How Does Rochelle City Council Receive Advice on Electrical Rates ?

Process

- RMU engages rate consultants to perform cost of service and financial performance analysis to identify rate requirements

- RMU has since 2011 had three studies done (2012, 2013 and 2014/15). Before these no rate studies had been done after 2004.

- These studies are reviewed with the Utility Advisory Board (UAB) (See RMU web site)

- After UAB review the recommendations are presented to the council

Goals of Public Utility Ratemaking: A Balancing Act

- Reasonable rates for all customers

- Rates that reflect cost

- Minimization of subsidies

- Protect customers from large bill impacts from short term market or system changes

- Social concerns

Rate Application Challenges

- Energy and demand forecast

- Revenue requirements

- Rate of return and return on equity

- Cost of service:
  - Allocate costs to jurisdiction, customer class and rates within each customer class

- Rate design:
  - Design rate structures and set prices

Cost of Service Analysis

Why Compute Cost of Service?

- Per the National Association of Regulatory Utility Commissioners (NARUC), the cost-of-service standard remains the primary criterion for reasonableness of rates

- What is an embedded Cost-of-Service Study?

  – An analysis in which a utility's *embedded* cost of providing service (i.e., revenue requirements) is determined by customer classes or other groupings

  – Embedded costs are the accounting costs on the company's balance sheet and income statement

Cost-of-Service Steps

1. Compile
2. Functionalize
3. Levelize
4. Classify
5. Assign
6. Allocate
7. Determine Return

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Step 1

Compile appropriate rate base, expenses, and revenues ; decide upon categories of customers to be analyzed

Step 1: Total Company Summary

	Total System	Residential	Commercial	Industrial	Lighting	Total Retail Service	Total Other Service
Rate base							
Revenues							
Expenses							
O&M – fuel							
O&M – other							
Depreciation & amort. expense							
Payments in Lieu of taxes							
Total adjusted expenses							
Net operating income							
Rate of return							

Cost-of-Service Steps

1. Compile
2. <u>Functionalize</u>
3. Levelize
4. Classify
5. Assign
6. Allocate
7. Determine Return

Step 2

Functionalize rate base and expense items by four major functions:

a. generation/supply
b. transmission
c. distribution
d. general plant and administration

Step 2: Functionalization

- Production (Generation)
  - Process of converting other forms of energy into electricity
- Transmission
  - Process of sending the electricity generated at the centralized power station through wire at high voltage to the substation where it is transformed to low voltage
- Distribution
  - Process of delivering electricity to customer meters through low voltage lines
- General plant support and other

Cost-of-Service Steps

- Compile
- Functionalize
- Levelize
- Classify
- Assign
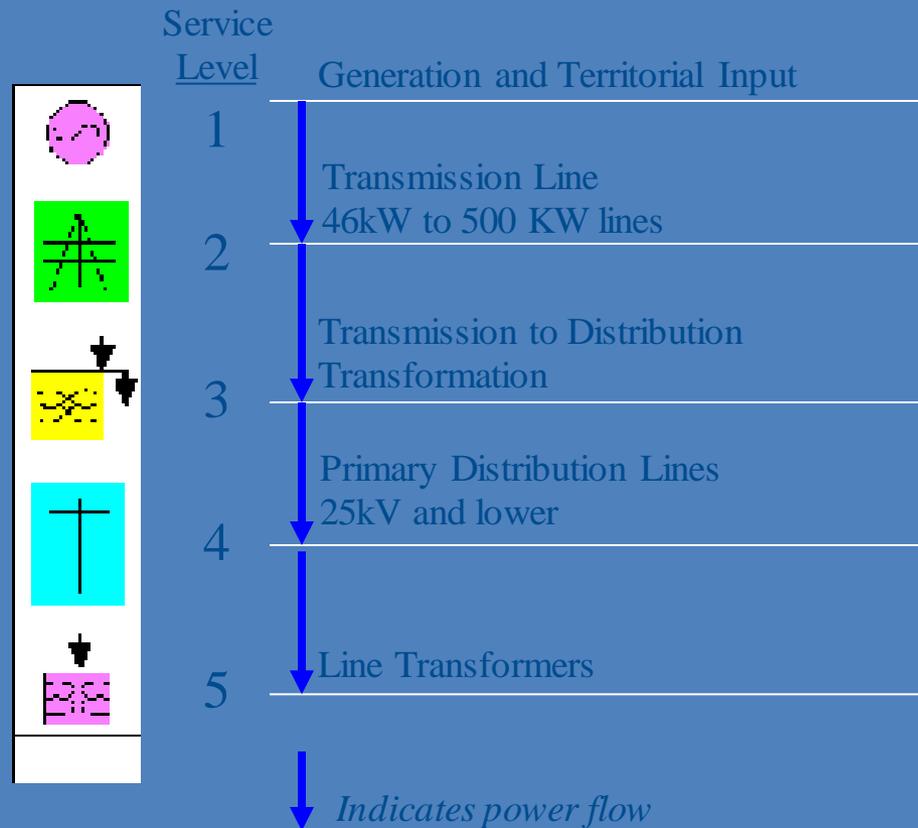- Allocate
- Determine Return

