

Designing Rate Structures that Support Your Objectives: Guidelines for NC Water Systems

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Resource

Free guide written for utility managers in June 2009 (funded by DENR).

<http://www.efc.unc.edu/publications/2009/GuidelinesDesigningRateStructures.pdf>

Designing Rate Structures that Support Your Objectives:
Guidelines for NC Water Systems

June 2009



Funding support for these guidelines provided by the Public Water Supply Section of the North Carolina Department of Environment and Natural Resources, and the United States Environmental Protection Agency

Ideal Pricing

- Prices cover full “costs” of service
- Prices send and reinforce strategic messages
- Prices follow State’s laws and policies
- Beneficiaries pay for their benefits and polluters pay for their pollution
- Ability to pay is recognized and addressed
- Simple

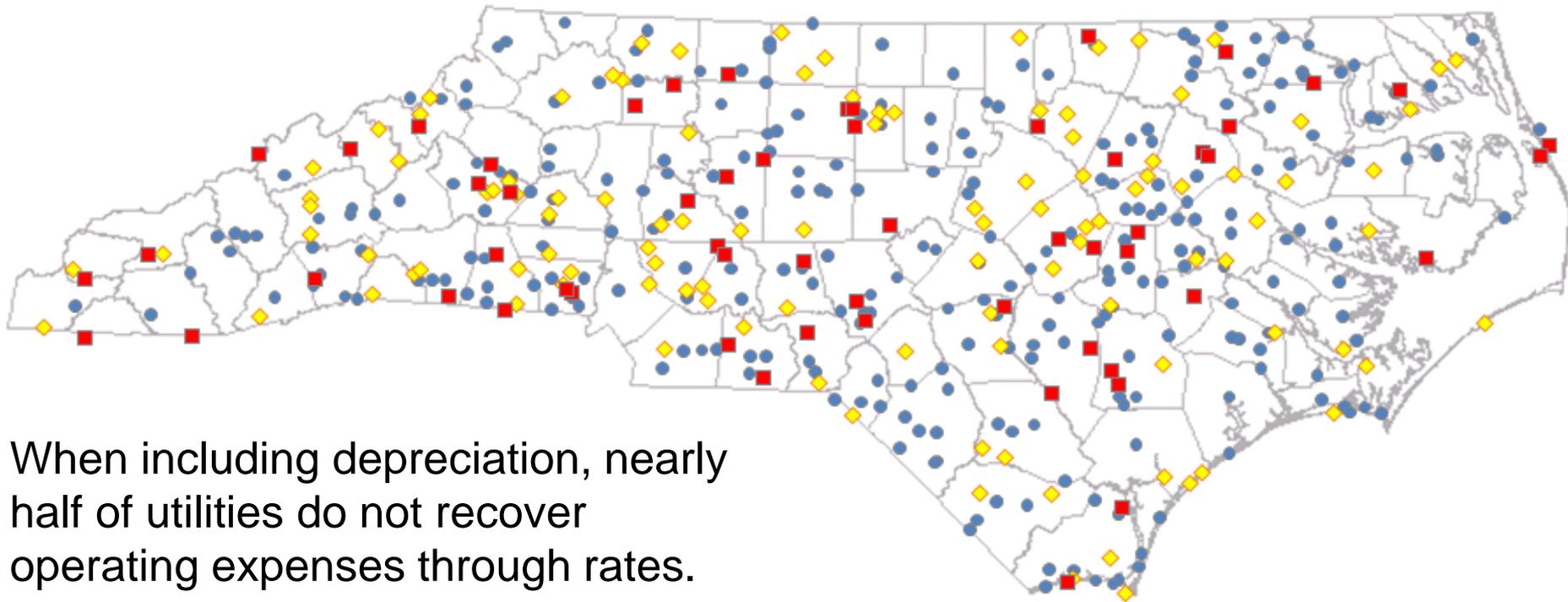
“Full Cost Pricing”

- 2008 N.C. Session Law 143-355.4(b)(1) [the “2008 Drought Bill”] :
“... adequate to pay the **cost of maintaining, repairing, and operating** the system, including reserves for payment of **principal and interest on indebtedness** incurred for maintenance or improvement of the water system during periods of normal use and periods of reduced water use due to implementation of water conservation measures.”

Do Water and Wastewater Rates Cover System Costs?

Local Government-Owned Water and Wastewater Utilities' Cost Recovery in FY 2009

- RED SQUARES:** Operating revenues < operating expenditures (13%)
- YELLOW DIAMONDS:** Operating revenues < operating expenditures + principal + interest on long-term debt (24%)
- BLUE CIRCLES:** Operating revenues > operating expenditures + principal + interest on long-term debt (63%)



How to Measure “Full Cost Pricing”: A Few Financial Indicators and Benchmarks

- Operating Ratio: Operating revenues must exceed operating expenses, including at least depreciation
- Days Cash on Hand (Emergency Reserves): At a minimum have enough cash on hand to satisfy your billing period (e.g.: 2 months) or enough cash on hand to replace the single most expensive asset (e.g.: largest pump). Aim for more than 6 months of cash on hand.
- Debt Service Coverage Ratio: Must at least be >1 . AAA-rated utilities have a median ratio of 1.5
- Transfers In From (or Out to) General Fund: Zero!

