



RAP

Energy solutions
for a changing world

Utility Business Incentives are Important (but please also pay attention to rate design!)

ACEEE Conference on Energy Efficiency as a Resource

Presented by Richard Sedano

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Introducing RAP and Rich

- RAP is a non-profit organization providing technical and educational assistance to government officials on energy and environmental issues. RAP Principals all have extensive utility regulatory experience.
 - Richard Sedano directs RAP's US Program. He was commissioner of the Vermont Department of Public Service from 1991-2001 and is an engineer.

Topics for Today

- Rate Design and Decoupling
- Current Trends in Utility Business
Incentives from the states

Rate Design Partners with Decoupling

- Utility investment signals and customer price signals can and should support energy efficiency
 - “alignment”

“Modernize rates” – Guldner, APS,
Sept 26, 2011

Rate Design should be about price signals to consumers, not revenue adequacy

High vs. Low Customer Charges

| Rate Element | High Customer | Low Customer |
|--------------------------------------|---------------|--------------|
| Customer Charge | \$25.00 | \$5.00 |
| Usage Charge | \$0.10 | \$0.14 |
| Total Bill for 500 kWh average usage | \$75.00 | \$75.00 |

Which rate design better represents long run marginal costs?



How High Customer Charge Affects Payback on Efficiency Investments

Reduction of Monthly Customer Usage from 1,000 to 900 kWh Energy Efficiency Investment of \$200

| | Standard Tariff Fixed charge \$15.00 \$0.075/kWh | Straight Fixed Variable Tariff Fixed charge \$50.00 \$0.04/kWh |
|-----------------------|---|---|
| 1,000 kWh | Fixed charge \$15.00 <u>Volumetric charge \$75.00</u> Total \$90.00 | Fixed charge \$50.00 <u>Volumetric charge \$40.00</u> Total \$90.00 |
| 900 kWh | Fixed charge \$15.00 <u>Volumetric charge \$67.50</u> Total \$82.50 | Fixed charge \$50.00 <u>Volumetric charge \$36.00</u> Total \$86.00 |
| Savings | \$7.50/month (\$90/year) | \$4.00/month (\$48/year) |
| Payback period | 2.2 years | 4.2 years |

Adapted from Table 2, David Magnus Boonin, National Regulatory Research Institute, *A Rate Design to Encourage Energy Efficiency and Reduce Revenue Requirements*, July 2008.

Many Ways To Calculate “Cost of Service”

Categories of Studies

- Marginal Cost
- Embedded Cost

Approaches Within Each Category

- Production / Transmission
 - Peak Responsibility
 - Base – Intermediate – Peak
 - Peak Credit
- Distribution Costs
 - Minimum System
 - Basic Customer

All Of These Rates Are Based On The “Cost of Service”

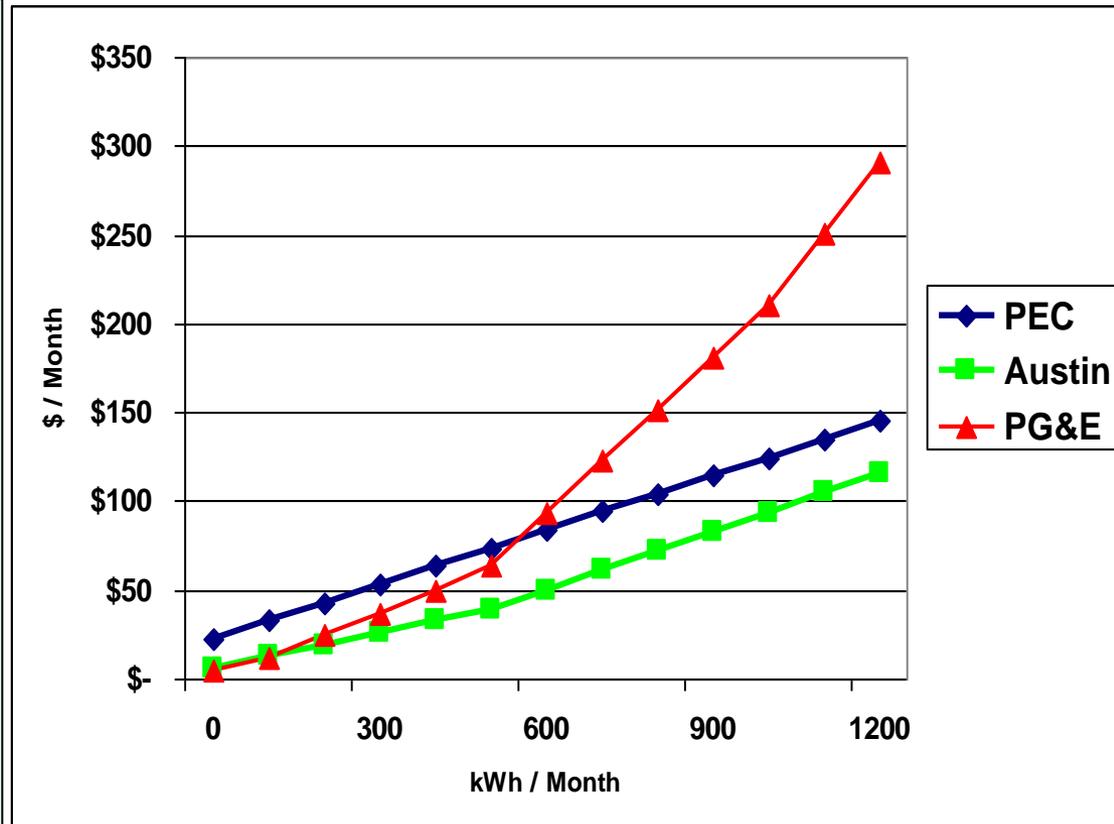
| Pedernales | | | |
|------------------------|--|----------------|-----------------|
| Customer Charge | | | \$ 22.50 |
| Energy Charge | | All kWh | \$ 0.102 |

