Regulatory Reform in the US: Different Paths Forward

Midwest Energy Research Consortium
Wisconsin Energy Distribution and Technology Initiative

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U.S. Program
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Introduction

The Regulatory Assistance Project (RAP) is a global NGO providing technical and policy assistance to government officials, agency staff, and others on energy and environmental issues.

- Foundation-funded; some contracts with U.S. DOE, EPA, State PUCs
- Advisor, consultant role, non-advocacy; no interventions
Outline

1. Overview of the challenge & opportunity
2. Traditional regulation
3. Regulatory reform tools
   - Performance-based regulation
     - Multi-year rate plans
     - Performance incentive mechanisms
   - Shared savings
   - Facilitated competition
     - Decoupling
   - Rate design pilots (MD, NH, MI, MN)
   - Capex/Opex equalization
21st century power sector shifts

- Clean = cheap grid solar & wind; pressure on legacy assets
- Information technology: new value and new risks
- Shifting demand, new load shapes, and aging infrastructure
- Rise of distributed energy resources
- New small commercial and residential customer choices including transportation and heating electrification
- Natural and manmade threats lead to resiliency discussion
Wholesale Price Effects of 40-50% Wind & Solar

(Wind: 30% wind & 10+% solar | Balanced: 20% wind & 20% solar | Solar: 30% solar & 10+% wind)

## Wholesale Price Effects of 40-50% Wind & Solar

(Wind: 30% wind & 10+% solar  |  Balanced: 20% wind & 20% solar  |  Solar: 30% solar & 10+% wind)

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<th>Impacts in 2030 relative to baseline with 2016 wind &amp; solar shares</th>
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## Impacts in 2030

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## Changes in Diurnal Price Profile

Red baseline shows 2016 wind & solar shares

## Wholesale Price Effects of 40-50% Wind & Solar

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*red baseline shows 2016 wind & solar shares*

<p>| | | | | |</p>
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<tr>
<td></td>
<td>Low VRE</td>
<td>Balanced VRE</td>
<td>High Wind</td>
<td>High Solar</td>
</tr>
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### More Price Variability

<table>
<thead>
<tr>
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<tr>
<td></td>
<td>1.8x</td>
<td>2.1x</td>
<td>2.5x</td>
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<tr>
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<td>2.1x</td>
<td>2.3x</td>
<td>2.5x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5x</td>
<td>3.0x</td>
<td>2.9x</td>
<td>3.4x</td>
</tr>
<tr>
<td></td>
<td>3.0x</td>
<td>2.9x</td>
<td>3.4x</td>
<td>1x</td>
</tr>
<tr>
<td></td>
<td>2.5x</td>
<td>2.3x</td>
<td>2.5x</td>
<td>4.7x</td>
</tr>
<tr>
<td></td>
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<td>2.1x</td>
<td>2.5x</td>
<td>6.6x</td>
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### Changes in Diurnal Price Profile

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### More Price Variability

<table>
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<tr>
<th>Changes in Timing of Top Net-Load Hours</th>
<th>Shift from 4pm to 7pm</th>
<th>Shift from 3pm to 5-7pm</th>
<th>No further shift 7pm</th>
<th>Shift from 3pm to 6-8pm</th>
</tr>
</thead>
</table>

Averch-Johnson effect

The tendency to over-invest capital to increase profit

- Results from revenue requirement calculation
- Bias for capital investments over other possible solutions
- “Gold plating”
Traditional regulation: The throughput incentive problem

- **Traditional ROR regulation sets** *prices*, not *revenues*
  - The revenue requirement is only an estimate of the total cost to provide service, used only as the basis for determining rates
- By themselves, consumption-based rates ($/kWh and $/kW) link revenues (and thus net income) to sales
  - The more kilowatt-hours a utility sells, the more money it makes
  - This is because, in most hours, the price of electricity is greater than the cost to produce it
    - Utility makes money even when the additional usage is wasteful, and loses it even when the reduced sales are efficient
- **Incentive to increase sales is extremely powerful**
  - This is the “throughput incentive”
How do utilities make money under traditional (price-based) regulation?

