Performance-Based Regulation (PBR): An Overview

PBR Workshop
Public Service Commission of Wisconsin

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raponline.org
1 Why do we need PBR?
All regulation is incentive regulation

- Trick is to understand what incentives are and how they affect behavior
- Traditional cost-of-service regulation often considered the baseline
  - Focused on inputs, sets prices, not revenues
  - Throughput incentive
  - Capital bias under certain conditions
Power Sector Transformation

What is PBR?
Performance-Based Regulation (PBR) is…

- A regulatory framework that connects achievement of specified objectives to utility financial performance

- A PBR plan can include a collection of revenue adjustment mechanisms and performance incentive mechanisms (PIMs), namely, metrics and formulas that can range from being simply reported, to scored against baseline, to financial rewards or penalties (i.e., adjustments to allowed revenues)
What are the typical tools of PBR?

- Multi-year determination/formula for allowed revenue
- Decoupling
- Earnings sharing mechanisms
- Metrics and financial incentives linked to outcomes

*Not all of these will be present in every PBR established*
PBR Design Considerations

- Set Guiding Goals
  - Make/keep energy affordable for customers
- Understand current incentives
- Develop measurable performance criteria
  - Declining customer bills, reduced customer outages
- Create metrics
  - Average monthly bills for residential customers
- Establish Performance Targets
  - 2% reduction in average monthly residential bills
MN PBR Design Considerations

- Articulate goals
- ID outcomes
- ID Performance Metrics
- Establish metrics and review
- Establish targets, as needed
- Establish incentive mechanisms, as needed
- Evaluate, Improve, Repeat

Graphic: MN PBR docket
https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId=%7BF0E82E68-0000-CF1F-93DB-4CE874187020%7D&documentTitle=20191-148970-01
Continuum of Options

- Reported metrics only: metrics are published on a publicly available dashboard. Ex: HI, Puerto Rico, IL
- Scorecards: metrics are published and ranked, some include reported metrics plus target progress. Ex: Denmark, RIIO
- Performance incentive mechanisms: publicly available metrics, and utilities receive financial incentives or penalties for achievement of metrics. Ex: NY REV, HI
Designing Performance-Based Incentives
Design Principles to Consider:

• Try to find a good 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
Financial Performance Incentive Options

- Return on equity bonuses or penalties
  - Still tied to rate base
- Incentives defined by $ amounts
  - Tied to program budget or net earnings
- Shared savings mechanisms
  - Baseline measurement can be difficult
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
Hard Issues

• Lack of clarity around measurement methodology or potential for gaming
  • Can the utility “juke the stats”?
• Question of utility control
  • What if a given metric is significantly influenced by weather or economic conditions?
• How much incentive is too much?
  • Costs and benefits of individual incentive or overall regulatory scheme?
• How big is the hurdle you need to overcome?
  • Need to understand value and drivers of existing behavior
A Package of Reforms

Pair positive-only performance incentives with reduction in baseline return on equity

*Overall revenue may actually decrease; but potential shareholder earning shareholders could grow commensurate with the additional risk shifted to utilities
Bringing all the pieces together

- PBR Framework consists of multiple components
- Taking a holistic view helps to avoid unintended outcomes, motivate positive outcomes
  - Fuel Adjustment Clause
  - Cost trackers
  - Earnings sharing mechanism
  - Decoupling
  - Multi-Year Rate Plan components
  - PIMs and Shared Savings Mechanisms
A Few Examples of Metrics and PIMs
Focus on Energy Program Administrator PIMs

- Up to $750,000 in total bonuses or penalties included in most recent quadrennial contract
- Separate PIMs for:
  - Customer Satisfaction
  - Achieved Savings
  - Customer Participation Rates
  - “Utility Equity”
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
Hawaii Phase 1 Outcomes

D&O 36326 establishes the regulatory guiding principles, goals, and outcomes to guide Phase 2

The following guiding principles will inform the development of the PBR framework:

1. **Customer-centric approach**, including immediate “day 1” savings for customers when the new regulations takes effect;

2. **Administrative efficiency** to reduce regulatory burdens to the utility and stakeholders;