| Austin | | | |
|------------------------|--|----------------------|-----------------|
| Customer Charge | | | \$ 6.00 |
| Winter | | First 500 kWh | \$ 0.067 |
| | | Over 500 kWh | \$ 0.091 |
| Summer | | First 500 kWh | \$ 0.067 |
| | | Over 500 kWh | \$ 0.109 |

| Pacific Gas and Electric | | | |
|---------------------------------|--|--------------------------|-----------------|
| Customer Charge | | Minimum \$5/month | |
| Energy Charge | | First 350 kWh | \$ 0.122 |
| | | Next 150 kWh | \$ 0.139 |
| | | Next 500 kWh | \$ 0.294 |
| | | Over 1,000 kWh | \$ 0.404 |

The Method Chosen Affects Customers and the Utility

- Recovering fixed costs in fixed charges stabilizes utility revenues, makes lenders comfortable, but puts a heavy burden on small users and discourages energy efficiency investments.
- Putting the bulk of cost recovery on incremental usage encourages conservation, but leaves the utility finances vulnerable to weather and other factors.
- Both are “cost of service.”



Some of the Basic Principles for Cost Analysis

- There are as many ways to calculate “cost of service” as there are analysts doing studies
- No method is “correct”
- Many regulators require multiple studies, and consider the results of multiple methods
- Some are based on engineering principles, some on economic principles

Synthesis

- Yes, it is important in regulation to follow principles
- But principles don't lead to a single answer
- Policy results you want can guide the answer
 - If you want a lot of energy efficiency, choose the principled rate design that helps the most
 - And now a few words about inclining blocks...

Different Residential Uses Have Different Load Shapes

- **Basic lights and appliances:** relatively even usage all year; **High** load factor.
- **Water heat / Water pumping:** Some usage all year; **Medium** load factor.
- **Space Heating and Cooling:** Sharply seasonal usage; very weather sensitive; very peak-oriented. **Low** load factor.