The Process of Setting Rates

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

Essential Background Information:

More Statutory Requirements on Rate Structures

- ✓ 2008 N.C. Session Law 143-355.4(b)(5) [the “2008 Drought Bill”] :
 - To be eligible for State infrastructure funds, local government water systems must not use a decreasing block rate structure for residential customers
- ✓ Central Coastal Plain Capacity Use Area Rules, Rule .0205(d)(5):
 - Utilities with CCPCUA permits must adopt water conservation rate structures: uniform rates, increasing block rates, seasonal rates or quantity-based surcharges

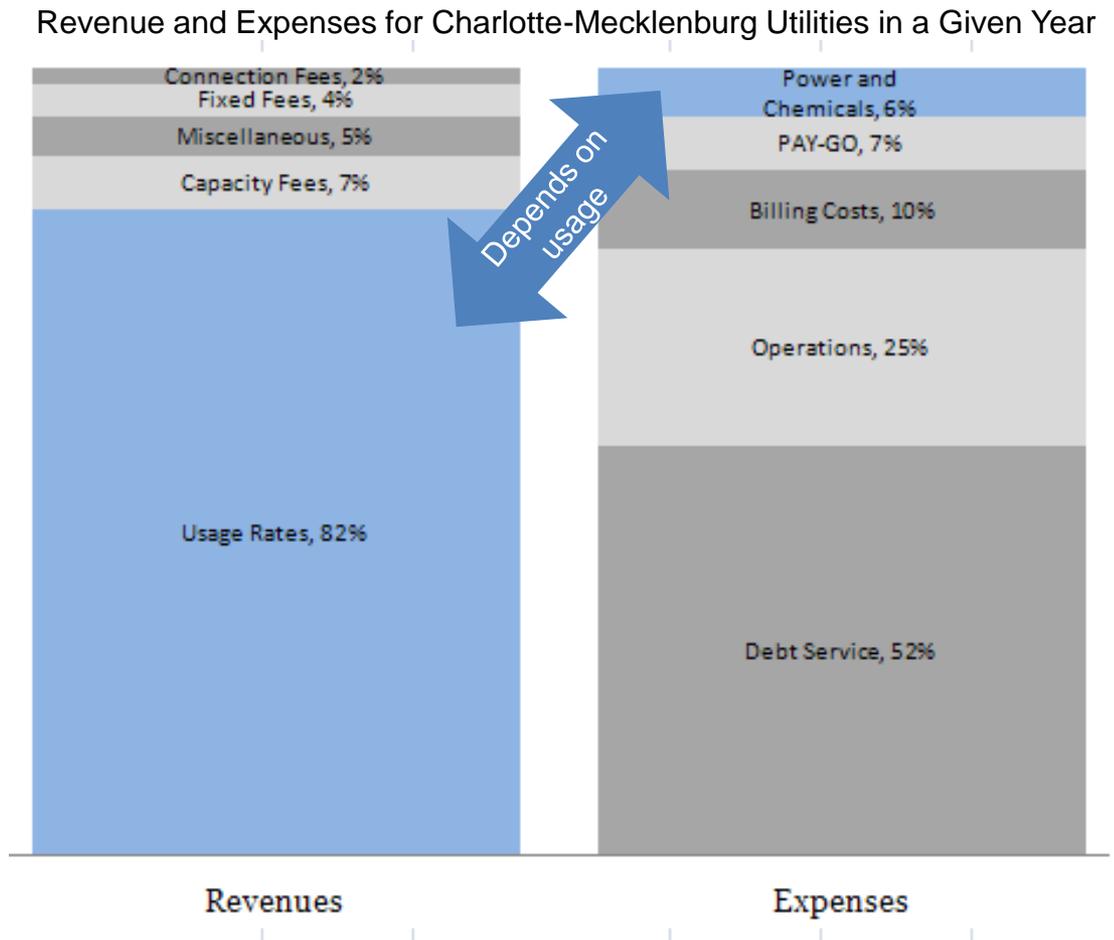
Essential Background Information:

Funding Agency Requirements on Rate Structures

- Drinking Water State Revolving Fund provides additional points to conservation-oriented rate structures
- “High Unit Cost grant threshold” determines eligibility currently by requiring the average residential water or sewer bill to exceed 0.75% of the median household income of the community, or 1.5% for combined water and sewer bills

Essential Background Information: Relationship between Rates and Usage

Utilities' costs are mostly fixed, not dependent on the amount of water sold/used by the customers. But the majority of revenues come from the amount of water sold. If customers conserve, revenues drop significantly but not costs.



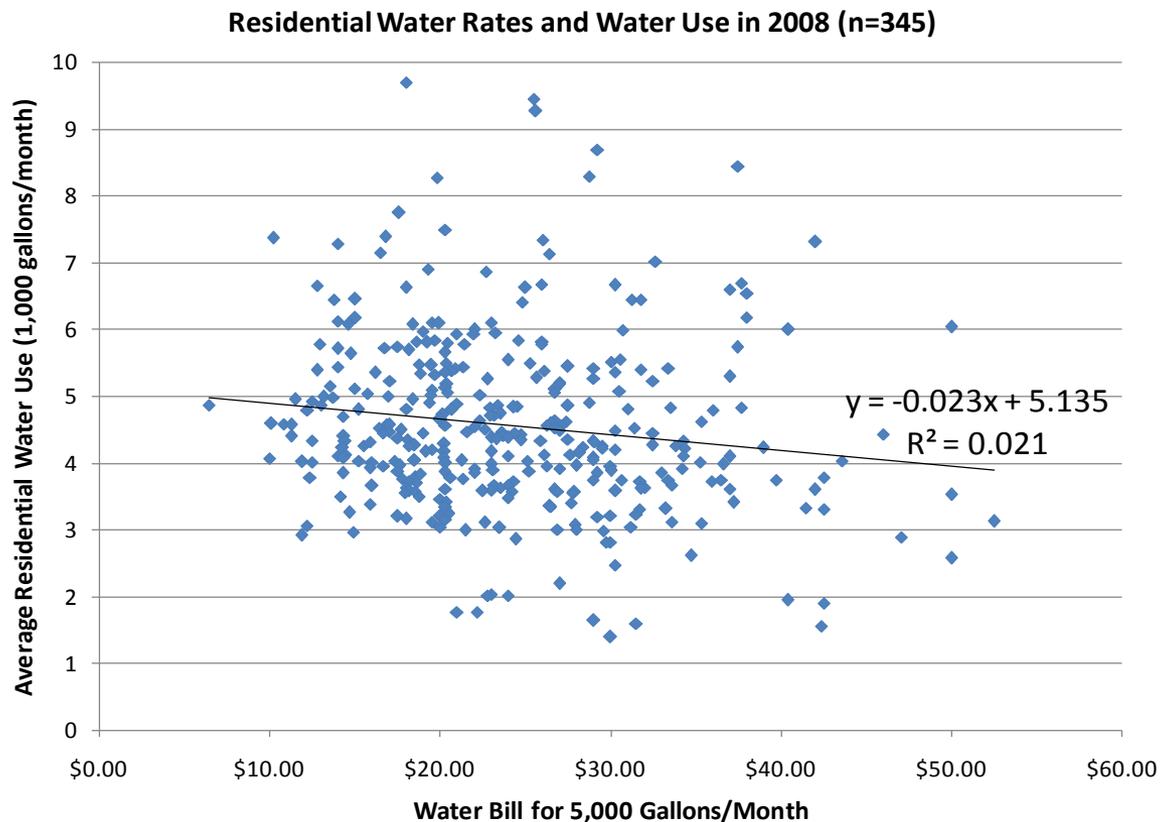
Source: CMU Director Doug Bean's presentation to the Charlotte City Council on December 1, 2008.

