Energy Efficiency and Utility Profits/Revenues

Energy Foundation Advocates Meeting
June 2, 2010
Richard Sedano
About the Regulatory Assistance Project

- 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 was commissioner of the Vermont Department of Public Service from 1991-2001 and is an engineer.

- Funded by foundations and the US Department Of Energy. We have worked in nearly every state and many nations.

- Also provides educational assistance to stakeholders, utilities, advocates.
Today’s Menu

➢ Why the utility business model is getting so much attention today
➢ A menu of solutions
➢ A quantitative study led by Lawrence Berkeley National Lab helps to understand the issues and challenges
➢ Lessons, ideas, closing thoughts
Utility of the Future

- **Service Focus**
- **Performance Oriented** (metrics)
- **Information Driven** (measure)
- **Carbon Metric**
  - Adds to value of energy efficiency
- **Continued opportunity to earn fair return**
- **Continued attention to reasonable rates**
How does the utility of the future address climate change?

- Embrace solutions
- Hold their noses
- Fight it
- Do whatever the regulators tell them to do
  - Who is most important: customer or regulator?

- Traditional Regulation seems ill-equipped to encourage the “embrace solutions”
Utility Motivation and the Throughput Incentive

- Regulatory Incentives
- Financial Incentives

What to do about the throughput incentive?
- Traditional regulation rewards utility for more sales and penalizes utility for less sales – this is the throughput incentive and discourages EE and DG, even if CEO is sympathetic
Regulatory Incentives for Energy Efficiency

- Cost Recovery Process is Fair and Timely
- Throughput incentive is eliminated or at least significantly reduced
- Financial incentives for performance are available
- Program reviews (pre- and post-) are efficient
Financial Disincentives:
A list of solutions

- Existing (strengthened) regulation
- Decoupling
- Shift costs to customer charge
- Return lost revenues/lost margins from energy efficiency program savings
- Add financial incentives
- Non-utility (3rd party) EE administration
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The Rate Case focus on Revenue Requirement

- Rev Reqmnt = (Exp + Return + Taxes)\_{Test \ yr}
- Price = Rev Reqmnt ÷ Units Sold\_{Test \ yr}
- Expenses:
  - Production
  - Non-production

<table>
<thead>
<tr>
<th>Traditional Regulation Example</th>
<th>Revenue Requirement Calculation</th>
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<tbody>
<tr>
<td>Expenses</td>
<td>100,000,000</td>
</tr>
<tr>
<td>Net Equity Investment</td>
<td>100,000,000</td>
</tr>
<tr>
<td>Allowed Rate of Return</td>
<td>10.00%</td>
</tr>
<tr>
<td>Allowed Return</td>
<td>$10,000,000</td>
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<tr>
<td>Taxes (35% tax rate)</td>
<td>$5,384,615</td>
</tr>
<tr>
<td>Total Return &amp; Taxes</td>
<td>$15,384,615</td>
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<tr>
<td>Total Revenue Requirement</td>
<td>$115,384,615</td>
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<table>
<thead>
<tr>
<th>Price Calculation</th>
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<tr>
<td>Revenue Requirement</td>
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<tr>
<td>Test Year Sales (kWh)</td>
</tr>
<tr>
<td>Rate Case Price ($/kWh)</td>
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Traditional Regulation is about Compliance

- Utilities will comply with requirements
  - Or else… (no upside, just downside)

- How will regulators measure compliance?
  - Are “all-cost effective EE” and “compliance” mutually consistent terms?

- Performance regulation can overlay traditional regulation and can help promote public interest outcomes
Existing Regulation

- Regulators apply performance expectations and reviews with explicit penalties if compliance or performance is lacking.
- Rate cases might get more frequent if energy efficiency ramps up to high levels, approximating what decoupling would do
  - A rate case just to account for sales reductions without significant expense changes?
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Decoupling: Sales no longer matter

- Focus on fixed costs from the last rate case
- Reconcile rates periodically to recover those costs, perhaps adjusted by a formula that captures major changes over time
- Enhancements can bound rate change size and resulting earnings
- Can successfully make utility indifferent to sales
What happens when consumption goes below rate case expectations?
**Key Decoupling Formulas: Post Rate Case**

- **Price**<sub>Post Rate Case</sub> = \( \frac{\text{Rev}_{\text{Allowed}}}{\text{Units Sold}_{\text{Actual}}} \)

- **Revenues**<sub>Actual</sub> = \( \text{Revenues} \)

- **Profits**<sub>Actual</sub> = \( \text{Revenues} - \text{Expenses} - \text{Taxes} \)

