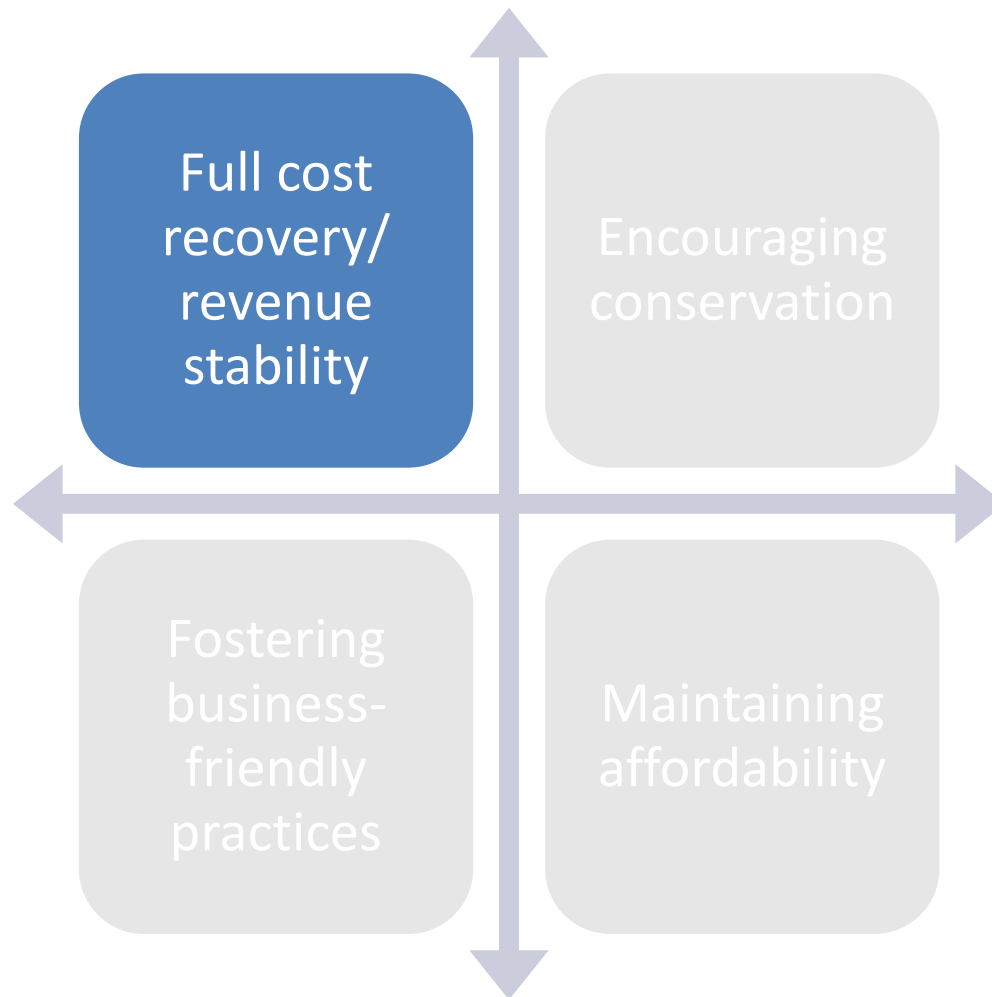




Pricing Water to Achieve Cost Recovery

Water System Objectives





Session Objectives

- Be able to use different approaches to calculate base charges and volumetric charges
- Evaluate the impact of different pricing structures on different customers
- Identify factors that can impact your pricing assumptions



Full(er) Cost Pricing

- The goal of full(er) 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.