- Under traditional regulation*:
  \[ \text{Price} = \frac{\text{Revenue Requirement}}{\text{Projected Sales}} \]
- But:
  \[ \text{Actual Revenues} = \text{Price} \times \text{Actual Sales} \]
- Which means that:
  \[ \text{Net Income} = \text{Actual Revenues} - \text{Actual Costs} \]
- The utility can make money by:
  - Reducing costs and
  - Increasing sales

*RR = Cost of Service = Test Year Expenses + Depreciation + Taxes + (Rate of Return * Rate Base)
Reforms must address multiple complexities

1. **Grid Flexibility**
   - to facilitate the integration of more renewables
   - Deploy hardware to mitigate potential integration constraints

2. **Grid Reliability**
   - to ensure functionality with high DER penetration
   - Increase DER interoperability, visibility, and control

3. **Grid Intelligence**
   - to enable two-way communication and better DER control
   - Exchange data between customer and HECO through AMI-enabled telecoms

4. **Voltage Management**
   - to mitigate impacts on saturated circuits
   - Deploy grid-connected voltage management hardware

5. **Asset Optimization**
   - to maximize utilization of equipment
   - Analyze useful life and utilization factors of existing infrastructure

6. **Microgrids**
   - to enable DERs and improve resilience
   - Pursue DER applications with sectionalizing capabilities

**Source:** Rocky Mountain Institute, Powering Paradise, 2020
Finding ways to engage customers on new expectations

• Regulation is often about finding a good resolution between two+ competing positions
• Innovation is often about new approaches not tools on the continuum
  • Often comes from people engaging, creating
• Advanced technologies, new customer capabilities present new expectations and opportunity
  • Process innovation more likely to secure it
Regulatory reform tools in U.S. jurisdictions
Approaches to overcome limits of traditional regulation

- Performance-based regulation
  - Multi-year rate plans
  - Performance incentive mechanisms
  - Shared savings
  - State examples
- Decoupling
Performance-based regulation (PBR) is...

- A regulatory framework to connect achievement of specified objectives to utility financial performance and executive compensation
- A PBR plan can include a collection of performance incentive mechanisms (PIMs), namely, metrics and formulas that determine the levels of financial rewards or penalties (i.e., adjustments to allowed revenues) for achievement of the specified objectives
States’ progress in grappling with PBR is uneven

Various combinations of drivers are advancing PBR in 19 states and D.C.

- **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: EnerKnol and Wood Mackenzie Power & Renewables; Tracking of the proceedings available on the EnerKnol Platform
Phase 1 of the proceeding culminated with a Staff Proposal for Updated Performance-Based Regulations and further party comments, then the Commission’s Phase 1 decision in May 2019. The Phase 1 decision adopted three goals and 12 outcomes to serve as the focus for PBR reforms (see Exhibit 15), as well as three guiding principles to inform further PBR development. The guiding principles established a clear set of design objectives for what new regulations should achieve:

1. **A customer-centric approach**, including achievement of ratepayer savings
2. **Administrative efficiency** to reduce cumbersome regulatory burdens
3. **Utility financial integrity** to maintain the utility’s financial health and access to low-cost capital

The decision also laid out a portfolio of specific PBR mechanisms for further examination and development in the proceeding (see Exhibit 16).

In sum, the Phase 1 PBR decision outlined a framework to establish a new regulatory paradigm for the HECO Companies. Utility revenues will be earned according to a combination of baseline target revenues designed to encourage cost control, plus **performance revenues** to encourage exemplary service.
### Hawaii PBR mechanisms

