BERKELEY LAB

Basics of Cost of Service Regulation

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EV Grid Assist – Rates & Incentives

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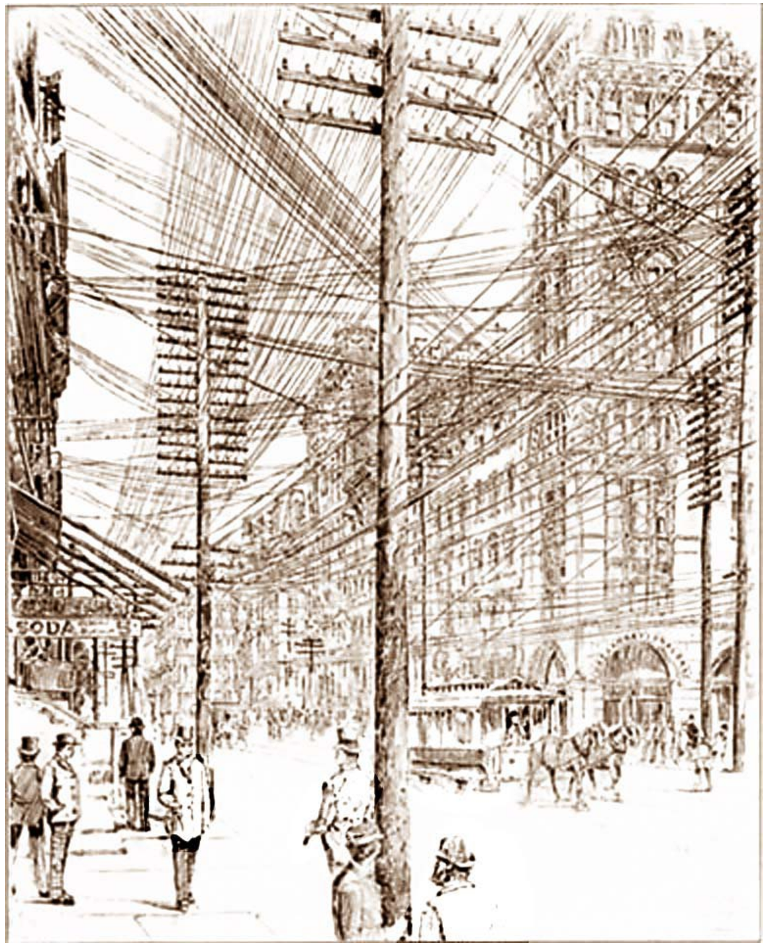
Allowing more than one company in a network industry to compete results in redundancy and higher costs



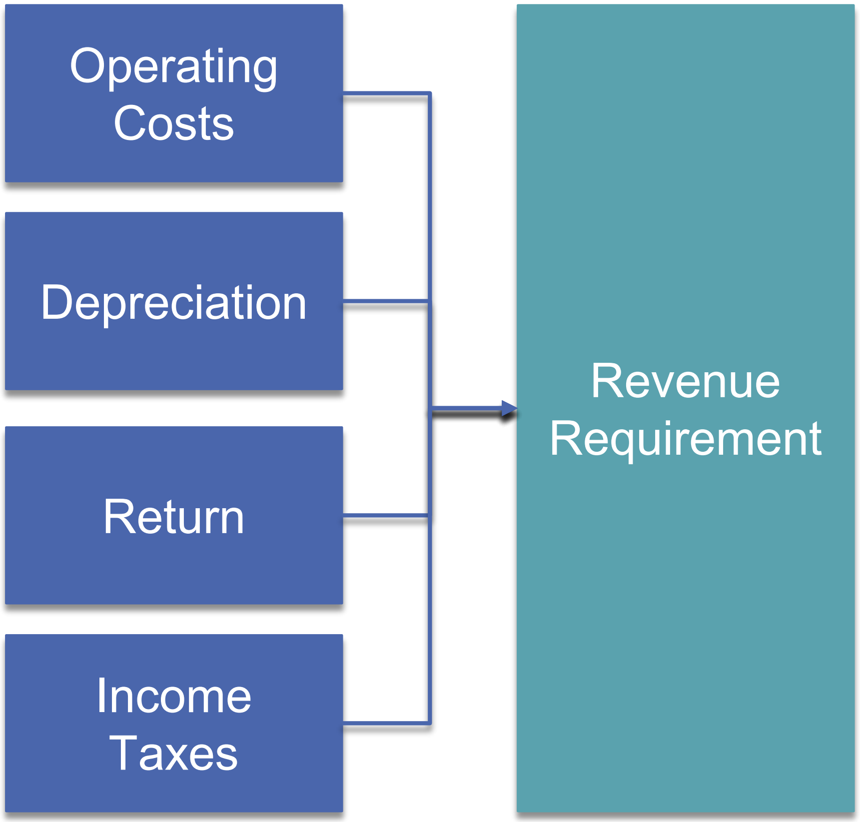
Source: https://commons.wikimedia.org/wiki/File:New_York_utility_lines_in_1890.jpg

