Performance-Based Regulation (PBR): An Overview

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Introduction

The Regulatory Assistance Project is a global, non-profit team of veteran regulators advising current regulators on energy sector issues. (www.raponline.org)

- Foundation-funded; some contracts
- Non-advocacy; no interventions

John Shenot joined RAP in 2011 after serving three years as policy advisor to the Public Service Commission of Wisconsin and 15 years with the Wisconsin Department of Natural Resources as an air pollution regulator and electric utility specialist.
1 Brief Review of Cost-of-Service/Rate-of-Return Regulation
Major Steps in a Rate Case

1. Determine revenue requirement through cost of service study
2. Allocate costs among defined customer classes
3. Design retail rates for each customer class to recover their allocated portion of the revenue requirement
Determine revenue requirement

- Net rate base (Plant in service – depreciation reserve)
- Rate of return
- Depreciation expense (Plant in service x depreciation rate)
- Operating expense (Fuel + purchased power + labor + labor overheads + supplies + services + income taxes)
- Other taxes

= $ millions

Allocate costs among customer classes

Design retail rates

- Residential: Dollars per month, Cents per kWh peak, Cents per kWh off-peak
- Commercial: Dollars per month, Cents per kWh peak, Cents per kWh off-peak
- Industrial: Dollars per month, Cents per kWh peak, Cents per kWh off-peak
- Street lighting: Dollars per kW monthly, Dollars per light per month
Utilities File Rate Cases When They Aren’t Recovering their Costs of Service through Current Rates

- Actual costs of service > assumed
  - Higher than expected operating costs
  - Need for large capital expenditures
- Billing determinants < assumed
  - i.e., # customers, kW, kWh
Key Ratemaking Concepts

- Rate Base
- Authorized Rate of Return
- Test Year
- Regulatory Lag

Determine revenue requirement

Net rate base
(Plant in service - depreciation reserve)

Rate of return

Depreciation expense
(Plant in service x depreciation rate)

Operating expense
(Fuel + purchased power + labor + labor overheads + supplies + services + income taxes)

Other taxes
Why Might We Want to Consider Changes?
Power Sector Transformation

## CAPEX Bias

### Hypothetical Grid Need:
Projected capacity shortfall of 10 MW

<table>
<thead>
<tr>
<th>Possible Solution</th>
<th>Included in Rate Base?</th>
<th>Potential for Shareholder Profit?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility-owned generation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Utility-owned storage</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Market purchase</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Customer-owned generation</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Demand response program</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Energy Efficiency</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>
Throughput Incentive

Actual Revenues < Costs of Service

if

Actual Sales (kW and kWh) < Assumed Sales in Rate Case
# Impact on Profit is Amplified

<table>
<thead>
<tr>
<th>% Change in Sales</th>
<th>Revenue Change</th>
<th>Impact on Earnings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-tax</td>
<td>After-tax</td>
</tr>
<tr>
<td>5.00%</td>
<td>$9,047,538</td>
<td>$5,880,900</td>
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<tr>
<td>4.00%</td>
<td>$7,238,031</td>
<td>$4,704,720</td>
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<td><strong>$1,809,508</strong></td>
<td><strong>$1,176,180</strong></td>
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<tr>
<td>0.00%</td>
<td>$0</td>
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</tr>
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So, What’s the Problem with the Throughput Incentive?

- Discourages end use energy efficiency
- Discourages demand response
- Discourages customer-owned resources
- Distracts from a focus on service, policy goals
We’re Sending Mixed Messages

WE ARE OPEN

OFFICIAL OPENING WILL BE VERY SOON
3 Alternatives to Traditional Utility Regulation
Use a Future Test Year for Rate Cases

- Revenue requirement is based on *anticipated* cost of service in a future year (normally the year rates take effect)
- Rates designed based on *anticipated* billing determinants (# customers, kW, kWh)
States Using Future Test Year
Some Pros & Cons of Using a Future Test Year

**Pros**
- Addresses regulatory lag and better reflects current conditions
- Less operating risk for utility

**Cons**
- Adds complexity and cost to rate case
- Information asymmetry tends to benefit utility
- Creates incentive to over-costs and under-estimate sales
Use Performance-Based Regulation (PBR)

- A regulatory framework that connects achievement of specified objectives to utility financial performance and compensation
- A PBR plan can include a collection of performance incentive mechanisms (PIMs), namely, metrics and formulas that determine financial rewards or penalties (i.e., adjustments to allowed revenues)
PBR May Help Overcome Bad Outcomes

- Good things that are not profitable for the utility that don’t get done (Non-wires Solutions, aggregated DERs)
- Bad things that are profitable to the utility that should be prevented (Gold-plating physical assets)
- Bad incentives not easily seen (Deferring expenses like tree trimming, customer care, underserved communities)
State Investigations of PBR

- **Early Exploration**: Initial inquiries often marked by a report examining PBR options
- **Initial Stakeholder Engagement**: Soliciting comments and/or conducting workshops assessing PBR options
- **Advanced Stakeholder Engagement**: Soliciting comments and/or conducting workshops in discussing specifics of PBR options
- **Implementation**: Decisions have been made or are close to being made to deploy PBR options
- **Conclusion of Inquiry**: Decisions have been made not to consider the PBR framework

