Tariff Development II: REVIEW of Basic Allocation and Rate Design Principles

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Briefing for the NARUC/INE Partnership

Overview

- Steps in Setting Rates
- Establish utility's revenue requirement
- Allocate revenue requirements to customer classes
- Design rates to recover revenue requirements
- Schedules
- Tariff

Information for Allocating Costs and Designing Rates

- Costs
- Consumption
- Billing Determinants
- Tariff

Rate = Cost/Billing Determinants

Charge = Rate * Billing Determinants

Expenses, Invested Capital, Rate of Return

- Fuel
- Purchased Power
- Operations and Maintenance
- Factoring, uncollectible
- Depreciation, amortization
- Payroll Taxes
- State and Local Taxes
- Federal Income Tax
- Interest on Customer Deposits
- Return
  - Cost of Debt
  - Cost of Preferred Stock
  - Cost of Equity
- Electric Plant in Service
- Construction Work in Progress
- Working Cash Allowance
- Materials and Supplies
- Base Rate Revenue
- Fuel Revenue

Consumption

- Number of customers by class
- Kilowatt-hour sales by class
- Class coincident peak
  - Requires statistical sampling with demand meters
- Revenue by class
- Provide test-year actual information and any adjustments
  - Weather normalization adjustment or customer adjustment (classification or number)
  - Annual and monthly information, historical information

Rate Setting

- Rate setting is prospective
- Rates are set today to recover the future cost of service
- Development of the revenue requirement is largely a science, but rate design involves significant element of art
- Rate setting may fulfill several objectives
- Cost of service practices have been in use since 1890's in US, but developments in information technology and metering may affect these practices
- Rate regulation is an act of government exercising social policy with the objective of enhancing social welfare

Bonbright's Principles for Rates

- Principles of Public Utility Rates by James C. Bonbright
- Rate attributes: simplicity, understandability, public acceptability, and feasibility of application and interpretation
- Effectiveness of yielding total revenue requirements
- Revenue (and cash flow) stability from year to year
- Stability of rates themselves, minimal unexpected changes that are seriously adverse to existing customers
- Fairness in apportioning cost of service among different consumers
- Avoidance of "undue discrimination"
- Efficiency, promoting efficient use of energy and competing products and services

Rate Setting Objectives

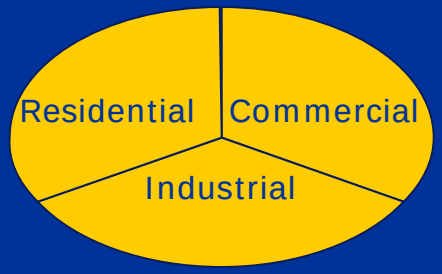
- In Texas, rates should not be:
  - Unreasonably preferential
  - Prejudicial
  - Predatory
  - Discriminatory
  - Anticompetitive
- Rates must not embody unreasonable distinctions
- Rates should be just, reasonable, sufficient, equitable, and consistent

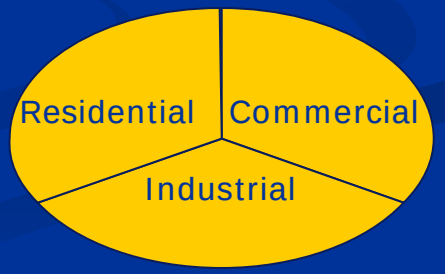
Rate Design or "How the Pie is Sliced"