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

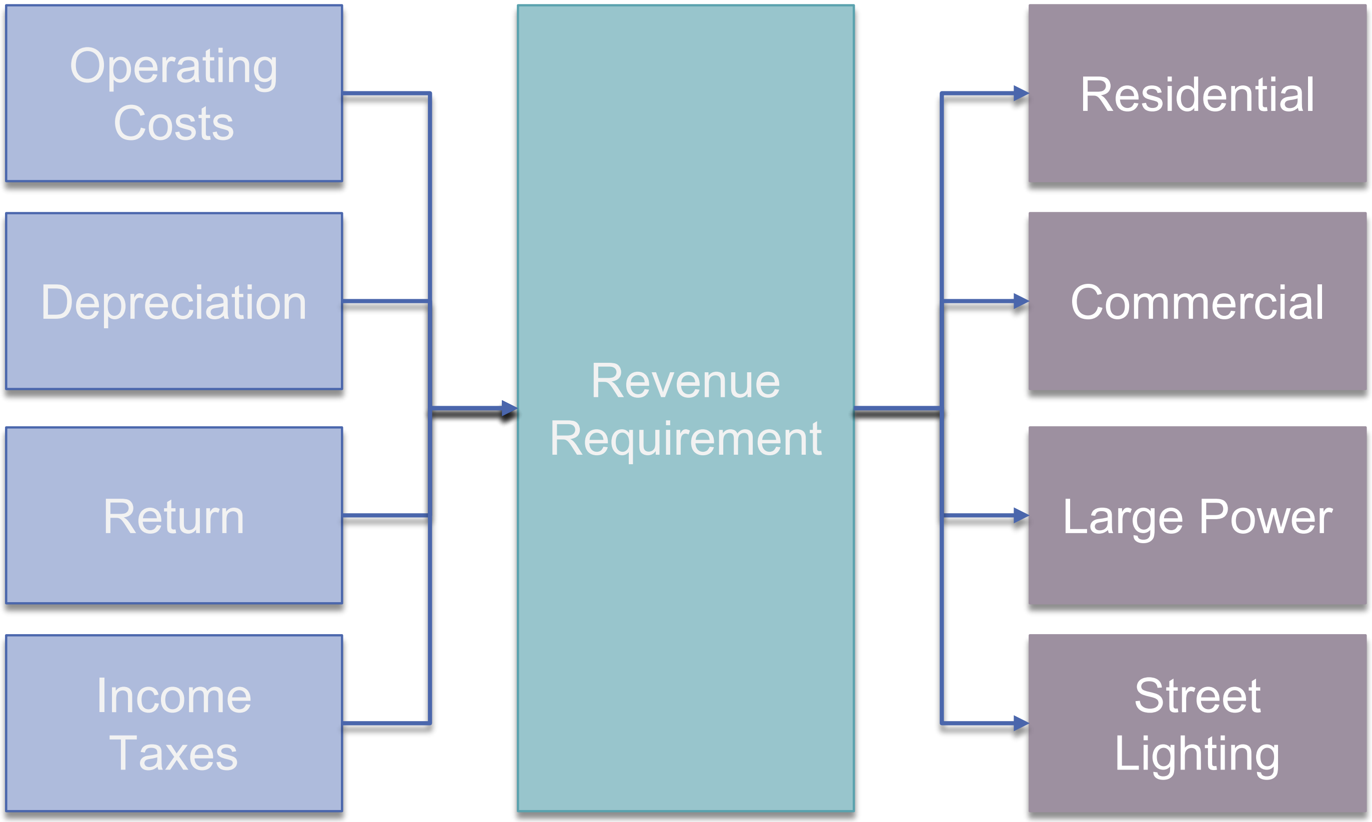
Elements of a Cost of Service (COS) Study

