Smart Management for Small Water Systems

Managing Your Water System into the Future

Trenton, NJ
June 3, 2019

UNC ENVIRONMENTAL FINANCE CENTER

EFCN environmental finance center network

NADO RESEARCH FOUNDATION

GFOA Government Finance Officers Association

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Housekeeping

CEU Certificates

If you need a CEU certificate, you will need to confirm the following on the roster today before you leave:

- Is your name spelled correctly?
- Did you provide an email address UNIQUE TO YOU? A unique email address is required to receive your certificate.
- Did you mark the checkbox that you need a certificate?

Within 30 days of the training, you will receive an email with instructions to print your certificate. Emails from EFCN may be blocked or go to your Junk mail. To avoid this issue, add *Smallsystem@syr.edu* to your email Contacts or check your Junk mail frequently.

EFCN will apply to the water operator state licensing agency for CEU preapproval when applicable. You may be awarded CEUs by your agency. It is your responsibility to confirm with the agency that training meets relevancy criteria established for your license type as some agencies may not apply CEUs to your license if the training topic is not relevant to your position.

EFCN follows the IACET Standard of CEU calculation.
0.1 CEU = 1 Contact Hour or 1 Professional Development Hour

Questions? Please contact *Smallsystem@syr.edu*

Environmental Finance Center Network (EFCN)

The Environmental Finance Center Network (EFCN) is a university-based organization creating innovative solutions to the difficult how-to-pay issues of environmental protection and improvement. The EFCN works with the public and private sectors to promote sustainable environmental solutions while bolstering efforts to manage costs.

The Small Systems Program Team

- Environmental Finance Center at The University of North Carolina at Chapel Hill
- Southwest Environmental Finance Center at the University of New Mexico
- Syracuse University Environmental Finance Center
- Environmental Finance Center at Wichita State University
- EFC West
- Environmental Finance Center at the University of Maryland
- New England Environmental Finance Center at the University of Southern Maine
- Great Lakes Environmental Infrastructure Center
- Government Finance Officers Association (GFOA)
- National Association of Development Organizations (NADO)

UNC Environmental Finance Center

Southwest Environmental Finance Center

Environmental Finance Center, Syracuse University

Wichita State University, Hugo Wall School of Public Affairs, Environmental Finance Center

EFC West, Environmental Finance Center West

University of Maryland Environmental Finance Center

New England Environmental Finance Center

Great Lakes Environmental Infrastructure Center, Environmental Finance Center for EPA Region 5

Government Finance Officers Association

NADO Research Foundation

Smart Management for Small Water Systems

Smart Management for Small Water Systems Program

Areas of Expertise

- Asset Management
- Rate Setting and Fiscal Planning
- Leadership Through Decision-making and Communication
- Water Loss Reduction
- Energy Management Planning
- Accessing Infrastructure Financing Programs
- Workforce Development
- Water Conservation Finance and Management
- Collaborating with Other Water Systems
- Resiliency Planning
- Managing Drought

Quick Introductions

1. Name?
2. Organization?
3. Responsibility?
4. Details on your water system
5. What are you most proud of at your water system?
6. What is your biggest issue?

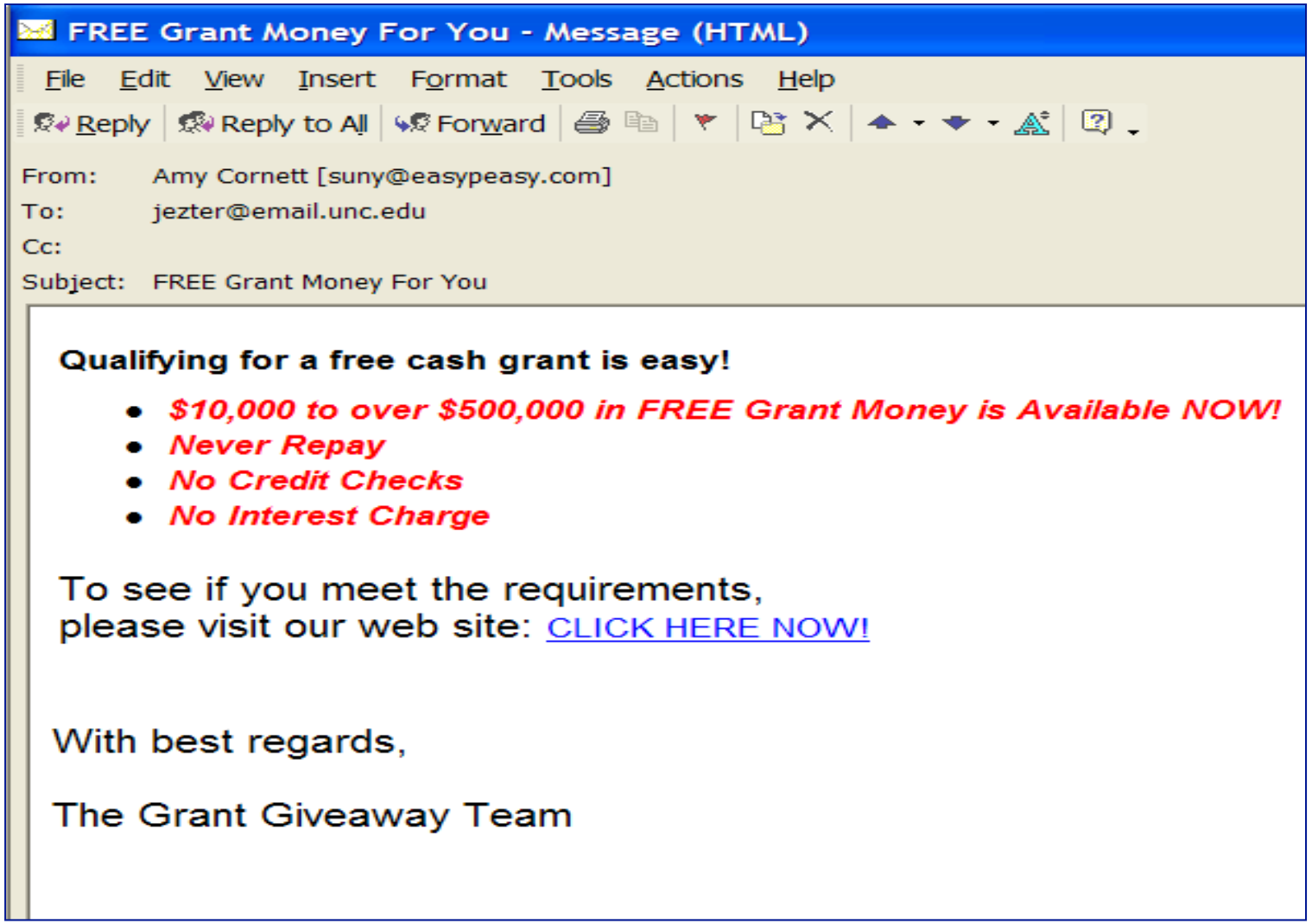
Workshop Objectives

- Understand how your system is doing financially
- Learn how to plan for and finance your water system now and into the future
- Provide forum for sharing finance and management perspectives, ideas, and experiences

Agenda

- 9:00 AM Introductions
  Revenues and Rate Setting
- 11:00 AM *Break**
- 11:15 AM Long Term System Planning Part I
- 12:00 PM *Lunch**
- 1:00 PM Long Term System Planning Part II
- 1:45 PM Available Funding Programs
- 2:30 PM *Break**
- 2:45 PM Workforce Planning
- 4:30 PM Evaluations and Adjourn

Topics Not Covered



Nigeria's anti-corruption unit finds $43 million cash in Lagos apartment

By **Yemisi Adegoke, CNN**

Updated 10:03 AM ET, Fri April 14, 2017

Source: CNN

Watch: Millions seized from Nigerian apartment 01:14

Story highlights

Nigeria's anti-corruption agency discovered $43 million in cash at a Lagos apartment

This is the latest in a string of busts thanks to a new whistleblowing policy

Lagos (CNN) — The Nigerian anti-corruption unit discovered more than $43 million in US dollars at an upscale apartment in Lagos.

The anti-graft agency said in a statement it raided the apartment Tuesday after a tipoff about a "haggard"

Top stories


MLB team spent $900M, still doesn't have a ring


Conservatives accuse the Pope of spreading heresy

A few questions for you before we continue...

What type of system are you?

A. Local Government
B. Non-Profit
C. For-Profit
D. Other
E. Not a System

How many people do you serve?

A. Up to 500
B. 501 to 3,000
C. 3,001 to 10,000
D. More than 10,000
E. Not a System

What is your background?