**EXHIBIT 16**

**PBR Mechanisms Adopted in Phase 1 Decision and Order**

<table>
<thead>
<tr>
<th>Revenue Adjustment Mechanisms</th>
</tr>
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</table>
| **MRP with Indexed Revenue Adjustment** | Five-year Control Period with Externally-indexed Revenue Adjustment allowing interim revenue changes pursuant to an indexed formula:  
Annual Revenue Adjustment = (Inflation) - (X-Factor) + (Z-Factor) - Customer Dividend |
| **Earnings Sharing Mechanism (ESM)** | Apply an ESM that provides both "upside" and "downside" sharing of earnings between the utility and customers when earnings fall outside a Commission approved range |
| **Major Projects Interim Recovery (MPIR)** | Examine the MPIR adjustment mechanism to determine how it can continue to provide relief for appropriate projects during the MRP consistent with other approved PBR objectives and mechanisms |
| **Revenue Decoupling and Existing Cost Trackers** | Continue to utilize revenue decoupling (i.e., the Revenue Balancing Account), to true up revenues to an annual revenue target and existing cost tracking mechanisms (e.g., PPAC, ECRC, etc.) to track and recover certain approved costs |
| **Off-Ramps** | Develop off-ramp mechanisms to provide for review of approved PBR mechanisms, pursuant to specified circumstances or conditions |

<table>
<thead>
<tr>
<th>Performance Mechanisms</th>
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<tbody>
<tr>
<td><strong>Performance Incentive Mechanisms (PIMs)</strong></td>
</tr>
<tr>
<td><strong>Shared Savings Mechanisms</strong></td>
</tr>
<tr>
<td><strong>Scorecards and Reported Metrics</strong></td>
</tr>
</tbody>
</table>

Source: Rocky Mountain Institute, Powering Paradise, 2020
Multi-year rate plans: Three decades of experience

• Set rates for longer period
• Allow utility to keep some/all savings if efficient
• First used in CA, NY, New England
• Common now in Australia, UK, Germany, New Zealand, Canada
Productivity growth of CMP and other U.S. utilities, 1992-2014

Adopted a System Efficiency Incentive

PIM is 45% of the net benefits (the remainder goes to ratepayers) from actions that increase system efficiency

- Annual capacity market savings from incremental (more than expected) behind-the-meter solar
- DR not eligible for other incentives
- Incremental storage
- Additional peak reductions from non-wires alternatives or partnerships with third parties count

Rhode Island PUC National Grid order (Dock. Nos. 4770/4780, Aug. 2018)
Rhode Island PUC National Grid order

Metrics to be tracked that may become eligible for PIMs:

- Installed energy storage capacity
- 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
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 connected DERs to grid
- Peak load reductions (from DR)
- Customers enrolled in time-varying rates
- Customer awareness of ComEd’s portal for viewing usage data
Michigan DR incentives

- **Case No. U-18369** (9/15/17): “financial incentive for DR is reasonable and ... providers and other interested parties may propose appropriate incentives as part of the DR reconciliation proceeding.”

- Consumers Energy DR Reconciliation (**Case No. U-20164**) (7/18/19) created these incentives:
  - Tied to IRP goal of 49 MW/yr. incremental DR growth
  - Incentive for achievement of each 1% increment between 50-100% of IRP goal
  - 2% of DR O&M for NWA solutions project
Decoupling

- Promotes economic efficiency
  - Stabilizes utility revenues
    - Reduces or eliminates a host of risks for both utility & customers
  - Eliminates the key financial barrier to utility support for customer-sited resources
- Can work well
  - “Now we can focus on customer service instead of worrying about revenue levels.”
A few rate design pilot examples

- Maryland
- New Hampshire
- Michigan
- Minnesota
Maryland - BG&E TOU Pilot

Excludes weekends and holidays, which are billed at off-peak rates. Holidays include New Year’s Day, President’s Day, Good Friday, Memorial Day, Independence Day, Thanksgiving, Christmas and the Monday following if any of these holidays fall on a Sunday.
New Hampshire – battery storage pilot

- TOU pricing ratios encourage usage shift to off-peak times
- Provides safe harbor: pricing ratios + battery storage test effects on system peaks
- Cost-based, consumer advocate buy-in

<table>
<thead>
<tr>
<th>Table 1: Liberty Utilities’ TOU Rates</th>
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<tbody>
<tr>
<td><strong>Summer period (May 1 to October 31)</strong></td>
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<tr>
<td>Off-peak: 8 p.m. through 8 a.m. (all days)</td>
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<td>Mid-peak: 8 a.m. through 3 p.m. (non-holiday M-F)</td>
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<td><strong>Winter period (November 1 to April 30)</strong></td>
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<td>Off-peak: 8 p.m. through 8 a.m. (all days)</td>
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Michigan Residential Time of Use Plan