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



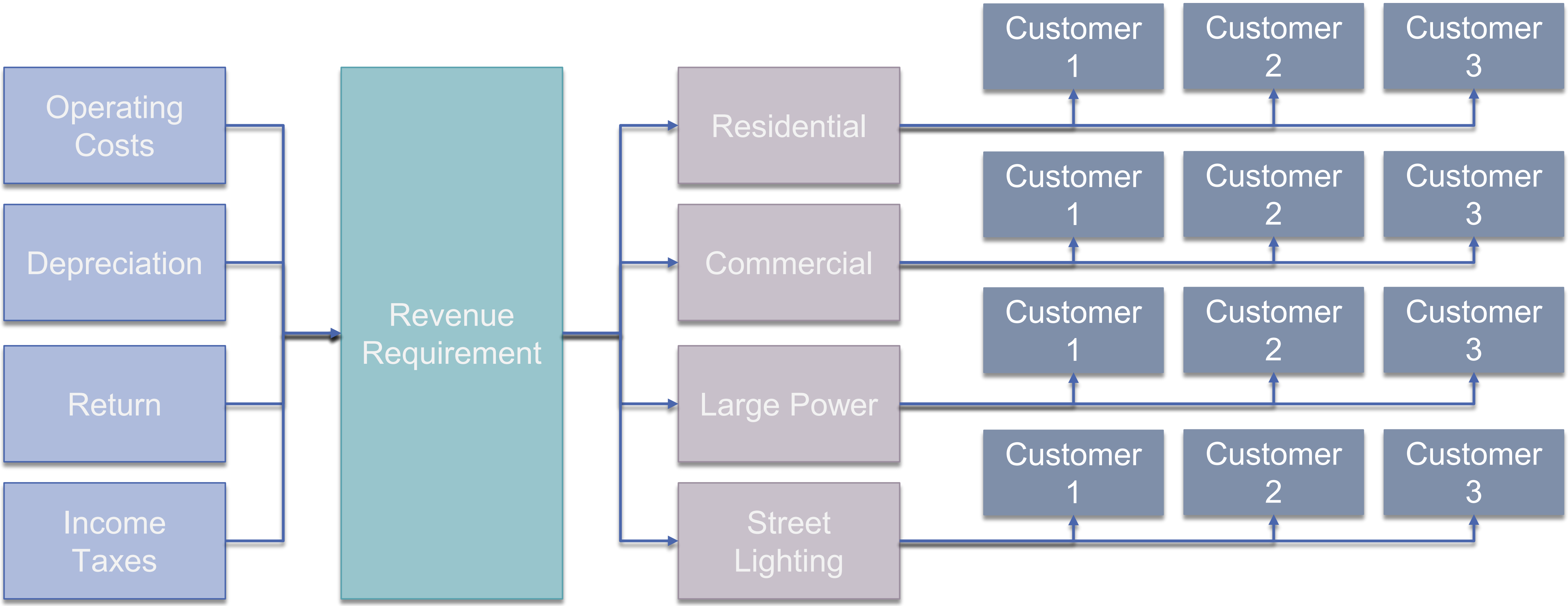
Elements of a Cost of Service (COS) Study

2. Determine the cost responsibility for each customer class



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 + **Depreciation** + **Return** + **Income Tax**

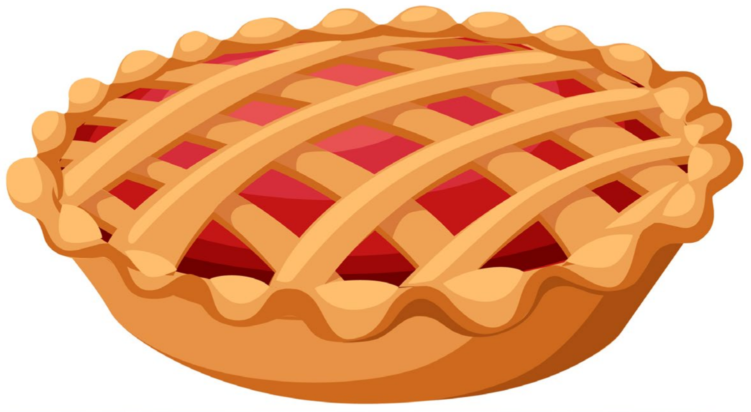
- **Example:**
  - Fuel & Purchased Power
  - Fixed O&M
  - Insurance
  - Taxes (excluding income tax)
  - Salaries

- **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

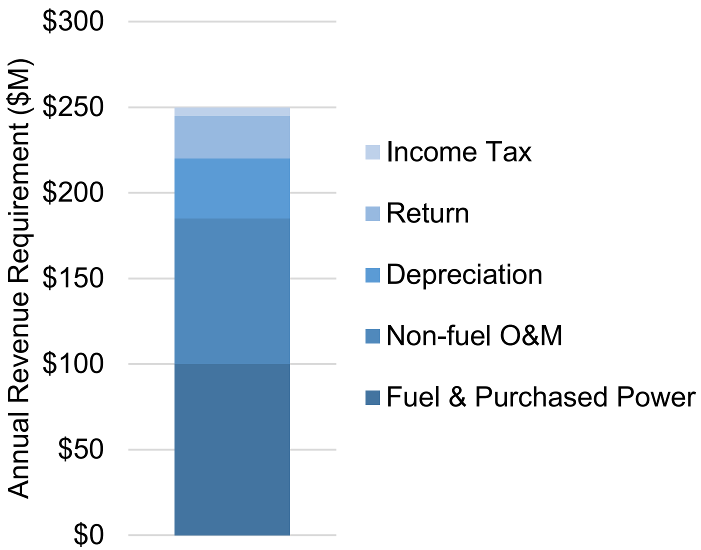
- **Example:**
  - Return **on** capital invested in rate base assets
  - Debt interest
  - Equity return (ROE)

- **Example:**
  - State income tax
  - Federal income tax
  - Note income tax is not applicable to all utilities

Test Year Revenue Requirement (RR)