Source: EnerNex and Wood Mackenzie Power & Renewables; Tracking of the proceedings available on the EnerNex Platform
4 Designing Performance-Based Metrics
Set Guiding Goals

Examples:

• Make/keep energy affordable for customers
• Improve distribution system reliability
Understand Current Incentives
Develop Measurable Criteria

Examples:
- Declining customer bills
- Reduced customer outages
Create Metrics

Examples:
• Average monthly bills for residential customers
• Frequency & duration of customer outages (SAIDI/SAIFI/CAIDI/MAIFI)
Establish Performance Targets

Example:
• 2% reduction in average monthly residential bills
• 5% improvement in SAIFI from baseline value
Performance Tracking Options

**Public Metrics Only**
- Metrics are publicized on a publically available "dashboard."

**Public Metrics with Ranking**
- Metrics are publicized and ranked
- Examples: Denmark DSO efficiency ranking, RIIO

**Public Metrics with Financial Incentives**
- Metrics are publically available, and utilities receive financial awards or penalties depending on achievement of the metrics.
- Examples: NY REV
5 Designing Performance-Based Incentives
Performance Incentive Mechanism (PIM) Options

- Incentives or penalties added to or subtracted from return on equity percentage
- Lower rate of return (to cost of debt, for example) with percentage adders based on performance
- Pay cash bonuses for achievement of specific milestones (no change to rate of return)
- Shared savings mechanism
Design Principles to Consider:

• PIMs can be comprehensive or targeted to specific goals
• For every PIM, ensure that the benefits exceed the costs
• Try to find the balance between the amount of reward that will incentivize the utility without over-compensation
• Assign greater rewards/penalties to most important policy goals and cost containment goals
• For non-monetizable benefits, consider reporting metrics only or a smaller incentive/penalty
No Deadband, Symmetric Compensation

- Based on a compliant result at the origin
- Utility wins or loses revenue based on performance
- Dollar for unit, no limits

Note pressure on measurement and verification of savings
Symmetric Deadband and Compensation

- Based on a compliant result around a deadband at the origin
- Utility wins or loses revenue based on performance
- Dollar for unit
- No limits

*Note pressure on measurement and verification of savings*
One-sided Penalty

- No upside
- Deadband from adequate performance
- Severe penalty for poor performance
Asymmetric Compensation

- Upside
- Capped, for superior performance
- Deadband from adequate performance
- Severe penalty for poor performance
One-sided Reward

- Upside
- Capped for superior performance above present level
- No penalty
Hit the Target

- Upside bonus
- Capped for significant specific superior performance
- No penalty
Practices That Lead to Difficulty

• Basing performance incentives on inputs ($$ spent)
• Basing rewards or penalties on exogenous factors
  • Weather, economic growth, etc.
• Unclear or uncertain metrics or goals
• Lack of clarity around measurement methodology
• Not understanding utility motivations
A Few Examples of Metrics and PIMs from Other States
Illinois: Tracking Metrics

• More than 60 metrics developed as part of a settlement agreement with ComEd, including:
  • Reduced GHG emissions (as measured through load shifting, peak reduction, reduced truck rolls)
  • Load served by distributed resources
  • Time to connect DERs to grid
  • Peak load reductions (from DR)
  • Customers enrolled in time-varying rates
  • Customer awareness of ComEd’s portal for viewing usage data
Rhode Island: Tracking Metrics

*May eventually become eligible for PIMs:*

- Installed energy storage capacity
- $\text{CO}_2$ avoided through EVs
- Light Duty Government and Commercial Fleet Electrification
- Low-income and multi-unit apartment building EV charging sites
- Distributed Generation Interconnection
New York: Shared Savings Mechanism in Fuel Adjustment Clause (FAC)

- Typical FAC passes all fuel price volatility onto customers, reducing utility incentive to operate plants efficiently.
- New York required utilities to absorb part of fuel costs if actuals are above forecasted costs and allowed them to retain savings if actuals below forecasted costs.
- Utilities with modified FACs operated their plants more efficiently (9% more efficiently in one study).
Michigan: DR Incentives

Consumers Energy DR Reconciliation (Case No. U-20164) (7/18/19)

- Shareholder return on OPEX if they fully or partially meet IRP target for incremental growth in DR
- Additional 2% of DR O&M if part of a non-wires alternative

Source: Michigan PSC

*DR used as part of a non-wires alternative project earn an annual payment of 2%
Key Takeaways
Takeaways

• The traditional approach to regulation is challenged by changes in the power sector and inherent misalignment of incentives

• PBR has the potential to better align utility, ratepayer, and public interests

• PBR succeeds where it is clear, transparent at each step, and aligns rewards and incentives for utilities and customers
RAP Resources

- Next-Generation Performance-Based Regulation: Volume 1 (Introduction—Global Lessons for Success)
- Next-Generation Performance-Based Regulation: Volume 2 (Primer—Essential Elements of Design and Implementation)
- Next-Generation Performance-Based Regulation: Volume 3 (Innovative Examples from Around the World)
- Performance Incentives for Cost-Effective Distribution System Investments
- Protecting Customers from Utility Information System and Technology Failures
- Metrics to Measure the Effectiveness of Electric Vehicle Grid Integration
Any questions?
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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