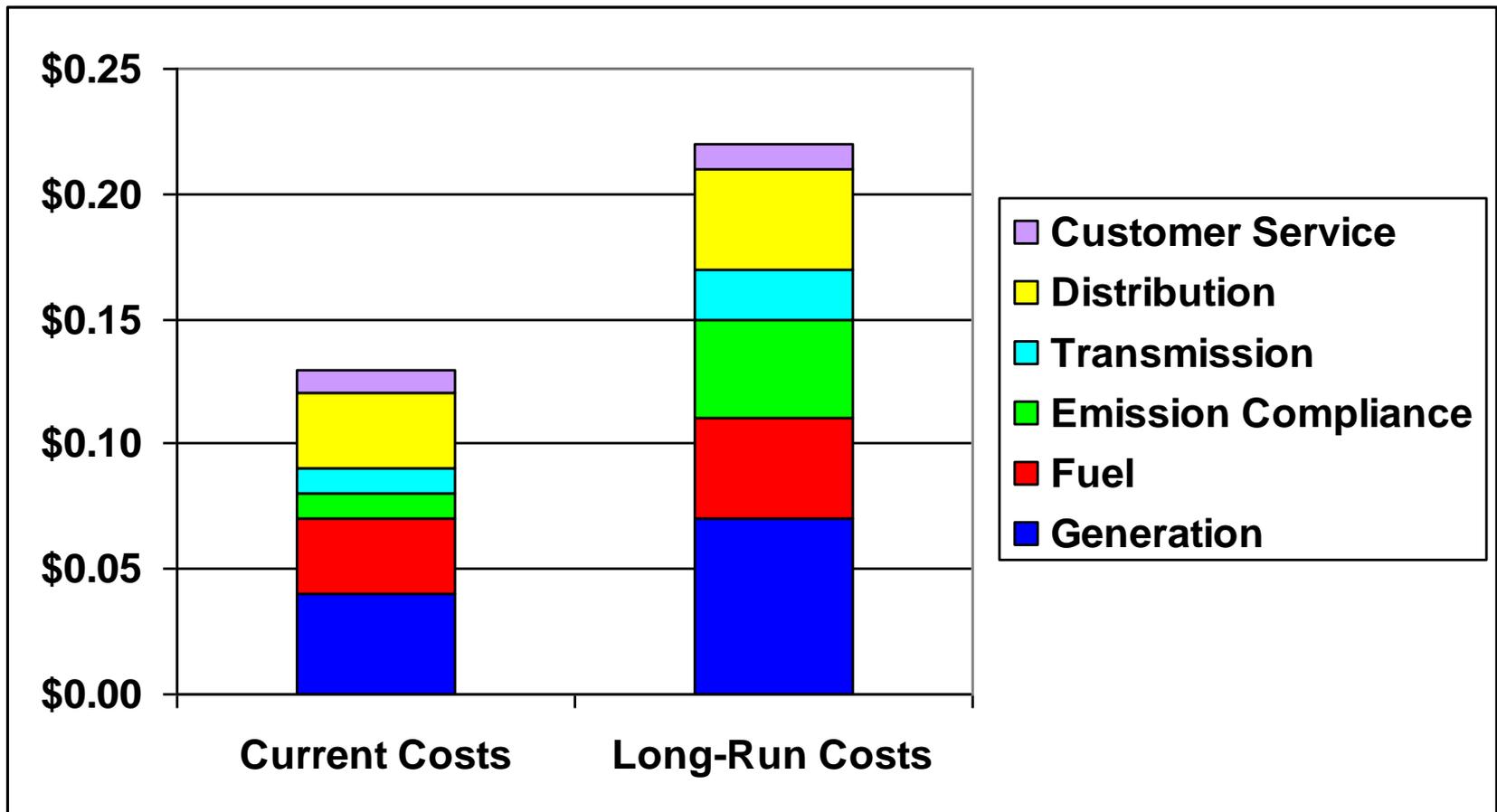
What if We Make a Residential Rate Out of Demand/Energy Costs?

| | | | | |
|--------------------|---------------------|-----------------|-------------------|--|
| Demand Cost | \$ 12.50 | | | |
| Energy Cost | \$ 0.03 | | | |
| | | | | |
| Usage | Lights / Appliances | Water Heat | Heating / Cooling | |
| kWh/Month | First 500 | Next 500 | Over 1,000 | |
| Load Factor | 70% | 40% | 20% | |
| | | | | |
| Demand Cost | \$ 0.025 | \$ 0.043 | \$ 0.087 | |
| Energy Cost | \$ 0.030 | \$ 0.030 | \$ 0.030 | |
| Total: | \$ 0.055 | \$ 0.073 | \$ 0.117 | |

When demand costs are assigned to energy blocks based on load factor, you get a rate design that looks a lot like that in Austin or San Francisco.

Very much “cost of service” rates.