A. Science/Engineering
B. Law
C. Finance
D. Management
E. South African Literature

Pricing Water to Achieve Full Cost Recovery

Carol Rosenfeld

Environmental Finance Center

The University of North Carolina at Chapel Hill

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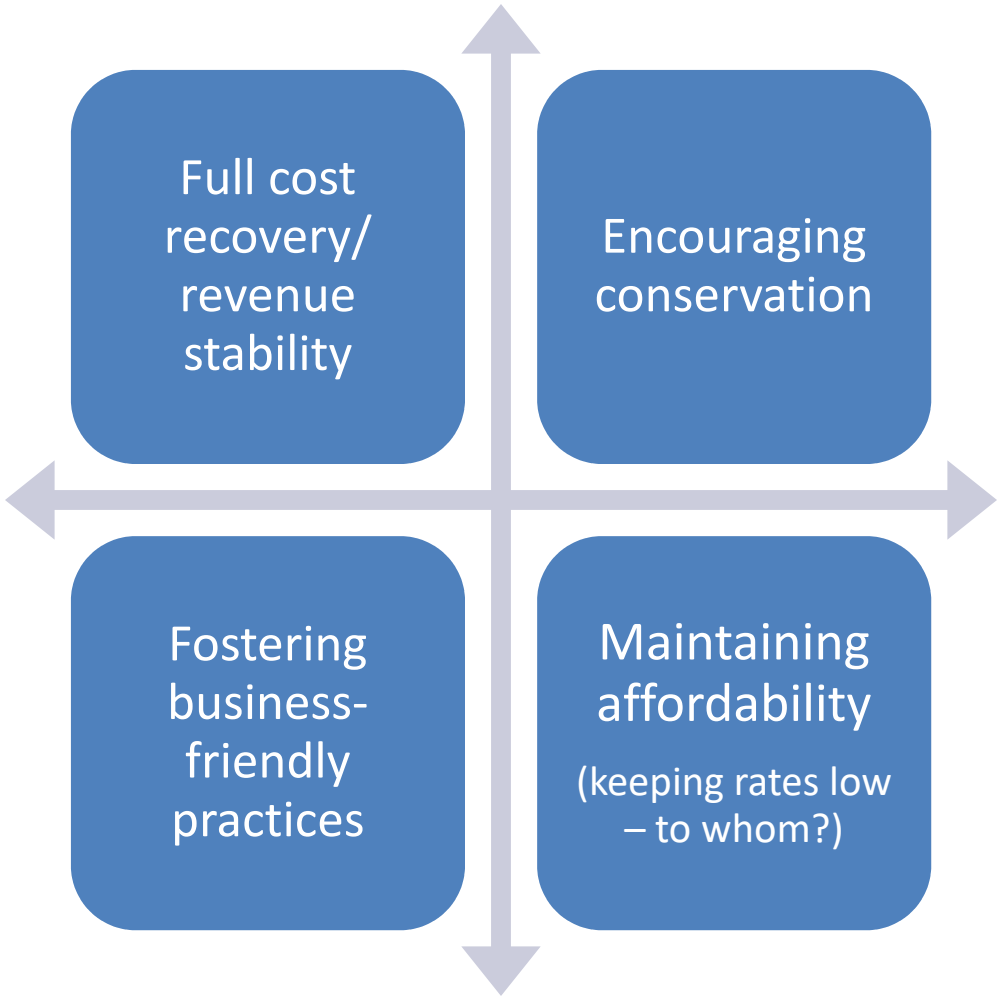
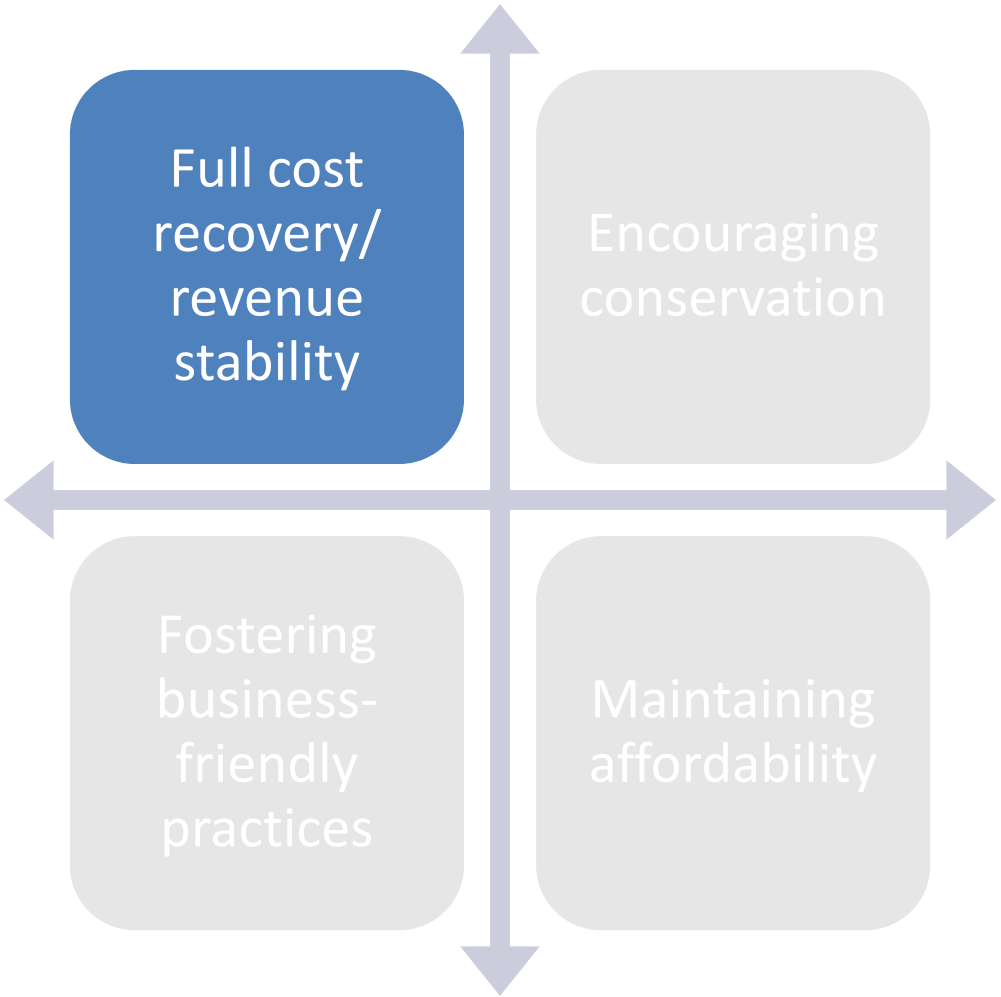
crosenfeld@sog.unc.edu

Session Objectives

- Understand how to calculate the base charges and volumetric charges to cover the full cost of providing water service
- Demonstrate the impact of different pricing structures on different customers
- Discuss what factors can impact your pricing assumptions

Examples of Four Rate Setting Objectives

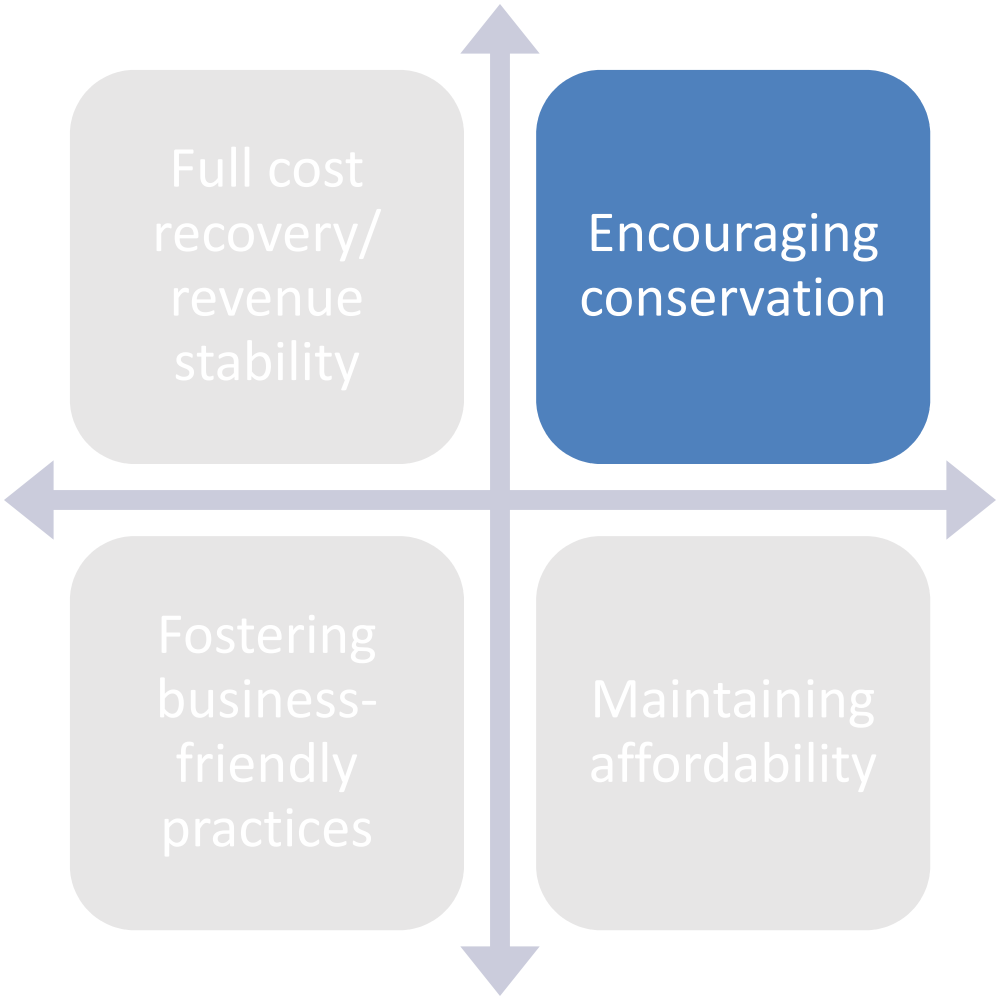




Bring in enough revenue to cover the full cost of running the water system:

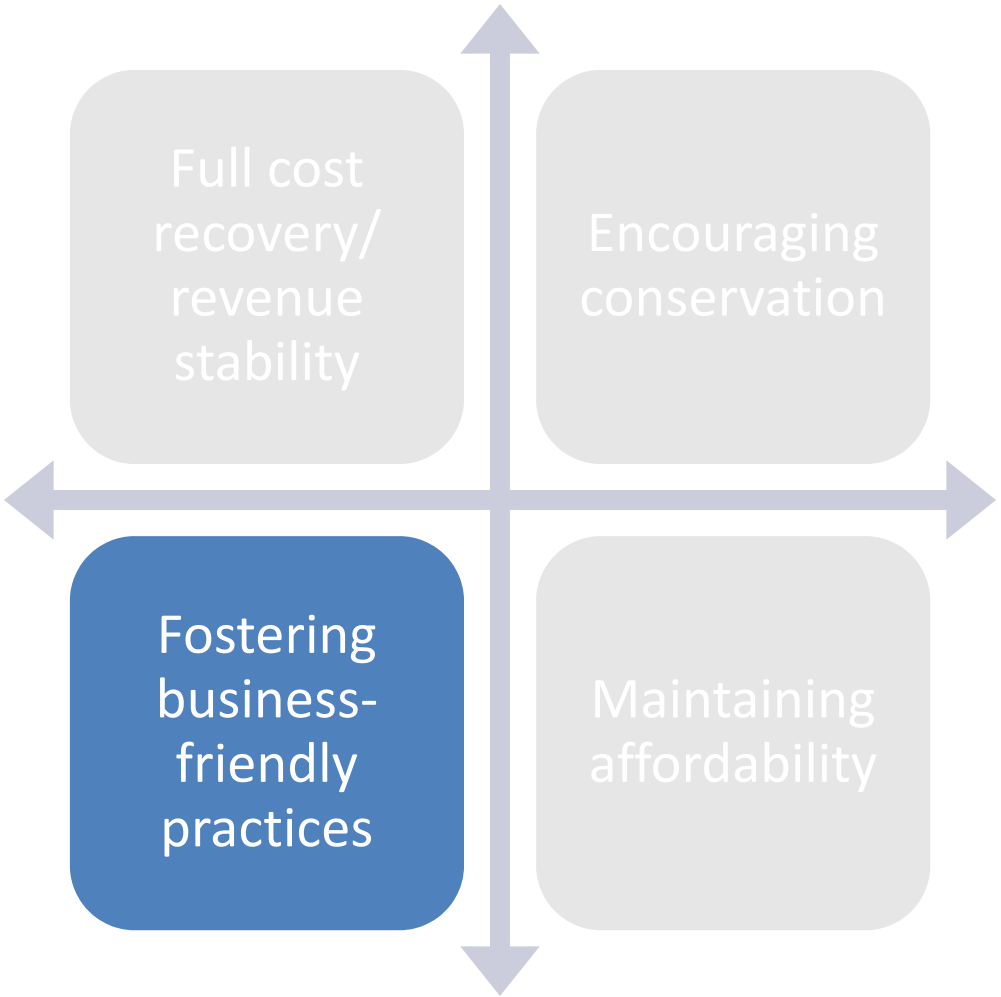
- O&M
- Capital needs
- Debt service

Why do this?



