



Smart Management for  
Small Water Systems

## Multi-Funding Workshop for Small Water Systems

08/17/17| Springfield, MO

*[www.efcnetwork.org](http://www.efcnetwork.org)*



UNC  
ENVIRONMENTAL  
FINANCE CENTER



American Water Works  
Association

This program is made possible under a cooperative agreement with the U.S. EPA.



# **Generating Needed Revenue – Rates**



© 2004 Ted Goff



**“This part of the plan will be funded with all the unused money we must have laying around someplace.”**



# Session Objectives

- Understand how to pay for the costs of running your water system
- Look more closely at your rates



**How much money  
do you need?**



Will it provide sufficient  
cost recovery?

Are we  
following the  
applicable  
laws?

What exactly  
does this  
include?

Will revenues be  
resilient to changing  
water demands?

Are we allocating  
the costs to the  
right customers?

Do these rates send  
the right signals to  
our customers,  
based on our  
objectives?

Will our customers  
understand these  
rates?

Will our customers  
be able to pay  
these rates?





Learn essential background information about rates

Determine critical characteristics of your utility and community

Design the most appropriate rate structure

*Cost-of-Service Study*

Compute the rates using projected costs and revenues

Re-evaluate/adjust rate structure to fit primary objectives

## The Process of Setting Rates



# Basic Principles

- Aim at full cost pricing
- Set equitable rates
- Share rate structure with customers
- Rate should be easy to understand
- Rates should be examined annually
- Consider fixed costs vs. variable costs
- Allow for reserve account(s)
- *Promote water conservation?*
- *Promote economic development?*





# **“Full Cost Pricing”**

- Operations & maintenance expenditures
- Taxes and accounting costs
- Contingencies for emergencies
- Principal and interest on long-term debt
- Reserves for capital improvement
- Source water protection



# Ways To Pay

- Pay as you go (current receipts)
- Save in advance and pay
- Pay later (someone loans you money)
- Grants (let someone else pay)



## Grants Aren't Completely Free Money

- Application for the grant can be expensive – staff time and money
- Applications can take months to process
- Often lots of strings attached
- Often require a percentage match
- Lots of competition
- Difficult to sustain

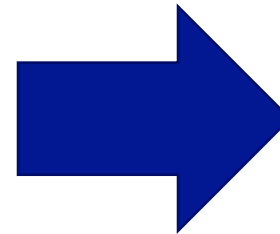
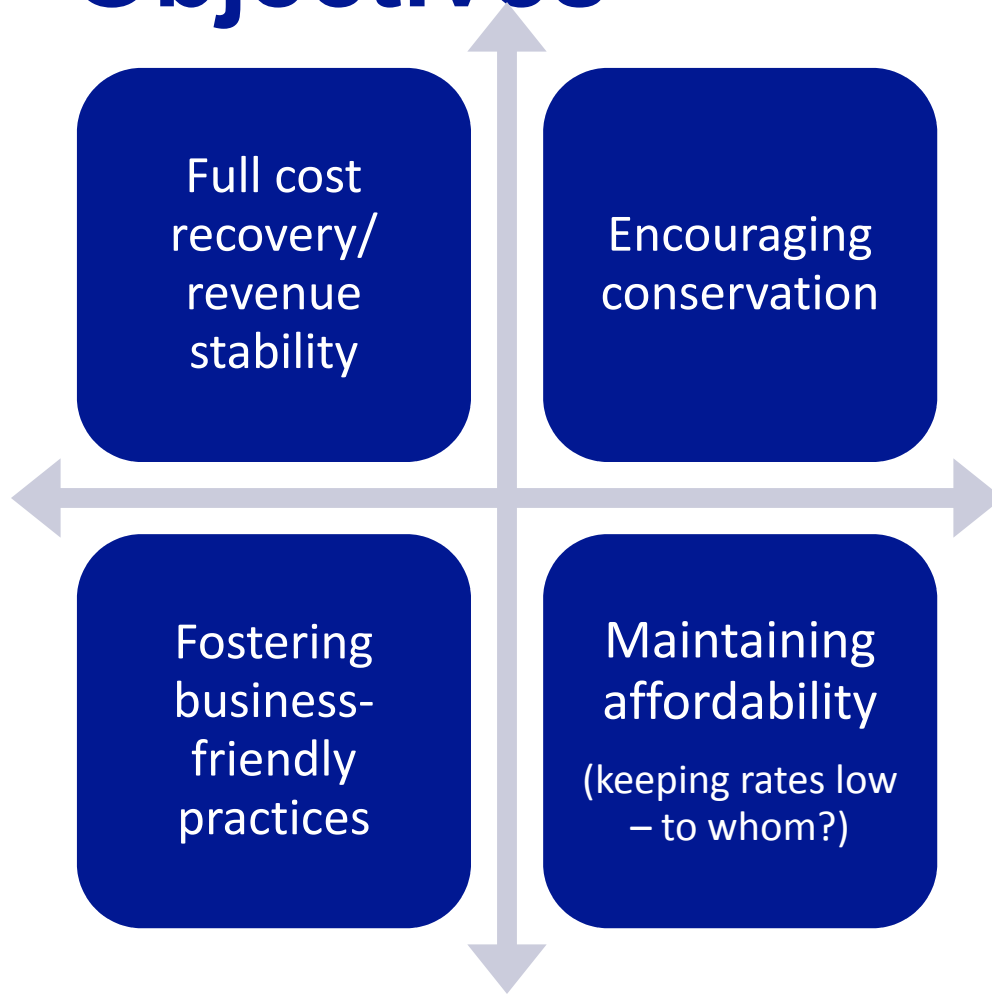