A Forward-Looking Rate Design Prepares Customers For the Future

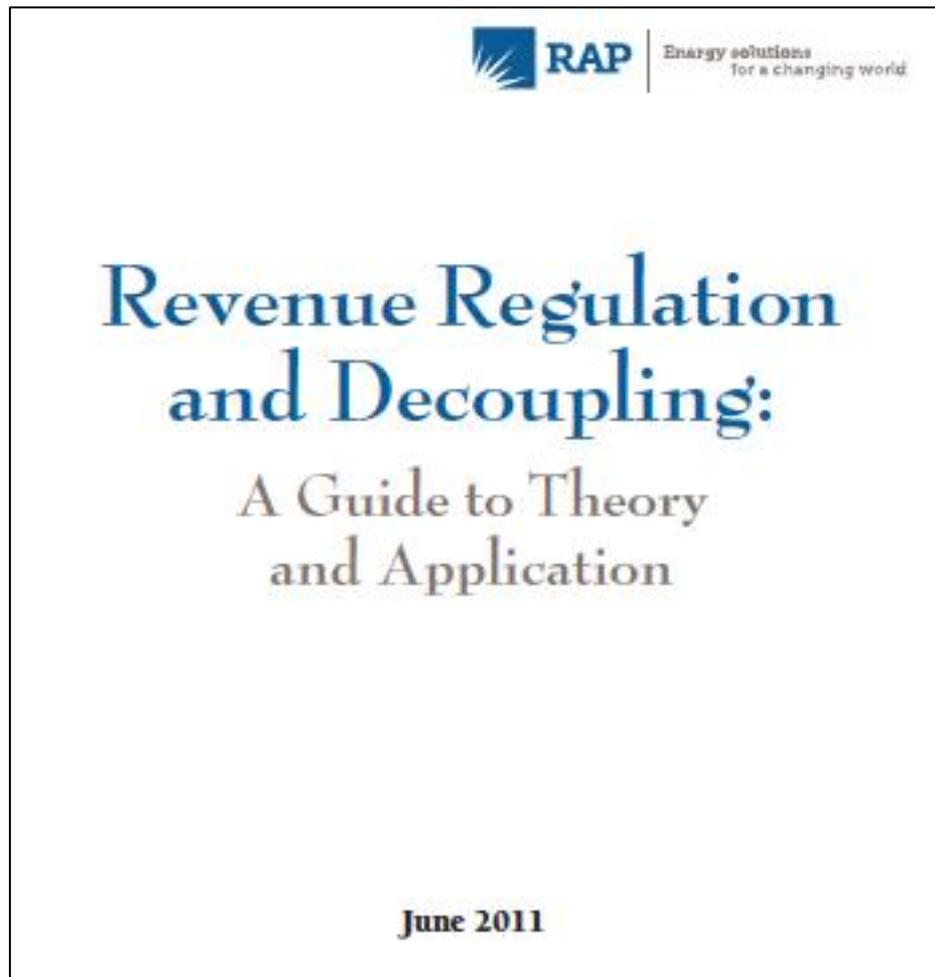


One Innovative Proposal Tucson Electric

- Inverted, seasonal residential rate design
- Annual decoupling adjustment
 - Decoupling credits applied to initial block
 - Decoupling surcharges applied to end blocks

| | Summer | Winter | |
|------------------------|-----------------|-----------------|--------------------------------------|
| Customer Charge | \$ 7.00 | \$ 7.00 | |
| First 500 kWh | \$ 0.080 | \$ 0.073 | Minus any decoupling credit |
| Next 2,500 kWh | \$ 0.102 | \$ 0.093 | Plus any decoupling surcharge |
| Over 3,000 kWh | \$ 0.120 | \$ 0.113 | Plus any decoupling surcharge |

Please see our new book



Decoupling is a method to assure utilities a reasonable opportunity to recover revenues found to be necessary to provide safe and reliable service, while leaving **rate design** to focus on optimal signals to energy consumers.

Nationwide Trends

- For context, let's look back
- A few states embraced connection between energy efficiency, rates and utility business incentives
 - Especially California
- Most did not, relying on regulatory discipline with a dash of performance incentives

What History Tells Us

- Institutions prefer not to mess with the traditional regulatory system
 - But after they do, “tinkering” may continue
- Lost revenue recovery systems do not work well
 - Decoupling works fine when done thoughtfully
- Revenue impacts on companies from energy efficiency were not that big
 - A principled problem was relatively small

2011 and Forward

- New states and utilities getting involved with energy efficiency
 - Utilities new to “big EE” say they need instant resolution of business model issues
 - More states responding, some not
- Savings target levels higher
 - Business, revenue impacts will be larger
- Risks associated with generation larger
 - Success from EE more important, apparent

Challenge: Manageable Regulation

- Recognize right trade-off between cost and precision
 - Attribution
 - Diminish need for (and litigation about) precision
 - Lost contributions to fixed costs
 - Shared savings
 - Expectations in an evidence-based process
- How to achieve regulatory stability?

More States Interested in Utility Business Model Options

- Tools from RAP, ACEEE, others
- LBNL Benefits Cost Calculator
 - A tool available to a small number of states at any given time
 - Useful for a collaborative to work through how to find balance among many options to resolve consumer and utility issues adapting to high levels energy efficiency
 - Requires active engagement from LBNL staff

LBNL Benefits Cost Calculator

- Outputs relate key results important to consumers and utilities
 - Rates
 - Cost of service
 - Utility earnings
- Allows a community to test adjusting rate design, method of cost recovery, method of throughput incentive solution, performance incentive design

About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raonline.org

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