



# Cost of Service in Michigan

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# Principals of a Cost of Service Study

- A class cost of service allocation study is a basic analytical tool used in utility rate design.
- Class cost of service studies are utilized to determine the revenue requirement for the services offered by the utility and to determine the costs that different classes of customers impose on the utility system.

# Principals of a Cost of Service Study (2)

Based on the assumption that service should be provided at cost, whether that is to the

- (a.) overall level of rates,
- (b.) the rates set for individual services,
- (c.) classes of customers and
- (d.) segments of the utilities business

Basically, the objective of a cost of service study is to apportion all costs required to serve customers among each customer class in a fair and equitable manner.

# Principals of a Cost of Service Study (3)

Cost allocation calculated through a cost of service study determines how many dollars to collect from various classes or rates allowing the proper total revenue requirement to be collected through rates

Rate design determines how to collect dollars from various customer groups

# Definitions

- System Peak Demand – The highest total hourly demand (MW) for all customers served on the utility's distribution system within a specific period (day, month, year). Typically referred to as the 'system peak'.
- Coincident Peak Demand – The demand of any class within a specific period (day, month, year) that occurs at the same time as the system peak demand for the same period.
- Coincident 12 CP Demand – The demand value derived by averaging the actual demand values registered on the monthly peak days for January through December.

# Definitions Continued

- Non-Coincident Peak Demand – The maximum demand of any class within a specific period but not necessarily occurring at the time of the system peak demand for that period.
- Losses – A term used to define the difference between the electrical energy delivered to a customer (or a given point on the electrical distribution system) and the amount of electrical energy that must be generated at the power plant to serve that customer. In other words, losses refer to the amount of power lost in transferring power from the power plant to the point of delivery (often referred to as line loss). Line losses will vary by rate class based upon the voltage level at which each class is served.

# Methodologies of Cost Studies

- **Accounting Based (Embedded)** – Cost study based on monies actually spent (embedded) for plant and operating expenses and fully allocate or distributed them among the classes of customers according to the principals of cost causation.
- **Marginal Cost Methodologies** – Based on theory that in a perfectly competitive equilibrium, that the amount consumers are willing to pay for the last unit of good or service equals the marginal price (an amount equal to the resources used to produce it). Attempts to set prices at marginal cost
- Michigan Uses an Embedded Cost Study

# Accounting Based Method (Embedded)

- Work better in a historical environment without high inflation or high construction costs.
- Verifiability and simplicity of the embedded cost study outweighs any hoped efficiencies and benefits of imperfect approximations of using a marginal cost methodology.



# Embedded Cost Studies in Michigan

- To do an embedded cost study in Michigan, we use the following principal types of information:
  - i. plant investment data
  - ii. detailed property records
  - ii. balance sheets
  - iv. operating expenses
  - v. information on KWH consumption and patterns of that consumption
  - vi. System maps

# Other Sources of Information

- Another source of Information is the Uniform System of Accounts with the following categories of costs:
  - i. 100 Series                      Assets and other debits
  - ii. 200 Series                      Liabilities and other credits
  - iii. 300 Series                      Electric plant accounts
  - iv. 400 Series                      Income and revenue accounts
  - v. 500 Series                      Operations and maintenance
  - vi. 900 Series                      Administrative and General

# The Uniform System of Accounts Continued...

- MPSC Uniform System of Accounts governs utility accounting for ratemaking purposes and serves as the basis for functionalizing costs, e.g., the USA requires utilities to record generating plant costs in accounts 310 - 359 and the associated O&M expense in accounts 500 - 557. These costs are directly assigned to the power supply function.
- Similarly, there are accounts in which the USA requires utilities to record distribution plant and O&M costs that are directly assigned to the distribution function. The O&M cost in accounts associated with providing customer service are directly assigned to distribution because they apply whether a customer receives power supply from the utility or an alternative electric supplier.
- Because Michigan utilities have divested transmission plant, all that remains in the USA's accounts designated for transmission are the plant costs associated with generator step up transformers. These costs are directly assigned to power supply. In addition, power supply includes the expense charged to account 565, "Transmission of Electricity by Others" including MISO charges.