# Rates & Monthly Charges

- What type of rates and monthly charges do you levy?
  - Charges based on metered usage?
  - Flat monthly charges?
  - Something else?
  - Nothing?



# Rank Your 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.



**What are your rate setting objectives?**



# 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) Drought Rates
8. Frequency of rate changes



# Customer Classes/Distinctions

- One rate structure for all
- Target: All are equal





# Customer Classes/Distinctions

- Separate rate structure for residential, irrigation, commercial, industrial, governmental, or wholesale customers
- Target: Specific type of customer



# Customer Classes/Distinctions

- One rate structure, but with different base charges based on meter size
- Target: Non-residential or multi-family housing



# Customer Classes/Distinctions

- One rate structure for all, but with blocks that implicitly only target non-residential use
- Target: Non-residential



# Customer Classes/Distinctions

- Different rates for customers outside municipal limits/service area boundaries
- Target: “Outside” customers

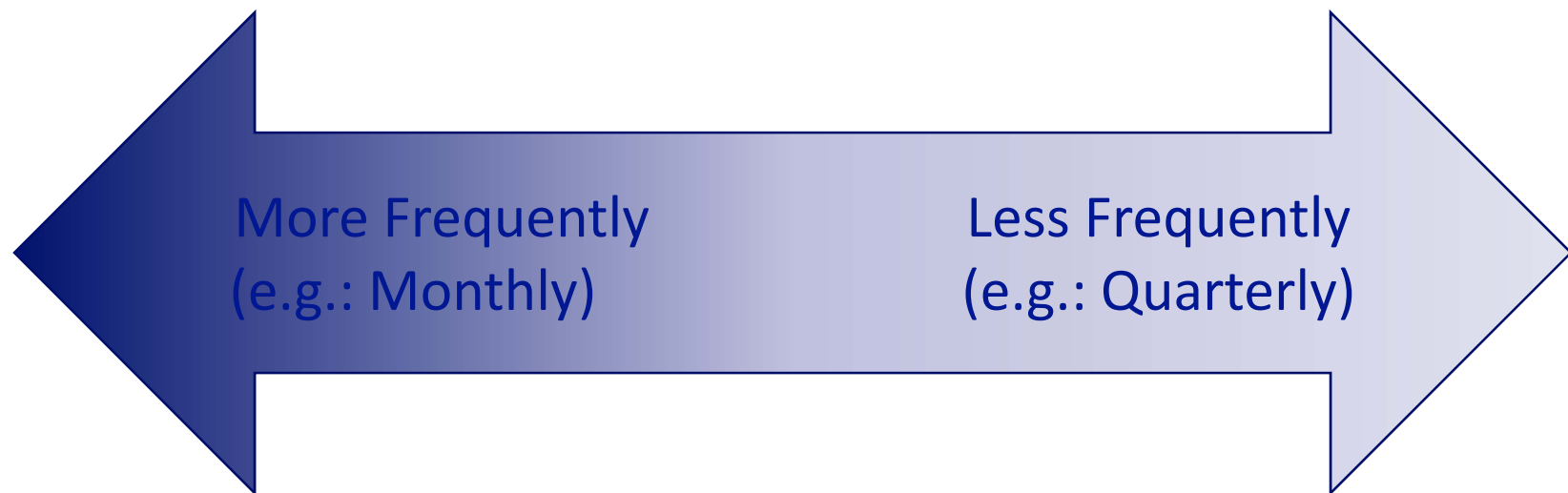


# Customer Classes/Distinctions

- Negotiated rate structure with individual high-use customers (typically an industrial customer)
- Target: Only one customer