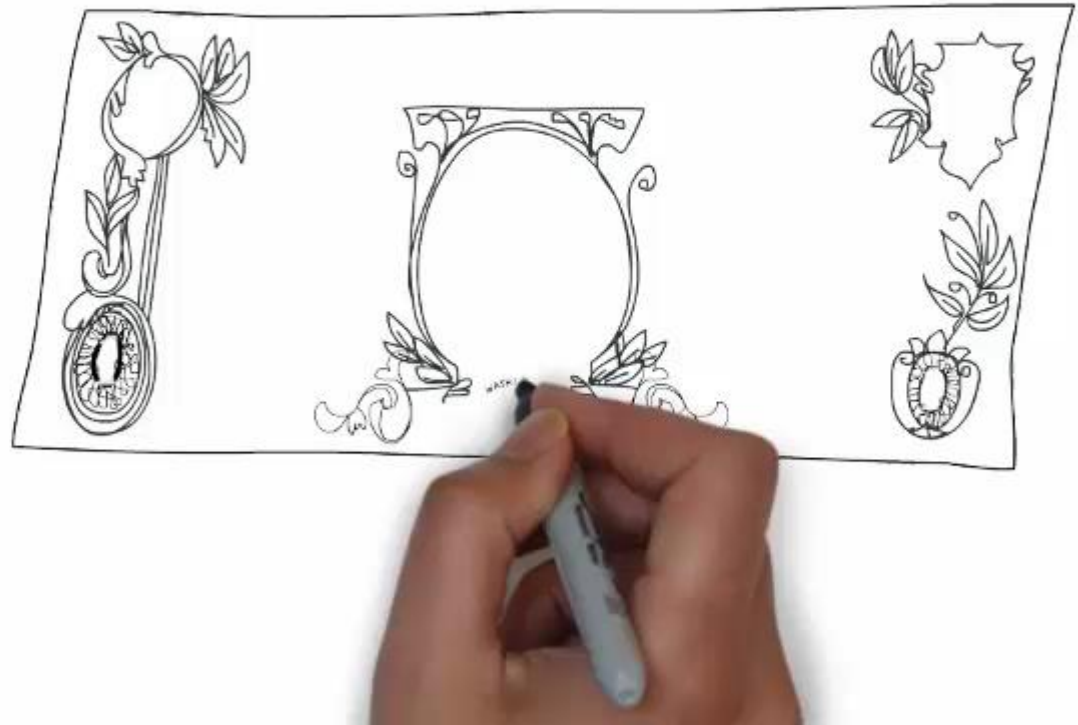


Small System Rate Setting Decisions

- **Decision on how much of the costs to cover through rates**
- **Revenue to be generated by base charges**
- **Revenue to be generated by volumetric charges**
- Revenue to be generated by different customer classes
- Establishing different prices for water for larger users
- Decision to implement more complex rate structures

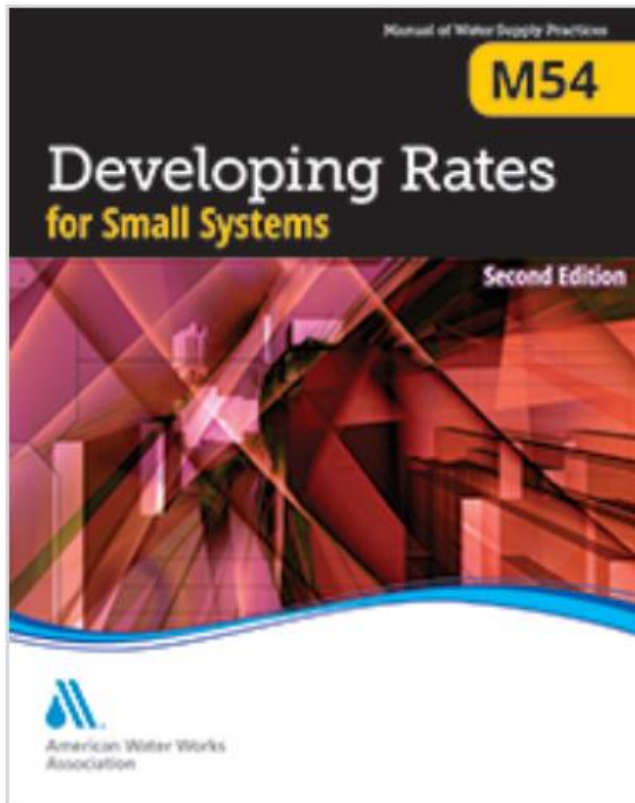
Understanding Water Revenues

**How
Utilities
Generate
Revenue**



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

Rate Study Technique to Determine Rates for Different Customers



M54 Manual by AWWA

1. Determine customer accounts and usage data
2. Project costs, and revenue needs and reserve targets
3. Consider alternative plans for revenue adjustments
4. Decide on appropriate rate structure design
5. Price out rate (by class if applicable)

By
customer
class if
desired



A Few Rate Setting Philosophies

- Customers should pay for having access
- Customers should pay for what they use
- Customers should pay fixed charges to cover the system's fixed costs, and variable charges to cover the system's 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 revenues¹*
- *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



Rate Setting Philosophies

Jeff Hughes

The Painful Art of Setting Water and Sewer Rates

- *An increase in mergers and acquisitions*
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Exercise

Let's figure out some rates for Irvindale that cover costs of providing water service.

For simplicity, let's assume the budgeted rate revenues take into all the actual costs (even though we know they don't).

How much revenue to generate from 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 Revenue Target:
\$382,932

