The PBR Challenge for US Consumer Advocates

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Introduction

Performance-based regulation ("PBR") and other alternatives to traditional cost of service regulation ("COSR"), which are collectively called "Altreg", are being considered in many US jurisdictions today.

This presentation briefly discusses:

- Forces driving Altreg
- PBR and other Altreg options
- PBR challenges and opportunities for consumer advocates
The Age of Altreg

Cost

Revenue

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What’s Driving Altreg?

COSR works best under favorable business conditions that make rate cases less frequent. Infrequent rate cases...

- strengthen utility cost performance incentives
- reduce regulatory cost

Business conditions are less favorable today than in COSR’s “golden age”

- Load growth much slower
- Some utilities nonetheless need high capital spending to modernize infrastructure and increase resiliency and/or reliance on clean energy sources

>>> Cost tends to grow faster than revenue

- Many generic issues to consider (e.g., rate designs and system planning)

Under COSR, these conditions lead to frequent rate cases, weak cost containment incentives, and high regulatory cost

As well, utilities are financially insulated from environmental damage that they cause
Altreg Options

COSR problems have spurred development of Altreg options

Utilities care mainly about attrition and propose...

- higher fixed charges
- additional cost trackers
- (Cost of service) formula rate plans
  - Essentially *comprehensive* cost trackers
  - Used by the FERC and, for retail services, in some southeastern and Exelon states (e.g., AR, AL, MS, LA, IL, MD, DC)
The PBR Alternative

PBR: Altreg approaches intended to encourage better performance through stronger incentives (aka “incentive regulation”)

4 well-established approaches:

- **Performance Metrics** measure performance in targeted areas
- **Revenue Decoupling** reduces utility resistance to DSM, DG, and high usage charges
- **Special Incentives for Underused Inputs** (e.g., Pilot programs and DSM cost trackers)
- **Multiyear Rate Plans** (“MRPs”)
Multiyear Rate Plans

Key Components

- Reduced rate case frequency (e.g., 4 or 5 year cycle)
- Attrition relief mechanism (“ARM”) automatically escalates rates or revenue but is not linked to utility’s actual costs
  >>> Stronger cost containment incentives
  >>> More efficient regulation

Precedents

- Popular in Great Britain, Canada, and Australia
- Ontario is a North American PBR leader
- Used in diverse American states (e.g., California, New York, and Florida)
- Mounting interest in other states (e.g., Washington and North Carolina)
Basic PBR Approaches Often Combined

- Multiyear Rate Plans
- Revenue Decoupling
- Performance Metrics
- Special Incentives for Underused Inputs

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MRP Pros and Cons

Pros
MRPs *do* streamline regulation and have sometimes sparked better performance

More time to address generic issues

Utilities assume some risk

MRPs sometimes include productivity growth targets and/or statistical benchmarking of cost and reliability

>>> Refreshing emphasis on utility performance

MRPs often initiated by legislators and regulators, not utilities
Cons

Utilities can and have played strategic games in MRP ratemaking
US regulatory staff and consumer groups are underfunded relative to foreign (e.g., Canadian) counterparts
Consumer advocates have lost some PBR battles (e.g., MA) but also won some (e.g., HI)
Confusion is commonplace in legislative and regulatory undertakings to consider PBR
Consultants are often not PBR experts.
Some consultants will “say anything” to advance their clients’ interests
Misconceptions that result from this “fog of Altreg” can produce surprising outcomes
  • MD and DC have recently approved “multiyear rate plans” that are really formula rates due to “reconciliation mechanisms”
  • IL is on the verge of doing the same thing
Conclusions

Altreg is a reflection of environmental concerns and unfavorable business conditions

Environmental groups are major Altreg players

Amongst the Altreg approaches, PBR has the best shot at helping consumers

PBR includes multiyear rate plans and decoupling, not just metrics

Consumer advocates should keep an open mind about PBR

Consider going out the PBR learning curve and becoming forceful, persuasive practitioners
Appendix

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### Indicators of Energy Utility Attrition 1931-2015