# Billing Period

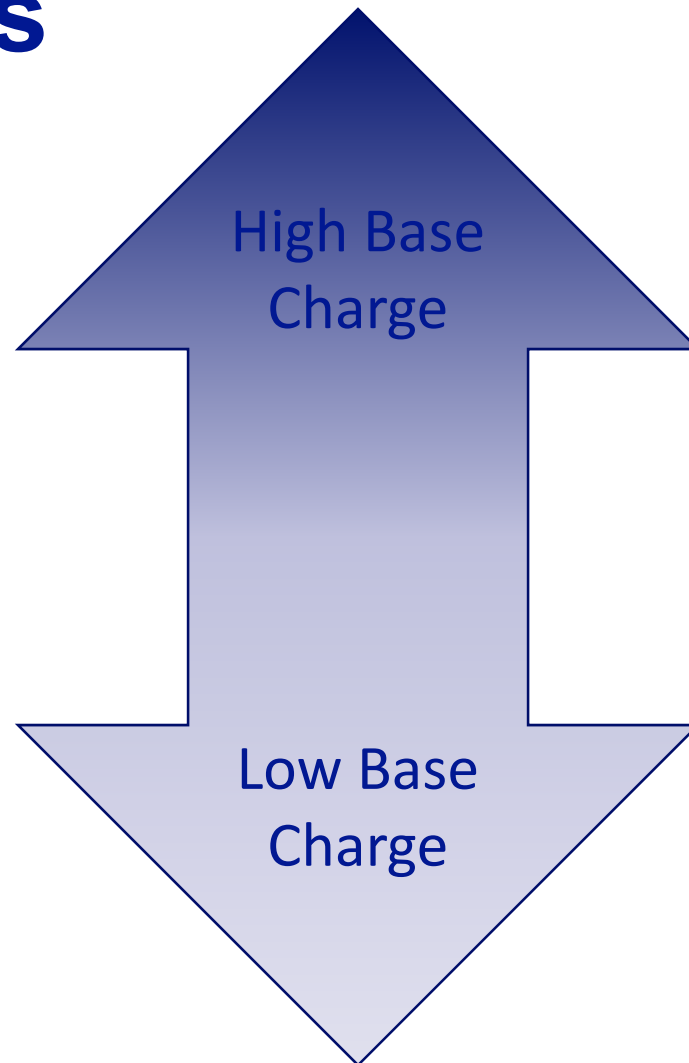


*Suggestion: Use a monthly billing period if you can afford it*



# Base Charges

*Suggestion:  
Smaller utilities  
should lean  
towards higher  
base charges*





# Consumption Allowance with Base Charge

Do not  
include any  
(0 gallons)

Include some  
amount  
(e.g. 1,000 gal/mo)

Include high  
amount  
(e.g. 3,000 gal/mo)

*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.*

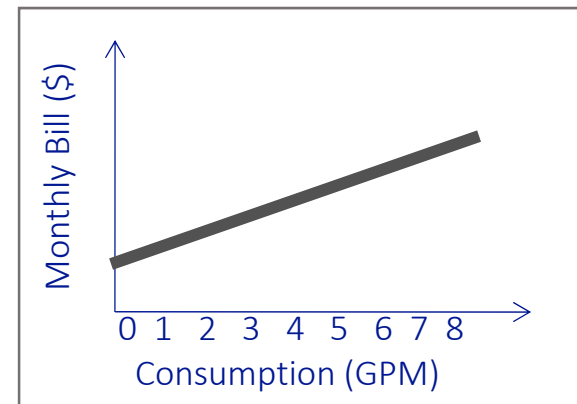
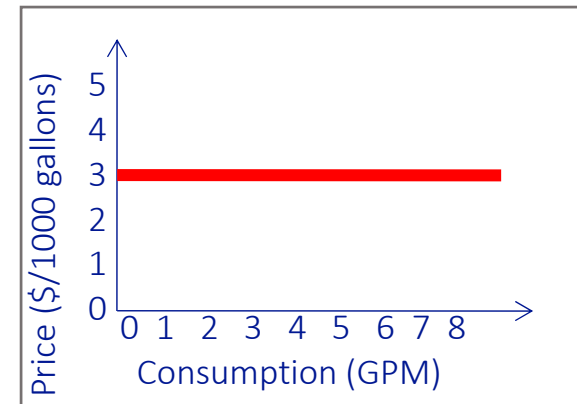