Essential Background Information:

Relationship between Rates and Usage

As rates increase, customers will adjust and lower their usage.

Estimates vary by community and season. In NC, we found that, on average, utilities charging 10% higher rates have 3-4% lower residential usage.

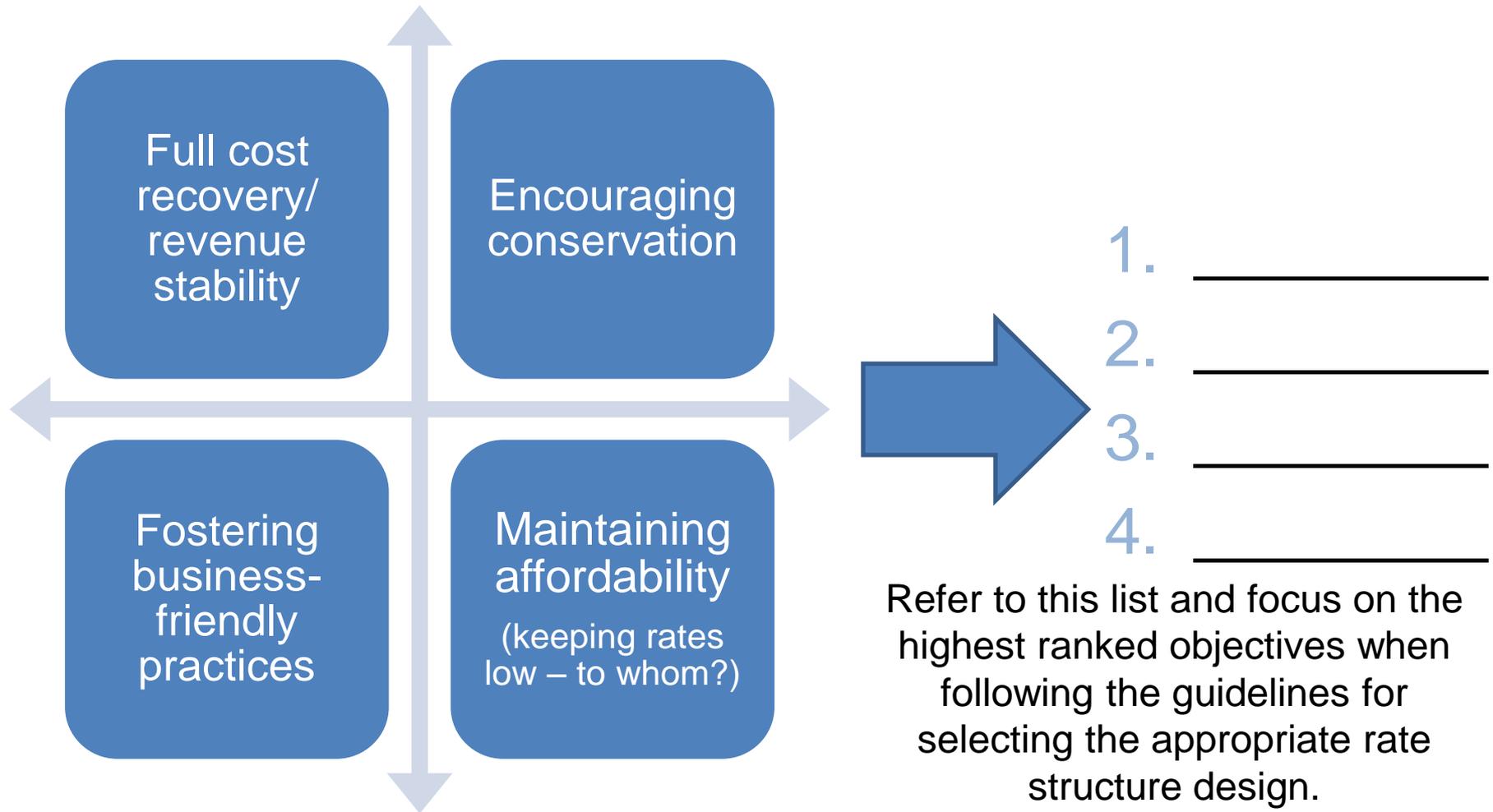


Data sources: Usage data from Division of Water Resources (DWR). Rates data from EFC/NCLM Rates Survey.