Determine Cost to Serve

Total Revenue Requirement

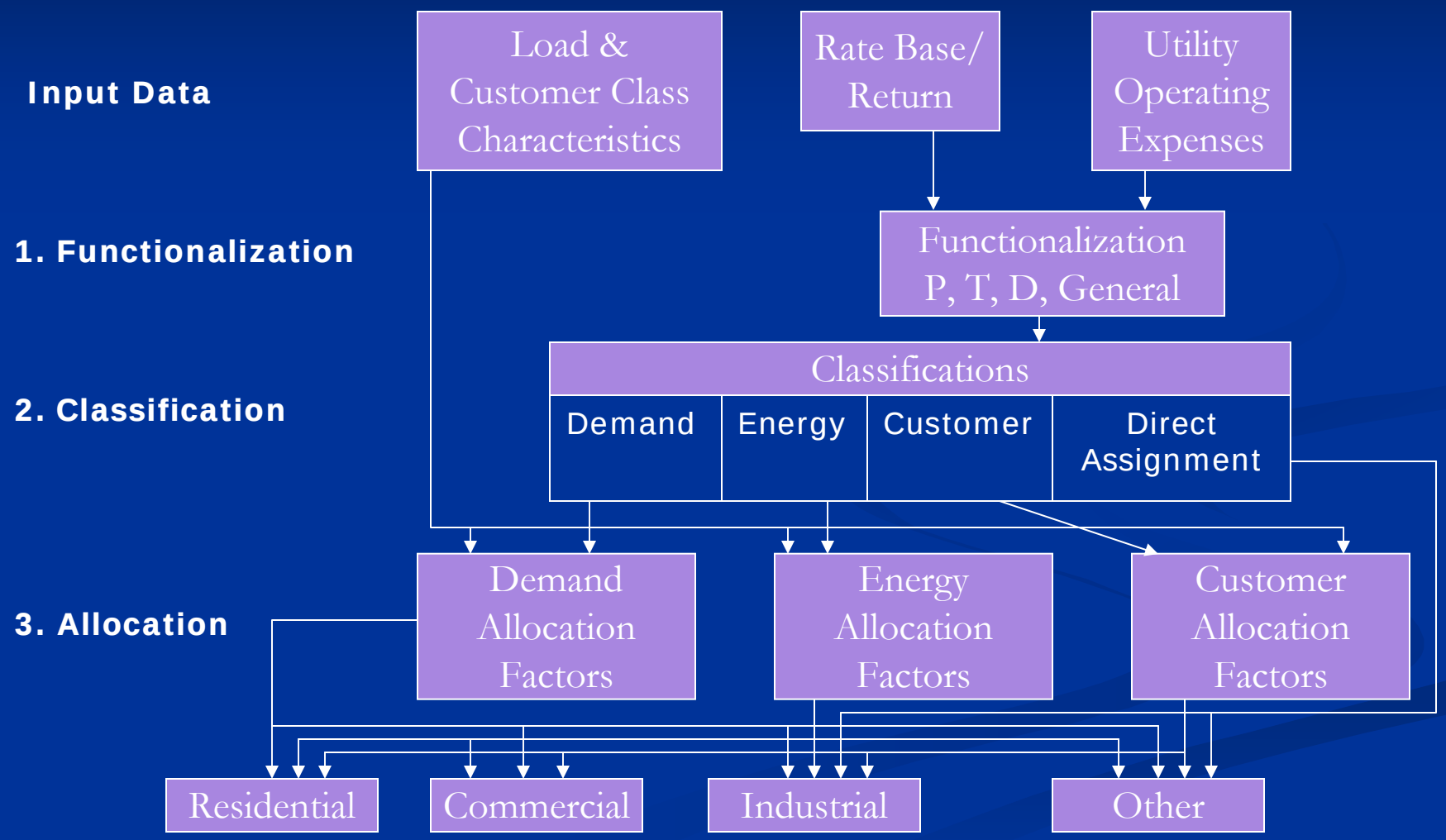
Allocate Costs to Classes





Design Rates to Reflect Cost and Produce Required Revenue by Customer Class

Steps in Allocating Costs



Functionalization

- Step 1: What purpose does the cost serve for the utility?
  - Determine, for each item of rate base and expense, the functional use in the following categories:
    - Production (including purchased power)
    - Transmission
    - Distribution
    - General or Other
  - Accounting rules should be generally consistent with functions