3. **Utility financial integrity** to maintain the utility’s financial health, including access to low-cost capital

<table>
<thead>
<tr>
<th>Regulatory Goal</th>
<th>Regulatory Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enhance Customer Experience</td>
<td>Affordability</td>
</tr>
<tr>
<td></td>
<td>Reliability</td>
</tr>
<tr>
<td>Emergent</td>
<td>Interconnection Experience</td>
</tr>
<tr>
<td></td>
<td>Customer Engagement</td>
</tr>
<tr>
<td>Improve Utility Performance</td>
<td>Traditional</td>
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<tr>
<td></td>
<td>Cost Control</td>
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<tr>
<td>Emergent</td>
<td>DER Asset Effectiveness</td>
</tr>
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<td></td>
<td>Grid Investment Efficiency</td>
</tr>
<tr>
<td>Advance Societal Outcomes</td>
<td>Traditional</td>
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<tr>
<td></td>
<td>Capital Formation</td>
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<tr>
<td></td>
<td>Customer Equity</td>
</tr>
<tr>
<td>Emergent</td>
<td>GHG Reduction</td>
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<td></td>
<td>Electrification of Transportation</td>
</tr>
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<td></td>
<td>Resilience</td>
</tr>
</tbody>
</table>
# Hawaii Affordability Metrics

<table>
<thead>
<tr>
<th>Metric</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LMI Energy Burden</td>
<td>Schedule R typical and average annual bill as a percentage of low-income average income,(^{115}) by island</td>
</tr>
<tr>
<td>Payment Arrangement</td>
<td>Percent of customers entered into payment arrangements by zip code</td>
</tr>
<tr>
<td>Disconnections</td>
<td>Percent of disconnections for non-payment by customer class by zip code</td>
</tr>
<tr>
<td>Commission Inclination:</td>
<td>reported on an annual basis</td>
</tr>
</tbody>
</table>

MN PBR approach

- Comprehensive approach
  - Examined existing regulatory framework for inherent incentives
  - Took a broad look at what performance metrics it could pursue
  - Recognized information needs – may not have sufficient information to implement all metrics currently, but anticipate steps to get additional data to implement metrics
- Considered and implemented new performance criteria and metrics
- Included stakeholders throughout the process
Sample MN Metrics adopted

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>METRIC CALCULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affordability</td>
<td>• Rates per kWh based on total revenue, reported (1) by customer class and (2) with all classes aggregated</td>
</tr>
<tr>
<td></td>
<td>• Average monthly bills for residential customers</td>
</tr>
<tr>
<td></td>
<td>• Total arrearages for residential customers</td>
</tr>
<tr>
<td></td>
<td>• Total disconnections for nonpayment for residential customers</td>
</tr>
<tr>
<td>Customer service quality</td>
<td>• Existing multi-sector metrics, including ACSI [American Customer Satisfaction Index] and J.D. Power</td>
</tr>
<tr>
<td></td>
<td>• Commission-approved utility-specific survey</td>
</tr>
<tr>
<td></td>
<td>• Subscription to third-party customer satisfaction metrics</td>
</tr>
<tr>
<td></td>
<td>• Call center response time</td>
</tr>
<tr>
<td></td>
<td>• Billing invoice accuracy</td>
</tr>
<tr>
<td></td>
<td>Number of customer complaints</td>
</tr>
<tr>
<td></td>
<td>• Equity metric — customer service quality by geography, income, or other relevant benchmarks</td>
</tr>
</tbody>
</table>
### MN Metrics Continued

<table>
<thead>
<tr>
<th>OUTCOME</th>
<th>METRIC CALCULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost-effective alignment of generation and load</td>
<td>- Demand response, including (1) capacity available (MWh) and (2) amount called (MW, MWh per year)</td>
</tr>
<tr>
<td></td>
<td>- Integration of customer loads with utility supply, including:</td>
</tr>
<tr>
<td></td>
<td>1. Amount of demand response that shapes customer load profiles through price response, time varying rates, or behavior campaigns</td>
</tr>
<tr>
<td></td>
<td>2. Amount of demand response that shifts energy consumption from times of high demand to times when there is a surplus of renewable generation</td>
</tr>
<tr>
<td></td>
<td>3. Amount of demand response that sheds loads that can be curtailed to provide peak capacity and supports the system in contingency events</td>
</tr>
<tr>
<td></td>
<td>4. Metrics that measure the effectiveness and success of items 1 to 3, individually and in aggregate</td>
</tr>
</tbody>
</table>
North Carolina Energy Regulatory Process (NERP)

