Designing Appropriate Rate Structures for Water and Wastewater Utilities

Webinar on June 27, 2017

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Funding for this project was provided by the Alabama Department of Environmental Management’s State Revolving Fund (SRF) program. For more information about how the SRF can help your utility save money and keep rates affordable, please visit http://adem.alabama.gov/programs/water/srf.cnt or contact:

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Webinar Outline

• Present the basics of different rate structure design components

• Discuss when it is appropriate to favor some elements over others

• Introduce tools and resources to help you with rate setting
Terminology: **Rates** vs. **Rate Structure**

$32.00 / month, includes the first 2,000 gallons
+$2.00 / 1,000 gallons for use between 2,000 and 5,000 gallons
+$5.00 / 1,000 gallons for use between 5,000 and 20,000 gallons
+$6.00 / 1,000 gallons for all use above 20,000 gallons
Terminology for Rate Structure

**Base Charge**

- $32.00 / month, includes the first 2,000 gallons

**Consumption Allowance**

- + $2.00 / 1,000 gallons for use between 2,000 and 5,000 gallons
- + $5.00 / 1,000 gallons for use between 5,000 and 20,000 gallons
- + $6.00 / 1,000 gallons for all use above 20,000 gallons

**Volumetric Rates**

**Blocks**
There is no one rate structure that works perfectly for all utilities
“Designing Rate Structures that Support Your Objectives”

Free guide written for utility managers.

http://efc.sog.unc.edu/
Find it in Resources / Publications

Click here for the direct link
What Goes Into Reviewing Rates for the Next Year?

- What exactly does this include?
- Will it provide sufficient cost recovery?
- Will revenues be resilient to changing water demands?
- Do these rates send the right signals to our customers, based on our objectives?
- Are we following the applicable laws?
- Are we allocating the costs to the right customers?
- Will our customers understand these rates?
- Will our customers be able to pay these rates?
The Process of Setting Rates

Learn essential background information about rates

Determine critical characteristics of your utility and community and utility priorities

Design the most appropriate rate structure

Compute the rates using projected costs and revenues

Cost-of-Service Study

Re-evaluate/adjust rate structure to fit primary objectives
Understanding Your Utility and Served Community

• How are your customer demands changing?
• Do you expect to meet demands comfortably?
• What is the make up of your served community?
  
  Serve many large families? What is the community’s ability to pay? Is it a seasonal community? Is there growth or decline in customers? Does a large fraction of your revenues come from a small number of customers? What is the mix of residential and non-residential customers? Who are your biggest customers?

• How often have customers been unable to afford their bills?
Understanding Your Utility and Served Community

- In the past few years, how much of your revenues and costs were fixed vs. variable?
- How have your operating expenses changed recently?
- Do you know what your capital expenses and debt service payments will be going forward?
Before You Begin: Rank Your Utility’s Rate Setting Objectives

1. ________
2. ________
3. ________
4. ________

Refer to this list and focus on the highest ranked objectives when following the guidelines for selecting the appropriate rate structure design.
Elements of Rate Structure Designs

1. Customer classes/distinction
2. Billing period
3. Base charge
4. Consumption allowance included with base charge
5. Volumetric rate structure
6. (If applicable) Number of blocks, block sizes and rate differentials
7. (Optional) Automatic adjustments

Also: frequency of rate reviews and rate changes
### Elements of Rate Structure Designs:
1. Customer Classes/Distinction

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>One rate structure for all</td>
<td>All are equal</td>
</tr>
<tr>
<td>Separate rate structure for residential, irrigation, commercial, industrial, governmental, or wholesale customers</td>
<td>Specific type of customer</td>
</tr>
<tr>
<td>One rate structure, but with different base charges based on meter size</td>
<td>Non-residential or multi-family housing</td>
</tr>
<tr>
<td>One rate structure for all, but with blocks that implicitly only target non-residential use</td>
<td>Non-residential</td>
</tr>
<tr>
<td>Negotiated rate structure with individual high-use customers (typically an industrial customer)</td>
<td>Only one customer</td>
</tr>
<tr>
<td>Different rates for customers outside municipal limits/service area boundaries</td>
<td>“Outside” customers</td>
</tr>
</tbody>
</table>
Customer Classes in Alabama (2016)

- 43% of water rate structures and 52% of wastewater rate structures have unique rates for commercial/non-residential customers
- Smaller fraction have unique industrial rates
- Only 3% of rate structures have unique rates for residential irrigation
- Only 15% of rate structures (25% of municipalities) have unique rates for outside customers