Classification

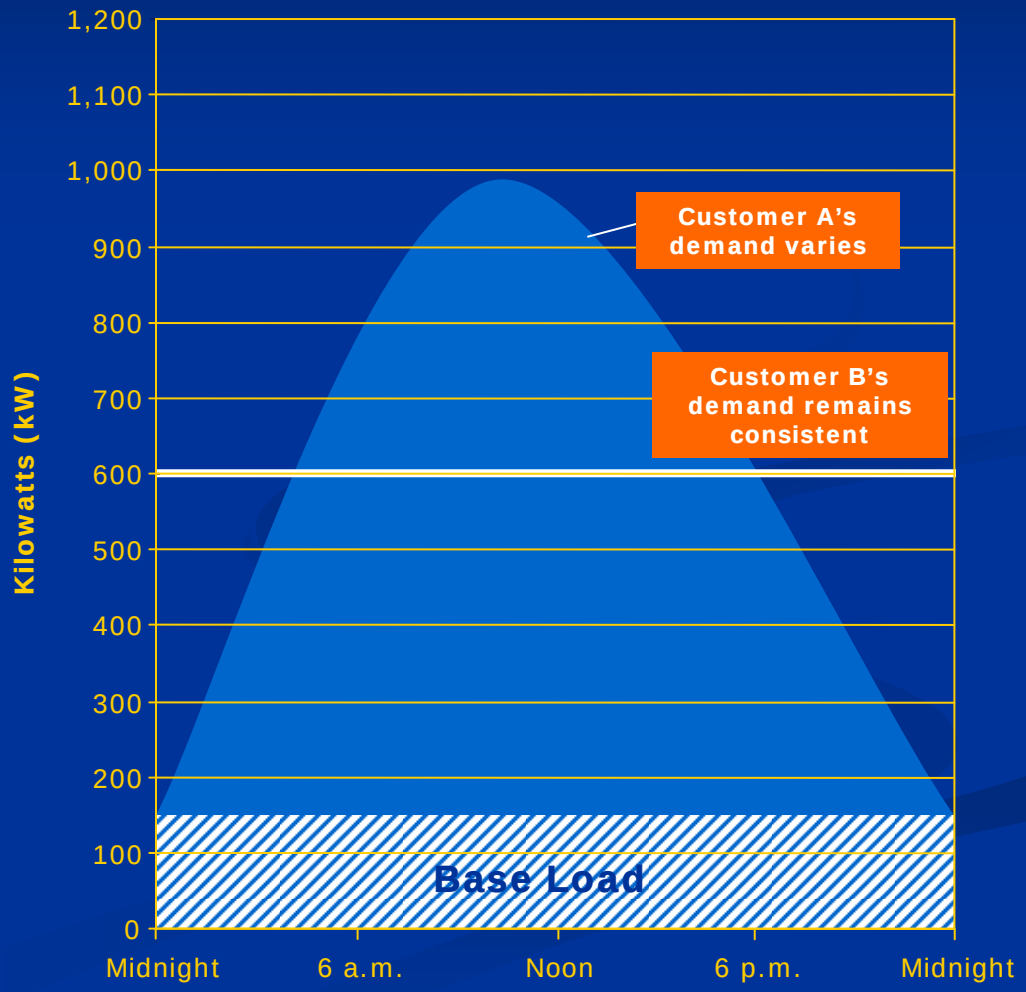
- Step 2: – What causes the cost to be incurred?
  - Divides the costs, according to causality, into the following components:
    - Demand (Fixed costs that vary with kW demand)
    - Energy (Variable costs that vary with kWh provided)
    - Customer (Directly related to number of customers)
      - Investment in distribution plant to establish basic service
      - Metering, accounting, billing and customer service costs

Allocation

- Step 3: How much of the total cost should each customer class pay?
  - Once costs have been functionalized and classified they are:
    - Directly assigned to a specific class if wholly attributable to a particular customer or customer class
    - Allocated to customer classes using appropriate allocation factors
  - Objectives or criteria to assess an allocation method
    - Reflects cause (cost causation)
    - Reflects usage patterns
    - Produces stable results from year to year
    - Easy to understand by both regulators and customers
    - Accepted by regulators

Patterns of Consumption and Allocation

- Customer A's consumption varies during the day. Peak demand is 1,000 kilowatts (kW), and energy consumption is 14,400 kWh
- Customer B's consumption is constant. Peak demand is 600 kilowatts (kW), and energy consumption is 14,400 kWh
- Impact of coincident peak allocator
  - Customer A--62.5% of costs
  - Customer B--37.5% of costs



Are Utility Rates Cost-based?