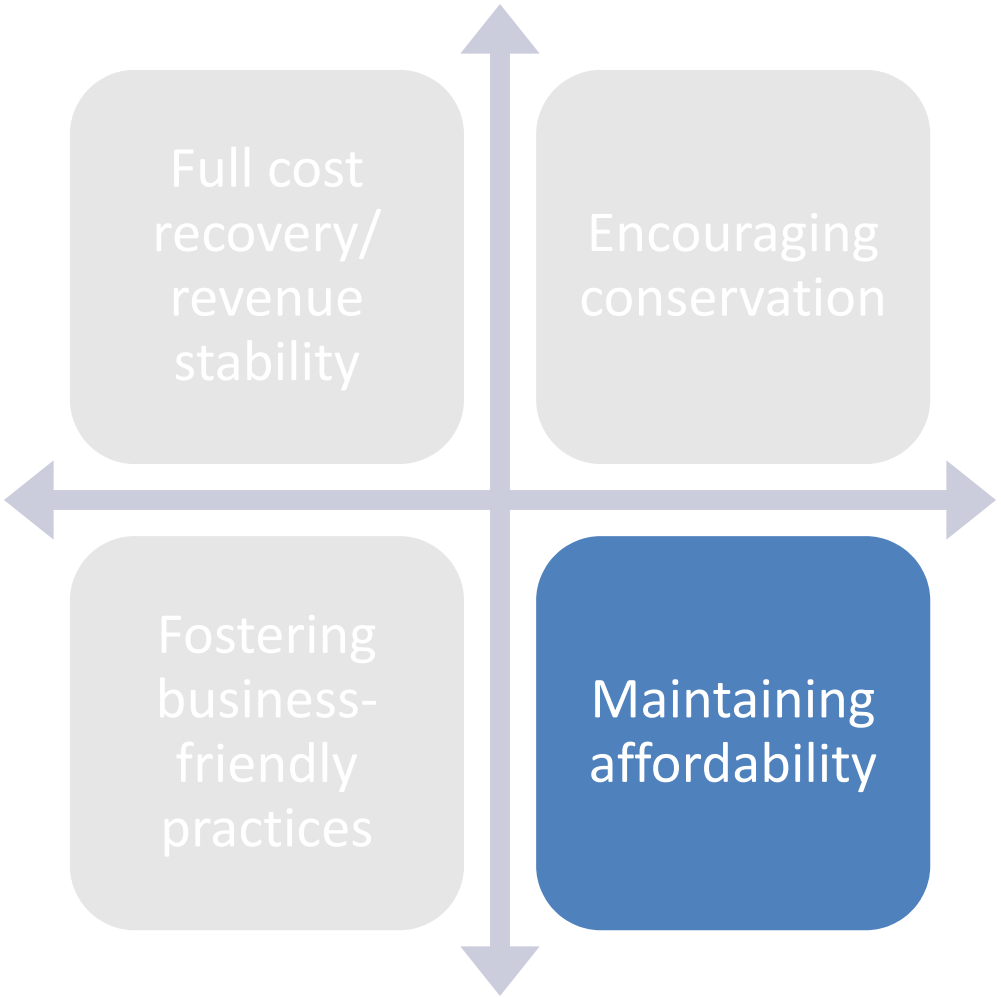
Use pricing to encourage customers to reduce their water consumption

Why do this?



Use pricing to encourage businesses and agriculture to locate in your community or stay in your community

Why do this?



Ensure that all customers in your water system are able to afford enough water to live on

Why do this?

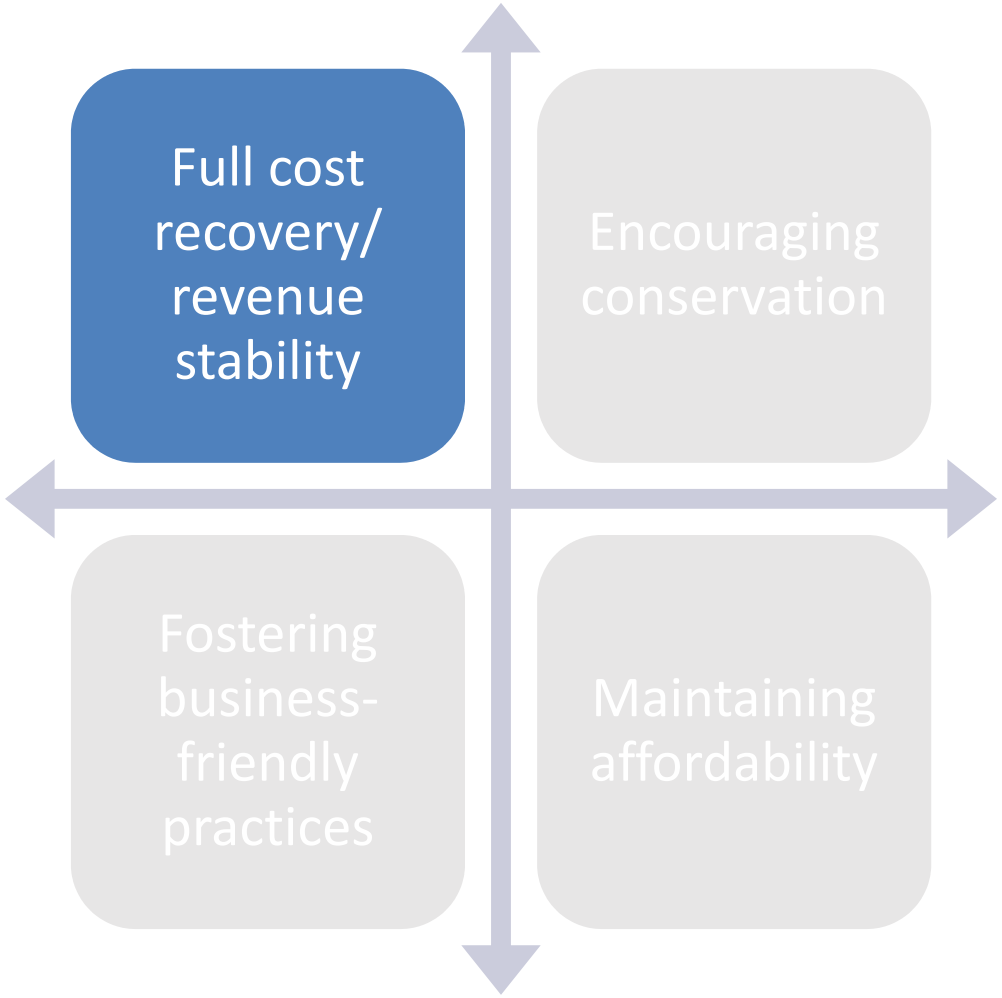
What is your #1 objective?

A. Full cost recovery
B. Encouraging conservation
C. Business friendly
D. Affordability
E. Something else

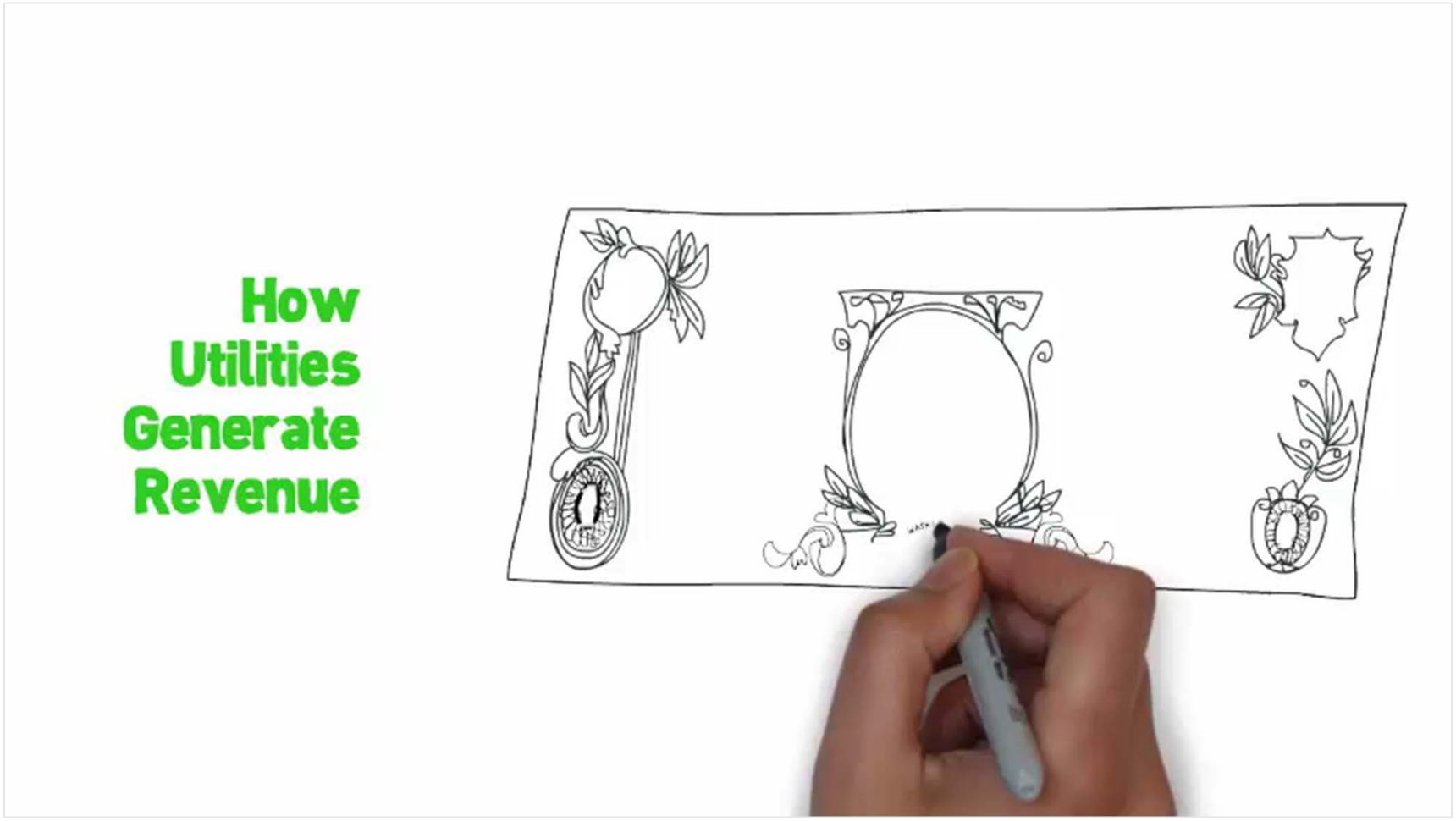
What is your #2 objective?