# Use of Information

- We then use the information gathered to determine the revenue requirement, expressed as  $R = (V-D) r + E$ , where:

R = Revenue Requirements

V = Value of Rate Base

(Plant in Service plus Working Capital)

D = Accumulated Depreciation

r = Rate of Return on investment

E = Operating Expenses

# 3 Steps in the Cost Allocation Process

- **“Functionalization”**
- **“Classification”**
- **“Allocation”**

# “Functionalization”

**What purpose does the cost serve for the utility?**

- Once the relevant data on investment and operating costs are gathered, the costs are separated by function
  - a.) Production or Purchased Power
  - b.) Transmission
  - c.) Distribution
  - d.) Customer Service
  - e.) Administrative and General

# Production or Purchased power

- Costs that are associated with power generation and wholesale purchases, whether that be fossil fuel fired, nuclear, hydro, solar or wind.
- May be sub-functionalized into generation type
  - a.) fossil
  - b.) steam
  - c.) nuclear
  - d.) hydroelectric

# Transmission

- Includes the assets and expenses associated with high voltage system
  - a.) high voltage power lines and substations
  - b.) transmission systems are distinguished by voltages and the ways in which those facilities are configured



# Distribution

- The system that connects the customer to the transmission system and is extensively subdivided in order to recognize the non-utilization of certain types of plant by particular customer classes, (such as those that take power at the primary voltage).
- May be sub-functionalized into specific types
  - a.) primary
  - b.) secondary

# Customer service

- Includes the plant and expenses that are associated with providing the service drop and meter, meter reading, billing and collection, and customer information and services.
- Customer related costs include billing, collections, information, customer service, and advertising and promotion.
  - Uncollectible accounts are included and are sometimes directly assigned to specific classes.
- These costs may be functionalized and classified as part of the distribution function related to customers.
  - Sometimes these are functionalized on a plant/labor based method.
- Customer account costs, sales costs and customer service costs are generally considered customer related, while load management and conservation efforts maybe allocated based on program goals.

# Administrative and General

- Management costs, administrative buildings, that cannot be directly assigned to any other major cost functions.
- Administrative and General costs are costs not included elsewhere such as general salaries, insurance, general office building and expenses or transportation equipment.
- These costs are allocated either on the sum of the other operating and maintenance costs or based on whether they are labor related, plant related or can be directly assigned.
- The property tax associated with production plant is directly assigned to power supply based on tax information provided by the Property Tax Department.
  - A share of the property tax associated with general and software plant is allocated to power supply in proportion to the power supply-related general and software plant and the remaining balance is assigned to distribution.

# **“Classification”**

**What causes the costs to be incurred?”**

- The next step is to separate the functionalized costs into classifications based on the components of utility service being provided. There are three principal cost classifications for an electric utility.
  - a.) DEMAND COSTS
  - b.) ENERGY COSTS
  - c.) CUSTOMER COSTS

# Principal Cost Classifications

- Demand Costs - costs that vary with the KW demand imposed by the customer
- Energy Costs – costs that vary with the energy or KWH that the utility provides
- Customer Costs – costs that are directly related to the number of customers served

# Cost Function Production

- Typically classified as either demand or energy related.
- Type of Production Classified as Demand Related:

Fixed production costs are those associated with the generating plant owned by the utility and include cost of capital, depreciation, taxes and fixed O&M. Fixed production costs vary with capacity additions and not with energy produced and is classified as demand related. (theory that plant is fixed to meet demand).

# Cost Function Production

- Type of Production Classified as Energy Related:
- Variable production costs are those costs that change with the amount of energy produced, delivered or purchased and are classified as energy related. (theory that KWH varies with system energy requirements, variable production costs should be allocated on a KWH basis.