Revenues to be collected
from rates:
\$344,445



Payment for Access

- Taken to its limit, 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

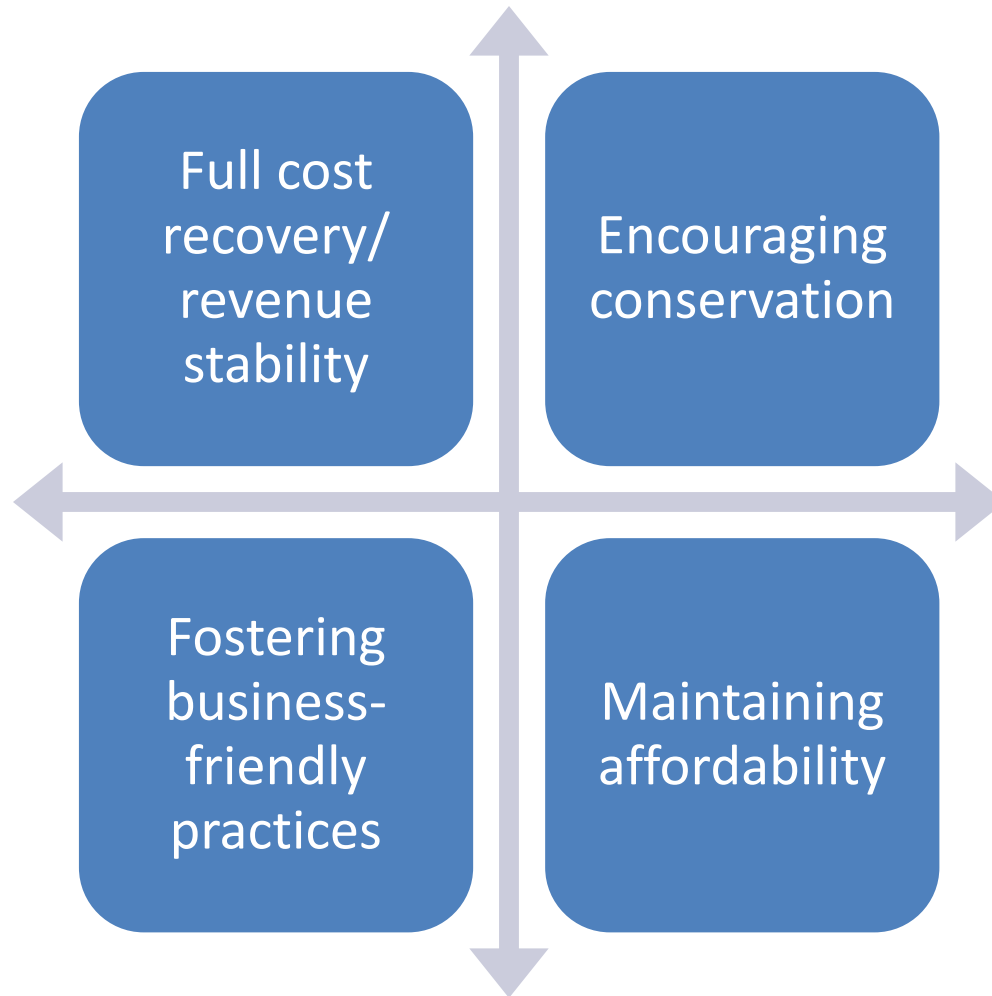


Payment for Access

$$\frac{\boxed{\$344,445}}{\text{Total Needed Revenue}} \div \frac{\boxed{\$765.43}}{\text{Total Annual Bill}} = \frac{\boxed{\$63.79}}{\text{Monthly Bill}}$$
$$\frac{\boxed{450}}{\text{Total Accounts}} = \frac{\mathbf{12}}{\text{Monthly Bill}}$$



Which Water System Objectives?





Payment solely based on volume

- 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 solely based on volume

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 solely based on volume

- What information do we need to make this calculation?
- Total revenue needed from rates
- Total gallons sold



Payment solely based on volume

\$344,445

Total Needed Revenue

32,877,590

Total Gallons Sold

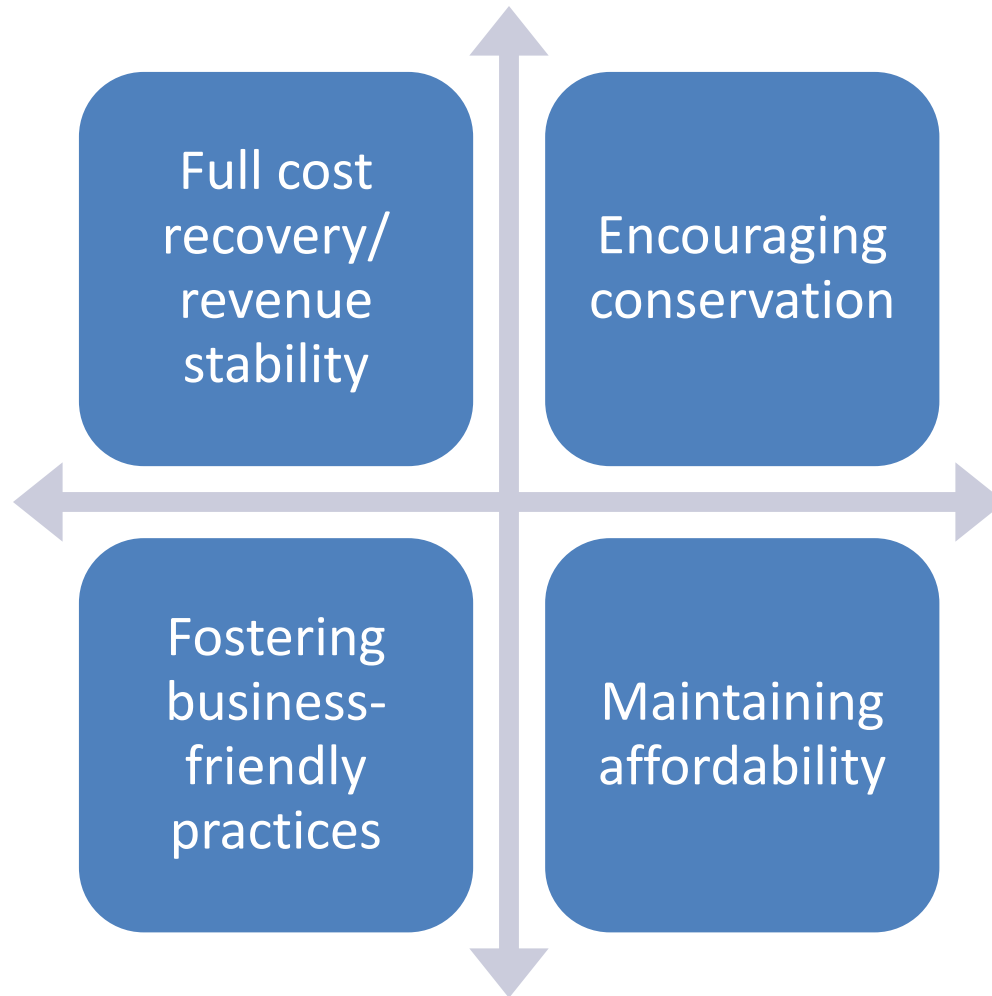
x 1,000 =

\$10.48

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

Revenue

76%

24%

Expenses

91%

9%

Readsboro, VT

A blue-tinted photograph of industrial machinery, specifically large pipes and valves, serving as a background for the top of the slide.