A. Full cost recovery
B. Encouraging conservation
C. Business friendly
D. Affordability
E. Something else

Water System Objectives



Understanding Water Revenues



https://www.youtube.com/watch?v=0jf83mE0Lyk

Full Cost Pricing

- The goal of full cost pricing is to have the charges for water cover the entire cost of running the water system today and into the future

- Of course, there are many ways in which you can get to the right dollar figure. Some of it comes down to your rate setting philosophy

Rate Setting Philosophies

- Payment for access vs. payment for volume of product received
- Fixed charges for fixed costs and variable charges for variable costs
- Some mix of the above ideas

Rate Setting Philosophies

Jeff Hughes

The Science of Setting Water and Sewer Rates

- *An increase in mergers and acquisitions*
- *Almost $8 billion in assets and more than $1 billion in annual revenues*[1]
- *Changing regulations, affecting the bottom line*
- *A backlog in capital investment needs*
- *Interruptions in supplies that hurt revenues*
- *Loss of major customers*
- *Innovative pricing and customer-relations strategies*
- *Sagging revenues*

typically fall on governing boards that were chosen not as business or technical experts but as representatives of their constituents on a broad range of matters.

The drought of 2002 brought two types of water stories to the headlines: (1) the struggles of many communities to maintain their water supplies and (2) the financial difficulties of many communities due to decreased sales. The response to the first type of circumstance was immediate and significant: an executive order requiring conservation, and statewide initiatives to examine current supplies. The response to the second type of circumstance has been less obvious and less pronounced.

Table 1). These numbers are impressive. However, the projected numbers are staggering. According to a study by the North Carolina Rural Economic Development Center, the state will need more than $11 billion in investments to meet its capital needs for water and sewer infrastructure over the next twenty years.[2]

In North Carolina, as throughout the country, numerous water and sewer enterprises owned by local governments benefited from the federal government's ambitious construction grants program of the 1970s (for the patterns of federal wastewater funding from 1970 to 2000, see Figure 1). Many local government officials fondly remember those days of


Greetings from
Irvindale
USA

Irvindale, USA Exercise

Small town with a water and wastewater system

Population: 1,100

Service Connections: 450

MHI: $24,432

Exercise

Let’s figure out some rates for Irvindale that cover the full cost of providing water service

Irvindale's Rates

	Account	Budget
1	30-329-00 W/S INTEREST EARNED DEPOS	$0.00
2	30-334-00 CONTRIBUTIONS/DONATIONS	$0.00
3	30-335-00 W/S MISC. REVENUE	$700.00
4	30-336-00 FUND BALANCE APPROPRIATED	$9,187.87
7	30-345-01 SALES TAX REFUND	$0.00
9	30-371-01 W/S CHARGES	$344,445.00
10	30-371-02 W/S ADJUSTMENTS	$0.00
11	30-373-00 TAP CONNECTIONS	$1,500.00
13	30-373-02 SERVICE CHARGES/CUT OFFS	$12,500.00
14	30-373-04 IMPACT FEES	$1,000.00
15	30-373-05 CAPITAL CONTRIBUTIONS	$0.00
16	30-374-00 Online W/S Payment Fee	$1,600.00
17	30-375-80 Contributed Capital - G.R.S.P.	$0.00
18	30-375-81 Contributed Capital Fund	$0.00
19	30-377-00 RBEG - Pump Station	$0.00
20	30-378-00 I&I Study Grant - Commerce	$12,000.00
22	30-385-00 SALE OF ASSETS	$0.00
23	30-386-00 TRANSFER FROM OTHER FUND	$0.00
		$382,932.87

For the Exercise

Total Revenues:
$382,932.87

Revenues from Rates:
$344,445.00

Payment for Access

- In its pure form, everyone in the water system pays the same amount for access to the system, regardless of how much water they use

Payment for Access

We charge a flat rate of $15.00 monthly

P.O. Box 133
Jacksonville

We are a small town we do not have sewage

Jacksonville, GA

Payment for Access

- What information do we need to make this calculation?

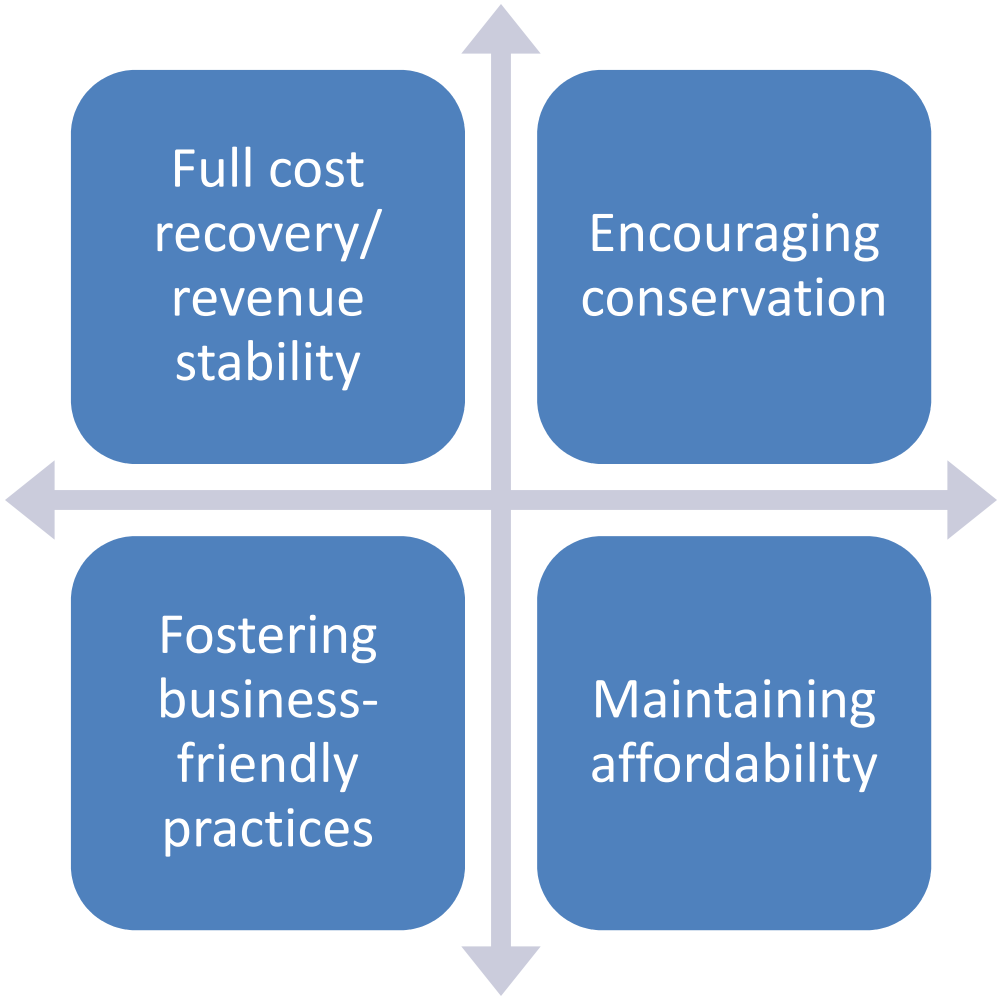
- Total revenue needed from rates
- Total number of accounts

Payment for Access

$$\frac{\$344{,}445}{450} = \frac{\$765.43}{12} = \$63.79$$

Total Needed Revenue / Total Accounts = Total Annual Bill / 12 = $63.79 Monthly Bill

Which Water System Objectives?



Payment for volume of product received

- In its pure form, everyone in the water system pays for the volume of water received and only for the volume of water received

Payment for volume of product received

WATER & SEWER RATES

In Town

Water	$ 7.72 per 1000 gallons
Sewer	$ 10.73 per 1000 gallons

Out of Town

Water	$ 15.44 per 1000 gallons
Sewer	$ 21.46 per 1000 gallons

Troutman, NC

Payment for volume of product received

- What information do we need to make this calculation?

- Total revenue needed from rates
- Total gallons sold

Payment for volume of product received

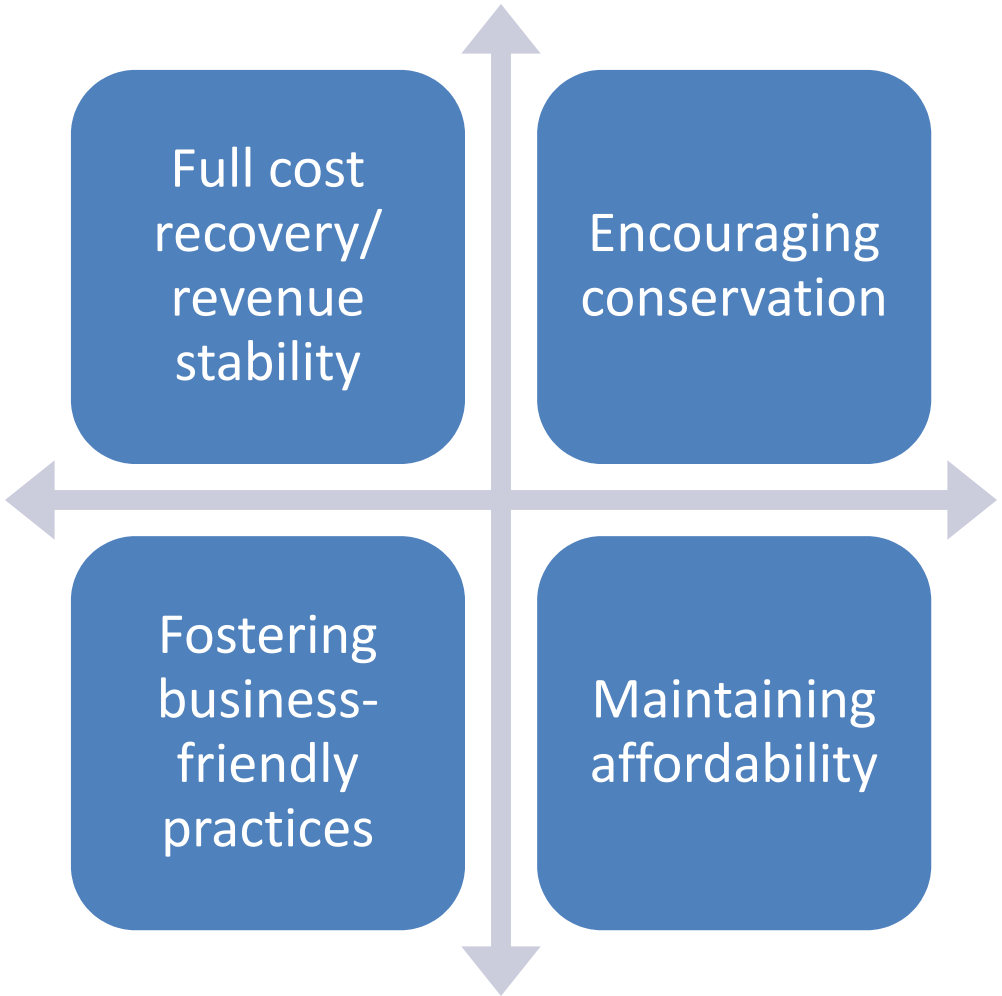
$$\frac{\$344,445}{32,877,590} \times 1{,}000 = \$10.48$$

Total Needed Revenue

Total Gallons Sold

Price per 1,000 Gallons

Which Water System Objectives?