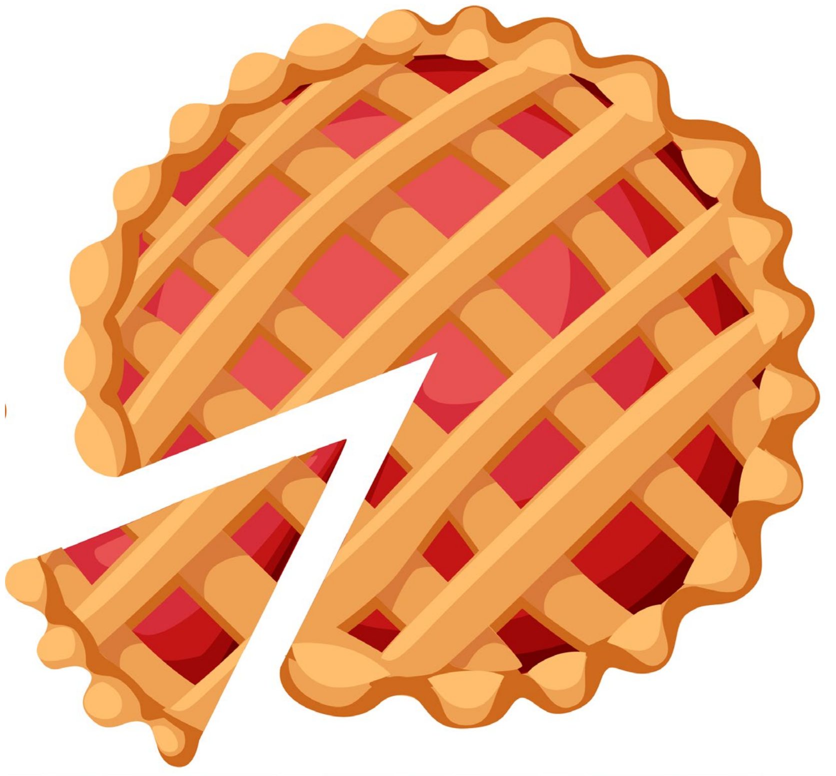


Revenue Requirement Example



- 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.

Allocation of RR to Customer Classes



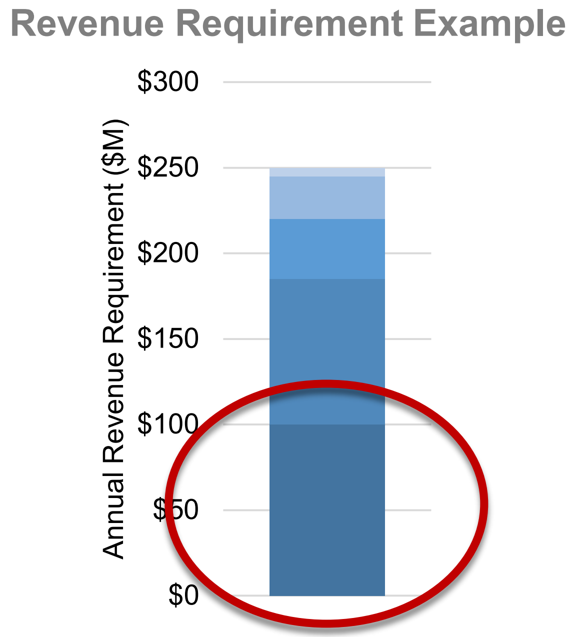
- The revenue requirement allocation determines revenue requirement amount that each customer class is responsible for
- This is analogous to dividing the pie into slices that correspond to the revenue responsibility for <u>each customer class</u>

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)

Embedded Cost Category	Example Allocation Factors
Fuel, Variable O&M	**Energy usage** in each class (i.e., annual kWh consumption, by class)
Fixed O&M **Depreciation** **Return** **Income Tax** Cost categories: Distribution, Transmission, Generation, Customer	**Coincident Peak Demand** in each class (i.e., 1 CP, 2 CP, 4 CP, 12 CP) **Number of Customers** in each class (i.e., meters, accounts)

Cost Allocation Example: Fuel & Purchased Power Costs



Allocation Component	Total	Residential	Commercial
Fuel & Purchased Power ($M)	**$100**		
Allocator: Energy Usage (MWh)	600,000	230,000	370,000
Allocation Factor (%)	100%	38%	62%
Allocated RR ($MM)	$100	$38	$62

