Pricing Public Utility Services: A Sea Changing?

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Regulated Utilities are Natural Monopolies

- **Natural Monopoly** – an industry in which economies of scale are so important that only one firm can survive.

  In other words, it is more efficient for there to be one firm in the industry.

  Example: Gas companies (we wouldn’t want multiple gas lines underground)
Monopoly and Competitive Prices

$8 - 7 - 6 - 5 - 4 - 3 - 2 - 1 - 0

$8 $7 $6 $5 $4 $3 $2 $1

0 10 20 30 40 50 60 70 80 90 100

Quantity (thousands)

$P_{UN}$ $P_{OPT}$

$D = P$

$MC \quad ATC \quad Q_{OPT}$

$Q_{UN} \quad MR$
Cost Characteristics of Public Utility

- Majority of costs are fixed costs, these are capital intensive industries.
- Fuel is the major variable cost- fuel to make electricity or the water or natural gas consumed
Timeline for rate case filing

Pre-filing

0 (years)

- Develop goals and objectives for case
- Obtain and analyze accounting and engineering data
- Create new rate design and tariff terms and conditions
- Choose witnesses and develop draft testimony
- Critical review of case filing

1-1.5

- Develop financial support for filing

1.75 - 2.25

Filing

Hearing Phase

- Compliance Review
- Initial Discovery
- Intervener Direct
- Company Discovery
- Company Rebuttal
- Discovery
- Intervener Rebuttal
- Company Discovery
- Company Surrebuttal
- Hearings
- Briefings
- Final Order
- Settlement Discussions
Pricing is a Three Step Process

- First- Determine the Total Allowed Revenue
- Second- Allocate Revenue Between Customer Classes
  - Residential
  - Commercial
  - Industrial
- Third- Design Rates or Prices
Revenue Requirement

\[ RR = OC + T + d + r (V-D) \]

\( RR \) = Revenue Requirement

\( OC \) = Operating Costs

\( T \) = Taxes

\( d \) = Annual depreciation

\( r \) = Rate of return

\( V \) = Value of plant and equipment

\( D \) = Accumulated/accrued Depreciation.
Pricing Objectives

- Allocation and Recovery of Costs - Customers who cause costs should pay for them.
- Prices in order to be just and reasonable should give the utility and opportunity to earn a fair rate of return.
- That is prices should produce a total revenue equal to the required revenue.
- One thing that can affect this result is the customers demand elasticity, that is how sensitive is customer demand to changes in price?
Demand for Public Utility Services

Demand is a schedule of prices and quantities that consumers are willing and able to purchase. The higher the price the lower the consumption (quantity demanded). This is related to:

- Income of consumers
- Prices of substitutes
- Price of complement goods
- Tastes and preferences
Demand Curves with Different Elasticities
Why is price elasticity important?

- Revenue and demand elasticity are related
  - $TR = P \times Q$ \Rightarrow for a price change there is both a “price effect” and a “quantity effect” on revenue
  - If demand is inelastic (i.e., $\%\Delta Q_d < \%\Delta P$) then the price effect is stronger than the quantity effect and total revenue increases

- Forecasting billing determinants (expected quantities consumed)

- Understanding customer fuel-switching capabilities
Declining Demand Growth

Figure 1. U.S. electricity demand growth, 1950-2035 (percent, 3-year moving average). Figures beyond 2012 are projections and not actual data. Source: EIA 2013e.
Residential Demand

Total US Natural Gas Delivered Per Customer (1987-2014)

Source: EIA
History of Rate Design

- Flat Rate- typically set at average costs of service
- Two Part rate or SFV- straight fixed variable
- Block rates
- Inverted block rates
- Time of Use rates
- Real Time Pricing
Volumetric Pricing Issues

- Flat rates and block rates are volumetric in nature, that is, in order to recover your fixed costs, inclusive of the rate of return, you must sell the expected/forecasted demands.
- If you don’t sell that expected level you cannot earn your rate of return.
- If you sell more you can over earn.
Declining Block Rate

Figure 7-5: Block Rate Design

Intra-block prices set such that excess cost recovered equals fixed costs

$P_1$, $P_2$, $P_3$

$Q_1$, $Q_2$, $Q_3$

$AC$, $MC$
Increasing Block Rate

![Increasing Block Tariff Structure](image)
SFV Rates

- All fixed costs are recovered from customers in a monthly fixed charge
- All variable costs are recovered based on the customers consumption
- Superior cash flow as opposed to volumetric rates, in effect, the utility profits are uncoupled from sales.
“Pricing Mechanisms”

- Riders and Trackers: mechanisms that add specific costs to a customer's bill to ensure cost recovery, often project specific like a main replacement program.

- Decoupling: like SFV decoupling is designed to break link between sales and profit, should change a utilities incentive to engage in conservation. The target revenue requirement is used to adjust rates, upward or downward as sales fall or rise respectively.
Old World View- More is Better

How does your kitchen rate on the electrical living scale?

Is your kitchen really complete? You may get some supplies and some good ideas too, when you check it with the Old World view- called "Kitchen Scale" below. There are many wonderful new ways to put electricity to work in your kitchen today. Realize now electrical servants that save you time and energy for yourself and your family. Decide now which of these electrical wrack work you need first. They're easier to buy than you may realize. See your local electrical dealer or utility for the prices and details.

<table>
<thead>
<tr>
<th>How many of these electric appliances do you have?</th>
<th>Could total</th>
<th>Here's how your kitchen rated!</th>
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<tbody>
<tr>
<td>Dishwasher</td>
<td>24</td>
<td>Just wonderful!</td>
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<tr>
<td>Mixer</td>
<td>23</td>
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<tr>
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<td>Juicer</td>
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<td>Refrigerator Freezer</td>
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<td>Food Planner</td>
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FREE IDEA BOOK: Sample of the electric living scale. Additional ideas for kitchen work, bath, bedroom, living room, and recreation areas. Ask your dealer or utility for the free idea book.