Basics of Cost of Service Regulation

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EV Grid Assist – Rates & Incentives
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Allowing more than one company in a network industry to compete results in redundancy and higher costs

Source: https://commons.wikimedia.org/wiki/File:New_York_utility_lines_in_1890.jpg
Overview of Cost of Service (COS) Regulation

- Electric utilities are generally monopolists
- Absent a competitive market, regulators must play role of enforcing economic efficiency
- Regulators strive to approve rates that are reflective of the costs of the services rendered by utilities
  - Costs must be deemed to be prudently incurred for inclusion in rates
  - Assets paid for in rates should be used and useful
  - Rates must be deemed fair and reasonable
  - Rates must allow a utility the opportunity to both sufficiently recover its incurred costs and to earn returns comparable to what a similarly situated utility would achieve
Elements of a Cost of Service (COS) Study

1. Determine the annual cost of serving all of the utility’s customers

- Operating Costs
- Depreciation
- Return
- Income Taxes

Revenue Requirement
Elements of a Cost of Service (COS) Study

2. Determine the cost responsibility for each customer class

- Operating Costs
- Depreciation
- Return
- Income Taxes

- Residential
- Commercial
- Large Power
- Street Lighting
Elements of a Cost of Service (COS) Study

3. Design rates that collect class-level revenue requirement for all customers in the class
Components of Revenue Requirement (RR)

**Operating Costs**
- Example:
  - Fuel & Purchased Power
  - Fixed O&M
  - Insurance
  - Taxes (excluding income tax)
  - Salaries

**Depreciation**
- Example:
  - Depreciation is return of utility capital invested in assets
  - Depreciation equals gross investment in assets ÷ useful life of assets
  - Collection of the depreciation amount ensures that the cost of each asset is collected equally over its useful life

**Return**
- Example:
  - Return on capital invested in rate base assets
  - Debt interest
  - Equity return (ROE)

**Income Tax**
- Example:
  - State income tax
  - Federal income tax
  - Note income tax is not applicable to all utilities
The annual revenue requirement amount can be compared to the size of a pie that is needed to serve all of the utility’s retail customers over a year.

The “Test Year” RR is the amount used to design rates in the general rate case. This may be a recent historical value or a future projected value.
The revenue requirement allocation determines revenue requirement amount that each customer class is responsible for.

This is analogous to dividing the pie into slices that correspond to the revenue responsibility for each customer class.
Allocation Factors Allocate RR to Customer Classes

- In the cost of service study, “allocation factors” are used to allocate each cost in the revenue requirement to individual customer classes.
- Allocation factors should match how costs are incurred (cost drivers).

<table>
<thead>
<tr>
<th>Embedded Cost Category</th>
<th>Example Allocation Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel, Variable O&amp;M</td>
<td><strong>Energy usage</strong> in each class (i.e., annual kWh consumption, by class)</td>
</tr>
<tr>
<td>Fixed O&amp;M</td>
<td><strong>Coincident Peak Demand</strong> in each class (i.e., 1 CP, 2 CP, 4 CP, 12 CP)</td>
</tr>
<tr>
<td>Depreciation</td>
<td></td>
</tr>
<tr>
<td>Return</td>
<td><strong>Number of Customers</strong> in each class (i.e., meters, accounts)</td>
</tr>
<tr>
<td>Income Tax</td>
<td></td>
</tr>
<tr>
<td>Cost categories:</td>
<td></td>
</tr>
<tr>
<td>Distribution,</td>
<td></td>
</tr>
<tr>
<td>Transmission,</td>
<td></td>
</tr>
<tr>
<td>Generation, Customer</td>
<td></td>
</tr>
</tbody>
</table>
Cost Allocation Example: Fuel & Purchased Power Costs

- This example shows the allocation of fuel & purchased power costs among residential and commercial customer classes using an energy usage (MWh) allocator.

<table>
<thead>
<tr>
<th>Allocation Component</th>
<th>Total</th>
<th>Residential</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel &amp; Purchased Power ($M)</td>
<td>$100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Allocator: Energy Usage (MWh)</td>
<td>600,000</td>
<td>230,000</td>
<td>370,000</td>
</tr>
<tr>
<td>Allocation Factor (%)</td>
<td>100%</td>
<td>38%</td>
<td>62%</td>
</tr>
<tr>
<td>Allocated RR ($MM)</td>
<td>$100</td>
<td>$38</td>
<td>$62</td>
</tr>
</tbody>
</table>

Revenue Requirement Example
Rate Design

- Rate design determines how each slice of the revenue requirement pie is collected.
- The rate design step allocates revenue responsibility to each customer in each class.
- Ideally, the entire slice of pie is collected from customers annually.
Retail rates are designed based on two broad concepts:

- Recover a utility’s costs (i.e., revenue requirement), apply sound ratemaking principles; and are considered just and reasonable.
- Satisfy certain policy and/or market objectives that can vary based on a state’s distinct rules, regulations, and policies, as well as different stakeholder motivations.
Commonly employed rate design principles include the following:

- Customer understanding
- Ease of implementation
- Collects utility’s cost of service
- Fairly apportions costs among customers
- Avoids undue discrimination

Balancing these principles can be more of an art rather than a science

Typically involves prioritizing policy goals such as sending economically efficient price signals, achieving GHG targets, enabling or promoting technology adoption of distributed resources.
## Rate Design: Common Rate Components

### $/kWh Volumetric Energy Charge

- **Options**: Flat, differs by quantity (inclining/declining blocks) and/or time-of-use (peak vs. off-peak period).
- **Science**: Ideally based on energy costs driven by electricity usage. Can include generation capacity costs.
- **Art**: In actuality, balances policy goals and ability of customers to understand and respond to price signals.

### $/kW-mo Volumetric Demand Charge

- **Options**: Differs by customer peak demand measurement period (i.e., monthly or ratchet). May also vary by TOU.
- **Science**: Ideally based on fixed costs driven by distribution and/or generation capacity infrastructure.
- **Art**: In actuality, balances metering ability and customer understanding of demand-based price signals.

### $/Month Customer Charge

- **Options**: Differs by customer class, size of customer (kWh, kW).
- **Science**: Ideally based on customer-related fixed costs (metering, billing, accounts).
- **Art**: In actuality, balances energy price signal and low-usage customer impacts.
Rate Design: Common Rate Components

**Volumetric Energy Charge**

- **$/kWh**
- **Options**: Flat, differs by quantity (inclining/declining blocks) and/or time-of-use (peak vs. off-peak period).
- **Science**: Ideally based on energy costs driven by electricity usage. Can include generation capacity costs.
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**Volumetric Demand Charge**

- **$/kW-mo**
- **Options**: Differs by customer peak demand measurement period (i.e., coincident or non-coincident). May also vary by time of use.
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## Rate Design: Common Rate Components

### Volumetric Energy Charge

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### Volumetric Demand Charge

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### Customer Charge

- **$/Month**
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- **Art**: In actuality, balances energy price signal and low-usage customer impacts.
Rate Design Example

In summary:
- Rates are designed to collect the revenue requirement that is allocated to each customer class.
- For each class and rate component, rates equal the allocated RR ÷ billing determinants.

<table>
<thead>
<tr>
<th>RR Component</th>
<th>Total</th>
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<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-fuel O&amp;M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(A) Allocated RR ($MM)</td>
<td>$85</td>
<td>$41</td>
<td>$44</td>
</tr>
<tr>
<td>(B) Billing Determinants (MWh)</td>
<td>600,000</td>
<td>230,000</td>
<td>370,000</td>
</tr>
<tr>
<td>Rate = A / B (¢/kWh)</td>
<td>$14.2</td>
<td>$17.8</td>
<td>$11.9</td>
</tr>
</tbody>
</table>
Ideal Outcome of CoS Ratemaking

Rates re(set) to exactly recover costs

Utility achieves authorized returns

Utility costs change by $X\%$/yr

Utility revenues change by $X\%$/yr

Utility billing determinants change by $X\%$/yr
Most Likely Outcome of CoS Ratemaking

Rates re(set) to exactly recover costs

Utility achieves higher/lower returns

Utility costs change by $X\%$/yr

Utility revenues change by $Z\%$/yr

Utility billing determinants change by $Y\%$/yr
Revenue Growth > Cost Growth

- When **revenue growth exceeds cost growth** between general rate cases (GRC), *ceteris paribus*, utility financial picture **improves**

- Utility increases its annual profits by not carrying out a GRC, leaving rates as is

- Regulators would need to compel utility to file a GRC, which in this scenario would reduce rates, but this only solves the problem temporarily

- Even if the utility files periodic GRCs, this issue persists between rate cases
Cost Growth > Revenue Growth

- When cost growth exceeds revenue growth between GRCs, *ceteris paribus*, the utility financial picture gets worse.
- The utility can have more frequent GRCs, but that only solves the problem temporarily.
  - If the utility does not file a GRC, the problem just keeps getting worse.
- More systemic issues may need to be addressed.
The Regulatory Balancing Act: Balancing Utility, Policy and Ratepayer Objectives

Utility Financial Health

- Allowed revenue requirement & allowed rate of return
- Allowed rate levels
- Approval of capital expenditures
- Interval between general rate cases
- Surcharges, decoupling

Impacts on Ratepayers

- Retail rate levels
- Bill impacts
- Complexity of rate structures
- Distributed resource programs, including program incentives
- Cost Shifts from DER programs

Common Policy Issues:

- GRC frequency, rate designs, Low-income customer protections
- Distributed resource program size, incentives
- Utility vs third-party ownership of generation
- Utility shareholder incentives
- Providing predictable regulation to support beneficial utility financial health outcomes

Regulator Balances Conflicting Objectives
Questions/Comments

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