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

Rate Design

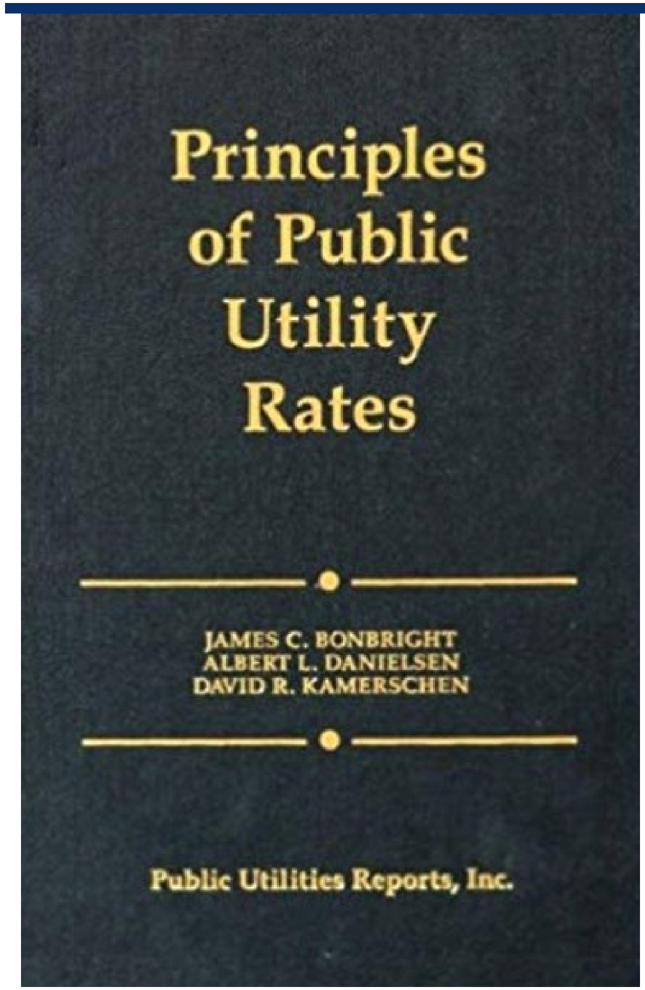
- Rate design determines how each slice of the revenue requirement pie is collected
- The rate design step allocates revenue responsibility to <u>each customer in each class.</u>
- Ideally, the entire slice of pie is collected from customers annually.

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

Rate Design Criteria (Bonbright Principles)



- **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.

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$/kW-mo — Volumetric Demand Charge

- **Options**: Differs by customer peak demand measurement period (i.e., coincident or non-coincident). May also vary by time of use.
- **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.

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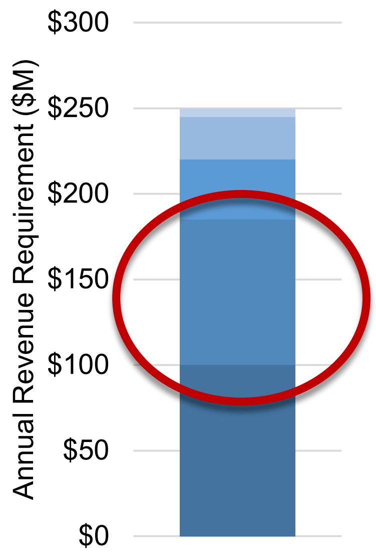
$/Month — Customer Charge

- **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 Example

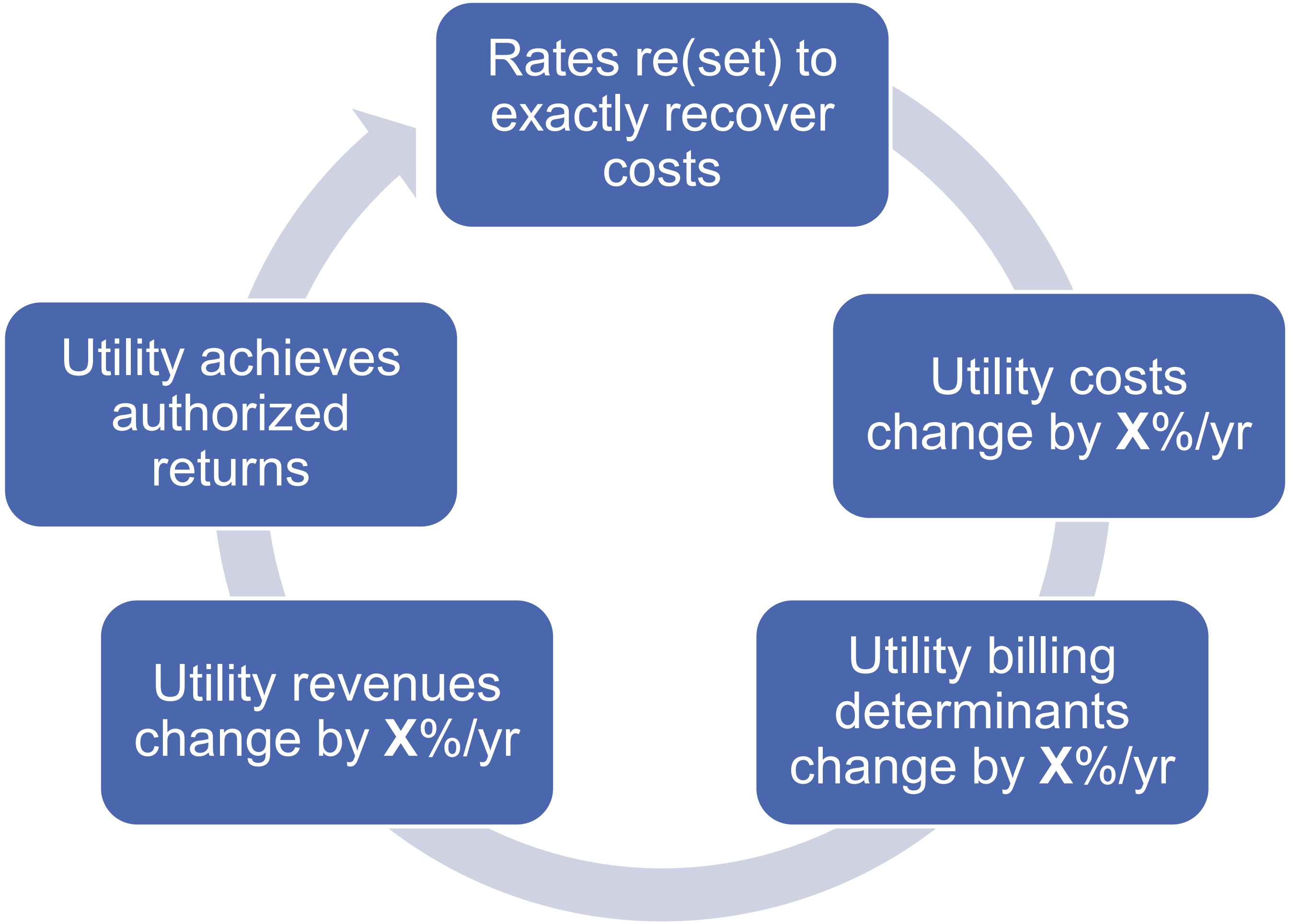
RR Component	Total	Residential	Commercial
Non-fuel O&M			
(A) Allocated RR ($MM)	$85	$41	$44
(B) Billing Determinants (MWh)	600,000	230,000	370,000
Rate = A / B (¢/kWh)	**$14.2**	**$17.8**	**$11.9**