# Volumetric Rate Structure

## Uniform (“Flat”) Rates

- Fair and simple

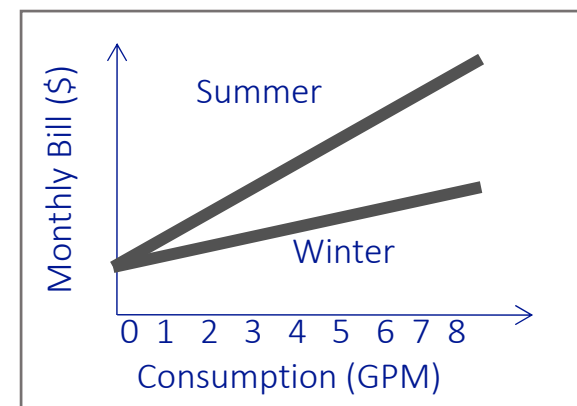
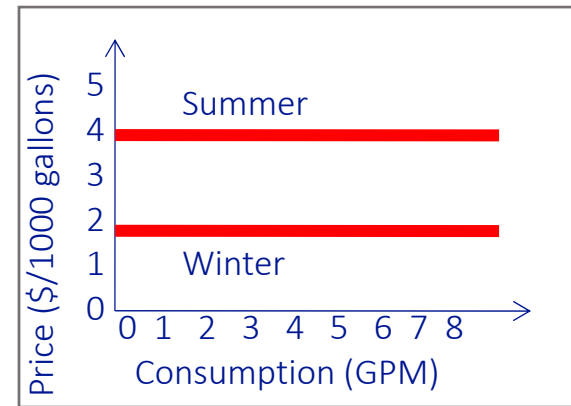




# Volumetric Rate Structure

## Seasonal (Uniform) Rates

- Conservation-oriented, good for seasonal communities

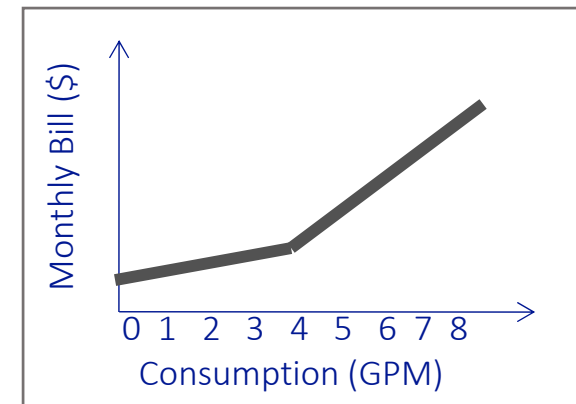
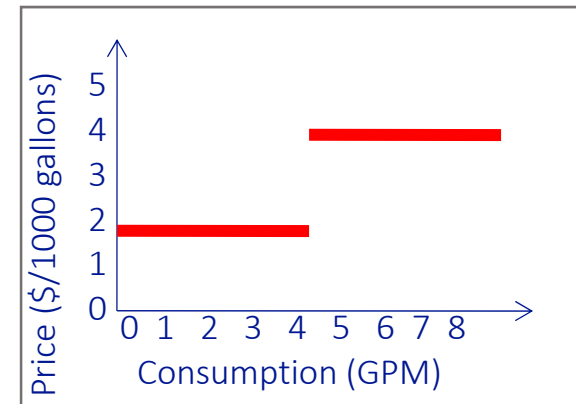