- For some costs, there may be competing methods proposed to allocate costs
  - For demand, 3 CP vs. 4 CP vs. 12 CP
- Class cost of service study is a view of the costs required to serve each class
- Regulator may have reasons not to assign costs in accordance with study
  - Government policy objectives favor a class or an objective (electrification)
  - Changing from existing to rates based on the study may result in a significant increase for some classes

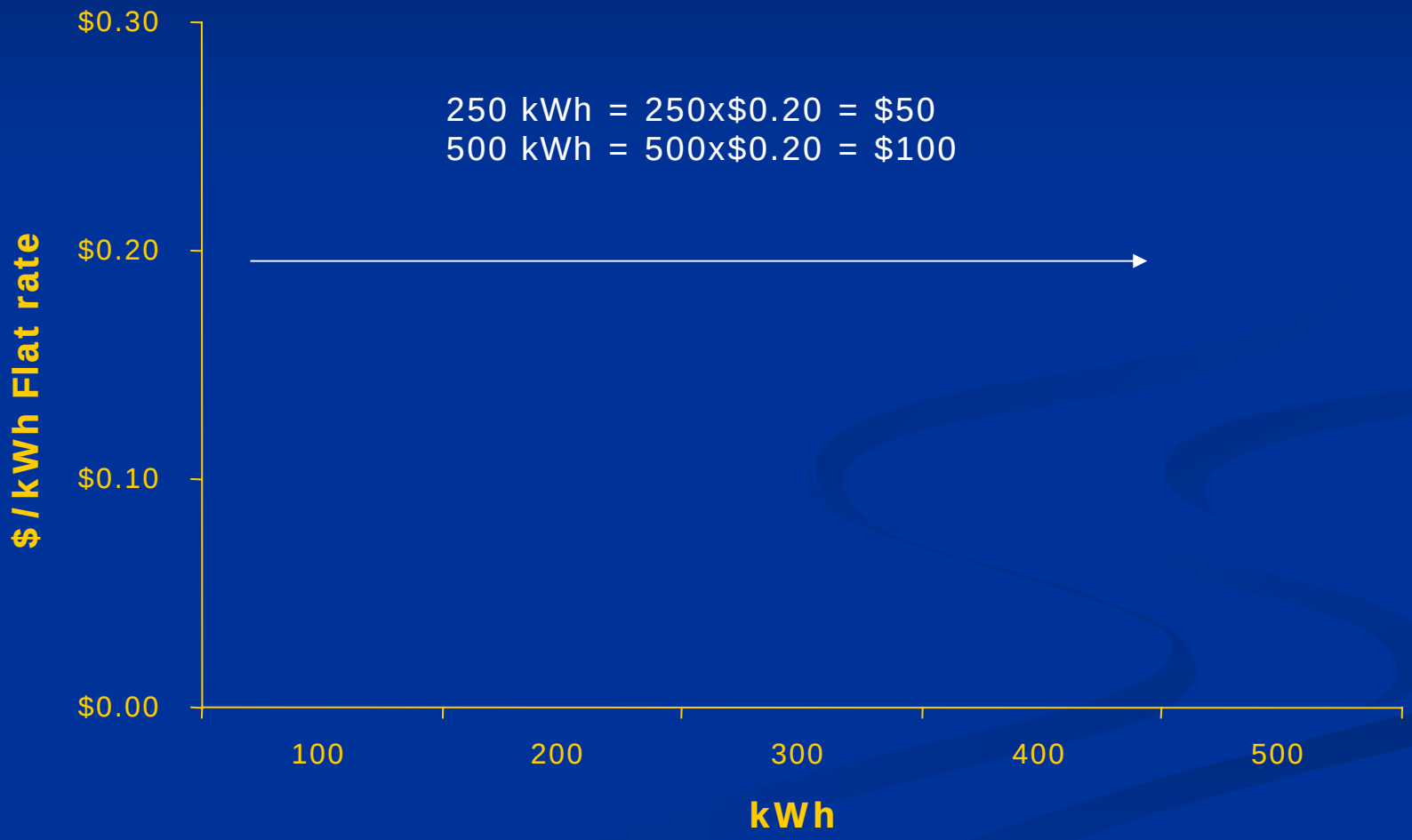
Designing Rates

- Uniform rates applied to groups of similar customers
- Factors applied in designing rates
  - Feasibility—what can be measured
    - Demand costs for residential customers recovered through energy charge
  - Stability
    - May use ratchets to spread seasonal costs over entire year
  - Cost causation
  - Ability of customers to understand charges
  - Marginal costs
  - Rates as incentives
  - Social objectives
    - Low-cost energy blocks