Understanding Your Utility and Served Community

- What is the make up of your served community?
Have a lot of large families? What is the community's ability to pay? Is it a seasonal community? Does demand vary greatly in the summer? Does a large fraction of your revenues come from a small number of customers?
- Do you anticipate any large capital expenses in the next few years? *Check/create your C.I.P. and asset management plan.*
- Do you have any debt service payment requirements?
- Do you expect to meet demands comfortably (in case there is a drought)?
- Rank your utility's rate setting objectives

Before You Begin: Rank Your Utility's Rate Setting Objectives



Priorities among NC Utilities in 2010

22) Please RANK up to 3 of the most important objectives that influence your utility's rates and/or rate structure. Write in 1 for the most important, 2 for the second most important, and 3 for the third most. You may choose fewer than 3.

Answer	Ranked #1 <i>n</i> = 263	Ranked #2 <i>n</i> = 256	Ranked #3 <i>n</i> = 245
Recover costs	76%	12%	4%
Encouraging economic development	2%	9%	20%
Maintaining affordability for residential customers	17%	53%	19%
Encouraging conservation/reduction of use	2%	11%	20%
Increasing sales due to excess supply/capacity	0%	2%	6%
Simplicity and understandability of the bill	0%	2%	7%
Comparability to other utilities' rates	2%	11%	24%
Other	2%	0%	0%

Source: EFC/NCLM 2010 Water and Wastewater Utility Financial Practices and Policies Survey

Draft Guidelines: 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) Temporal adjustments
8. Frequency of rate changes



Elements of Rate Structure Designs:

1. Customer Classes/Distinction

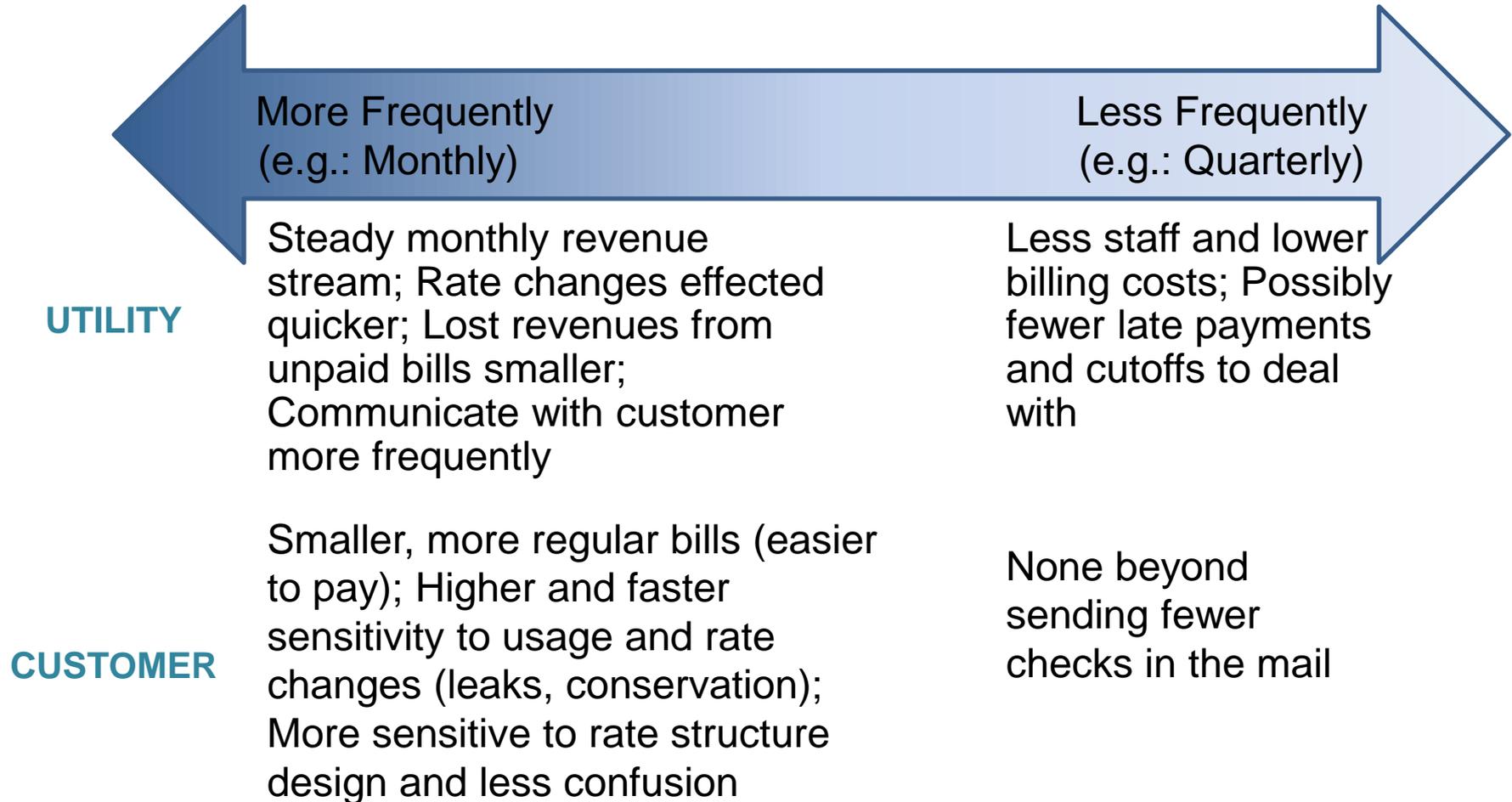
Alternative	Targets
One rate structure for all	All are equal
Separate rate structure for residential, irrigation, commercial, industrial, governmental, or wholesale customers	Specific type of customer
One rate structure, but with different base charges based on meter size	Non-residential or multi-family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

Important: You can only legally charge different rates for customers based on cost-related factors (often usage). E.g.: cannot charge lower rates to seniors or low-income customers explicitly.



