Committee on Energy Resources and the Environment
Time for TOU?

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Considering TOU rates

1. Define goals up front
2. Evaluate all alternatives
   Will load profile change?
   Will that affect system cost drivers and customer cost allocation?
3. Understandable + actionable
4. Advance education + technology to respond
Commission Objectives

- Economic Efficiency
- Rate Reduction
- Consumer Protection
- Emissions Reduction
- Distributed Energy Resources (DER) Deployment
- Financially Viable Utility
Alternatives to Achieving Goals

Non-TVR Alternatives
- Volumetric variants, e.g. tiered rates
- Utility direct control load programs
- Performance-based incentives to encourage goals
- Increased efficiency spending

Time-varying Alternatives
- Classic time of use
- Peak-time rebates
- Critical peak pricing
- Technology enablers for Time-varying rates
Price Signal: Understandable and Actionable?

» Concept of “rush hour pricing” generally understood

» Two elements needed to allow customer action:
  > Price for each time period
  > Timing of each time period

» No significant penalties for occasional transgressions
Consumer Protections:

» Offer TOU as optional rate, targeting early adopters or specific loads (e.g. EVs).
» If default, ensure easy access to rate information and opt-out.
» Offer shadow billing and rate comparisons.
» Exclude vulnerable groups from default.
» Expand LMI efficiency programs, and include cost-effective energy management equipment.
Cost Causation

» Hourly costs vary throughout the day, week and year

» Reducing loads during high cost periods should reduce overall costs.
What Does Success Mean?

- Rates that reflect cost causation, are actionable, and minimize volatility
- Responding to TOU price signal yields
  - Flattened load curve, i.e. higher load factor
  - Better asset utilization
- Reduced capital spending over time => lower rates
- Emissions reductions
- Barriers to customer-driven DER removed

![Average Peak Reduction from Time-Varying Rate Pilots](image.png)

Source: Faruqui, Time-Varying and Dynamic Pricing, RAP, 2012
Thank You!

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Douglas Jester
Marcel Hawiger
Rick Gilliam
Appendix: Load profiles

[Only if needed]
Load Profile Example

Use caution when drawing conclusions about average, typical and actual load curves.

Xcel CO Class Load Curves
Average of Four Summer Peak Days

Residential Load Curve

System Peak Hour

Residential | C&I Secondary | C&I Primary
Hourly individual Residential Loads: Jun-Sep 2013

27-Jun

11-Jul

20-Aug

6-Sep

11/15/2017
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Selected Results from 2016 TOU Opt-In Pilot:

• SCE, PG&E and SDG&E put about 40,000 residential customers on a pilot TOU rate. About 17,000 control customers on standard inclining block rate
• Customers received $200 participation payment to mitigate self-selection bias.
• Each of the utilities tested 3 rates, with TOU period of around 4-9 pm
• Tested for 3 months in summer of 2016
### PG&E 2016 Pilot TOU Rates:

The rates do not include a baseline credit of 11.7 cents/kwh for each kwh below the baseline amount.

<table>
<thead>
<tr>
<th>Rate</th>
<th>Peak Period Time</th>
<th>Price</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4-9 pm</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>6-9 pm</td>
<td>44</td>
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<tr>
<td>3</td>
<td>4-9 pm</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3-6 pm</td>
<td>44</td>
<td></td>
</tr>
</tbody>
</table>

Partial peak period 4-6 pm
PG&E: Less than 10% of Customers Gain by Shifting from IBR to TOU
PG&E: Summer TOU Bill Impacts (Structural) in Hot Climate Zones Vary from $17 to $39 per Month
PG&E: Distribution of Summer TOU Bill Impacts

- $9 to $0: 0%
- $1 to $10: 22%
- $11 to $20: 40%
- $21 to $30: 33%
- $31 to $40: 4%
- $41 to $70: 0%

- Hot, CARE: 0%
- Hot, Senior: 22%
- Hot, Below 100%: 10%
- Hot, Non-CARE: 28%
- All: 28%

Lower bills. Livable planet.
PG&E: Impact of Load Shifting on Summer Bills Minimal

![Bar chart showing average monthly summer bills for different categories under different temperature conditions.](chart.png)

- **Senior**: No Change in Behavior or Tariff ($133.23), No Change in Behavior, Change in Tariff ($157.49), With Change in Behavior and Tariff ($153.94).
- **Below 100% FPG**: No Change in Behavior or Tariff ($103.69), No Change in Behavior, Change in Tariff ($122.15), With Change in Behavior and Tariff ($127.48).
- **100% - 200% FPG**: No Change in Behavior or Tariff ($119.80), No Change in Behavior, Change in Tariff ($140.42), With Change in Behavior and Tariff ($136.32).
- **CARE**: No Change in Behavior or Tariff ($91.16), No Change in Behavior, Change in Tariff ($108.46), With Change in Behavior and Tariff ($107.67).
- **Non-CARE**: No Change in Behavior or Tariff ($184.43), No Change in Behavior, Change in Tariff ($214.55), With Change in Behavior and Tariff ($208.68).
- **Moderate Temp**: CARE - No Change in Behavior or Tariff ($50.39), No Change in Behavior, Change in Tariff ($60.82), With Change in Behavior and Tariff ($58.67).
- **Cool Temp**: CARE - No Change in Behavior or Tariff ($93.25), No Change in Behavior, Change in Tariff ($110.46), With Change in Behavior and Tariff ($109.91).

* Indicates statistically significant result.
PG&E: Low Income Customers Reduce Peak Load Much Less Than Other Customers, but Seniors Similar to Others

<table>
<thead>
<tr>
<th>Rate/</th>
<th>Percentage of Peak Load Reduction</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>All Customers</td>
<td>non-CARE Hot Climate</td>
</tr>
<tr>
<td>PG&amp;E 1</td>
<td>5.8</td>
<td>8.7</td>
</tr>
<tr>
<td>PG&amp;E 2</td>
<td>6.1</td>
<td>9</td>
</tr>
<tr>
<td>PG&amp;E 3</td>
<td>5.5</td>
<td>9.5</td>
</tr>
</tbody>
</table>
SURVEY RESULTS: Low Income Customers Have Greater Economic Insecurity, but Seniors Do Not
SURVEY RESULTS: No Difference Between Treatment (TOU) And Control (IBR) Groups
CPUC Decision 17-09-036

• Order PG&E, SCE and SDG&E not to include CARE (Low Income) customers in hot climate zones from the 2017 default TOU pilot
• Will revisit whether to exclude those customers from default TOU to be implemented in 2019
• No exception for seniors
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