<table>
<thead>
<tr>
<th>Multiyear Averages</th>
<th>Electricity UPC</th>
<th>Natural Gas UPC</th>
<th>GDPPI Inflation</th>
<th>Summary Attrition Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Residential</td>
<td>Commercial</td>
<td>Average</td>
<td>Residential</td>
</tr>
<tr>
<td>1927-1930</td>
<td>7.06%</td>
<td>6.67%</td>
<td>6.86%</td>
<td>NA</td>
</tr>
<tr>
<td>1931-1940</td>
<td>5.45%</td>
<td>2.00%</td>
<td>3.73%</td>
<td>0.54%</td>
</tr>
<tr>
<td>1941-1950</td>
<td>6.48%</td>
<td>5.08%</td>
<td>5.78%</td>
<td>3.90%</td>
</tr>
<tr>
<td>1951-1960</td>
<td>7.53%</td>
<td>6.29%</td>
<td>6.91%</td>
<td>3.40%</td>
</tr>
<tr>
<td>1961-1967</td>
<td>5.37%</td>
<td>10.48%</td>
<td>7.93%</td>
<td>2.42%</td>
</tr>
<tr>
<td>1968-1972</td>
<td>6.38%</td>
<td>6.43%</td>
<td>6.41%</td>
<td>1.78%</td>
</tr>
<tr>
<td>1973-1982</td>
<td>1.34%</td>
<td>1.61%</td>
<td>1.47%</td>
<td>-2.15%</td>
</tr>
<tr>
<td>1983-1986</td>
<td>0.90%</td>
<td>2.26%</td>
<td>1.58%</td>
<td>-3.07%</td>
</tr>
<tr>
<td>1987-1990</td>
<td>1.39%</td>
<td>2.29%</td>
<td>1.84%</td>
<td>-1.25%</td>
</tr>
<tr>
<td>1991-2000</td>
<td>1.15%</td>
<td>1.68%</td>
<td>1.41%</td>
<td>-0.37%</td>
</tr>
<tr>
<td>2001-2007</td>
<td>0.73%</td>
<td>0.64%</td>
<td>0.68%</td>
<td>-2.12%</td>
</tr>
<tr>
<td>2008-2015</td>
<td>-0.47%</td>
<td>-0.20%</td>
<td>-0.34%</td>
<td>-0.85%</td>
</tr>
</tbody>
</table>

**Key business conditions are on balance much less favorable today than in COSR’s “golden age” when it became a tradition**

---

MRPs are a common form of Altreg in U.S.

Popular for vertically integrated electric utilities (e.g., Hawaii)

Renewed popularity for power distributors (e.g., New England)
MRP Precedents: Canada

MRPs are the norm for Canadian gas & electric power distributors
Impetus has come mainly from policymakers
MRP Case Study: Central Maine Power

Attrition Relief Mechanism:
  \[ \text{growth Rates} = \text{growth GDPPI} - X \quad (X=1\%) \]

Capital Cost Tracker: Automated metering infrastructure

Earning Sharing: Asymmetric sharing of surplus earnings

Plan term: 5 years (2009-13)

Service Quality: Multi-indicator penalty mechanism

Marketing Flexibility: Light-handed regulation of optional targeted rate schedules and rate discounts

Multifactor Productivity Trend of CMP Under MRPs

MRPs have improved utility performance
But some plan provisions (e.g., earnings sharing & capital cost trackers) weaken incentives
ARM Design Options

ARM design is biggest issue in most MRP proceedings

Several well-established approaches

- Indexing
  
e.g., $\text{growth Revenue} = \text{Inflation} - X + \text{growth Customers}$

- Forecasting

- Hybrid

X factor controversies in US and Canada
**Revenue Decoupling**

**Decoupling Basics**

- Tracker and rider cause *actual* revenue to track *allowed* revenue closely.
- Thus, revenue (and earnings) are “decoupled” from UPC.
- Revenue adjustment mechanism escalates allowed revenue (e.g., for customer growth).

**Decoupling Advantages**

- Eliminates “lost margin” disincentive for utility to embrace DSM and DG.
- Rate designs that encourage efficient DSM and DG are less risky.
- No need for high fixed charges that many (e.g., Wisconsin) utilities favor.
- Reduces rate case frequency by targeting an attrition problem.
Special Incentives for Underused Inputs

The Basic Idea

• Utilities can be reluctant to use certain inputs (e.g., substitutes for capex) or embrace new ways of doing things
• Targeted inducements for such actions are available

Tools

• Trackers and riders for costs of underused inputs (e.g., DSM and purchased power expenses)
• Capitalize operation & maintenance expenses and add ROE premium
• Prior approval and pilot programs for risky but promising initiatives

Downside

• Cost trackers are a crude tool that can give rise to excessive costs (e.g., many utilities have made imprudent purchased power commitments)
Key Attributes of Altreg Alternatives

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Performance Metrics

Performance metrics quantify utility activities in key performance areas.

Several potential uses:

- Monitoring Only
- Monitoring with Target
- Performance Incentive Mechanisms (PIMs)

PIMs strengthen incentives in targeted areas by linking revenue to performance.

Performance metric systems can have different approaches for different metrics.

“Scorecards” summarize utility performance for public.
What do PIMs Target?