### Decoupling Example

<table>
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<tr>
<td>Actual Sales (kWh)</td>
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<tr>
<td>Decoupling Price ($/kWh)</td>
</tr>
<tr>
<td>Decoupling Adjustment ($/kWh)</td>
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</table>
Decoupling issues

- How rates change (approx. future rate cases)
  - Revenue per customer is one way
- Full, partial, limited decoupling
  - All effects on sales
  - Just sales effects from EE programs
  - Eliminate only part of the throughput incentive
- Reflecting risk changes
- Include power, Connection to Fuel clause
Risk Changes

- Customers pretty much pay for everything
- Decoupling should reduce the risk of the firm
  - And thus reduce what consumers pay in the long run
  - Risk reduction may not be recognized by financial markets right away, eventually will be
  - Risk shifting (zero sum game) is not the idea
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Shift Revenue to Customer Charge, reduce volume rate

- Customer charge might go from $3-$10/mo. to $30 in order to make utility indifferent to sales, with reduction in volume charge
  - Low use customer see an increase
  - Energy efficiency less beneficial to customer

- Known as “Straight-Fixed-Variable” (SFV)
SFV Rate Design
for 500 kWh/month customer

A. $5/month + $0.10/kWh = $55/month
   - $5.00 is approximately equal to per-customer metering and billing costs.
   - $.10 recovers the balance of the embedded revenue requirement, and is approximately equal to total system long-run incremental cost (TSLRIC) for power, transmission, delivery, and carbon.

B. $30/month + $0.050/kWh = $55/month
   - $30 is approximately equal to the so-called "fixed" costs.
   - $.05 is approximately equal to short-run marginal cost for power and line losses, with no assumed variable cost for transmission or delivery, and no monetized price for carbon.

Let's call the second an SFV rate. The consumer will consume power based on Short Run Marginal Cost of $.05. Assuming a very conservative arc elasticity of 0.1, increasing the price from $.05 to $.10 (100% increase) would produce a 10% decrease in the usage. That decrease is what we give up with SFV.
Why Some Like SFV

- Effective solution for utility revenue concern
- Easy to administer
- Rates don’t change outside a rate case

Why Some Oppose SFV

- Reduces value of EE to consumers (reduces EE)
- Reduces volumetric charge below long run margin, so not really economically efficient
- Transition hurts low volume users the most
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Lost Revenue Adjustment

- Returns to utility net margin that would have accrued without energy efficiency

- Utility still has incentive to build load and to avoid sales reductions not directly due to its programs
  - Focus only on programmatic savings, not total savings

- History of tough regulatory process to calculate
Trends

- Lost revenue adjustment was a preferred solution in early days of energy efficiency
- Its limitations caused it to nearly disappear 10-15 years ago
- States are considering it again
  - Because many with experience are gone?
- Utilities want a solution to their “revenue to cover fixed cost” problem
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Financial Incentives

- In addition to or instead of reducing throughput incentive, regulators can apply an opposite force, putting a reward on the administrator achieving a certain level of spending, savings, or other metric
  - Puts energy efficiency in comparison with other assets to contribute to utility profits
  - Can be an acceptable substitute for decoupling in some circumstances
Proper Basis for Financial Incentives

- Performance
- Not spending, no bonus for just showing up
- Performance for what? For what matters!
  - “Stretch” performance
  - Overall portfolio savings (energy, capacity)
  - Sub-categories too (keyed to public interest)
    - Impact effects by customer class or program
    - Market effects
    - Process achievements, milestones too
Why Financial Incentives for Energy Efficiency?

➢ To create behavior and performance from the utility beyond what would be expected from pure regulatory compliance
  – How do you measure innovation, inspiration?
    • Wrong question
  – Align, Harmonize regulatory incentives

➢ Why? Because EE is equivalent or superior to other resources
Energy Efficiency as a Resource Equivalent to Others

➢ Does that mean EE has be an investment?
   – Or are the important aspects the opportunity to earn, and perhaps secondarily, the magnitude of the bottom line effect?

➢ G&T investments earn a return, but…
   – Purchased Power earns nothing but thanks and exposes the utility to prudence risk
   – Logic is different with munis and coops
Energy Efficiency Superior to Other Resources

➢ How will utility management be motivated to allocate resources, financial and human, to truly maximize cost effective EE?
  – Emphasis from the CEO (support from CFO)
    • Supported by regulation
  – Organize all departments around EE
  – Reward employees for EE success
  – Service, not throughput, is prime directive

➢ Comprehensive culture shifts (are hard)
Check on Magnitude of Financial Incentive

- Can a third party accomplish sustained equivalent or superior results at less cost?
  - Possible reason for EE returns to be less than generation returns

- State has an option to switch if utility demand for incentive is too big
  - If state is ultimately unwilling to switch, result may need to be greater financial incentives owing to utility leverage
Financial Incentives for Energy Efficiency: Methods

- Return on Equity Bonus (NV)
- Performance Bonus (RI)
- Shared Saving (CA)
- Shared Avoided Cost (Duke)
Key Choices

- How much money is available?
  - Capped? % of program budget? % of COS?
  - Compared to alternative earning opportunity?