Revenue Requirement Example

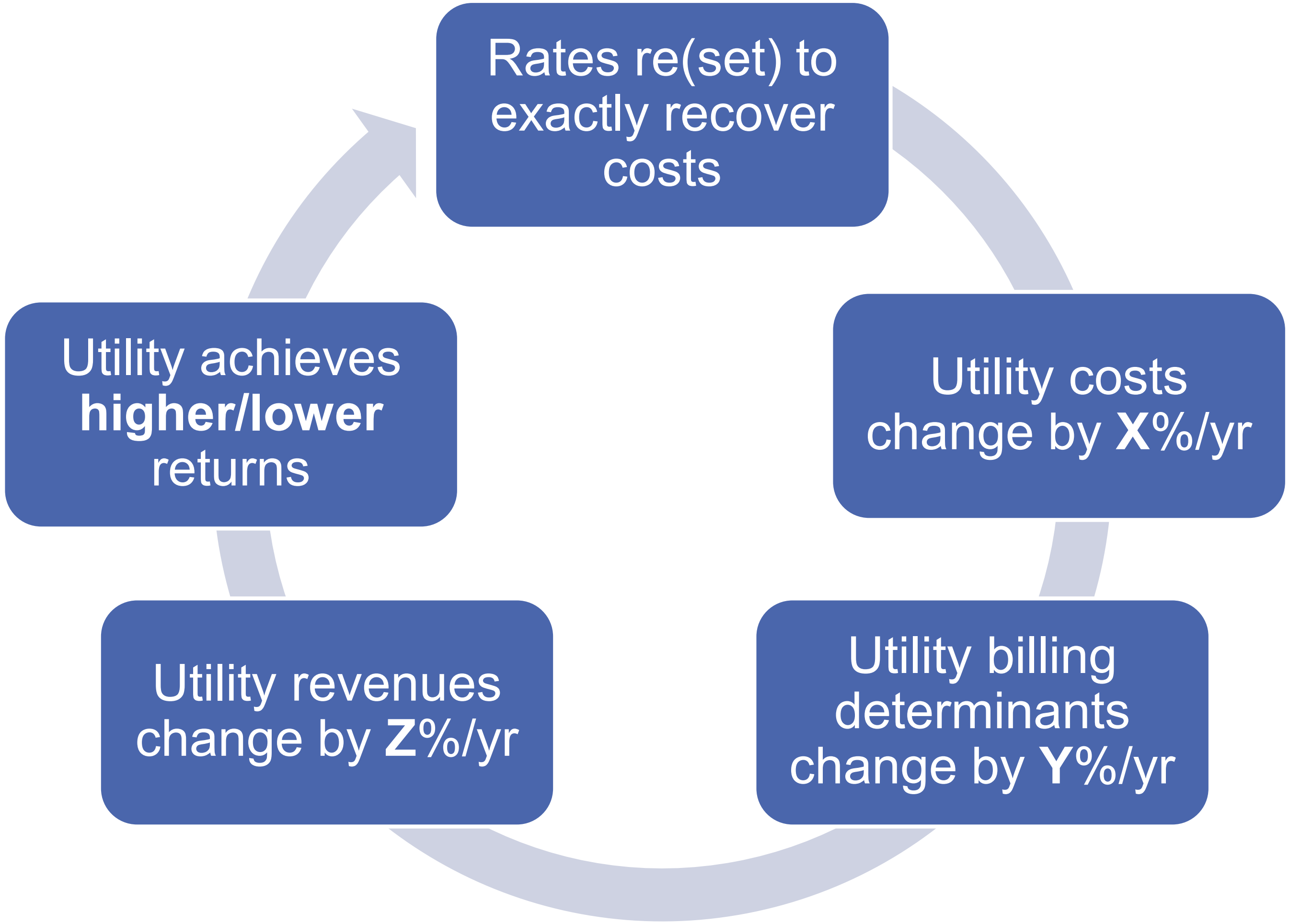


- In summary:
  - Rates are designed to collect the revenue requirement that is allocated to each customer class
  - For each class and rate component, rates equal the allocated RR ÷ billing determinants