PIM setting Process
- Goal: utility incentives aligned with cost control and policy goals.
- Analyze COS incentives and current incentives, complementary regulatory tools (decoupling, MYRP)
- ID PIMs that align with state and regulatory goals
- Assess other state approaches

PIM Principles
- advance public policy goals – drive new areas of utility performance
- clearly defined, measurable, use available data, and easily verified
- Reward outcomes, not inputs
- Revisit PIMs regularly
# NERP recommended metrics

## Outcome: Low-income affordability

**Preferred metric:**
- % of low-income households, defined as those falling at or below 200% of the federal poverty level, that experience an annual electricity cost burden of 6% of gross household income or higher (upside only)

**Alternative metrics:**
- Total disconnections for nonpayment
- Usage per customer vs. historic rolling average, per class
- Average monthly bill
- % customers past due on their accounts
- # customers on fixed-bill programs

## Notes:
- Why there is a need: In 2016, Duke Energy Carolinas had around 330,000 residential customers with household incomes ≤ 150% of the federal poverty level. They accounted for around 20% of DEC’s total residential accounts. Those customers spent on average 10.5% of household income on energy (approximately 83% of which was for electricity and the rest for heating), compared to around 3% for DEC customers system-wide.\(^{22}\)
- There is a need to ensure affordability for other customers as well. Municipal utilities would benefit from any outcome that reduces production costs and commercial and industrial (C&I) customers want to keep NC rates competitive with other Southeast states. Metrics may need to be developed for these other classes of customers and for residential customers who do not qualify as low-income. Some of the alternative metrics listed above might be useful for some of these customers.
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
8 Supplemental Slides if Helpful for Q&A
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 alternative

![Chart showing percentage return on program O&M for different targets and NWA projects.]

Source: Michigan PSC

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

Adopted a System Efficiency Incentive

PIM is 45% of the net benefits (the remainder go to ratepayers) from annual capacity market savings as a result of actions to increase system efficiency:

- incremental BTM PV beyond forecasts,
- DR not eligible for existing incentives,
- incremental storage, or
- additional peak reductions from NWA’s or partnerships with third parties.
## Hawaii regulatory mechanisms

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>3 Year Rate Case Cycle</td>
<td>Metrics Reporting Requirements</td>
<td>RPS and EEPS Requirements</td>
</tr>
<tr>
<td>Revenue Decoupling (RBA Provision)</td>
<td>Backstop PIMs (SAIDI, SAIFI, Customer Service)</td>
<td>System Planning Requirements</td>
</tr>
<tr>
<td>RAM Attrition Relief Provisions (O&amp;M, Rate Base, Depreciation &amp; Amortization)</td>
<td>Demand Response PIM</td>
<td>Competitive Bidding Framework</td>
</tr>
<tr>
<td>Partial Revenue Cap (RAM Cap)</td>
<td>Renewable Procurement PIMs</td>
<td>Approval of Major Capital Projects, Fuel Contracts, and Purchased Power Contracts</td>
</tr>
<tr>
<td>Major Projects Interim Recovery Mechanism</td>
<td>ECAC/ECRC Fuel Cost Risk Sharing Incentive</td>
<td>Approval of Rules and Standards</td>
</tr>
<tr>
<td>Earnings Sharing Mechanism</td>
<td>ECAC Generation Efficiency Incentive</td>
<td>Approval of Accounting Policies and Financing Arrangements</td>
</tr>
<tr>
<td>Major Projects and Baseline Projects Credit Mechanisms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ECAC/ECRC and PPAC fuel and purchased power pass-through</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Hawaii Public Utilities Commission
Maryland’s behavioral demand response program