Base Charge for Fixed Costs; Volumetric Charge for Variable Costs

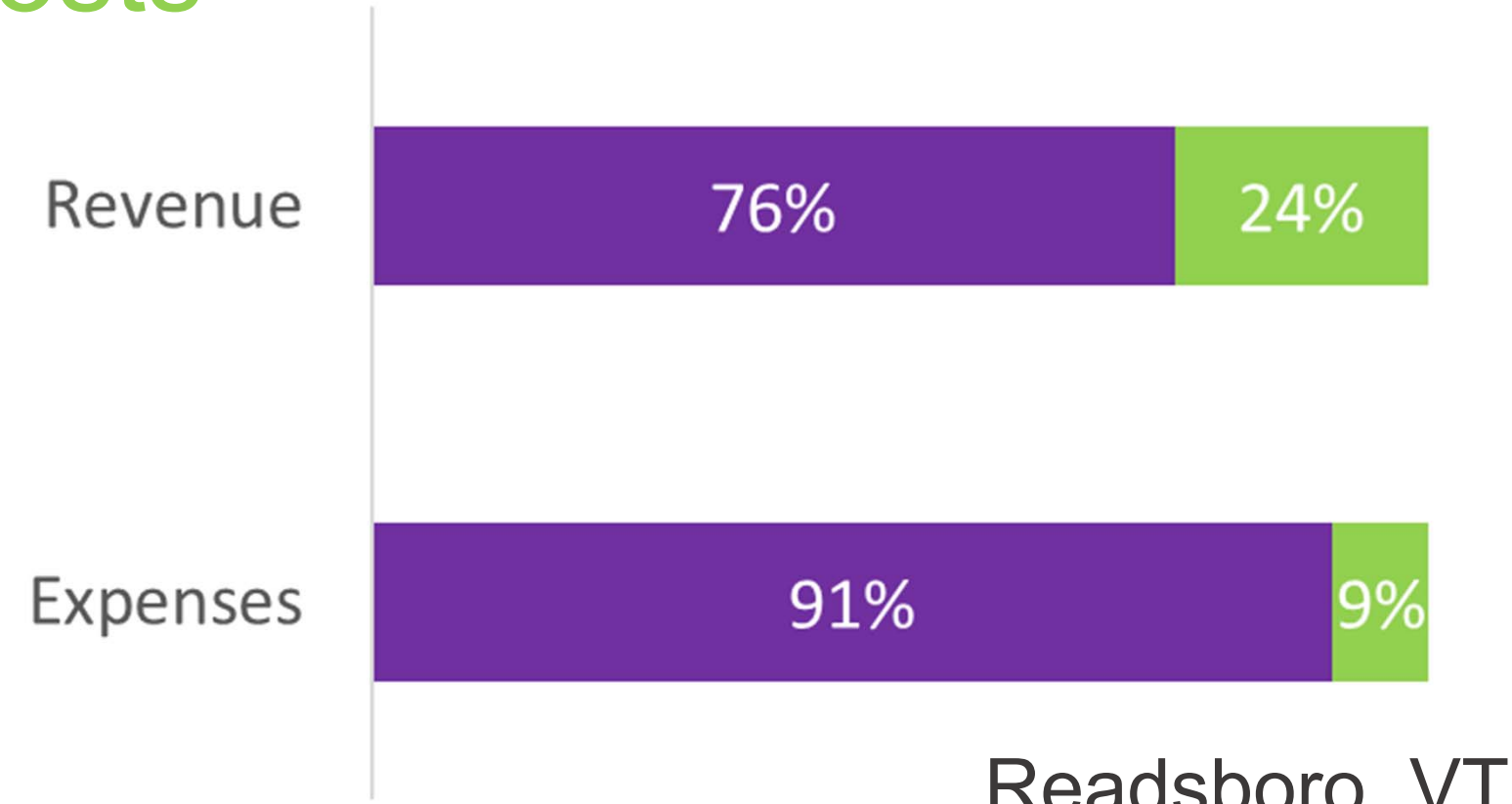
- In its pure form, all of the fixed costs of the water system would be covered by the base charge, and all of the variable costs would be covered by the volumetric rate

Base Charge for Fixed Costs; Volumetric Charge for Variable Costs

Base Chrg	Lower Bound	Rate
38.00	0	0.000000
	4	9.500000

Readsboro, VT

Base Charge for Fixed Costs; Volumetric Charge for Variable Costs



Base Charge for Fixed Costs; Volumetric Charge for Variable Costs

- What information do we need to make this calculation?

- Total revenue needed to cover fixed costs
- Total Accounts
- Total revenue needed to cover variable costs
- Total gallons sold

For the Exercise

Revenues from Rates:

$344,445

Everything else

W/S Utilities
Chemicals & Salt
Purchase Water Bill

$292,045

Fixed Cost

$52,400

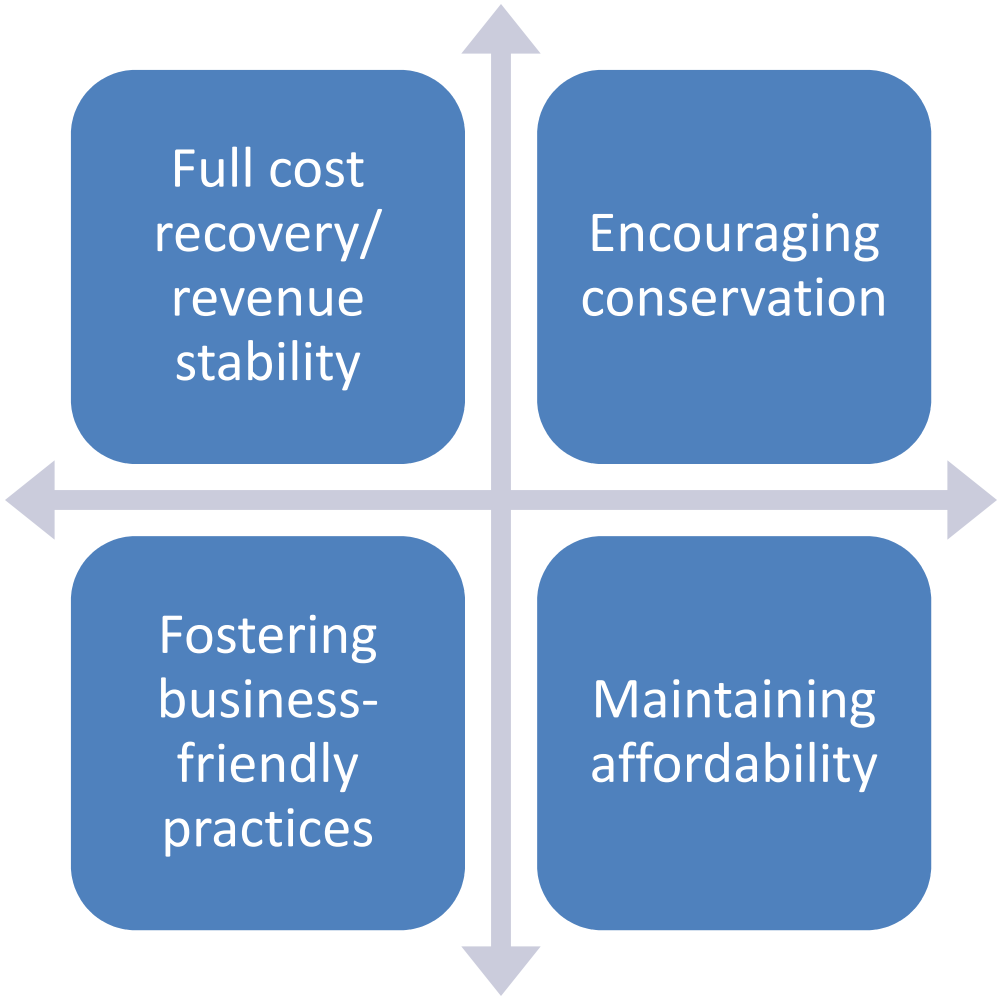
Variable Cost

Base Charge for Fixed Costs; Volumetric Charge for Variable Costs

$$\frac{\text{\$292,045 — Fixed Annual Costs}}{\text{450 — Total Accounts}} = \text{\$648.99 — Total Annual Bill} \div 12 = \text{\$54.08 — Monthly Base Bill}$$

$$\frac{\text{\$52,400 — Variable Annual Costs}}{\text{32,877,590 — Total Gallons Sold}} \times 1{,}000 = \text{\$1.59 — Price per 1,000 Gallons}$$

Which Water System Objectives?