Adapted from 2016 Water and Wastewater Rate Structures and Rates in Alabama report.
Elements of Rate Structure Designs: 2. Billing Period

<table>
<thead>
<tr>
<th>More Frequently (e.g.: Monthly)</th>
<th>Less Frequently (e.g.: Quarterly)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UTILITY</strong></td>
<td></td>
</tr>
<tr>
<td>Steady monthly revenue stream;</td>
<td>Less staff and lower billing</td>
</tr>
<tr>
<td>Rate changes effected quicker;</td>
<td>costs; Possibly fewer late</td>
</tr>
<tr>
<td>Lost revenues from unpaid bills</td>
<td>payments and cutoffs to deal</td>
</tr>
<tr>
<td>smaller; Communicate with</td>
<td>with</td>
</tr>
<tr>
<td>customer more frequently</td>
<td></td>
</tr>
<tr>
<td>Smaller, more regular bills</td>
<td>None except for the hassle of</td>
</tr>
<tr>
<td>(easier to pay); Higher and</td>
<td>more frequent billing</td>
</tr>
<tr>
<td>faster sensitivity to use and</td>
<td></td>
</tr>
<tr>
<td>rate changes (leaks,</td>
<td></td>
</tr>
<tr>
<td>conservation); More sensitive</td>
<td></td>
</tr>
<tr>
<td>to rate structure design and</td>
<td></td>
</tr>
<tr>
<td>less confusion</td>
<td></td>
</tr>
</tbody>
</table>

**Suggestion:** Use a monthly billing period if you can afford it
Billing Periods in Alabama (2016)

Nearly every water rate structure is on monthly billing.

Adapted from 2016 Water and Wastewater Rate Structures and Rates in Alabama report.
Elements of Rate Structure Designs: 3. Base Charges

**PROS**

Higher “guaranteed” revenue to pay off the fixed costs; Higher month-to-month revenue stability

Provides strong incentive to keep use low; Customers more likely to notice month-to-month change in bill due to change in use

**CONS**

Customers with very low use are paying a high unit price; Customers do not witness a significant change in bill if conserve water

Revenues less stable for utility; Revenues are highly seasonal

*Suggestion: Smaller utilities with high fixed costs should lean towards higher base charges*
Elements of Rate Structure Designs:
3. Base Charges

Two common ways to charge:
• Constant (by customer class): $35.00/month
• By meter size:
  – $35.00/month for 5/8” or ¾” meter
  – $55.00/month for 1” meter
  – $105.00/month for 2” meter, etc.
Nearly all rate structures include a non-zero base charge. Water base charges are slightly higher than wastewater base charges.

Median water base charge = $18.38/month
Median wastewater base charge = $15.00/month
Elements of Rate Structure Designs: 4. Consumption Allowance with Base Charge

- Bills and revenues are more sensitive to use changes.
- Provides a lifeline amount of water to offset some of the effects of high base charges.
- Provides a greater offset for the customer, but discourages conservation.

Do not include any amount (0 gallons) for systems with low base charges.
Include some amount (e.g.: 1,000 gallons/month) for systems with high base charges but wish to encourage conservation.
Include high amount (e.g.: 3,000 gallons/month)

Suggestion: For systems with low base charges, do not include any consumption allowance. For systems with high base charges but wish to encourage conservation, keep consumption allowance low, if any.
How Much Consumption Allowance is Included in the Base Charge in Alabama (2016)?

93% of water rate structures and 67% of wastewater rate structures include a consumption allowance with the base charge. Most are at or near 2,000 gallons/month.

Adapted from 2016 Water and Wastewater Rate Structures and Rates in Alabama report.
Elements of Rate Structure Designs: 5. Volumetric Rate Structure

**Uniform (“Flat”) Rates**
- Simple and Fair

**Seasonal (Uniform) Rates**
- Conservation-oriented, good for seasonal communities

_Suggestion:_ Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.
Elements of Rate Structure Designs:
5. Volumetric Rate Structure

**Decreasing Block Rates**
Provide price break for large users (e.g.: commercial). Not recommended for residential.

**Increasing Block Rates**
Conservation-oriented. Consider large families.

*Suggestion:* Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.
Elements of Rate Structure Designs: 5. Volumetric Rate Structure

**Targeted Block Rates**
Increase *and* decrease based on desired targets: increasing for residential, decreasing for commercial.