Elements of Rate Structure Designs:

2. Billing Period



Suggestion: Use a monthly billing period if you can afford it

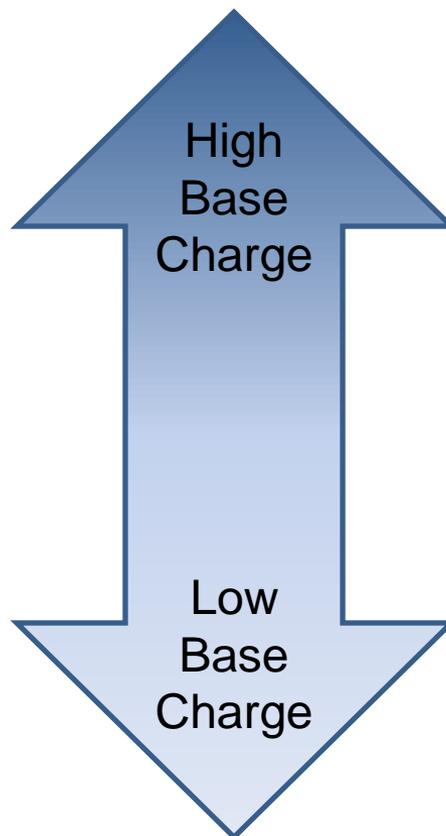
Elements of Rate Structure Designs:

3. Base Charges

PROS

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

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



CONS

Customers with very low usage 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 should lean towards higher base charges

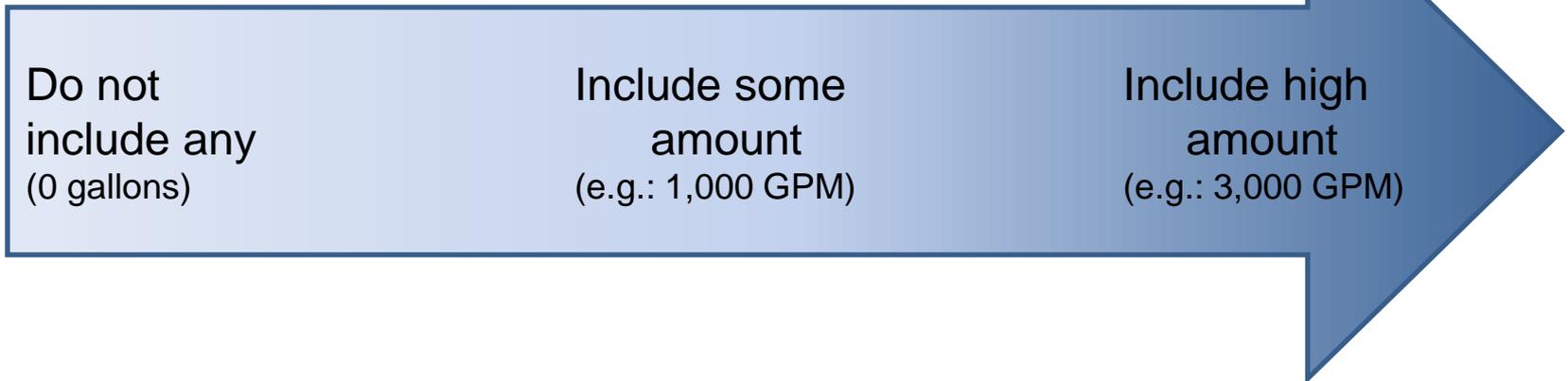
Elements of Rate Structure Designs:

4. Consumption Allowance with Base Charge

Bills and revenues are more sensitive to usage changes

Provides a lifeline amount of water to offset some of the effects of high base charges

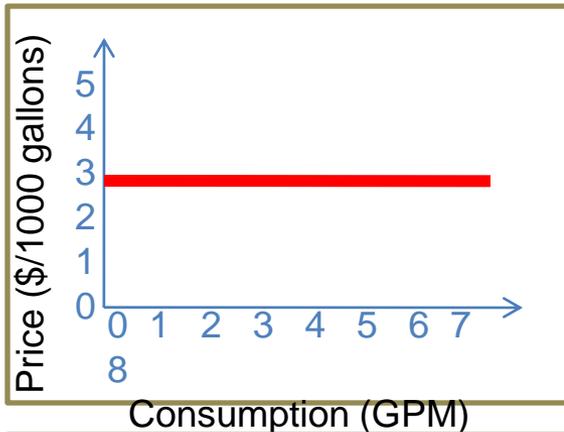
Provides a greater offset for the customer, but discourages conservation



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.

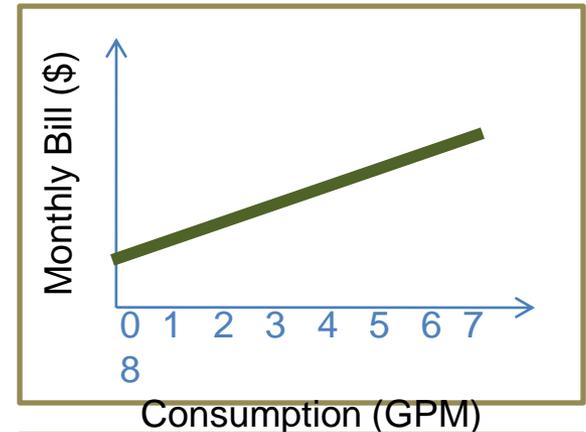
Elements of Rate Structure Designs:

5. Volumetric Rate Structure



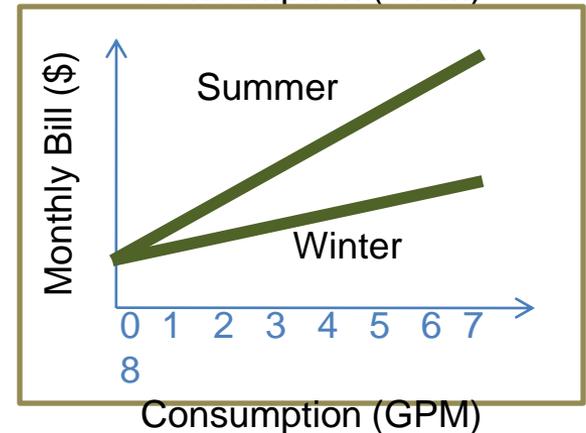
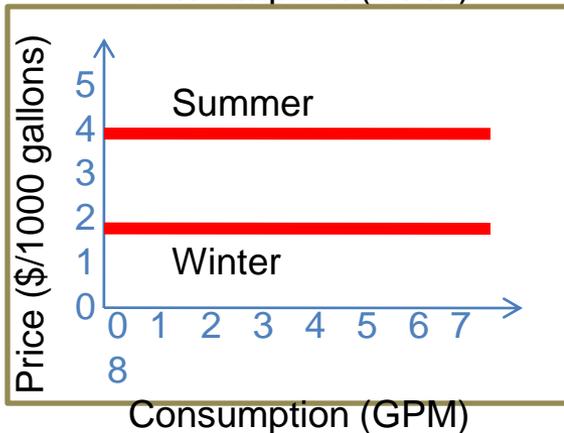
Uniform (“Flat”) Rates

Simple and Fair



Seasonal (Uniform) Rates

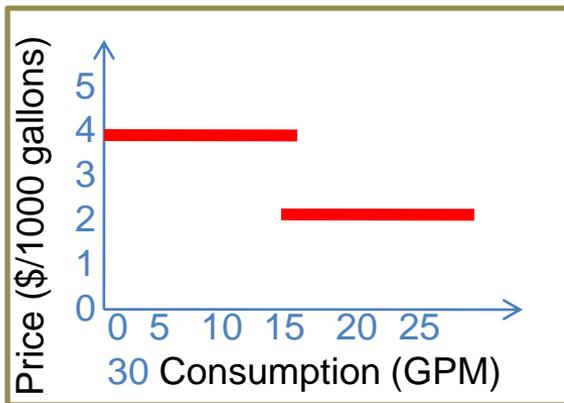
Conservation-oriented, good for seasonal communities



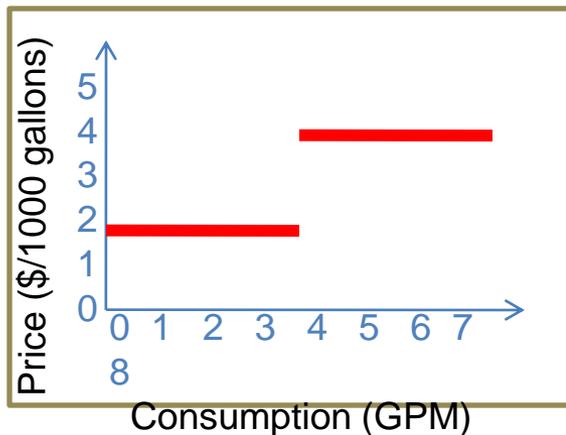
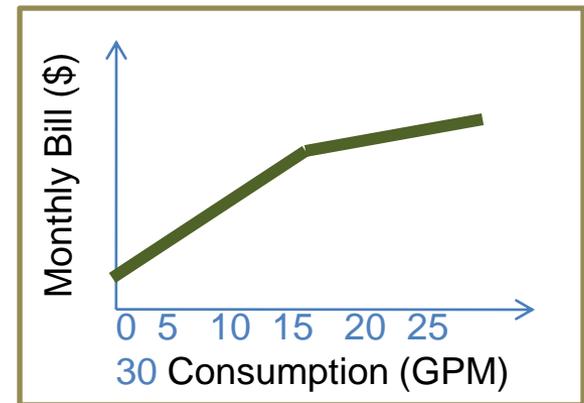
Suggestion: Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.

Elements of Rate Structure Designs:

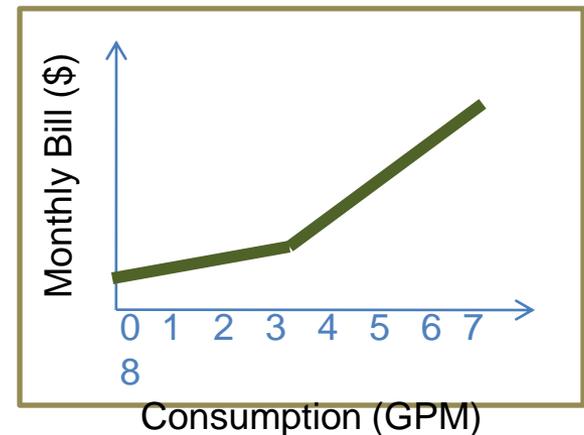
5. Volumetric Rate Structure



Decreasing Block Rates
 Provide price break for large users (e.g.: commercial). Do not use for residential.



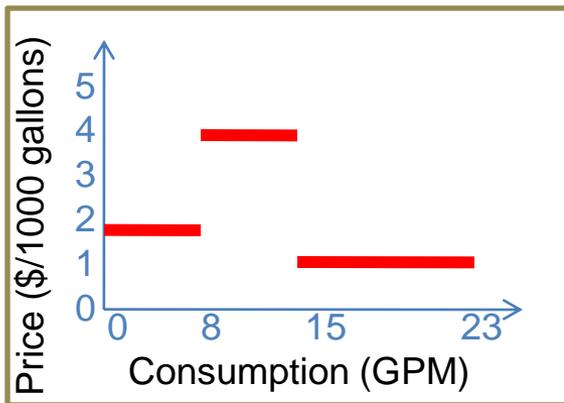
Increasing Block Rates
 Conservation-oriented. Consider large families.