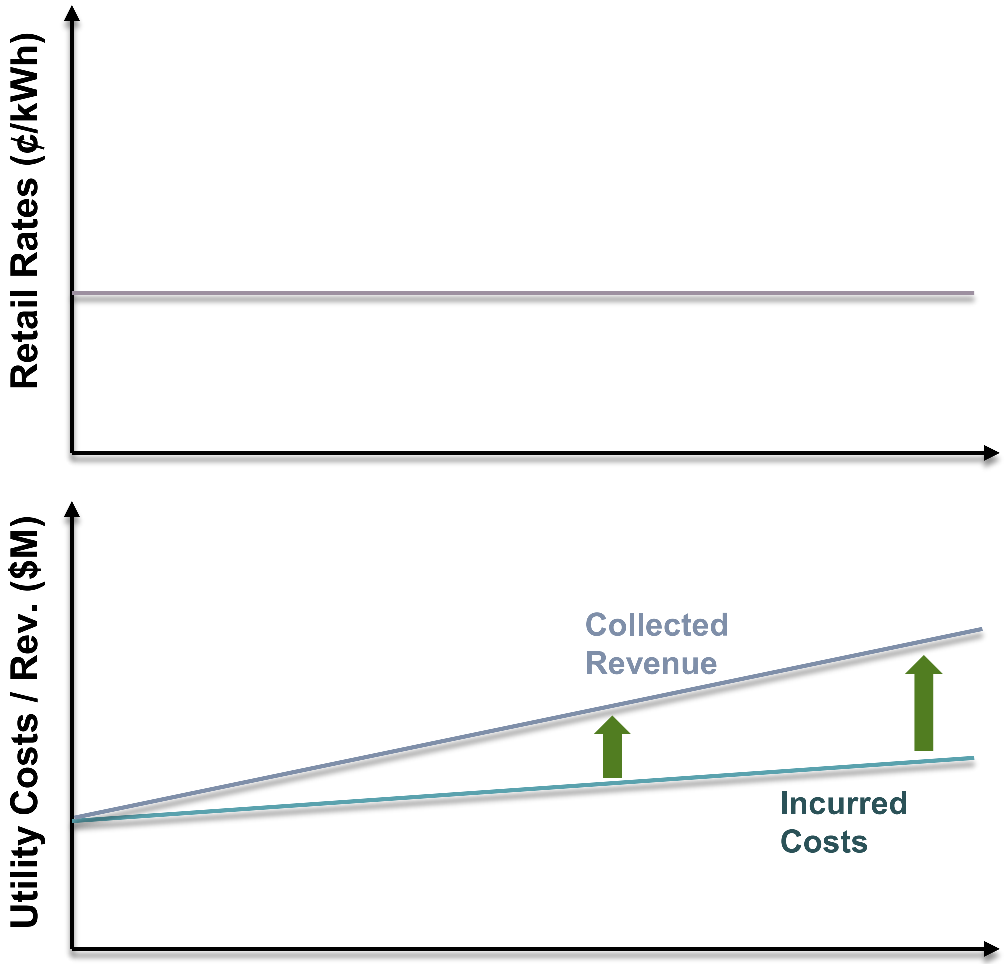
Ideal Outcome of CoS Ratemaking



Most Likely Outcome of CoS Ratemaking

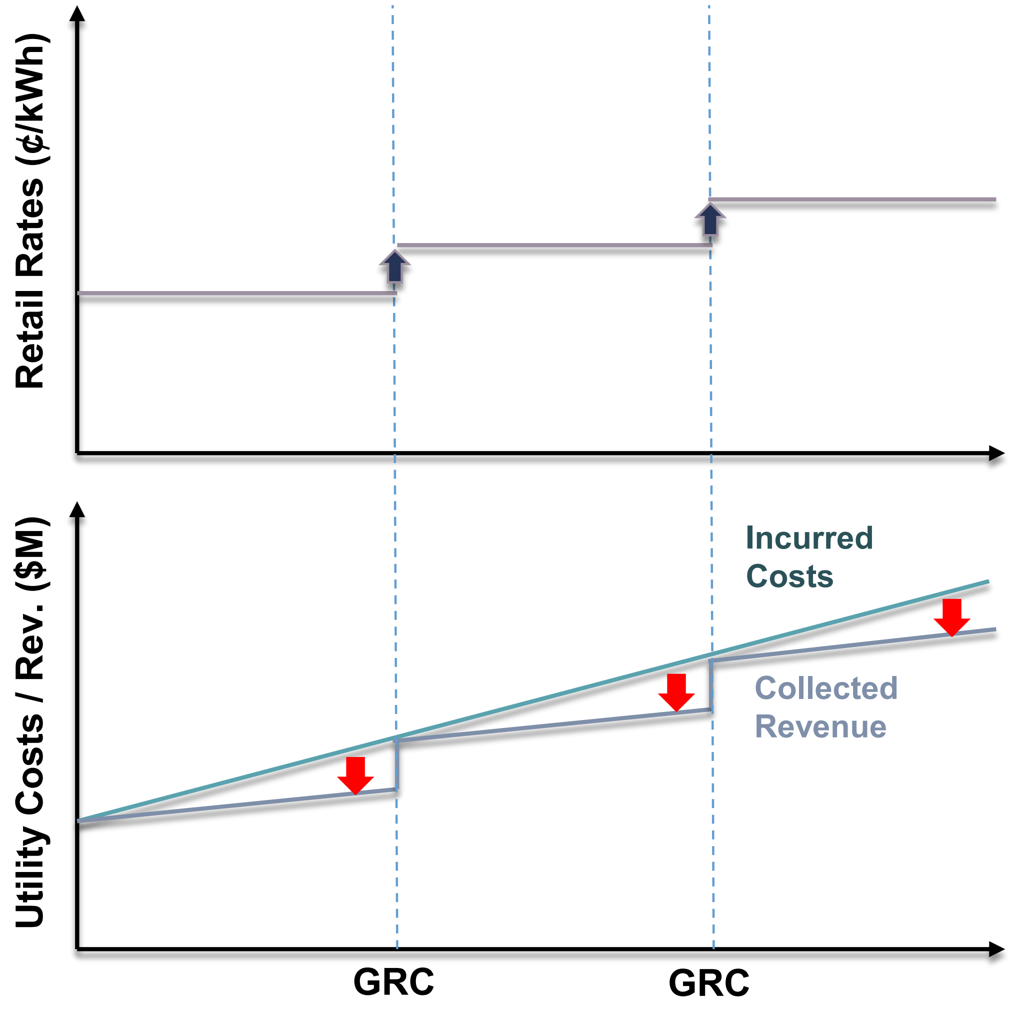


Revenue Growth > Cost Growth



- 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

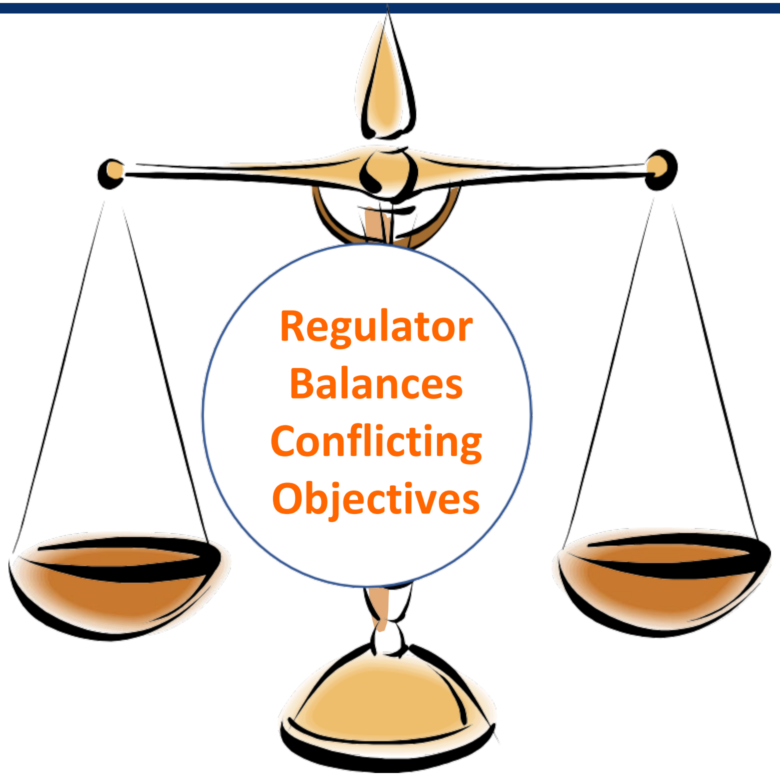


- When **cost growth exceeds revenue growth** between GRCs, *ceteris paribus*, the utility **financial** picture gets **worse**
- The utility can have more frequent GRCs, but that only solves the problem temporarily
  - If the utility does not file a GRC, the problem just keeps getting worse
- More systemic 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

Questions/Comments

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