# Volumetric Rate Structure

## Increasing Block Rates

- Conservation-oriented
- Consider large families

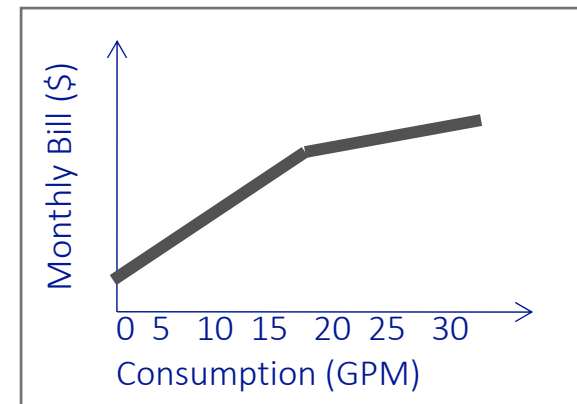
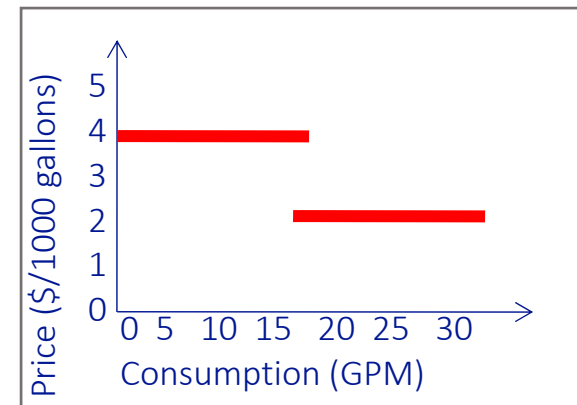




# Volumetric Rate Structure

## Decreasing Block Rates

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





# **(If Applicable) Block Designs**

For block rate structures to be effective:

- Decide on the correct number of blocks
- Decide on where the blocks should end/start
- Set significant rate differentials between blocks



# **(If Applicable) Block Designs**

For block rate structures to be effective:

- Keep in mind your base charge and consumption allowance
- Meter reading must be punctual, and meters must be replaced frequently
- Think about large families



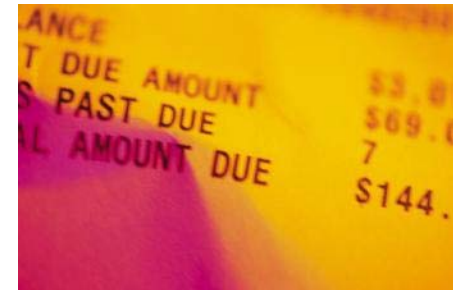
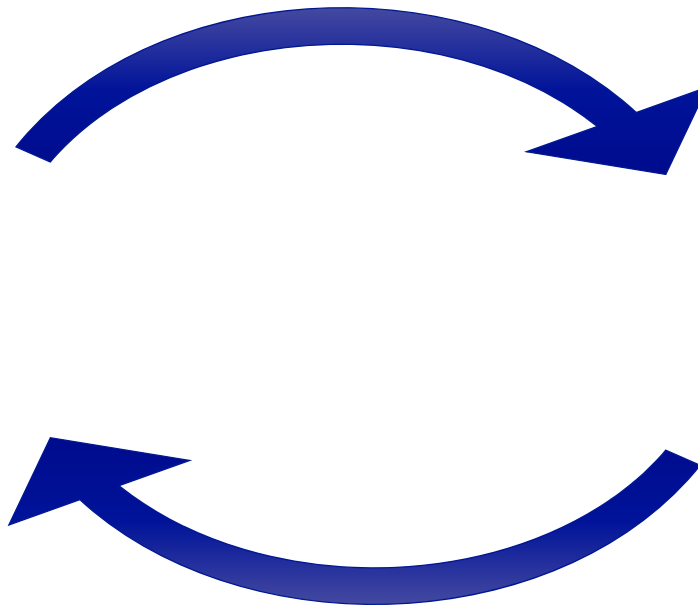
# (Optional) Drought Rates

- 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”).