$25 Base Charge; Rest from Volumetric Rates

- Pick a base charge and see what the volumetric charge would need to be

$25 Base Charge; Rest from Volumetric Rates

WATER & SEWER RATES AND FEE SCHEDULE EFFE

	IN TOWN
WATER MINIMUM (1000 GALLONS)	$25.00
SEWER MINIMUM (1000 GALLONS)	$25.00
DISPOSAL FEE	$ 5.00
ADDITIONAL WATER PER 1000 GALLONS	$ 6.15

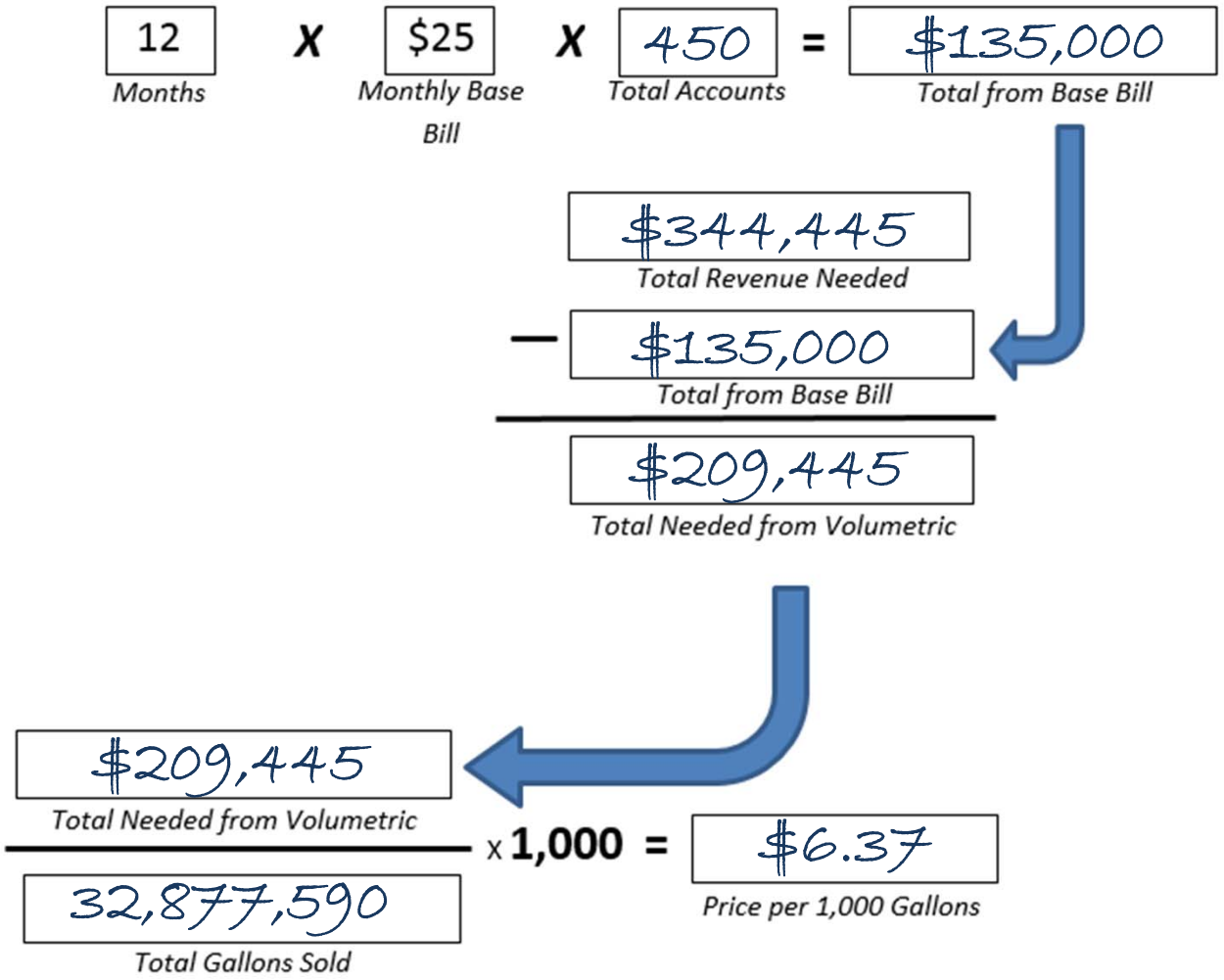
Denton, NC

$25 Base Charge; Rest from Volumetric Rates

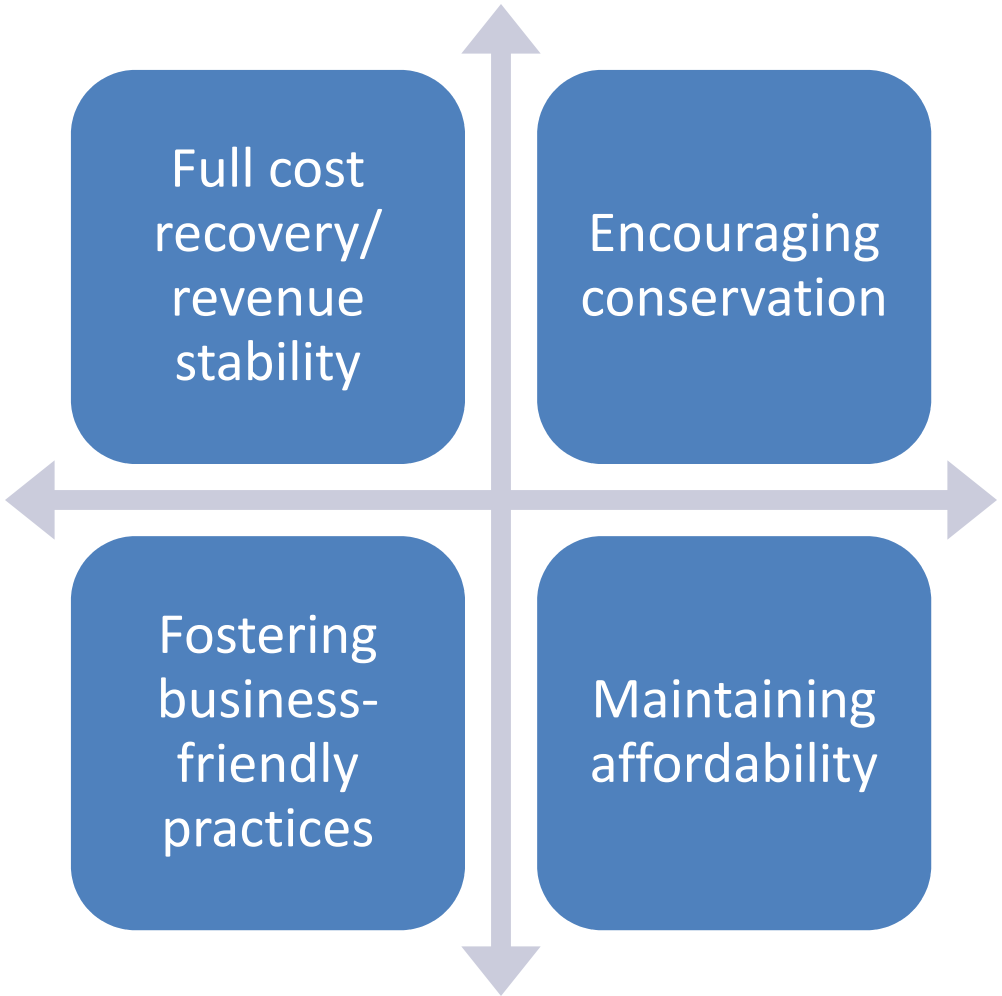
- What information do we need to make this calculation?

- Total Accounts
- Total Revenue Needed
- Total Gallons

$25 Base Charge; Rest from Volumetric Rates



Which Water System Objectives?



Which looks most right to you?

A. $63.79 base

B. $10.49 per 1,000 gallons

C. $54.08 base
$1.59 per 1,000 gallons

D. $25.00 base
$6.37 per 1,000 gallons

So where do you think the $25 per month base charge came from?

How This Impacts Customers

- All four rate structures get us to the same total revenue

- But how does each approach impact different types of customers?

How This Impacts Customers

1,000 gallons/month

4,000 gallons/month

12,000 gallons/month

34,000 gallons/month

Exercise

How much will water service cost per month for different customers under each rate structure?

The Rates

- $63.79 base
- $10.49 per 1,000 gallons
- $54.08 base
  $1.59 per 1,000 gallons
- $25.00 base
  $6.37 per 1,000 gallons

Payment for Access

$63.79	$63.79	$63.79	$63.79

Payment for Volume of Product Received

$10.48	$41.92	$125.76	$356.32

Base Charge for Fixed Costs; Volumetric Charge for Variable Costs

$55.67	$60.44	$73.16	$108.14

$25 Base Charge; Volumetric Charge for Rest

$31.37	$50.48	$101.44	$241.58

	 1,000 gallons/month	 4,000 gallons/month	 12,000 gallons/month	 34,000 gallons/month
Payment for Access (Fixed Monthly Bill)	$63.79	$63.79	$63.79	$63.79
Payment for Volume of Product Received	$10.48	$41.92	$125.76	$356.32
Base Charge for Fixed Costs; Volumetric Charge for Variable Costs	$55.67	$60.44	$73.16	$108.14
$25 Base Charge; Volumetric Charge for Rest	$31.37	$50.48	$101.44	$241.58

These numbers are based on Irvindale's budget

Does

Maybe, but probably not

Your revenues last year were...

A. Significantly higher than expected
B. Slightly higher than expected
C. Close to as planned
D. Slightly lower than planned
E. Significantly lower than planned

What causes variation?

Rate Changes

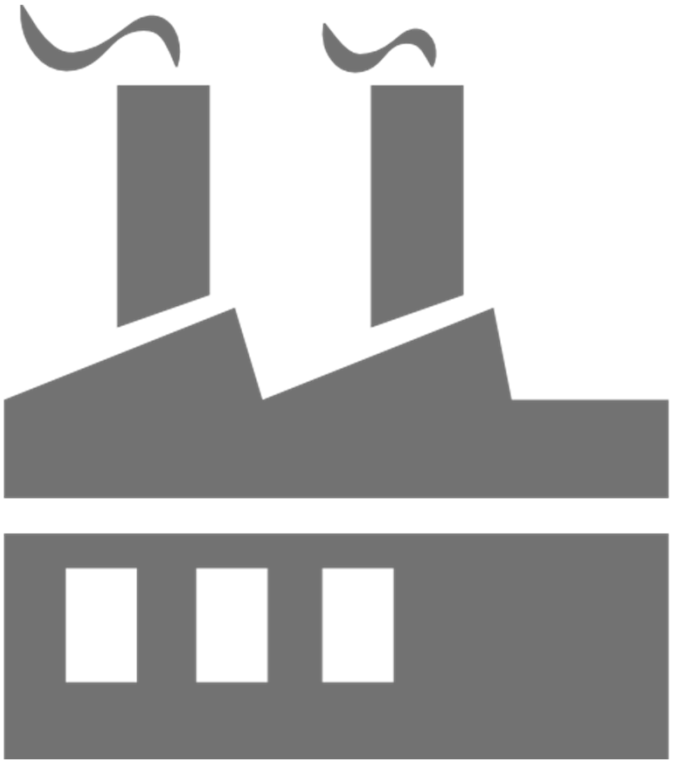
As rates go up, usage goes down

As a rule of thumb, typically usage goes down 3-4% for every 10% increase in rates