Consumers Energy EV pilot uses its current TOU rate option

**RESIDENTIAL: JUNE-SEPTEMBER**

12.6¢ STANDARD

**TIME OF DAY (MONDAY–FRIDAY)**

<table>
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<tr>
<th>Energy Cost</th>
<th>7:00am–11:00am</th>
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This assumes that household and EV charging already uses at least 600 kWh

**RESIDENTIAL: OCTOBER–MAY**

9.5¢ STANDARD

**TIME OF DAY (MONDAY–FRIDAY)**

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DTE Charging Forward

- per-kWh energy charges of $0.02 during off-peak times (a 14-hour period from 11 p.m. to 9 a.m.) vs. $0.08 on-peak

- requires second meter, meter charge

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**Experimental Electric Vehicle Rate**

**Option 1 Time of Day Pricing:**
- On-peak hours: Monday-Friday 9 a.m. to 11 p.m.

**Power Supply Charges:**
- All on-peak kWh
  - Capacity Energy: 8.023c per kWh
  - Non-Capacity Energy: 8.895c per kWh
- All off-peak kWh
  - Capacity Energy: 2.006c per kWh
  - Non-Capacity Energy: 2.223c per kWh

**Delivery Charges:**
- Service Charge: $1.95 per month
- Distribution kWh: 6.109c per kWh

**Option 2 Monthly Flat Fee (upon availability):**
- Monthly fee of $48.34 per vehicle including surcharges and credits.

This option is closed to new enrollments at May 9, 2019, and will no longer be offered to existing customers as of December 31, 2019.

Minnesota EV pilots

Xcel Energy optional Residential EV Charging Service tariff

• Success: Steep peak and off-peak differential increases off-peak charging to 90-94%
• Challenge: Required second meter installation may have lowered participation rates (473 customers or 7% of registered EVs, as of 4/2019)

Details:
• $4.95 monthly meter charge and per-kWh energy charges of $0.04 during off-peak times (a 12-hour period from 9 p.m. to 9 a.m.)
• Much higher charges of $0.20 (summer) and $0.17 (nonsummer) during peak times (9 a.m. to 9 p.m.)

Xcel Energy Residential EV Service Pilot
• Removed need for second meter installation (customers use EV charging equipment capable of transmitting on- and off-peak billing data), off-peak charging increases to 96%
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 disincentives for investments in services inherent in traditional cost-of-service model
- Levels investment playing field between CAPEX and OPEX
3 Takeaways for Wisconsin
Pilots are how utilities, regulators, customers . . .

<table>
<thead>
<tr>
<th>Test customer response . . .</th>
<th>Test grid/system response . . .</th>
<th>Test systems, processes, personnel . . .</th>
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<tbody>
<tr>
<td>• Do they like it?</td>
<td>• Load</td>
<td>• Outreach</td>
</tr>
<tr>
<td>• Save $?</td>
<td>• Load shape, shift</td>
<td>• Customer service rep training</td>
</tr>
<tr>
<td>• Want to control their energy?</td>
<td>• Revenue</td>
<td>• IS/IT system changes</td>
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<tr>
<td></td>
<td>• Revenue Stability?</td>
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Regulatory Assistance Project (RAP)®
Think it through . . .

- Goal → metric → performance → outcome framework
- Take advantage of others' ideas, wisdom and experience
- Consider what can go wrong
- Reevaluate, review, improve
Set guiding goals
From the goals consider performance criteria (directional targets)

Guiding goal: improve distribution system reliability

Directional target: 5% improvement in SAIFI from baseline value
Expressing targets with measurable performance criteria, expressed in standard metrics is a best practice.
Metrics

• Quantifiable measure of a specified performance

• Typically expressed as standard **power system measures** or **consumer impact measures**
Performance criteria to metrics

• Quantifiable measure of a specified performance
• Typically expressed as standard power system measures or consumer impact measures
• Examples:
  • Service quality: improved customer service time
  • EE savings: measure % EE savings of utility sales or reduced consumer bills as a result of EE
  • Reduced outages: SAIDI / SAIFI / CAIDI / CAIFI
Operational Incentives
Outputs are specific results of utility actions