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

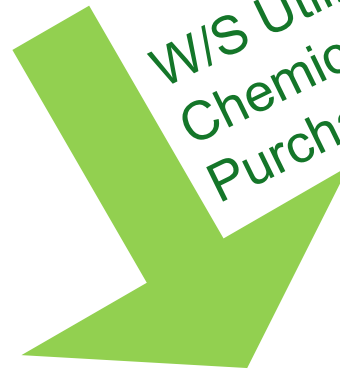
Everything else



\$292,045

Fixed Cost

W/S Utilities
Chemicals & Salt
Purchase Water Bill



\$52,400

Variable
Cost



Base Charge for Fixed Costs; Volumetric Charge for Variable Costs

\$292,045

Fixed Annual Costs

\$648.99

Total Annual Bill

\$54.08

Monthly Base Bill

450

Total Accounts

12

\$52,400

Variable Annual Costs

x 1,000 =

\$1.59

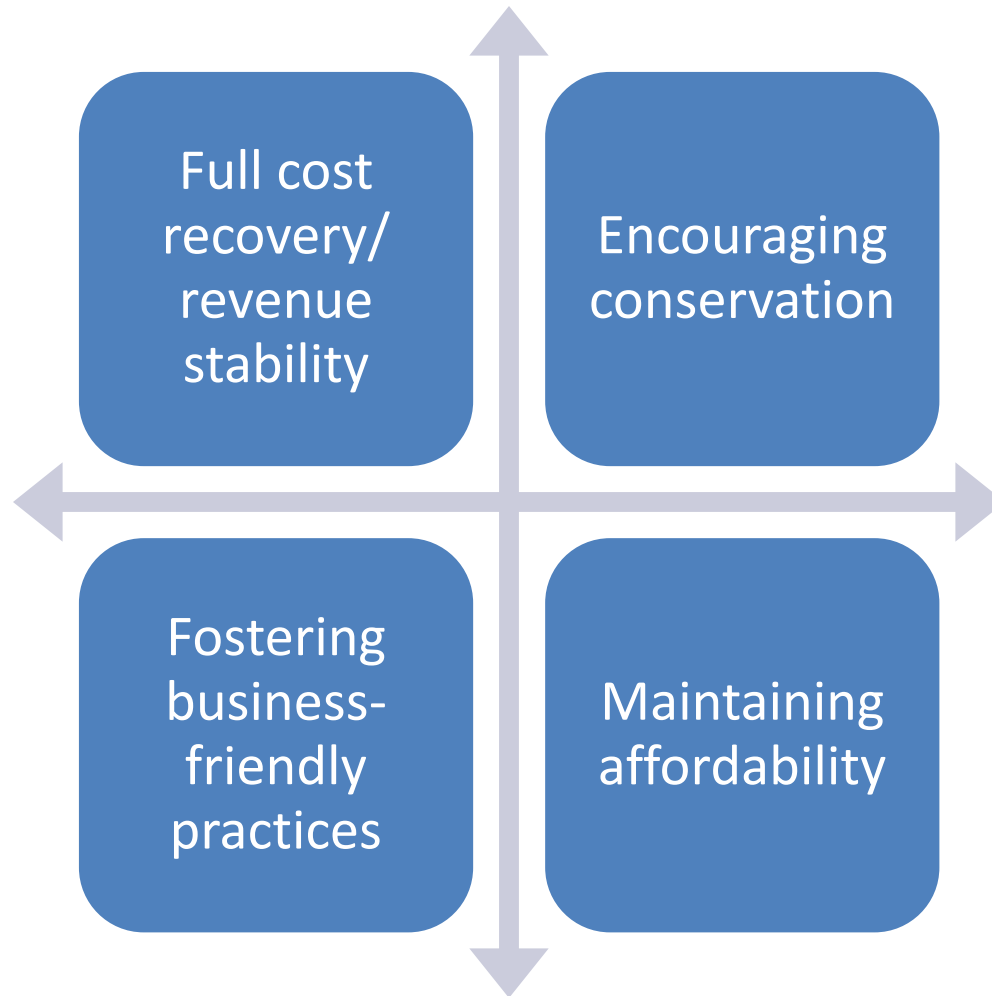
Price per 1,000 Gallons

32,877,590

Total Gallons Sold



Which Water System Objectives?