- How money is earned
  - Performance

- Mechanism
  - Ease of administration
  - Incentives to promote sales reductions (EE, DG)
If you do financial incentives

- You want them to matter
  - To utility management – motivate CEO
  - To Wall Street and analysts
  - To Earnings per Share
  - To employees
  - To program performance, and thus customers
Measuring Implications

- Pressure on EM&V to show performance indicator results
  - Performance thresholds are reached or not
  - Shared savings rewards every unit

- Bottom line cost to ratepayers is a key consideration, so choice among methods should be comparable this way
  - Caps are typical, regardless of method
  - Incentives included in B/C calcs as appropriate
Performance Bonus (MA)

- Performance targets for energy efficiency programs
- Incentive rewards the utility with a percentage of total program costs for meeting targets—essentially a “bonus” on top of cost recovery.
- Targets can focus on overall results and on performance of a sampling of programs with a reward attached to each target, or can be associated with achievements associated with the public interest.
Cost Capitalization (NV)

- Utility “capitalizes” energy efficiency program costs—similar to investments in supply-side assets
  - The energy efficiency investment may be amortized over the average lifetime of the energy efficiency measures
  - Or over a shorter period to balance other financial concerns

- Utility earns a return on the un-depreciated energy efficiency regulatory asset, a modest incentive

- A bonus to its authorized return on equity can create a more substantial incentive comparable with other methods
Shared Savings (CA 06-08)

- Utility retains a percentage of the “Net Resource Benefits” achieved by the total energy efficiency portfolio.
- Incentive levels tied to achievement of energy savings goals or specified level of net benefits.
- Net Resource Benefits are typically defined as avoided costs of energy, capacity, transmission & distribution and environmental benefits where allowed.
Earnings capped at $450 million.

Reward (% of PEB)

Penalty (per unit below CPUC goal)

5c/kWh, $25/kW, 45c/therm below goals, or payback of negative net benefits (cost-effectiveness guarantee), whichever is greater.

Earnings = ER x PEB

PEB = Performance Earnings Basis
ER = Earnings Rate (or Shared-Savings Rate)
<table>
<thead>
<tr>
<th>Verified Savings % of Goals</th>
<th>Total Verified Net Benefits</th>
<th>Shareholder Earnings</th>
<th>Ratepayers' Savings</th>
</tr>
</thead>
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<tr>
<td>125%</td>
<td>$3,919</td>
<td>$450 cap</td>
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<tr>
<td>120%</td>
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<td>55%</td>
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<td>50%</td>
<td>$228</td>
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<td>$467</td>
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<td>45%</td>
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<td>($276)</td>
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<tr>
<td>40%</td>
<td>($264)</td>
<td>($378)</td>
<td>$114</td>
</tr>
<tr>
<td>35%</td>
<td>($510)</td>
<td>($450) cap</td>
<td>($60)</td>
</tr>
</tbody>
</table>
Avoided Cost

- Energy efficiency savings valued at a set percentage of avoided generation costs
- This approach covers program costs, any net lost revenue, and traditional incentive payment.
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Non-utility (3\textsuperscript{rd} Party) Administration

- If utility throughput incentive is irreconcilable, or for other reasons, government can assign energy efficiency task to someone else
  - As in OR, VT and HI, a 3\textsuperscript{rd} party
  - NY, ME, WI have state govt responsible
  - CT and MA have a public-private board making management decisions
An objective of any state government is to offer consistent policy to the public.

Finding the right balance of these regulatory reforms will promote strategies consistent with the overall objective of supporting energy efficiency.
“The Commission has stated it views energy efficiency as an energy resource. The Commission has an obligation to steer utilities toward resources, whether demand side or supply side, in a manner that results in just and reasonable prices. And because the Commission is in the energy regulation business, the Commission views energy efficiency as a means to an end — energy at a low cost to consumers within the context of a balanced energy resource portfolio -- not an end in itself that must be rewarded.”
“… PGE does have the ability to influence individual customers through direct contacts and referrals to the ETO. PGE is also able to affect usage in other ways, including how aggressively it pursues distributed generation and on-site solar installations; whether its supports improvements to building codes; or whether it provides timely, useful information to customers on energy efficiency programs. We expect energy efficiency and on-site power generation will have an increasing role in meeting energy needs, underscoring the need for appropriate incentives for PGE.”
Leadership

- Many imminent changes to power sector
- Energy efficiency will be more valuable than ever
- Yet supply-orientation remains powerful in utility and government cultures
- Leadership will be needed to nurture changes
My Preferences

- Decoupling to remove reasons for utility to fight energy efficiency
- Financial incentives to give utility reasons to promote energy efficiency
- Third party administrator if
  - There is reason to doubt utility capability to ever overcome aversion to energy efficiency
  - There is reason to doubt utility will champion EE
My Preference: Decoupling

- Decoupling directly addresses the throughput incentive, applied not just to savings from energy efficiency programs, but to savings from all sources.