**Uniform At One Block**
Complex, but greater price incentives over traditional block rate structures.

*Suggestion:* Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.
Elements of Rate Structure Designs: 5. Volumetric Rate Structure

**Uniform Rates with Cap**
Only appropriate for residential sewer, cap at max. indoor use level

**Budget-based Rates**
Tailored to each customer, most equitable, accounts for family size and industry, conservation-oriented, but complex

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**Suggestion:** Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.
Elements of Rate Structure Designs:
5. Volumetric Rate Structure

Another rate structure option:

Non-volumetric. Only charge a periodic fixed (base) charge and not based on volume, or include water with rent.

Not reading meters. Simplest and cheapest option. Gives the customer zero financial incentive to be efficient in their water use while utility incurs
How Volumetric Rates are Structured in Alabama (2016)

**Water:**
Most are on uniform rates. Large systems favor increasing blocks. Many small systems favor decreasing block.

**Wastewater:**
Majority are on uniform rates. Large number have caps or non-volumetric fixed charges (“Other”).

Adapted from 2016 Water and Wastewater Rate Structures and Rates in Alabama report.
Elements of Rate Structure Designs: 6. (If Applicable) Block Designs

For block rate structures to be effective:

- **Decide on the correct number of blocks**
  How many targets should you set on residential use? Do you want all non-residential use to be charged at a uniform rate, or provide blocks for non-residential use as well?

- **Decide on where the blocks should end/start**
  Start the second block only where summertime residential use ends and non-residential use continues (i.e.: charge residential use at uniform rates)? Set increasing block rates for residential customers where the blocks end at average use (e.g.: 5,000 gal/month), then double it (e.g.: 10,000 gal/month), and then over that (to target irrigation use more specifically)?
Elements of Rate Structure Designs:
6. (If Applicable) Block Designs

For block rate structures to be effective:

- **Set significant rate differentials between blocks**
  
  Charging only 50 cents/1,000 gallons more in one block than in the preceding block defeats the purpose of using an increasing block rate structure. If you select a block rate structure, select significant rate differentials to see any added value of your rate structure.

- **Keep in mind your base charge and consumption allowance**
  
  High base charges and consumption allowances may be significant portions of the total bill, greatly diluting the effect of an increasing block rate structure on providing incentives to conserve. Offset high base charges by reducing the consumption allowance, or setting high block rates.
Elements of Rate Structure Designs:
6. (If Applicable) Block Designs

For block rate structures to be effective:

- **Meter reading must be punctual**
  If the meter is read a few days too late, it may unjustly place the last few days’ of a customer’s use in a higher block.

- **Replace meters frequently and repair lines quickly**
  Faulty meters or leaking pipes will cause the customer to be billed at the wrong block levels, costing either the utility lost revenue or the customer more.
For block rate structures to be effective:

- Consider the adverse effect on large families

Large families consistently use high amounts of water throughout the year and may not have capacity to conserve. An increasing block rate structure therefore negatively affects the customer, without achieving any conservation objectives. Investigate your billing records to estimate the number of residential accounts that consistently use high amounts of water and use this knowledge to select the appropriate block sizes to mitigate this effect. Consider using uniform rates or budget-based rate structures if the community has many large families.
Half of the water rate structures have block rates; only 18% of wastewater. 26% of water block rates have 2 blocks, 30% have 3, 28% have 4, 16% more. Most block rates end the first block between 4,000 – 6,000 gallons/month.
Elements of Rate Structure Designs: 7. (Optional) Automatic Adjustments

- Prepare for drought in advance: create an ordinance *in advance* to give the utility the ability to raise rates temporarily during a water shortage scenario (sometimes called “drought surcharges”).
- Specify the potential rate increases precisely.
- Rate increases should be substantial to encourage conservation.
- Explicitly state the conditions that would trigger the temporary rate changes on and off. Tie the triggers to your water shortage response plans and water reservoir/well levels.

*Note: Temporary rate increases that are significant in magnitude have been shown to be effective methods of encouraging conservation while recovering lost revenue.*
Frequency of Rate Changes

Decide when and how often you will review your rates. Some alternatives:

• Always review your rates annually (recommended)
• Review your financial health indicators annually, and then review your rates if any of the indicators reflect poor financing
How Often Do Rates Change in Alabama (2016)?

66% of rate structures had changed within the last 2.5 years.