Common Approaches to Setting Base Charges -- Base Charge Set at:

- All “fixed” costs
 - Debt costs
 - Customer service costs
 - Capped at a “reasonable” amount
-
- After the base charge is determined, calculate volumetric rate to generate the remainder of the revenue requirement



\$25 Base Charge; Rest from Volumetric Rates

WATER & SEWER RATES AND FEE SCHEDULE EFFECTIVE

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

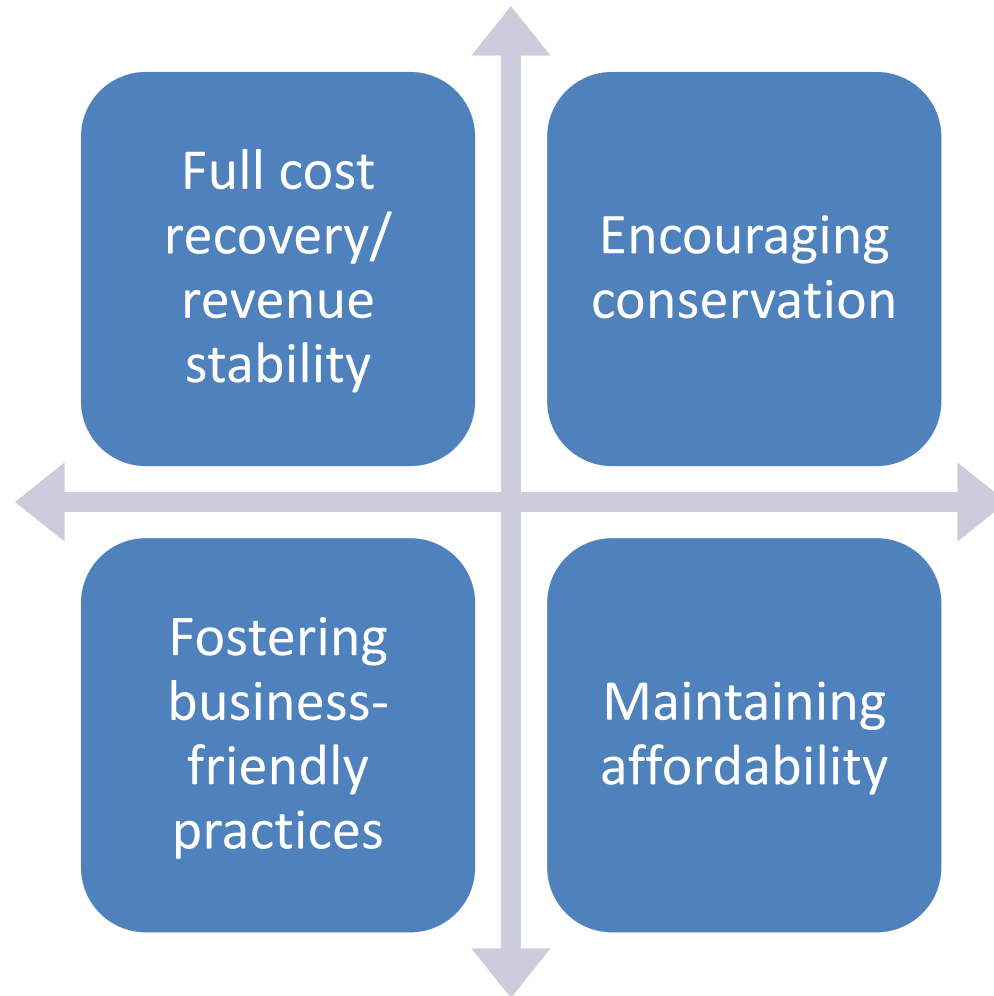
$$\begin{array}{rcccl} \boxed{12} & \times & \boxed{\$25} & \times & \boxed{450} = \boxed{\$135,000} \\ \text{Months} & & \text{Monthly Base} & & \text{Total Accounts} & & \text{Total from Base Bill} \\ & & \text{Bill} & & & & \end{array}$$

$$\begin{array}{r} \boxed{\$344,445} \\ \text{Total Revenue Needed} \\ - \boxed{\$135,000} \\ \text{Total from Base Bill} \\ \hline \boxed{\$209,445} \\ \text{Total Needed from Volumetric} \end{array}$$

$$\begin{array}{r} \boxed{\$209,445} \\ \text{Total Needed from Volumetric} \\ \hline \boxed{32,877,590} \\ \text{Total Gallons Sold} \end{array} \times 1,000 = \boxed{\$6.37} \text{ Price per 1,000 Gallons}$$



Which Water System Objectives?





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?

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





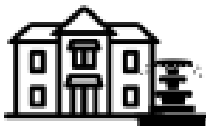

\$31.37

\$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

What do you think would work best for your utility?