PBR to promote peak demand reduction

- Opt-out peak rebate program - $1.25/kWh rebate for energy reduction on Energy Savings Days with 24-hour notice.
- BGE may capitalize the operating expenses associated with Smart Energy Rebate (SER) program.
- BGE could not recover any of the AMI costs, or earn the 9.75% return on equity on its smart grid program until the utility proved that the deployment had a positive benefit-cost.
- The SER program was instrumental in maximizing the AMI business case and ultimately recovering the costs ($687 million capex).
### SER Program Summary to Date

<table>
<thead>
<tr>
<th>Year</th>
<th># of Energy Savings Days</th>
<th>Eligible Customers</th>
<th>Average Bill Credit</th>
<th>Peak Demand Reduction (MW)</th>
<th>Total Bill Credits to Customers</th>
<th>% Participation</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>4</td>
<td>315,000</td>
<td>$9.03</td>
<td>96</td>
<td>$7 M</td>
<td>82%</td>
</tr>
<tr>
<td>2014</td>
<td>2</td>
<td>860,000</td>
<td>$6.55</td>
<td>209</td>
<td>$5.6 M</td>
<td>76%</td>
</tr>
<tr>
<td>2015</td>
<td>4</td>
<td>1,020,000</td>
<td>$6.67</td>
<td>309</td>
<td>$15.5 M</td>
<td>81%</td>
</tr>
<tr>
<td>2016</td>
<td>3</td>
<td>1,074,000</td>
<td>$6.73</td>
<td>336</td>
<td>$11 M</td>
<td>71%</td>
</tr>
<tr>
<td>2017</td>
<td>2</td>
<td>1,095,000</td>
<td>$6.13</td>
<td>330</td>
<td>$6.1 M</td>
<td>74%</td>
</tr>
</tbody>
</table>

### SER Wholesale Market Benefits to Customers, 2013 to 2015

<table>
<thead>
<tr>
<th>Benefits from Peak Demand Reductions</th>
<th>Benefits from Energy Reductions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesale Capacity Revenue</td>
<td>Wholesale Energy Revenue</td>
</tr>
<tr>
<td>Avoided Capacity Cost</td>
<td>Avoided Energy Cost</td>
</tr>
<tr>
<td>Capacity Price Mitigation</td>
<td>Wholesale Energy Price Suppression</td>
</tr>
<tr>
<td>Benefits</td>
<td>$46 M</td>
</tr>
<tr>
<td>Share of Total</td>
<td>11%</td>
</tr>
<tr>
<td>$87 M</td>
<td>$9 M</td>
</tr>
<tr>
<td>$234 M</td>
<td>$5 M</td>
</tr>
<tr>
<td>21%</td>
<td>100%</td>
</tr>
</tbody>
</table>

[https://info.aee.net/hubfs/MD%20DR%20Final.pdf](https://info.aee.net/hubfs/MD%20DR%20Final.pdf)
BQDM in NY: Localized DERs to Achieve Lowest Cost service

- Utility provided incentives such as direct payments to DER providers or customers
- Facilitated competitive procurements among DER providers
- Shared savings consisted of ratepayers avoiding additional distribution costs; Con Edison receiving some of these savings in the form of a ROE adder
Treating Cloud Computing Services as Capital Expenditures in Illinois

- Changes to treatment of “CAPEX” and “OPEX”
- Allows utilities to treat service contracts for cloud computing services like utility-owned IT
- Removes penalties for investments in services inherent in traditional cost-of-service model
- Levels investment playing field between CAPEX and OPEX
## 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>
</tr>
<tr>
<td>4.00%</td>
<td>$7,238,031</td>
<td>$4,704,720</td>
</tr>
<tr>
<td>3.00%</td>
<td>$5,428,523</td>
<td>$3,528,540</td>
</tr>
<tr>
<td>2.00%</td>
<td>$3,619,015</td>
<td>$2,352,360</td>
</tr>
<tr>
<td>1.00%</td>
<td>$1,809,508</td>
<td>$1,176,180</td>
</tr>
<tr>
<td>0.00%</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>-1.00%</td>
<td>-$1,809,508</td>
<td>-$1,176,180</td>
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</tr>
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</table>
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