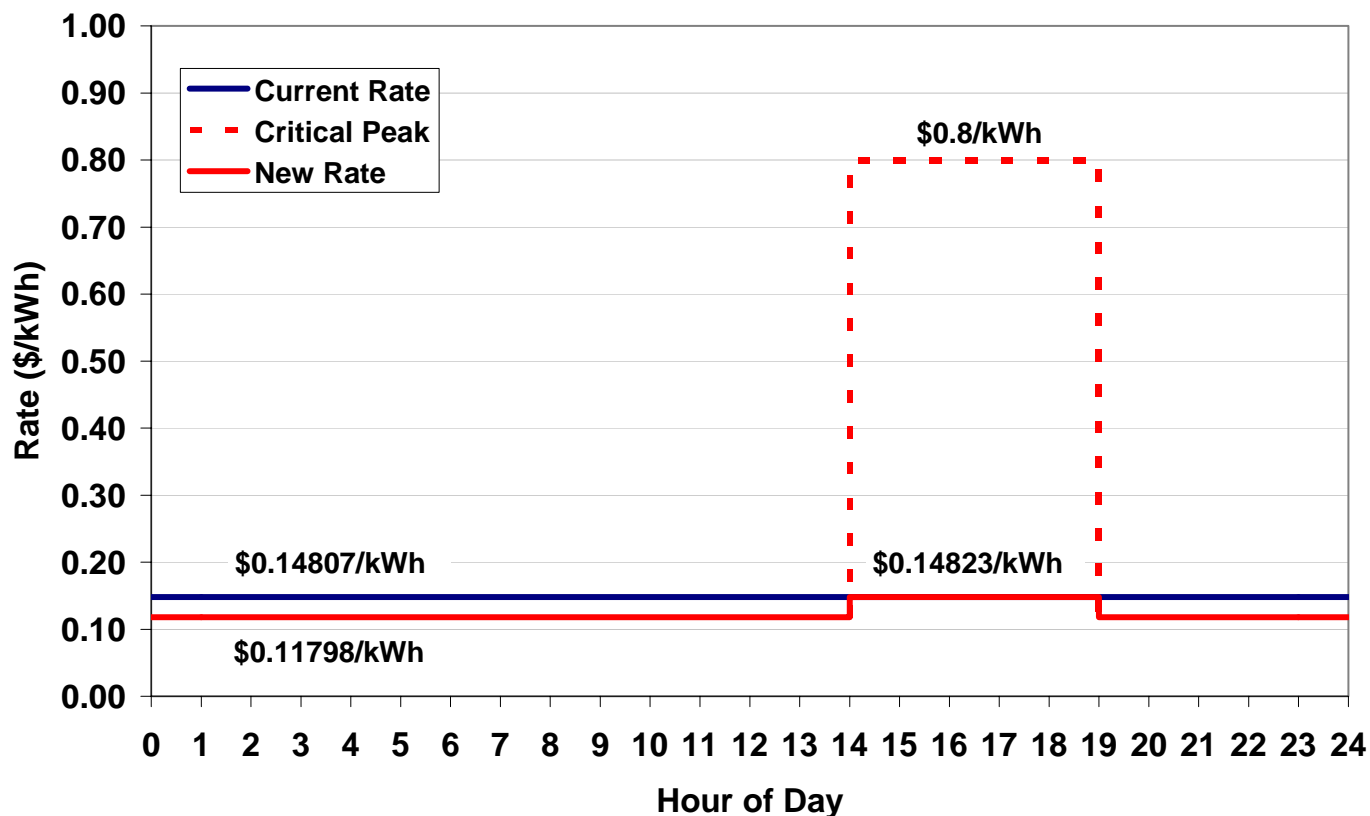
Potential High CPP Revenue Neutral Summer Rate: CPP is \$1 per kWh

"High" CPP/TOU All-In Rate vs. Current Rate



Potential Low CPP Revenue Neutral Summer Rate: CPP is \$0.80 per kWh

"Low" CPP/TOU All-In Rate vs. Current Rate



Conduct BGE Customer Focus Groups

- Test information package and presentation for different rate options
- Test rate options
- Test notification/communication options (internet, email, timing, etc.)
- Test enabling technologies
 - Manual vs. automated response
 - Switch vs. thermostat
- Pre-test customer survey instruments
 - post summer 2007 survey of customer characteristics
 - post summer 2008 survey of customer experience and response

Next steps for BGE CPP Pilot: Summary

- **Spring 2007:** Design the CPP Pilot
 - Develop sample design, draw sample, install interval meters on randomly selected residential accounts to obtain pre-treatment data
 - Test concept and communication of CPP using focus groups
 - Finalize recruitment material, survey and information package for pilot
- **Fall 2007:** Develop treatment and control groups
 - Compare load data from summer of 2007 to develop groups
 - Refine sample design, treatment options, information package
- **Prior to Summer 2008:** Recruit and educate CPP participants
- **Summer 2008:** Conduct CPP pilot
 - Collect hourly load data
 - Compare treatment vs. control groups prior to treatment (Summer 2007) and during treatment (Summer 2008)
- **Fall 2008:** Report findings from CPP Pilot to the Commission and file for approval of new CPP rate design

Analyze CPP Pilot Data

Post Summer 2007

- Compare customer characteristics, usage, and other factors.
- Assign customers to treatment and control groups

Post Summer 2008

- Compare treatment vs. control groups
- Estimate impact of CPP
- Report findings and file for approval of CPP rate design