# How Rates and Usage Interact

Set rates based on projected water use



Raising rates lowers water use

Rule of thumb: water use declines ~2-6% as rates increase 10%





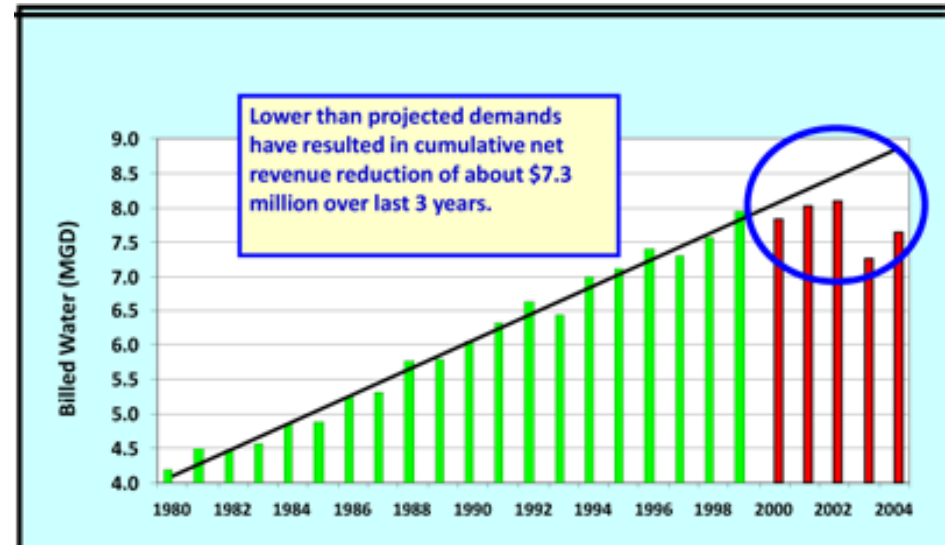
# Background Information: How Rates and Usage Interact

Public Perception:



Source: Fayetteville Observer 2/6/2004

Utility Reality:

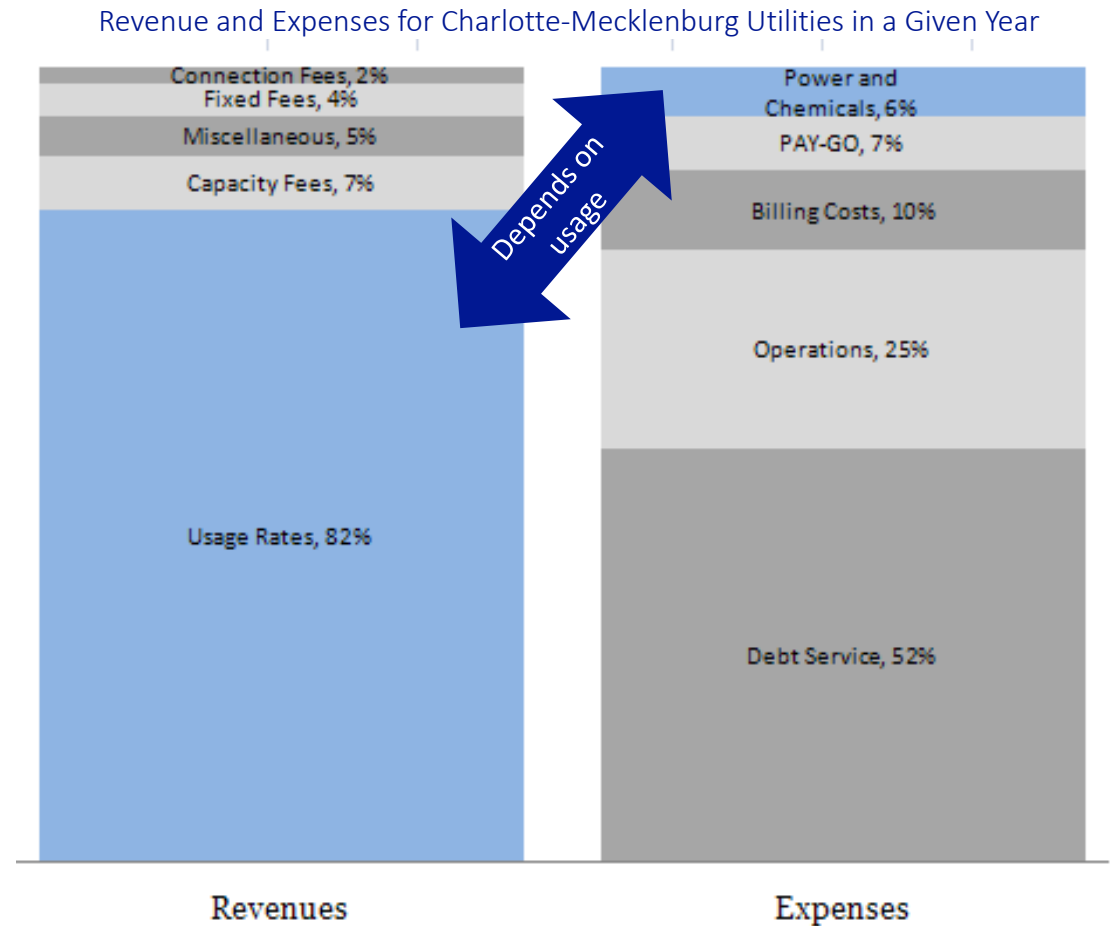


Source: Orange Water & Sewer Authority



## Why Does this Happen?

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.