Population Change

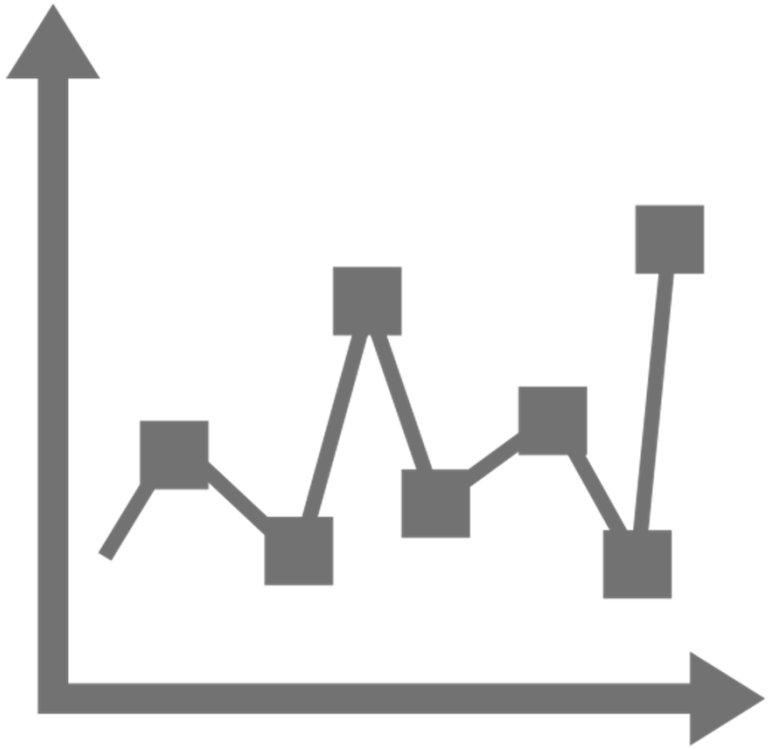
Customers could be coming into your system or leaving your system

Loss of a Big Customer



Some customers use significantly more water than others. Losing a single big user can have a disproportionate impact on revenues

Economic Conditions

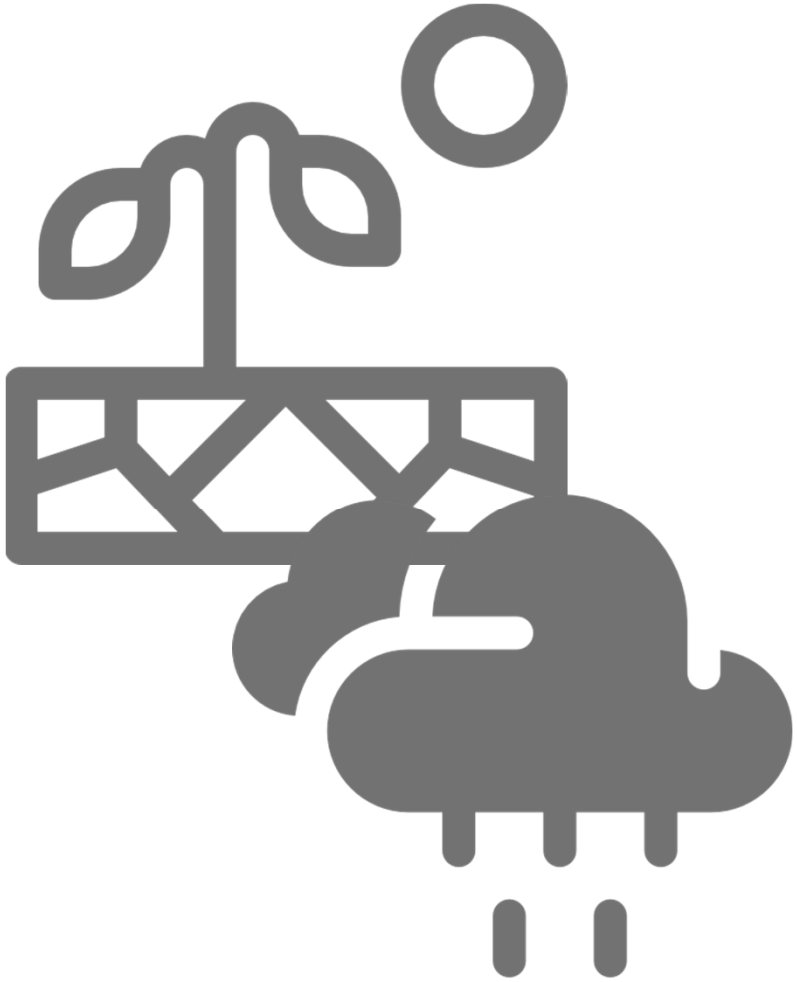


Economic downturns can cause customers to cut back on water use. Conversely, periods of economic growth can lead to higher water consumption

Changes in Collection Rates

Even if the number of customers doesn't change, how often they are paying you may be changing

Weather



Rainy conditions or dry/drought conditions can impact how much water customers use for outside irrigation

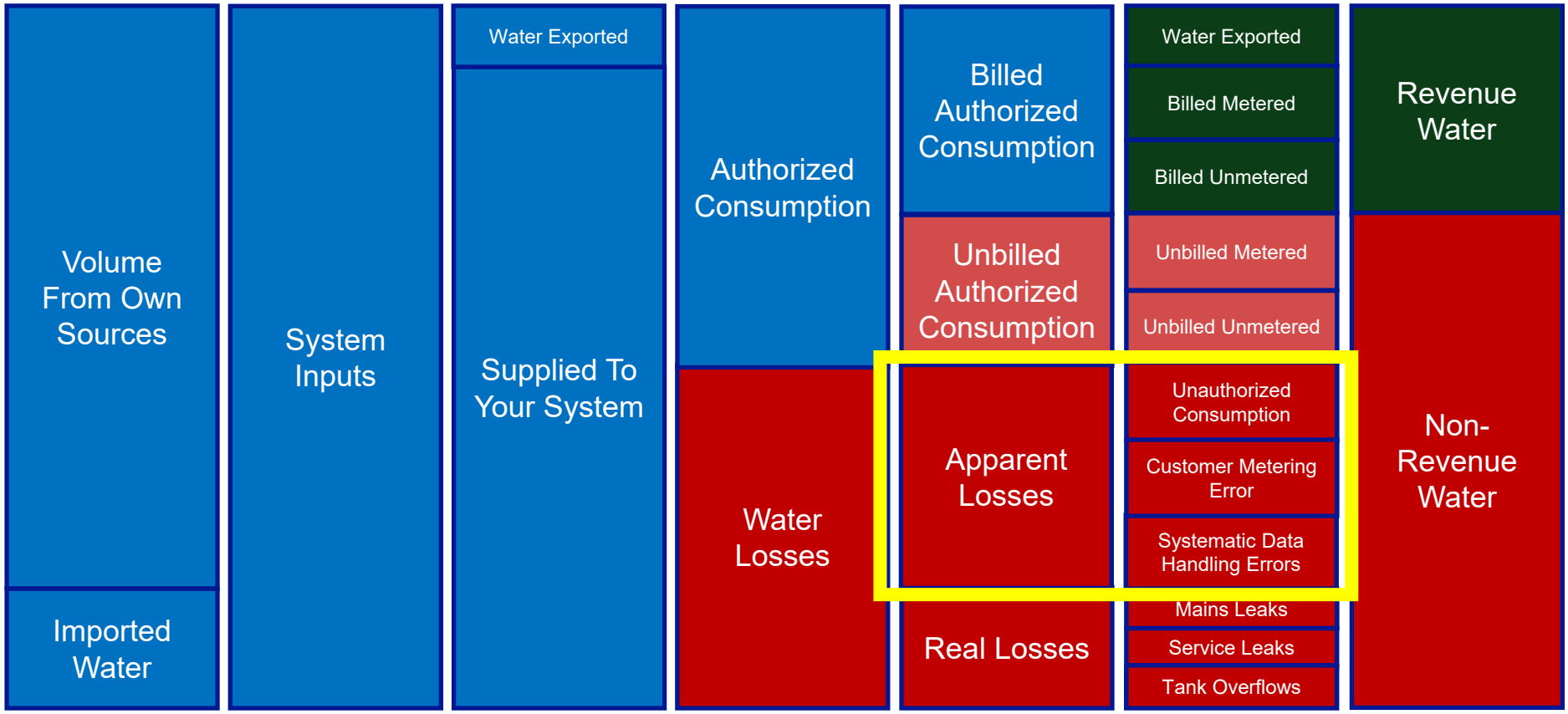
Water Use Restrictions

Whether due to water supply shortages or drought conditions, restricting water use will obviously impact revenues

Technology

Fixtures use less water today than in the past, and overall per capita water demand is decreasing across the country

Bill Correctly



What to do?

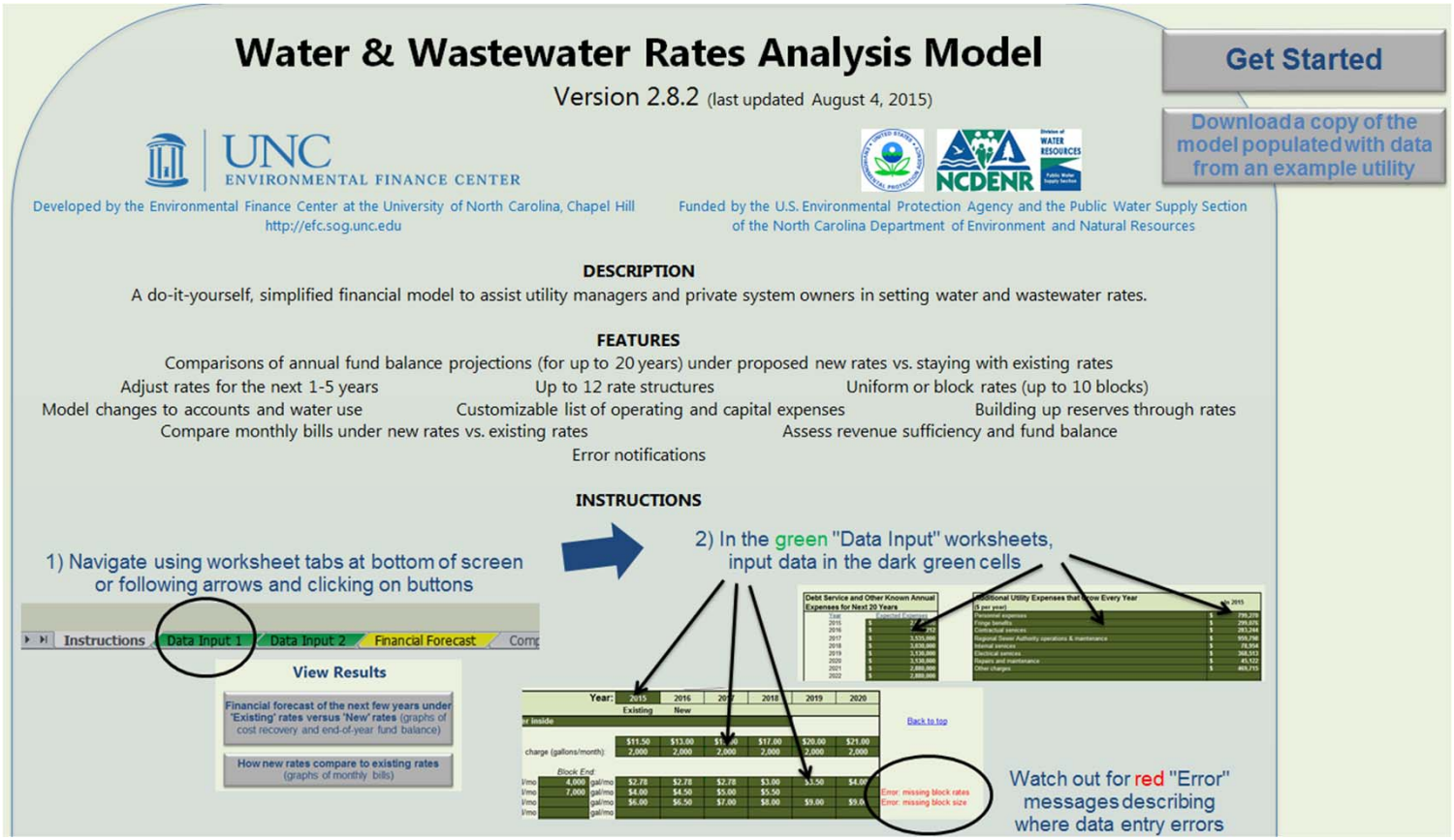
- Multiple forecasts based on different assumptions