Step 3

Identify rate base, expenses, and customers (and their usage) with voltage service levels:

Customers are responsible for costs at their level and higher.

Develop Levelized Demand and Energy Allocators

Service Level Designation and Power Flow Diagram

Service Level

Generation and Territorial Input

1

Transmission Line
46kW to 500 KW lines

2

Transmission to Distribution
Transformation

3

Primary Distribution Lines
25kV and lower

4

Line Transformers

5

Indicates power flow

Cost-of-Service Steps

1. Compile
2. Functionalize
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Step 4

Classify rate base and expense items by cost causative (and observable) characteristics:

a. Energy-related
b. Demand-related
c. Customer-related
d. Revenue-related

Step 4: Classifying Costs

❑ Gross plant assets (and depreciation):
demand, energy, and customer components

Service Level	Generation		Transmission	Distribution	
	Demand	Energy	Demand	Demand	Customer
Level 1	✔	✓			
Level 2			✔		
Level 3				✔	✔
Level 4				✔	✔
Level 5				✔	✔

Cost-of-Service Steps

1. Compile
2. Functionalize
3. Levelize
4. Classify
5. Assign
6. Allocate
7. Determine Return

Step 5

Assign those rate base expense and revenue items that can be <u>directly</u> associated with serving the previously decided upon customer categories

Step 5: Directly Assign

- Revenue from sales
- Customer-specific lines
- Meters
- Sales support and billing costs

Cost-of-Service Steps

1. Compile
2. Functionalize
3. Levelize
4. Classify
5. Assign
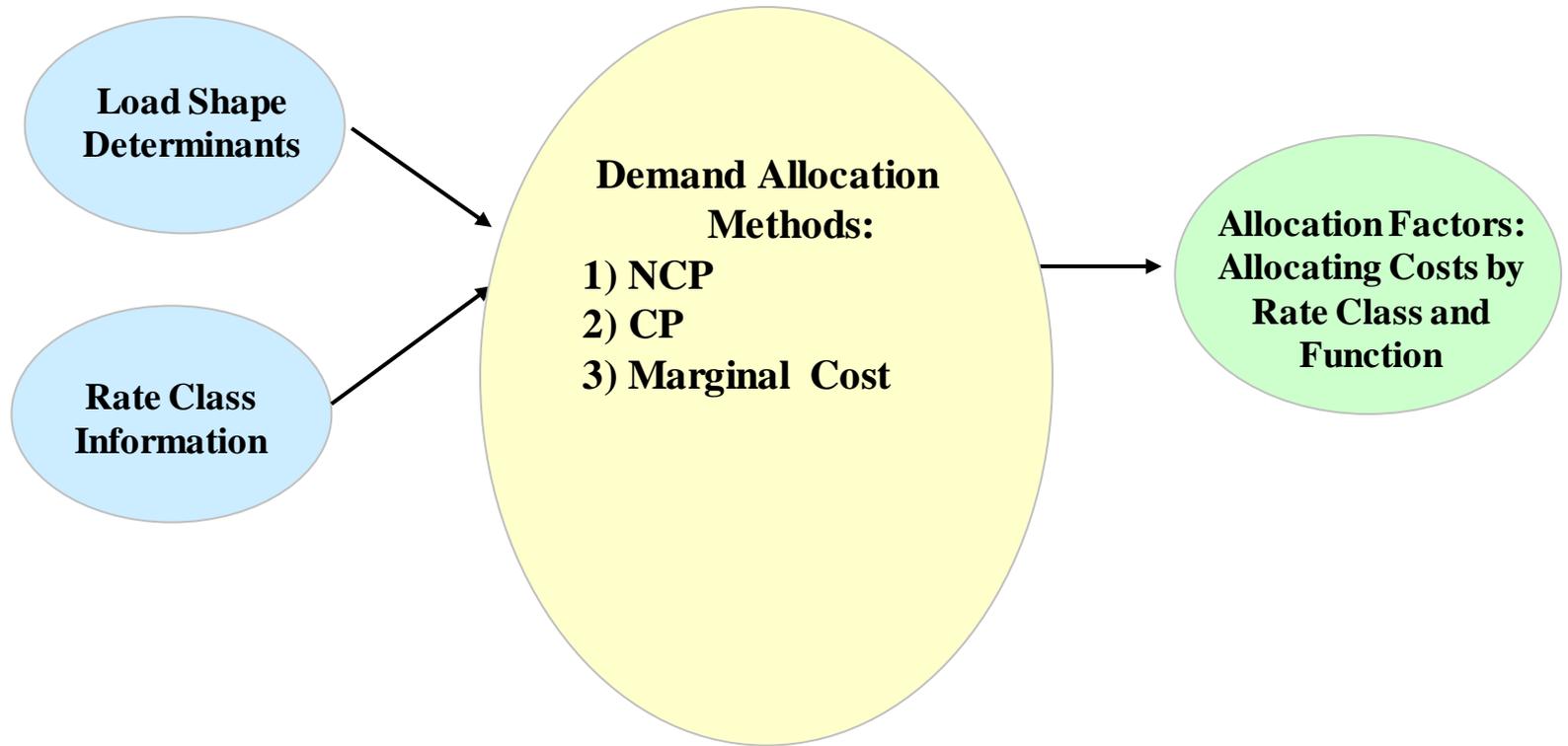6. Allocate
7. Determine Return