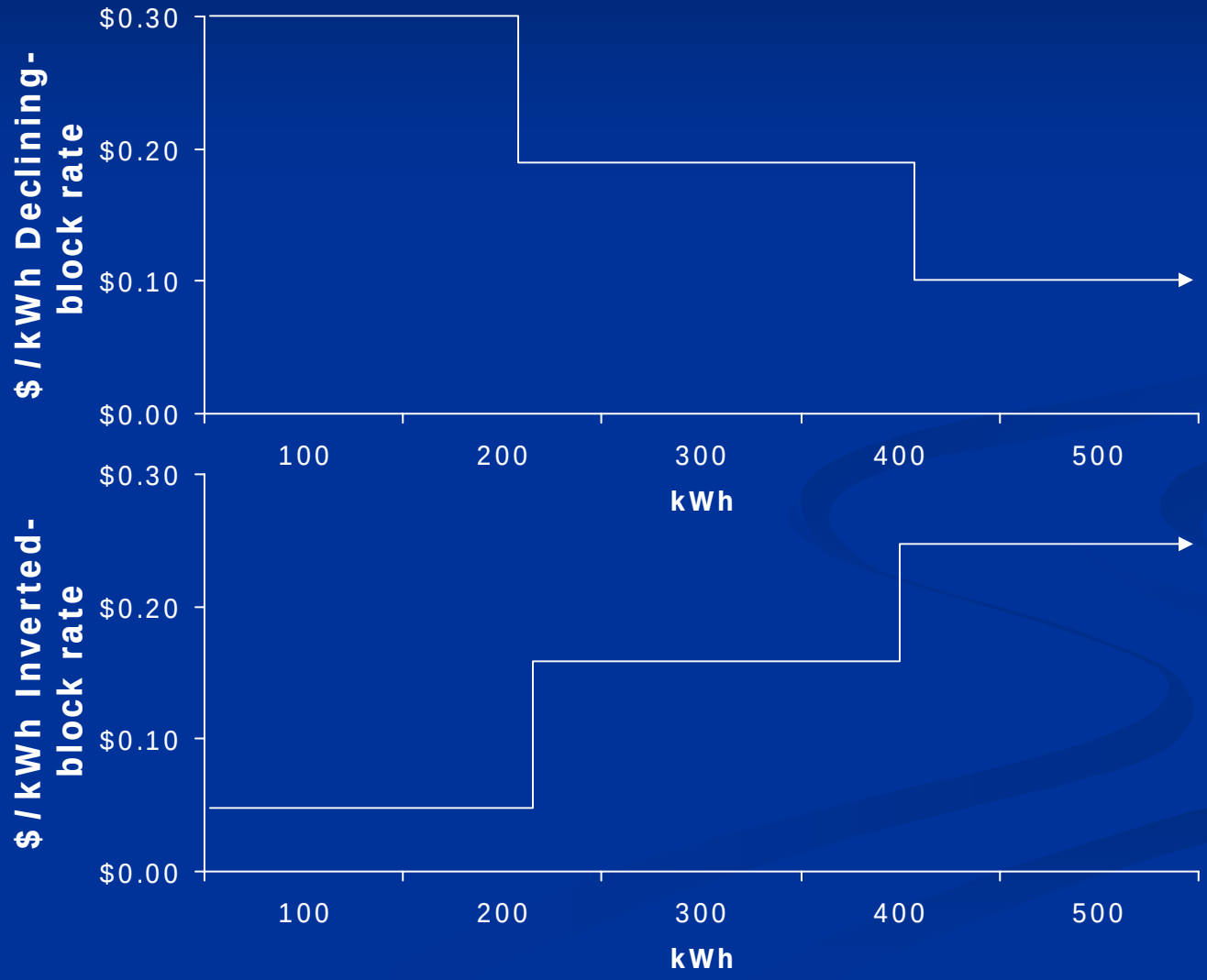
Typical Rate Designs in Texas

- Residential charges
  - Customer charge (per customer per month)
  - Energy charges (per kWh)
  - Percentage of revenue charge (taxes)
- Industrial charges
  - Customer charge (per customer per month)
  - Demand charges (per KW)
  - Energy charges (per kWh)
  - Percentage of revenue charge (taxes)

Energy Rate Designs: Flat Rate



Energy Rate Designs: Declining or Inverted Block



Rationales for Block Structures

- Declining block might be used with low customer charge to facilitate broader access to electricity
  - First block is high to recover customer and demand costs
- Declining block might be used to encourage off-peak consumption
  - Texas utilities have used it for electric heating
- Inverted block might be used to encourage conservation
- Multiple objectives can be addressed through pyramid blocks

Concepts Relating to Demand Charges

- Demand or load:
  - Rate of consumption at a specified time or over a time
  - Demand on a utility system is the amount of energy consumed at a specific time
- Coincident peak demand (CP)
  - A customer's or customer class's demand at the time of a utility system's peak demand
  - CP may be used to allocate costs to customers
- Non-coincident peak demand (NCP)
  - A customer's or customer class's maximum demand, regardless of when the system peak occurs
  - Commercial and industrial customers may pay monthly demand charge based on their NCP
- Average demand
  - The total amount of energy consumed during a period divided by the number of hours in the period

Mechanisms for Volatile Costs

- Fuel and purchased power adjustments