\$63.79 Flat charge for all customers

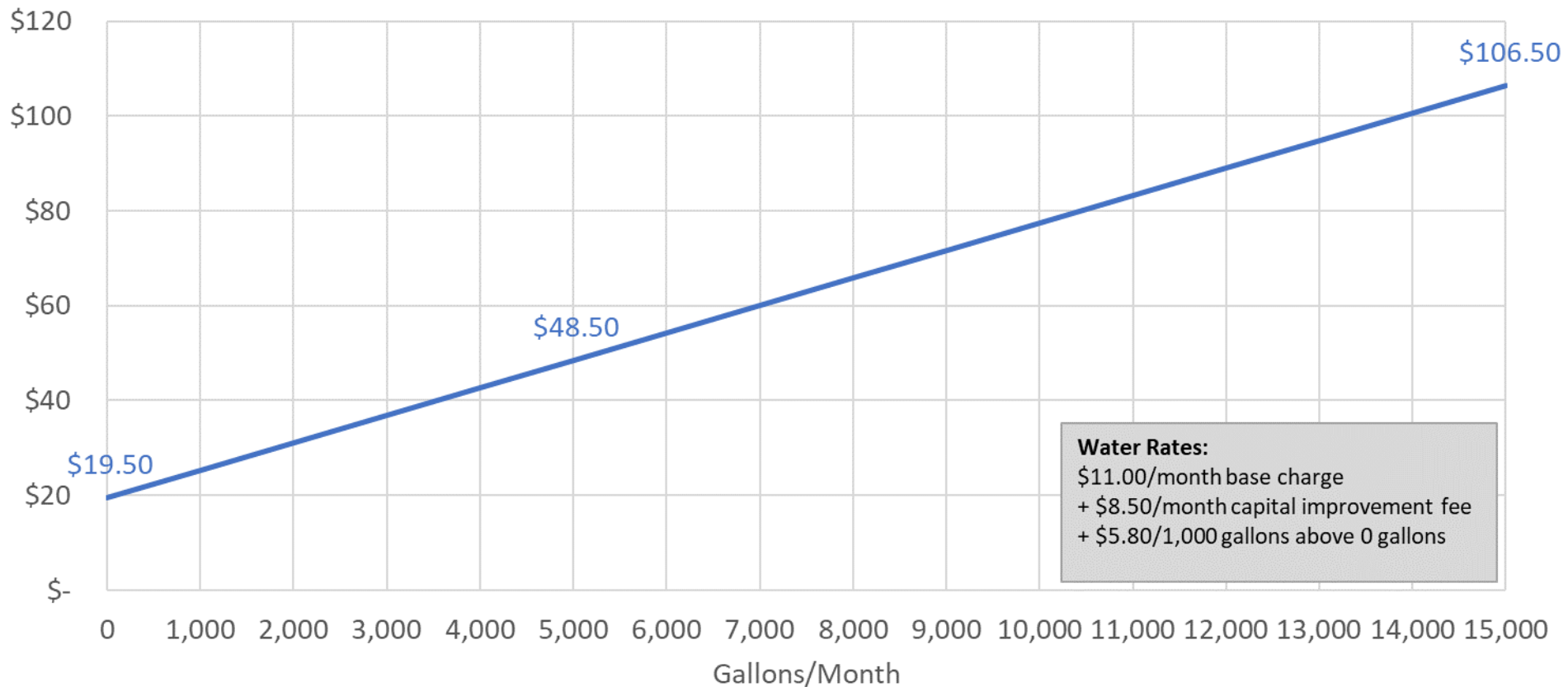
\$10.49 per 1,000 gallons

\$54.08 base charge plus
\$1.59/\$1000

\$25.00 base charge plus
\$6.37/1,000 gallons

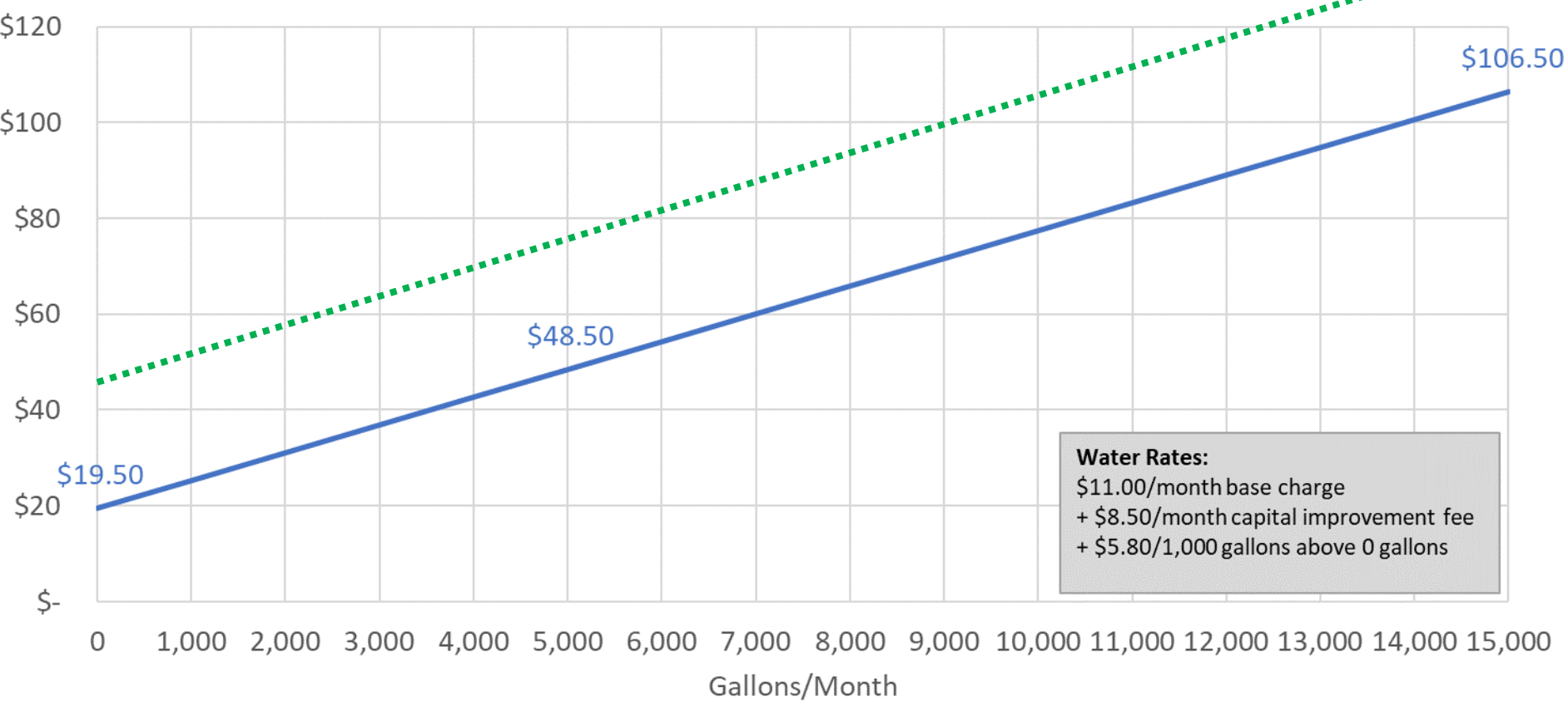


Example of a Uniform Water Rate Structure