PIMs most commonly target service quality and energy conservation (e.g., positive incentive to embrace conservation)

Need for new performance metrics and incentive mechanisms is focus of recent “utility of the future” proceedings

- Peak load management
  - *System* load peak
  - “Non-wire alternatives” to *local* grid investments

- Utilization of advanced metering infrastructure capabilities
- Quality of service to DG customers
- Electric vehicles
### Ontario Scorecard Metrics

<table>
<thead>
<tr>
<th>Performance Outcomes</th>
<th>Performance Categories</th>
<th>Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer Focus</strong></td>
<td>Service Quality</td>
<td>New Residential/Small Business Services Connected on Time</td>
</tr>
<tr>
<td>Services are provided in a manner that responds to identified customer preferences.</td>
<td></td>
<td>Scheduled Appointments Met On Time</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Telephone Calls Answered On Time</td>
</tr>
<tr>
<td></td>
<td>Customer Satisfaction</td>
<td>First Contact Resolution</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Billing Accuracy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customer Satisfaction Survey Results</td>
</tr>
<tr>
<td><strong>Operational Effectiveness</strong></td>
<td>Safety</td>
<td>Level of Public awareness [measure to be determined]</td>
</tr>
<tr>
<td>Continuous improvement in productivity and cost performance is achieved; and distributors deliver on system reliability and quality objectives.</td>
<td></td>
<td>Level of Compliance with Ontario Regulation 22/04</td>
</tr>
<tr>
<td></td>
<td>Safety</td>
<td>Serious Electrical Incident Index</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Number of General Public Incidents</td>
</tr>
<tr>
<td></td>
<td>System Reliability</td>
<td>Average Number of Hours that Power to a Customer is Interrupted</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Average Number of Times that Power to a Customer is Interrupted</td>
</tr>
<tr>
<td></td>
<td>Asset Management</td>
<td>Distribution System Plan Implementation Progress</td>
</tr>
<tr>
<td></td>
<td>Cost Control</td>
<td>Efficiency Assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Cost per Customer (^1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Cost per Km of Line (^1)</td>
</tr>
</tbody>
</table>

Notes:
1. These figures were generated by the Board based on the total cost benchmarking analysis conducted by Pacific Economics Group Research, LLC and based on the distributor’s annual reported information.
2. The Conservation & Demand Management net annual peak demand savings include any persisting peak demand savings from the previous years.

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## Ontario Scorecard Categories (continued)

<table>
<thead>
<tr>
<th>Performance Outcomes</th>
<th>Performance Categories</th>
<th>Measures</th>
</tr>
</thead>
</table>
| Public Policy Responsiveness | Conservation & Demand Management | Net Annual Peak Demand Savings (Percent of target achieved)  
Net Cumulative Energy Savings (Percent of target achieved) |
| Distributors deliver on obligations mandated by government (e.g., in legislation and in regulatory requirements imposed further to Ministerial directives to the Board). | Connection of Renewable Generation | Renewable Generation Connection Impact Assessments Completed On Time  
New Micro-embedded Generation Facilities Connected On Time |
Leverage: Total Debt (includes short-term and long-term debt) to Equity Ratio  
Profitability: Regulatory Return on Equity Deemed (included in rates)  
Achieved |
| Financial viability is maintained; and savings from operational effectiveness are sustainable. | | |

Notes:
1. These figures were generated by the Board based on the total cost benchmarking analysis conducted by Pacific Economics Group Research, LLC and based on the distributor's annual reported information.
2. The Conservation & Demand Management net annual peak demand savings include any persisting peak demand savings from the previous years.
Cost Performance PIMs

Cost performance PIMs have the general form

\[ \text{Award/Penalty} = \$ \times \left( \frac{\text{Cost Metric}^{\text{Actual}}}{\text{Cost Metric}^{\text{Benchmark}}} \right) \]

Benchmarks are often based on statistics (e.g., average value of metric for a utility peer group)

**Statistical Benchmarking**

Approaches to benchmarking that use statistics
Econometric Benchmarking

Basic steps...

- Develop mathematical model of relationship between cost and cost drivers
- Estimate model parameters using historical utility operating data
- Fit model with parameter estimates \(a_0, a_2, \ldots\) & utility values for business condition variables

\[
\ln \text{Cost}_{\text{Bench}} = a_0 + a_1 \ln \text{Input Prices}^{\text{Western}} + a_2 \ln \text{Customers}^{\text{Western}} + a_3 \ln \text{Line Miles}^{\text{Western}} + \ldots
\]

Compare benchmark to utility’s actual value

\[
\text{Performance} = \frac{\text{Cost}_{\text{Actual}}}{\text{Cost}_{\text{Bench}}}
\]
### Illustrative Econometric Cost Model Used in Regulation