# Transmission, Distribution and Customer Service Cost Functions

- “**Transmission**” is typically classified as either demand or energy related.
- “**Distribution**” is typically classified as either demand, or customer related.
- “**Customer Service**” is typically classified as customer related or demand related



# **“Allocation”**

**How much of the total cost should each customer class pay?**

- After the costs have been functionalized and classified, the next step is to allocate them among the customer classes. The customers served and are separated into several groups based on the nature of the service provided and characteristics. There are three principal customer classes.

# Three Principal Customer Classes

- 1.) Residential
- 2.) Commercial, Secondary and Primary
- 3.) Industrial, Secondary and Primary

Customer classifications should produce homogeneous groups based upon characteristics of each group

# How Functionalized and Classified Costs are Allocated to Customer Classes

- Demand related costs are allocated among the classes on the basis of demands (KW) imposed on the system during specific peak hours
- Energy related costs are allocated among the customer classes on the basis of energy (KWH) which the system must supply to serve the customers
- Customer related costs are based on the number of customers or the weighted number of customers

# Production and Transmission Allocation

- “The cost of providing service to each customer class shall be based on the allocation of production-related and transmission costs based on using the 50-25-25 method of cost allocation.” Michigan Public Act 286.

Production and transmission are allocated similarly because the transmission system is considered to be an extension of the production function.

However, the Michigan PSC has also allowed the 12 CP 75 / 25 method for utilities serving less than 1 million customers in the State.

- For distribution, allocated using factors reflecting relevant demand levels, number of customers or a cost-weighted number of customers.

# 12 CP 50/25/25

- This allocation method assigns a 50% weight to the coincident peak demand, a 25% weight to the energy used in the on-peak period, and a 25% weight to total energy use.
- The 12 CP 75 / 50, in contrast, allocates 75% weight to the coincident peak demand and a 25% weight to the energy used in the on peak period.

# Reduction and Elimination of Cross-Subsidies

- Historically in Michigan, residential customers' rates have been subsidized by commercial and industrial customers.
  - This is maintaining residential rates at levels too low to achieve required rates of return.
  - Current legislation proposes (now a reality) to eliminate subsidization through rate design over a period of years.
  - This will allow reduced rate shock to customers currently paying rates less than their cost to serve.

# Reduction and Elimination of Cross-Subsidies, Continued...

- A rate subsidy exists when there is a difference between a tariff's current rate level and what the tariff's rate level would be if that tariff's rate level were based only on full cost of service.
- Subsidies can be either positive or negative and an inter-class rate subsidy is created when tariff rate levels are set at a level above or below cost to serve.
- A tariff whose average rate is less than the cost to serve would include a negative subsidy indicating that other tariffs are subsidizing this tariff by having rates set at a level higher than cost to serve.

# Michigan Law (Public Act 286) and Cost of Service

- Sec. 11. (1) This subsection applies beginning January 1, 2009. Except as otherwise provided in this subsection, the commission shall phase in electric rates equal to the cost of providing service to each customer class over a period of 5 years from the effective rate of the amendatory act that added this section. If the commission determines that the rate impact on industrial metal melting customers will exceed the 2.5% limit in subsection (2), the commission may phase in cost-based rates for that class over a longer period. The commission may modify this method to better ensure rates are equal to the cost of service if this method does not result in a greater amount of production-related and transmission costs allocated to primary customers.”



## **Why would a utility be concerned about inter-class subsidies as long as it's allowed to collect its total revenue requirement?**

- Even with rates designed to collect the utility's full revenue requirement, subsidies in any form send the wrong economic signal to customers.
- Residential rates set below cost send incorrect price signals to the residential customer where, arguably, the residential customer is not aware of the true cost of electric service.
- All other things being equal, commercial and industrial rates set above cost to serve have a negative effect on those customers' abilities to compete.
- While utility rates are only one factor that affect business development decisions, electric rates set above the actual cost-to-serve negatively affects Michigan's competitive position as measured against other states and may discourage commercial and industrial customers from investing in Michigan.

# End of Presentation

## Questions and Discussion Continued

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