  - Fuel or purchased power adjustment clause—utility adjusts charge monthly to reflect costs
    - May also include cost/revenue correction
  - Fixed factor—Regulator adjusts charge periodically to reflect expected costs
    - Utility files projected costs
    - Costs tied through formula to broad index, such as NYMEX
    - Interest to or from customers for imbalance in cost and revenue
    - Reconciliation of costs and revenues, review of reasonableness of costs and operating decisions

Example of Residential Tariff

APPLICABLE: To residential customers for electric service used for domestic purposes in private residences and separately metered individual apartments . . . measured through one kilowatt hour meter, where facilities of adequate capacity and suitable voltage are adjacent to the premises to be served.

TERRITORY: Texas service territory.

RATE: Service Availability Charge: $5.10 per month.

Energy Charge:

4.500¢ per kWh for all kWh used per month during each summer month

3.656¢ per kWh for all kWh used per month during each winter month

WINTER MONTHS: The billing months of October through May.

SUMMER MONTHS: The billing months of June through September.

FUEL COST RECOVERY AND ADJUSTMENTS: The charge per kilowatt hour of the above rate shall be increased by the applicable fuel cost recovery factor per kilowatt hour. This rate schedule is subject to other applicable rate adjustments as in effect from time to time in this tariff.

SECONDARY DISTRIBUTION FUEL COST RECOVERY FACTOR:

The Secondary Distribution fuel cost recovery factor to be billed is 3.4975¢ per kilowatt-hour and shall apply when service is metered at less than approximately 12 kV.