Step 6

Allocate those common rate base, expense, and revenue items to the customer categories

* appropriate allocators must be developed

Step 6: Develop Allocators

- Determine **customers** for each class by level of service

- Determine **energy consumption** (kWh) by level and customer class

- Determine **demand** (kW) by level and customer class

  - Coincident peak (CP)

  - Non-coincident peak (NCP)

Developing Demand Allocators

Cost-of-Service Steps

1. Compile
2. Functionalize
3. Levelize
4. Classify
5. Assign
6. Allocate
7. Determine Return

Step 7

Determine rate of return for evaluation

Cost-of-Service Summary

- COS analysis distributes rate base, revenues, and costs across tariff groups according to a well-defined set of rules:
  - Create rows for each function and level
  - Classify each row by cost causation factor
  - Spread across columns of rates according to assignment and allocation
- COS Results: essentials for rate design
  - Revenue requirement (target: x %, actual y %)
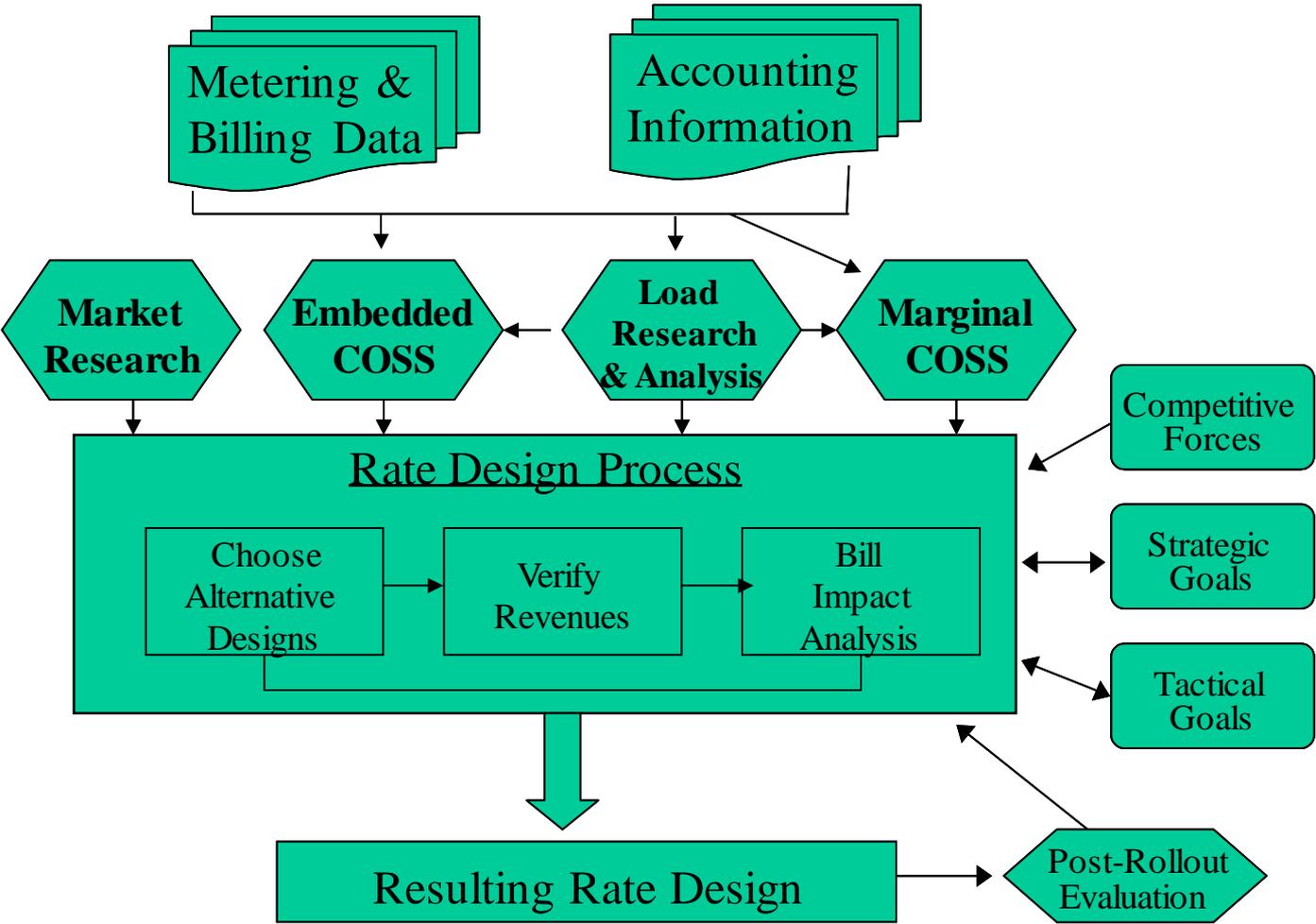 - Unit costs and current rate of return by tariff

■ Rate Design

Bonbright Principles
Criteria of a Sound Rate Structure

- Simple and acceptable
- Freedom from controversy
- Yield total revenue requirements
- Revenue stability
- Rate stability
- Fair
- Avoid undue discrimination
- Encourage efficient use

Rate Design Flow Chart

Metering & Billing Data

Accounting Information

Market Research

Embedded COSS

Load Research & Analysis

Marginal COSS

Competitive Forces

Rate Design Process

Choose Alternative Designs

Verify Revenues

Bill Impact Analysis

Strategic Goals

Tactical Goals

Resulting Rate Design

Post-Rollout Evaluation