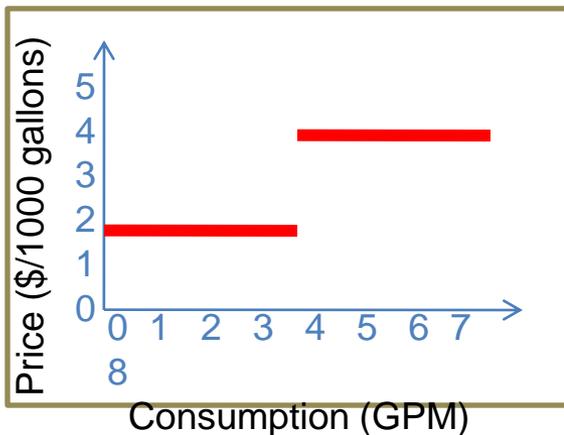
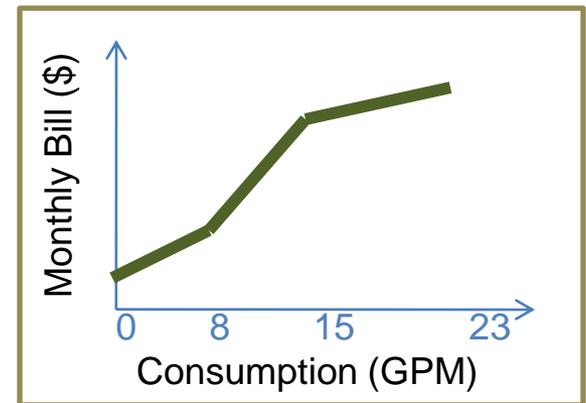
Suggestion: Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.

Elements of Rate Structure Designs:

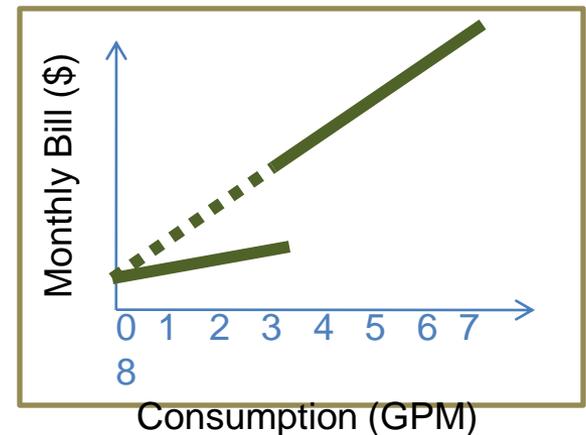
5. Volumetric Rate Structure



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



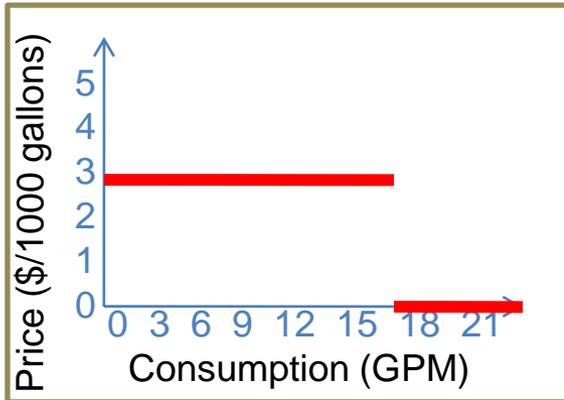
Uniform At One Block
 Complex, but greater price incentives over traditional block rate structures



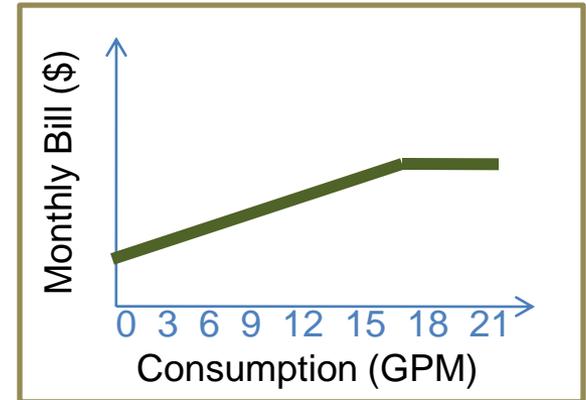
Suggestion: Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.

Elements of Rate Structure Designs:

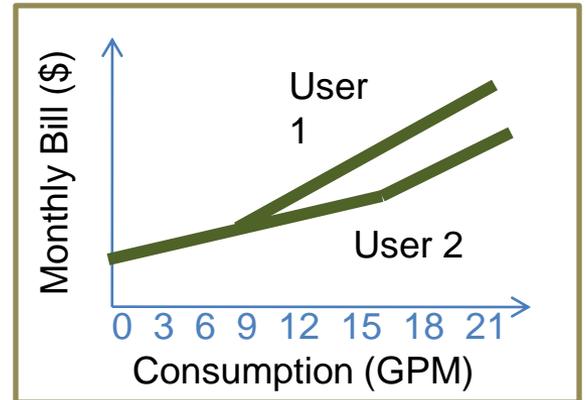
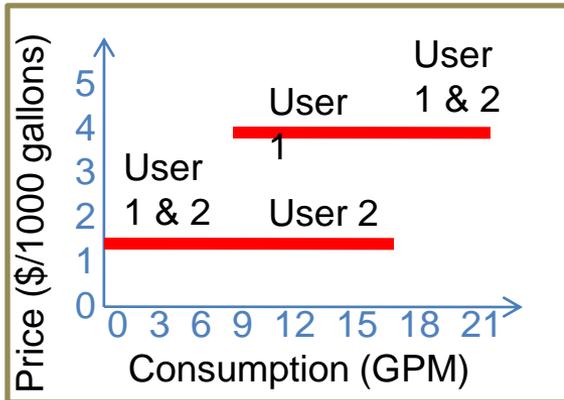
5. Volumetric Rate Structure



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



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



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:

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 usage? 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 GPM), then double it (e.g.: 10,000 GPM), 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.