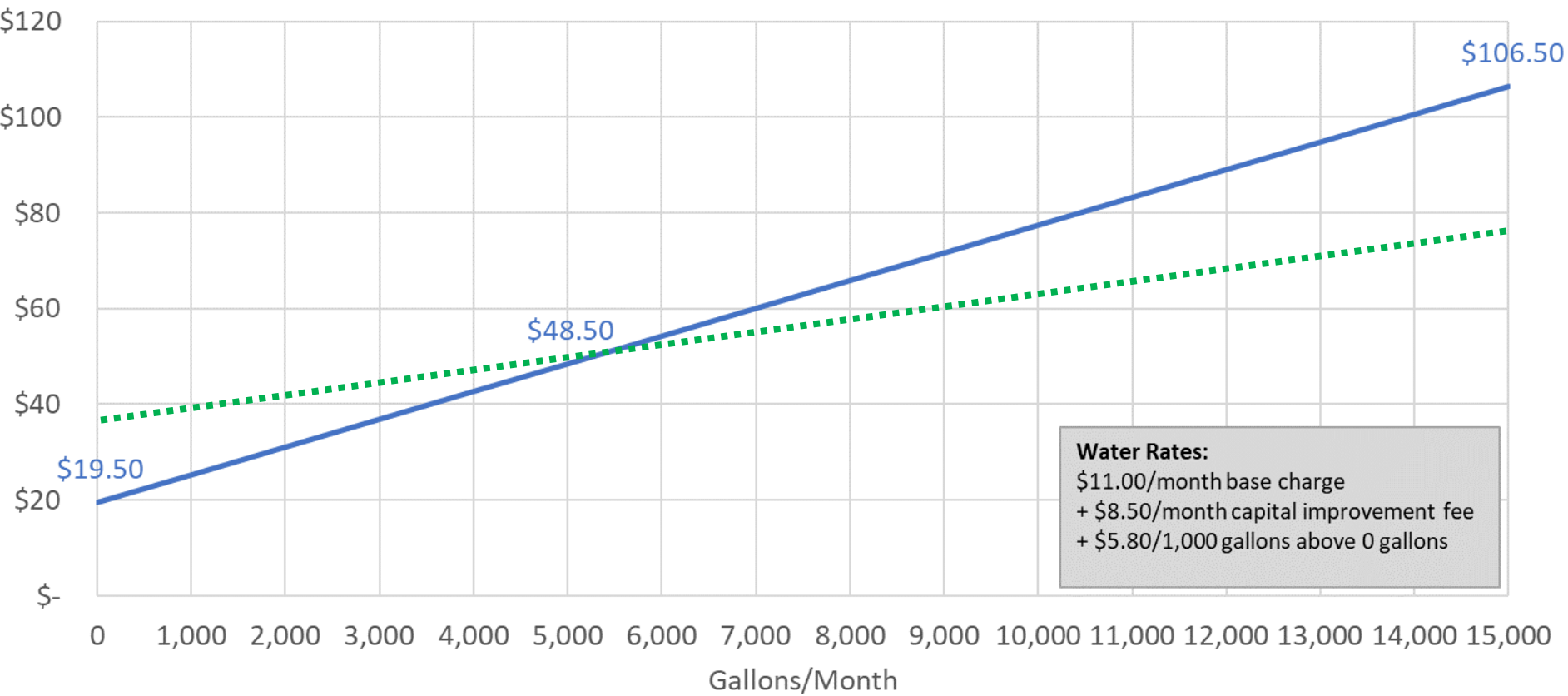


Moving towards a rate structure that generates more revenue for capital



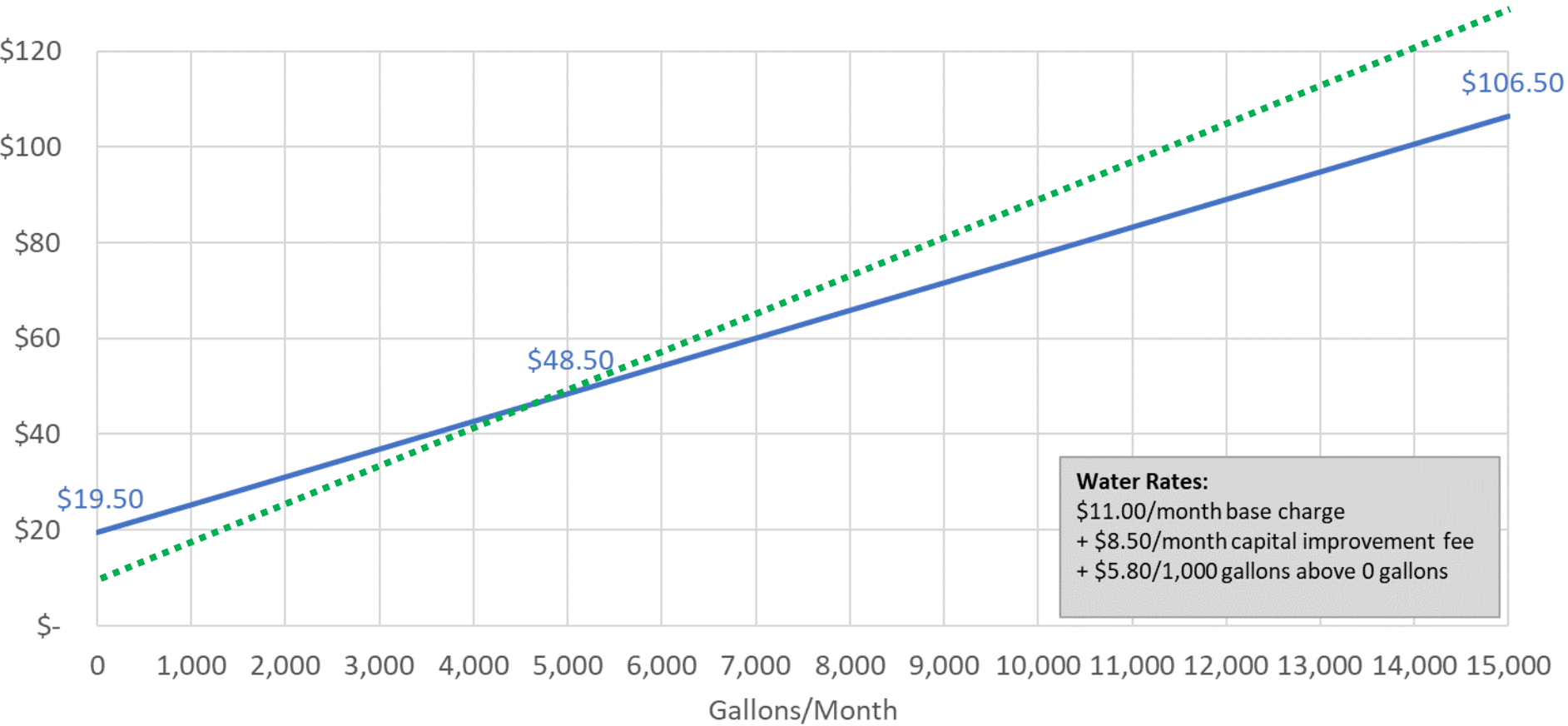



Moving toward a more revenue stable rate structure





Moving toward a more conservation-oriented rate structure