- Ideally, be conservative
- Don’t forget price elasticity
- Use tools to stress test projections
- Give board options

Water and Wastewater Rates Analysis Model

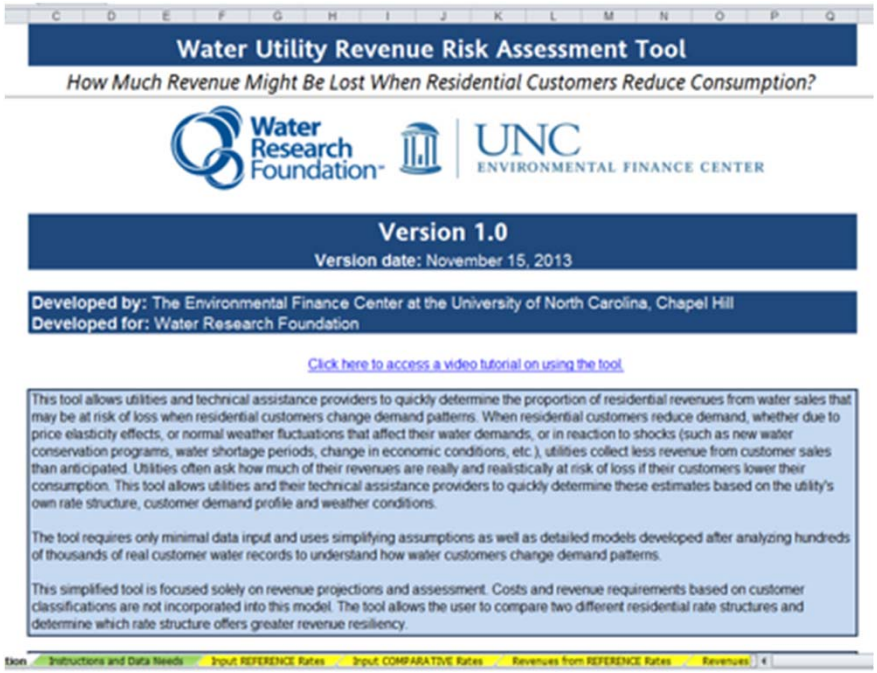
http://efc.sog.unc.edu or http://efcnetwork.org

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



Created by the Environmental Finance Center at the University of North Carolina, Chapel Hill
Funded by the U.S. E.P.A. and the N.C. Department of Environment and Natural Resources

Water Utility Revenue Risk Assessment Tool



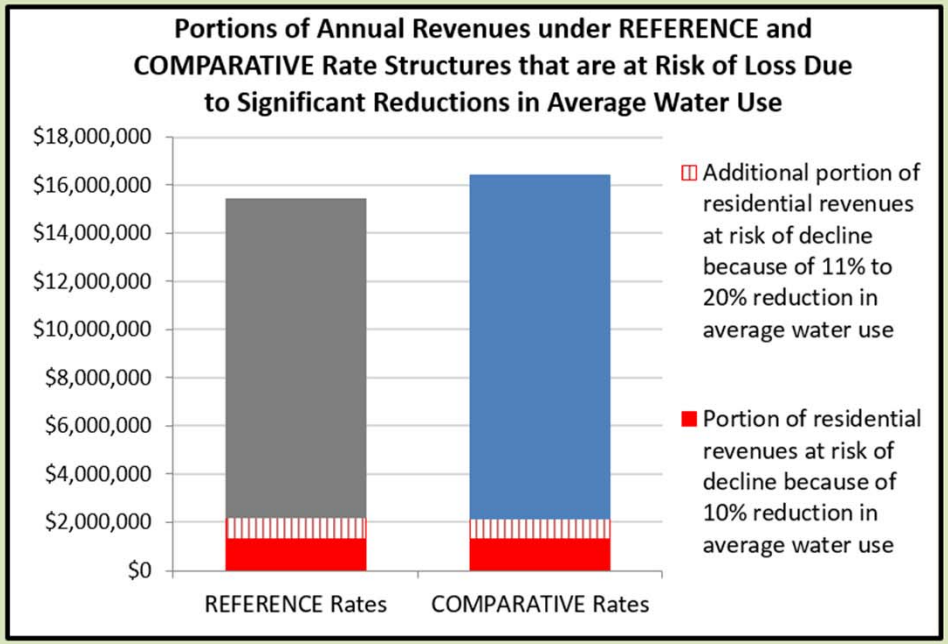
- Excel tool (simplified)
- Focus on residential revenues
- Utility inputs own:
  - Rate structure details
  - Residential customer water use profile
  - Weather patterns
  - Assumptions on price elasticity
- Tool estimates the proportion of revenues that may be lost due to changes in water use patterns due to:
  - Rate increase, alone or plus:
  - Normal weather pattern changes, or
  - One-time, significant and sudden conservation effort

Free to download and use at
www.waterrf.org
www.efc.sog.unc.edu

Water Utility Revenue Risk Assessment Tool

Comparing Revenues After a Significant Decline in Water Use

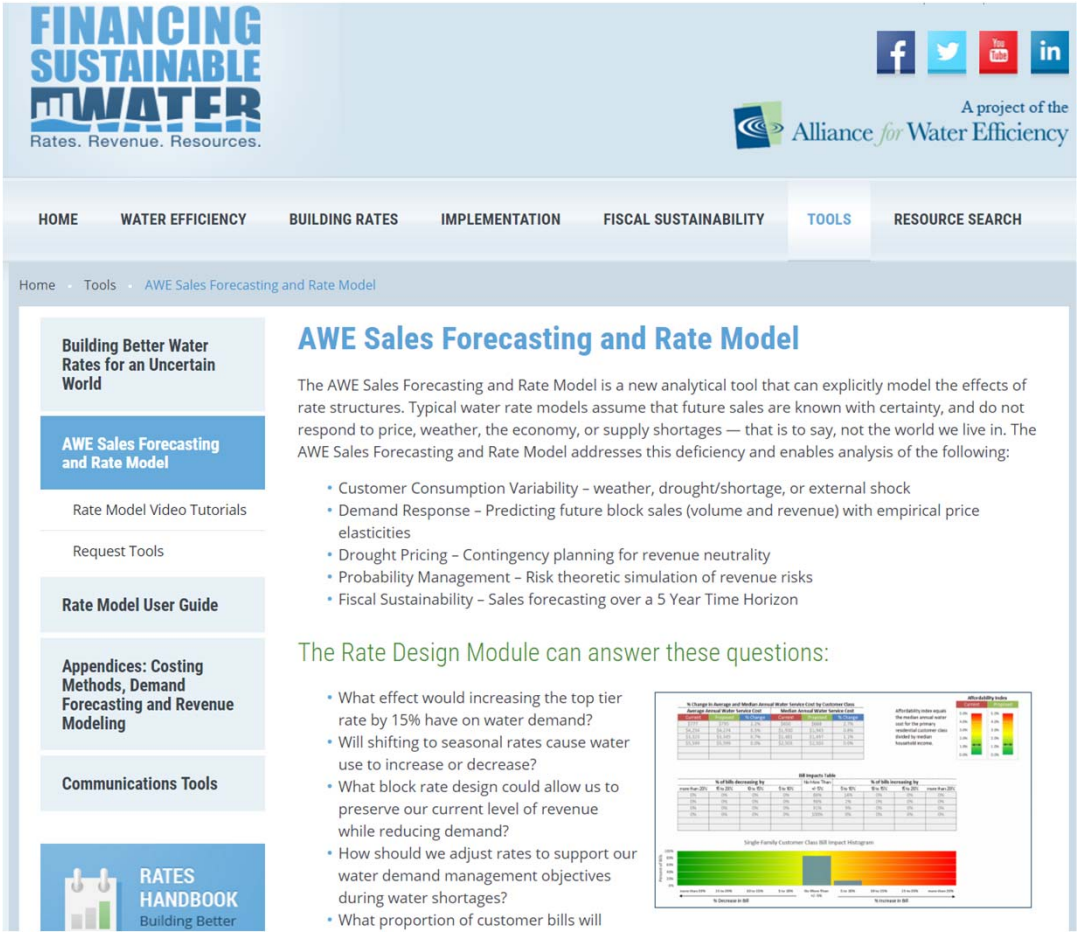
How do the total revenues compare under both rate structures if there is a reduction of 10% - 20% in average water use and subsequent demand distribution shifts?



Decline in Total Annual Revenues for a:	REFERENCE Rates	COMPARATIVE Rates
10% reduction in avg use	$1,311,000	$1,319,000
20% reduction in avg use	$2,181,000	$2,167,000
10% reduction in avg use	8.5%	8.0%
20% reduction in avg use	14.2%	13.2%

The comparative rate structure generates revenues that are MORE resilient to sudden and significant declines in residential water use than the revenues generated by the reference rate structure. Revenues under the comparative rate structure are projected to drop 8% - 13.2% for a 10% - 20% reduction in average water use, and their related shifts in demand distribution. These declines occur after including the effect of price elasticity when adjusting rates from the reference rate structure to the comparative rate structure. By comparison, revenues under the reference rate structure are projected to drop 8.5% - 14.2% for the same declines in residential water use.

AWE Sales Forecasting and Rate Model



Available for Alliance for Water Efficiency members:

http://www.financingsustainablewater.org/