Elements of Rate Structure Designs:

6. (If Applicable) Block Designs

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.

Elements of Rate Structure Designs:

7. (Optional) Temporal 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.

Elements of Rate Structure Designs:

8. 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
- Pass an ordinance or internal policy to raise rates each year automatically based on inflation

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.

Scenario #1: Urban Utility Currently With Low Costs and High Demand, Wishing to Encourage Residential Conservation

1. **Customer class:** possibly create separate residential class.
2. **Billing period:** use monthly.
3. **Base charge:** keep base charges low.
4. **Consumption allowance:** do not include.
5. **Volumetric rate structure:** increasing block, seasonal, uniform, budget-based. Set high rates.
6. **(If applicable) Block design:** multiple blocks within residential use (first block ends <5,000 GPM, second block ends near large family indoor use, third block within irrigation levels). Set low rates in blocks up to 5,000 GPM and much higher rates in later blocks.
7. **(Optional) Temporal adjustments:** recommended.
8. **Frequency of rate changes:** annual.

Scenario #2: Rural Water Utility With Naturally High Costs and Excess Capacity, Wants to Maintain Affordability

1. **Customer class:** possible create separate residential class.
2. **Billing period:** use monthly.
3. **Base charge:** if majority of customers use little water, charge fair base charge and include allowance. Otherwise, low base charge, and shift high rates to high volume users.
4. **Consumption allowance:** if including, set at a lifeline amount (~2,000 gallons/month).
5. **Volumetric rate structure:** probably use uniform
6. **(If applicable) Block design:** if using, first block at least 4,000 GPM, depending on your customers' consumption.
7. **(Optional) Temporal adjustments:** none.
8. **Frequency of rate changes:** annual.

Note: Set up a customer assistance program: http://www.efc.unc.edu/tools.htm#customer_assistance.



Pricing Out Your Rate Structure (References)

Use any of several reference documents with step by step instructions on calculating projected costs, revenues and rates:

- AWWA (2000). *Principles of Water Rates, Fees, and Charges: Manual of Water Supply Practices, M1.*
- U.S. Environmental Protection Agency (2006). *Setting Small Drinking Water System Rates for a Sustainable Future: One of the Simple Tools for Effective Performance (STEP) Guide Series.* EPA 816-R-05-006. Office of Water, Washington DC. 62 pages.
http://www.epa.gov/waterinfrastructure/pdfs/final_ratesetting_guide.pdf
- Georgia Environmental Protection Division (2007). *Conservation-Oriented Rate Structures.*
http://www1.gadnr.org/cws/Documents/Conservation_Rate_Structures.pdf

Re-evaluate the Proposed Rate Structure

- ✓ Will your new rate structure provide sufficient revenue next year to be considered “full cost pricing”?
- ✓ Is your rate structure design in tune with statutory and/or funding agency requirements?
- ✓ Is the overall rate structure design in sync with the primary objective(s) you identified?
- ✓ Is the bill for average residential consumption within the ability to pay of your customers, including your low-income customers?
- ✓ Are the rates fair and equitable to your non-residential customers?
- ✓ Is your rate structure relatively simple to understand?

Current Rates and Rate Setting Practices in NC



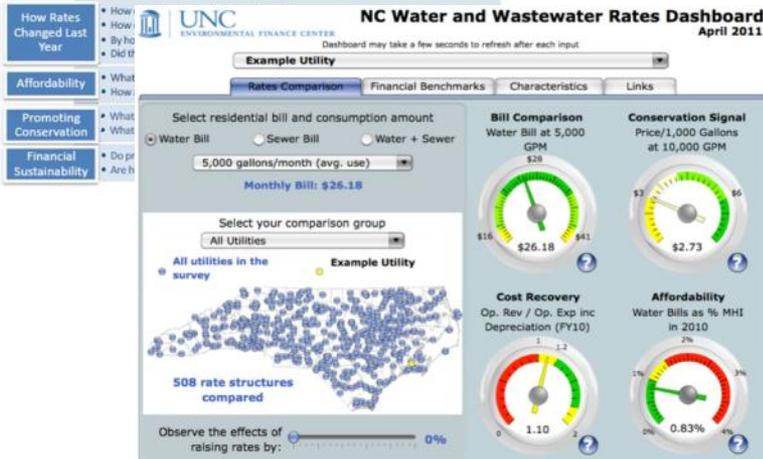
Water and Wastewater Rates and Rate Structures in North Carolina

Chris Nida, North Carolina League of Municipalities
Shadi Eskaf, Environmental Finance Center

March 2009

Click on any of the following questions:

- Tools for Comparisons**
 - What is this study?
 - How many and which utilities and types of rates are analyzed in this report?
 - Where can I find tools and tables I can use to help me evaluate our rates?
- Current Rate Structure Designs**
 - What are the utilities' base charges?
 - How much consumption is included in these base charges?
 - What are the most common rate structure types in North Carolina?
 - How do rate structures differ between commercial and residential customers?
 - How do rate structures differ between indoor and irrigation/outdoor rates?
 - For block rate structures, how much consumption is included in the first block?
 - How much do utilities charge per 1,000 gallons near the average consumption level?
 - What does the State recommend for residential rate structures?
- Current Rates**
 - How much is charged for residential consumption?
 - How much is charged for commercial consumption?
 - How much is charged for residential irrigation water?
 - How do rates differ based on utility size, utility type or river basin?
 - How do rates differ for customers inside or outside municipal boundaries?



Annual survey by the NC League of Municipalities and the Environmental Finance Center.

<http://www.efc.unc.edu/projects/NCWaterRates.htm>

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