Outcomes are how utility services affect ratepayers and society

<table>
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<tr>
<th>Output</th>
<th>Outcome</th>
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<tr>
<td>Certain SAIFI result</td>
<td>Reliable service</td>
</tr>
<tr>
<td>Calls to call center answered in less than 20 seconds</td>
<td>Responsive customer service</td>
</tr>
<tr>
<td>Disconnections at less than X per month</td>
<td>Universal service</td>
</tr>
<tr>
<td>Interconnection of DG averaging $X in user costs on average in under Y days</td>
<td>Supported customer generation</td>
</tr>
</tbody>
</table>
Public Metrics Only
- Metrics are publicized on a publicly 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

Figure 6. Metrics continuum
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
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)

- Revenue Regulation and Decoupling: A Guide to Theory and
  Application

- Decoupling Design: Customizing Revenue Regulation to Your State’s
  Priorities

- raponline.org
## How Changes in Sales Affect Earnings

<table>
<thead>
<tr>
<th>% Change in Sales</th>
<th>Revenue Change</th>
<th>Impact on Earnings</th>
<th>Actual ROE</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Pre-tax</td>
<td>After-tax</td>
<td>Net Earnings</td>
</tr>
<tr>
<td>5.00%</td>
<td>$9,047,538</td>
<td>$5,880,900</td>
<td>$15,780,900</td>
</tr>
<tr>
<td>4.00%</td>
<td>$7,238,031</td>
<td>$4,704,720</td>
<td>$14,604,720</td>
</tr>
<tr>
<td>3.00%</td>
<td>$5,428,523</td>
<td>$3,528,540</td>
<td>$13,428,540</td>
</tr>
<tr>
<td>2.00%</td>
<td>$3,619,015</td>
<td>$2,352,360</td>
<td>$12,252,360</td>
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<tr>
<td>1.00%</td>
<td>$1,809,508</td>
<td>$1,176,180</td>
<td>$11,076,180</td>
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<tr>
<td>0.00%</td>
<td>$0</td>
<td>$0</td>
<td>$9,900,000</td>
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<tr>
<td>-1.00%</td>
<td>-$1,809,508</td>
<td>-$1,176,180</td>
<td>$8,723,820</td>
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<tr>
<td>-2.00%</td>
<td>-$3,619,015</td>
<td>-$2,352,360</td>
<td>$7,547,640</td>
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<tr>
<td>-3.00%</td>
<td>-$5,428,523</td>
<td>-$3,528,540</td>
<td>$6,371,460</td>
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<tr>
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<td>-$4,704,720</td>
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<tr>
<td>-5.00%</td>
<td>-$9,047,538</td>
<td>-$5,880,900</td>
<td>$4,019,100</td>
</tr>
</tbody>
</table>
Decoupling rate adjustments have generally been very small.

<table>
<thead>
<tr>
<th>Without Decoupling</th>
<th>Ratio</th>
<th>Cost</th>
<th>Weighted without-tax cost of capital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>48%</td>
<td>10%</td>
<td>7.38%</td>
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<tr>
<td>Debt</td>
<td>52%</td>
<td>7%</td>
<td>2.37%</td>
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<tr>
<td>Weighted cost</td>
<td></td>
<td></td>
<td>9.75%</td>
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<tr>
<td>Revenue requirement: $1 Billion Rate Base</td>
<td>$97,506.154</td>
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</table>

<table>
<thead>
<tr>
<th>With Decoupling</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Equity</td>
<td>45%</td>
<td>10%</td>
<td>6.92%</td>
</tr>
<tr>
<td>Debt</td>
<td>55%</td>
<td>7%</td>
<td>2.5%</td>
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<tr>
<td>Weighted cost</td>
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<td>9.43%</td>
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<td>Revenue Requirement: $1 Billion Rate Base</td>
<td>$94,255,769</td>
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</tbody>
</table>

**Savings Due to Decoupling Cost of Capital Benefit:** $3,250,385
Revenue adjustment mechanisms

- **Revenue Per Customer** – Revenue requirement determined on a per customer basis and is adjusted for the total number of customers served.

- **Annual Review Decoupling (aka Attrition Decoupling)** – Rates are periodically adjusted for incremental and decremental known and measurable changes to rate base and operating expenses.