Types of Charges

- Three major ways to bill a customer
  - Customer or base charge: $/customer/month
  - Demand (highest level of measured consumption): $/kW/month
  - Energy: $/kWh usage/month

Traditional Rate Designs

- Energy-only Rates

- Demand and Energy Rates
  - Customer, Demand, and Energy rates (Hopkinson)
  - Hours-of-Use rates (Wright)

- Time-Differentiated Rates
  - Seasonal Rates
  - Time-of-Use Rates

Demand and Energy Rates

- Demand rate:
  - Bills customers for maximum measured demand and for energy usage, plus customer charge

  - Example:
    - $15.00 per kW of maximum demand per month
    - $0.08 per kWh usage in a given billing month
    - $200 per month customer charge

  - Rates can have declining or inverted block demand and/or usage charges

Seasonal Rates

- Rates that differ by the season of the year

- Seasonal rates are still fixed for the season and are not dynamic

- May have two or more seasons

Time-Differentiated Rates

- Price differs by hour of the day

- Benefits
  - Costs differ by time; prices better reflect cost causality
  - Can induce load shifting, lowering overall costs
  - Customer's time pattern of usage determines cost

Summary

- ## Ratemaking
  - Embedded cost-based COS

- ## Cost of Service
  - Seven steps yield costs and rate of return by rate; provide basis for revenue request and rate setting

- ## Rate Design
  - Rates serve multiple objectives, leading to trade-offs
    - Revenue recovery and pricing efficiency are central
  - Innovative rates add pricing efficiency and complexity

For more info

- Read Cost of Service Study
- Email Dan Westin at RMU
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