# Frequency of Rate Changes

- 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
- Perhaps less politically charged option: Raise rates each year automatically based on inflation



# Frequency of Rate Changes

- *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.*




**Look at your rate setting objectives. Look at your rate structure. Do they line up? What changes do you want to consider?**



# **Water and Sewer Rates Analysis Model**



## Free, rate-setting tool using only MS Excel, developed by the Environmental Finance Center at UNC.



### Water and Sewer Rates Analysis Model

Version 2.7 (updated March 24, 2014)

*20-year fund balance estimates under proposed new rates vs. existing rates; compare side-by-side  
Uniform or block rates Residential and non-residential rates Changes to customers and demands*

### INSTRUCTIONS

- 1) Click on tabs at bottom of screen to navigate to different pages.
- 2) On the **"Data Input 1"** tab enter current and new rate details in the dark green cells.
- 3) On the **"Data Input 2"** tab enter current consumption levels, utility finances, and other assumptions in the dark green cells.
- 4) On the **"Charts"** tab, see projections of the End of Year Fund Balance, and input a Fund Balance Policy in the dark green cell at the top of the page.
- 5) Compare new rates to existing rates in **"Compare Monthly Bills"** and their impacts on costs and revenues in **"Existing Rates"** or **"New Rates"**.

**Rate Structure**

Residential Rates	Block Start	Block End	Block Rate
Block Rate 1 (\$/1,000 gal)	2,001	5,000	\$2.00
Block Rate 2 (\$/1,000 gal)	5,001	7,000	\$3.00
Block Rate 3 (\$/1,000 gal)	7,001	12,000	\$4.00
Block Rate 4 (\$/1,000 gal)	12,001		\$5.00

**Water Base Rate** \$10.00

**Sewer Base Rate** \$10.00

**Residential Water Monthly Bills**

**Rate Structure**

Block Start	Block End	Block Rate
2,001	5,000	\$2.00
5,001	7,000	\$3.00
7,001	12,000	\$4.00
12,001		\$5.00

**During FY2013**

Existing	FY2013
12,235,000 (gal/month)	
5,500 (gal/month)	
1,500,000 (gal/month)	
3,000,000 (gal/month)	
1,000,000 (gal/month)	
1,200,000 (gal/month)	
2,400,000 (gal/month)	
800,000 (gal/month)	
1,000,000 (gal/month)	
1,435,000 (gal/month)	
2,500,000 (gal/month)	

**Starting Fund Balance**

Existing	FY2013
\$1,750,000	

**Utility Expenses Excluding Debt Service (\$ per year)**

Existing	FY2013
\$200,000	
\$8,000	
\$5,000	
\$5,000	
\$5,000	
\$20,000	
\$20,000	
\$150,000	
\$100,000	
\$15,000	

**Assumptions**

After FY2013

**Note:** This tool models the impact on a utility's fund balance of a one-time increase in rates, rather than an ongoing series of rate increases. Update this tool **every year** and do not rely on analysis conducted more than one year ago.

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Funded by the Public Water Supply Section, Division of Water Resources at the NC Department of Environment and Natural Resources, and the U.S. Environmental Protection Agency

Download the latest version of this tool at <http://efc.sog.unc.edu>. Find it in Resources / Tools.

Provide feedback or ask questions by emailing Shadi Eskaf at [eskaf@sog.unc.edu](mailto:eskaf@sog.unc.edu)

Download the latest version at  
<http://efc.sog.unc.edu>.  
Find it in Resources / Tools.

Tool development was funded by the  
Public Water Supply Section of  
DWR/ NCDENR  
and partly by the USEPA.