<table>
<thead>
<tr>
<th>VARIABLE KEY</th>
<th>EXPLANATORY VARIABLE</th>
<th>PARAMETER ESTIMATE</th>
<th>T-STATISTIC</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>N = Number of Retail Customers</td>
<td>N</td>
<td>0.546</td>
<td>24.558</td>
<td>0.0000</td>
</tr>
<tr>
<td>CAPTOT = Total Generating Capacity</td>
<td>CAPTOT</td>
<td>0.183</td>
<td>7.446</td>
<td>0.0000</td>
</tr>
<tr>
<td>GNET = Net Generation Volume</td>
<td>GNET</td>
<td>0.122</td>
<td>6.119</td>
<td>0.0000</td>
</tr>
<tr>
<td>AGETOT = Average Age of Generation Plant</td>
<td>AGETOT</td>
<td>0.128</td>
<td>4.119</td>
<td>0.0000</td>
</tr>
<tr>
<td>PCTDIRT = Percentage of Generation Capacity that is Coal or Heavy Fuel Oil</td>
<td>PCTDIRT</td>
<td>0.186</td>
<td>6.329</td>
<td>0.0000</td>
</tr>
<tr>
<td>PCTNUC = Percentage of Generation Capacity that is Nuclear</td>
<td>PCTNUC</td>
<td>0.275</td>
<td>21.575</td>
<td>0.000</td>
</tr>
<tr>
<td>PCTSCR = Percentage of Generation Capacity that is Scrubbed</td>
<td>PCTSCR</td>
<td>0.066</td>
<td>4.369</td>
<td>0.000</td>
</tr>
<tr>
<td>PCTELEC = Percentage of Retail Customers who are Electric</td>
<td>PCTELEC</td>
<td>0.070</td>
<td>2.178</td>
<td>0.030</td>
</tr>
<tr>
<td>TXMIPERCUST = Line Miles per Retail Customers in 2012</td>
<td>TXMIPERCUST</td>
<td>0.050</td>
<td>3.516</td>
<td>0.000</td>
</tr>
<tr>
<td>PCTPOTD = Percentage of Line Plant that is Overhead</td>
<td>PCTPOTD</td>
<td>0.131</td>
<td>3.290</td>
<td>0.001</td>
</tr>
<tr>
<td>Trend = Time Trend</td>
<td>Trend</td>
<td>-0.005</td>
<td>-4.487</td>
<td>0.000</td>
</tr>
<tr>
<td>Constant</td>
<td>Constant</td>
<td>19.616</td>
<td>741.485</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**REFERENCE:**
Public Utilities Commission of Colorado, D-17AL-0649E, Testimony of Mark N Lowry for Public Service of Colorado, October 3, 2017. Model developed by PEG Research LLC

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Regulators in some jurisdictions do their own cost benchmarking

- Australia
- Ontario
- GB

O&M & capex
Total cost
“Totex” (O&M & capex)

e.g., Ontario Energy Board

60+ Ontario power distributors operate under multiyear rate plans

Board benchmarks their total cost annually using econometric model

Basis for “stretch factors” in price cap indexes w/ Inflation – X formulas

Distributors must use the model to benchmark their proposed forward test year revenue requirements in rate cases

OEB is now developing granular benchmarking capability
## Roles for PBR Tools

When PBR tools are used in concert each has a role

<table>
<thead>
<tr>
<th>PBR Tools</th>
<th>Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiyear Rate Plans</td>
<td>Strengthen <em>general</em> cost containment incentives</td>
</tr>
<tr>
<td></td>
<td>Streamline regulation</td>
</tr>
<tr>
<td>Revenue Decoupling</td>
<td>Removes disincentives to embrace</td>
</tr>
<tr>
<td></td>
<td>DSM, DG, and innovative pricing</td>
</tr>
<tr>
<td>Special Incentives for Underused Inputs</td>
<td>Encourages use of these inputs</td>
</tr>
<tr>
<td>PIMs</td>
<td>Shore up weak spots in incentive structure</td>
</tr>
</tbody>
</table>
Formula Rates

Basic Idea

Revenue requirement adjusted annually to reflect pro forma cost of service --- “cost of service formula”

Retail variant: reset rates automatically to achieve target ROE when actual (or forecasted) ROE differs materially

Scope and duration of prudence reviews reduced

Supplemental “bells & whistles” may strengthen incentives and add a PBR flavor

- SQ PIMs
- $growth Revenue^{O&M} < Growth CPI + 0.5%$
Formula Rate Precedents

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About Dr. Lowry

• President, Pacific Economics Group Research LLC
• Active in PBR field since 1989
• Specialties: regulatory strategy, PBR mechanism design, input price and productivity research, statistical benchmarking, expert witness testimony
• Former Penn State University energy economics professor
• PhD Applied Economics, University of Wisconsin

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