Changes in Residential Rate Structures in the Last Year

Almost half of Alabama utilities actively evaluate and modify their rate structures every one or two years. The calendar year in which each of the 394 rate structures active as of January 2014 (from utilities responding to this year’s rates survey) were first put into effect is shown in Figure 11. The figure shows that 48 percent of the current rate structures were made effective since January 2015, and 66 percent have changed their rates in the last three years. Only 16 percent of the rate structures were instated prior to 2011 (at least five years ago).

Figure 11: In What Calendar Year Were the Current Rate Structures First Instated? (n=255)

As of April 2016

- In 2015: 41%
- In 2014: 18%
- In 2013: 13%
- In 2012: 5%
- In 2016: 7%
- 2011 or earlier: 16%
Important
Avoid maintaining low rates at the expense of your utility’s financial health.

It will either lead to a sudden, massive rate increase in the future or to failing systems and endangering public health.
Examples of rate structures
A Few Scenarios

Keep in mind:

No one rate structure design fits all utilities, even in each of the following scenarios.

Showing the starting point of discussion – each utility would then have to evaluate and tailor rate structure according to own conditions.
Scenario: Groundwater System with a Very Small Customer Base

*High fixed costs, small number of customers*

- High base charges, possibly with a consumption allowance.
- Monthly billing if very small number of customers; bi-monthly if cost savings outweigh cash flow stability (phase the meter reading over the two months)

*Warning: No one rate structure design fits all utilities, even in this scenario.*
Scenario: Small, Purchase Water System

High variable costs, small number of customers

- Lower base charges (sufficient to pay off the monthly fixed/minimum charge to the seller utility plus at least most of own fixed costs),
- No consumption allowance (unless included by the seller utility)
- High volumetric rates that exceed the variable rates you are paying the utility

Warning: No one rate structure design fits all utilities, even in this scenario.
Scenario: Worried About Affordability of Rates for Residential Customers

- Do not compromise revenue sufficiency to maintain artificially low rates
- Create separate residential rate structure:
  - Low base charges with no consumption allowance
  - Increasing block rates with a first block only up to lifeline amount (~ 2,000 gallons/month)
  - Relatively steep increases in rates between blocks
  - Monthly billing
- Consider separate “Customer Assistance Programs”
- Find out if it is legal to charge different rates for low-income or fixed-income customers (in many cases, it is not)

*Warning: No one rate structure design fits all utilities, even in this scenario.*
Scenario: Water Demands are Decreasing

- Increase base charges and the percent of revenues from fixed charges.
- If using block rates, considering consolidating some of the blocks and/or decreasing the size of the blocks accordingly.

*Warning: No one rate structure design fits all utilities, even in this scenario.*
Scenario: Want to Encourage Conservation

- Monthly billing
- Lower base charge with no consumption allowance, higher volumetric rates
- Uniform rates, increasing block rates, or budget-based rates.
- Seasonal rates during peak demand season.
- Many, small block sizes and steep differentials in rates between blocks. Low rate for the first block.
- Have a water shortage rate structure

*Warning: No one rate structure design fits all utilities, even in this scenario.*
Scenario: Have Highly Seasonal Demands

*Resorts, second home communities, etc.*

- Charge a base charge year-round
- Consider seasonal rate structure: higher rates during high season(s)
- If seasonal demand is due to irrigation water, have a separate irrigation rate structure where rates are higher than standard water rates

*Warning: No one rate structure design fits all utilities, even in this scenario.*
You Have a General Rate Structure Design in Mind. Now What?
The Process of Setting Rates

1. Learn essential background information about rates
2. Determine critical characteristics of your utility and community and utility priorities
3. Design the most appropriate rate structure
4. Compute the rates using projected costs and revenues
5. Re-evaluate/adjust rate structure to fit primary objectives

Cost-of-Service Study
Rate Setting Resources

Setting Small Drinking Water System Rates for a Sustainable Future

One of the Simple Tools for Effective Performance (STEP) Guide Series

http://www.awwa.org

https://www.epa.gov/dwcapacity/resources-setting-small-system-water-rates-0
Water & Wastewater Rates Analysis Model

http://efc.sog.unc.edu or http://efcnetwork.org

Find the most up-to-date version in Resources / Tools

Free, simplified Excel tool allowing you to model and compare two rate structures on your projected fund balance
Webpage of all Resources on AL Rates

or do an internet search for “Alabama water rates ADEM EFC”
AL Water and Wastewater Rates Dashboard

Go to: [efc.sog.unc.edu](http://efc.sog.unc.edu) and search for “Alabama Rates Dashboard”

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