<http://efc.sog.unc.edu/reslib/item/water-sewer-rates-analysis-model>

## Data Input 1

Rate\_Analysis-version2 - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Clipboard Font Alignment Number Styles Cells Editing

Q3 100

**Water and Sewer Rates Analysis Model. Version 2.0**

**Inputs: Rates and Rate Structures**

Input current rate and account information in the dark green cells to analyze projected cashflows from rate changes.

**Rate Structure**

FY: 2012 2013

**Residential Rates**

	Existing	New
Water Base Rate	\$10.00	\$12.00
Water:		
Block Rate 1 (\$/1,000 gal)	\$1.00	\$1.25
Block Rate 2 (\$/1,000 gal)	\$2.00	\$2.25
Block Rate 3 (\$/1,000 gal)	\$3.00	\$3.25
Block Rate 4 (\$/1,000 gal)	\$4.00	\$4.25
Final Block Rate (\$/1,000 gal)	\$5.00	\$5.25
Sewer Base Rate	\$10.00	\$12.00
Sewer:		
Block Rate 1 (\$/1,000 gal)	\$1.00	\$1.25
Block Rate 2 (\$/1,000 gal)	\$2.00	\$2.25
Block Rate 3 (\$/1,000 gal)	\$3.00	\$3.25
Block Rate 4 (\$/1,000 gal)	\$4.00	\$4.25
Final Block Rate (\$/1,000 gal)	\$5.00	\$5.25

**Rate Structure**

2012 2013

**Commercial Rates**

	Existing	New
Water Base Rate	\$10.00	\$12.00
Water:		
Block Rate 1 (\$/1,000 gal)	\$1.00	\$1.25
Block Rate 2 (\$/1,000 gal)	\$2.00	\$2.25
Block Rate 3 (\$/1,000 gal)	\$3.00	\$3.25
Block Rate 4 (\$/1,000 gal)	\$4.00	\$4.25
Final Block Rate (\$/1,000 gal)	\$5.00	\$5.25
Sewer Base Rate	\$10.00	\$12.00
Sewer:		
Block Rate 1 (\$/1,000 gal)	\$1.00	\$1.25
Block Rate 2 (\$/1,000 gal)	\$2.00	\$2.25
Block Rate 3 (\$/1,000 gal)	\$3.00	\$3.25
Block Rate 4 (\$/1,000 gal)	\$4.00	\$4.25
Final Block Rate (\$/1,000 gal)	\$5.00	\$5.25

**Rate Structure**

2012 2013

**Irrigation Rates**

	Existing	New
Irrigation Base Rate	\$0.00	\$0.00
Irrigation:		
Block Rate 1 (\$/1,000 gal)	\$3.50	\$3.50
Block Rate 2 (\$/1,000 gal)		
Block Rate 3 (\$/1,000 gal)		
Block Rate 4 (\$/1,000 gal)		
Final Block Rate (\$/1,000 gal)		

**Tap Fees**

	2012 Existing	2013 New
Average Sewer Tap Fee	\$2,000.00	\$2,400.00
Average Water Tap Fee	\$500.00	\$600.00
Average Irrigation Tap Fee	\$2,200.00	\$2,500.00

**Data Input Color Explanation:**

White: Data to be entered, can be changed

Black: Automatically calculated data; do not change!

Red: Important Results

**cubic feet to gallons converter**

100 cubic feet = 748 gallons

**\$/ccf to \$/1000 gallons converter**

\$ 1.00 /hundred cubic feet = \$1.34 /1,000 gallons

Input block sizes (state and end) in gallons/month

Input rates in \$/1000 gallons

Use the converters above for converting from cubic feet units

**Number of Accounts**

	Existing	Growth Rate:
Residential Water	3000	0.50%
Residential Sewer	2500	0.50%
Commercial Water	200	0.50%
Commercial Sewer	80	0.50%
Irrigation Water	3000	0.50%

**Miscellaneous**

	2012 Existing
Uncollected Bills	8.0%
Non-revenue Water	15.0%

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Funded by the NC Department of Environment and Natural Resources and the U.S. Environmental Protection Agency

Instructions Data Input 1 Data Input 2 Charts Fund Balance - Existing Rates Fund Balance - New Rates

Ready Calculate Scroll Lock





# Water and Sewer Rates Analysis Model - Results

- Results are Excel Spreadsheet with:
    - The Fund Balance Under **Existing** Rates
    - The Fund Balance Under **Proposed** Rates
- ...Projected for the next 20 years