- Respects imperative to cover fixed costs as found in most recent rate case with revenue.
  - Respects most recent rate case.

- Rate design preserved (no SFV)
My Preference: Decoupling

- Rate reconciliation can be ministerial and will tend to be small, smaller than fuel clause adjustments (and can be applied in current time, monthly)
- Fewer Rate Cases may be needed
- Works compatibly with financial performance incentives and with 3rd party
- Reduces business risk, which reduces costs that customers pay (not a zero sum game)
My Preference: Decoupling

- Rationalizes incentives so regulation is not as much about correcting past wrongs, utility more interested in customer value

- Decoupling can be simple or complex, but complexities only serve to more precisely strike a balance between the utility interest and the public interest

- Legislature in some states does direct consideration of decoupling
Paradigm Shifts Are Here

- Every state can choose a strategy
  - Based on its priorities
  - Energy efficiency a compelling resource and does not “just happen”

- Statutes should be reviewed to see if they are unnecessarily and unproductively precluding or narrowing useful options
Financial Analysis of Incentive Mechanisms to Promote Energy Efficiency: Case Study of a Prototypical Southwest Utility

- Peter Cappers, Charles Goldman (LBNL)
- Michele Chait (E3)
- George Edgar (WECC)
- Jeff Schlegel
- Wayne Shirley (RAP)

Published March 2009 by LBNL Environmental Energy Technologies Division LBNL-1598E Funded by U.S. DOE
Attention to balance Customer and Company

- Whether and if so how to share the estimated net resource benefits from energy efficiency between customers and utility

- Key model outputs
  - Retail rates
  - Total cost (average bills)
  - Shareholder earnings
  - Return on equity
Some Report Findings

- Application of full RPC decoupling entirely removes short term disincentive from reduced sales between rate cases, but does not improve earnings opportunities.

- Shared benefit incentive, as modeled, increases utility earnings compared with no EE case.
  - Any method could if you make them rich enough.
Some More Report Findings

- Energy Efficiency more likely to be a “profit center” for utility if decoupling and performance incentive are combined
  - ROE increases compared with BAU case

- Earnings increase in Aggressive EE case
  - More financial benefits to share with utility

- Incentives tied to benefits have more variable effect on cost of EE
LBNL Model References

- http://eande.lbl.gov/EA/EMP/ee-pubs.html
Sharing benefits of energy efficiency

- Overall balance between consumer and shareholder is an important “front page” test
- More sharing to shareholder may be appropriate at higher levels of savings to address deeper hit to earnings
- More sharing may also be more justifiable after some period of sustained performance
Targeted Design for Shareholder Incentive Mechanisms

- Illustrative example: PUC decides EE shareholder incentive mechanism should provide “fair share of benefits” to ratepayers and opportunity for a significant reward to utility for superior performance:
  - Ratepayers retain 80% of net resource benefits
  - Utility shareholders have opportunity to see after-tax ROE increase by at most 20 basis points

- Approach provides implicit determination by a PUC of “how much is enough”:
  - To motivate utility managers to achieve superior performance
  - To gain support of customer and other stakeholder groups for utility EE business model by putting upper bounds on financial and rate impacts
Designing an incentive plan: Study finds…

➢ Savings pie has to be big enough to divide to get a meaningful earnings bump,
  – Moderate EE is not enough
  – Enough savings in Significant and Aggressive cases
Key Issue

- Public interest concerns will bound what is realistic to pay for incentives
  - Limits on earnings (front page test) will bound incentive levels
  - 3rd party test – if utility demand excessive incentives, 3rd party administration is always available alternative
    - Decoupling appropriate even with 3rd party or mandated resource standard to motivate cooperation
Last Words

- Success will balance distinct interests in pursuit of public interest
- Incentives are best if they reward (defined) superior performance
- Earnings potential may grow if savings targets and public benefit also grow
RAP, other References

Thanks for your attention

- rsedano@raponline.org
- http://www.raponline.org
- RAP Mission: *RAP is committed to fostering regulatory policies for the electric industry that encourage economic efficiency, protect environmental quality, assure system reliability, and allocate system benefits fairly to all customers.*