The rates we calculated are based on Irvindale's budget for exactly \$344,445.

Will they generate \$344,445 next year?

...probably not



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

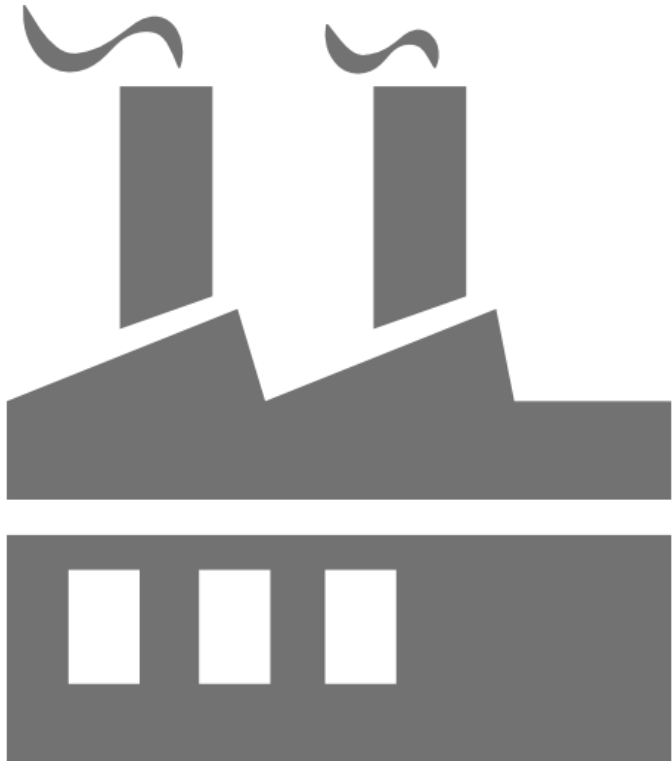
Population Change



Customers could be coming into your system or leaving your system

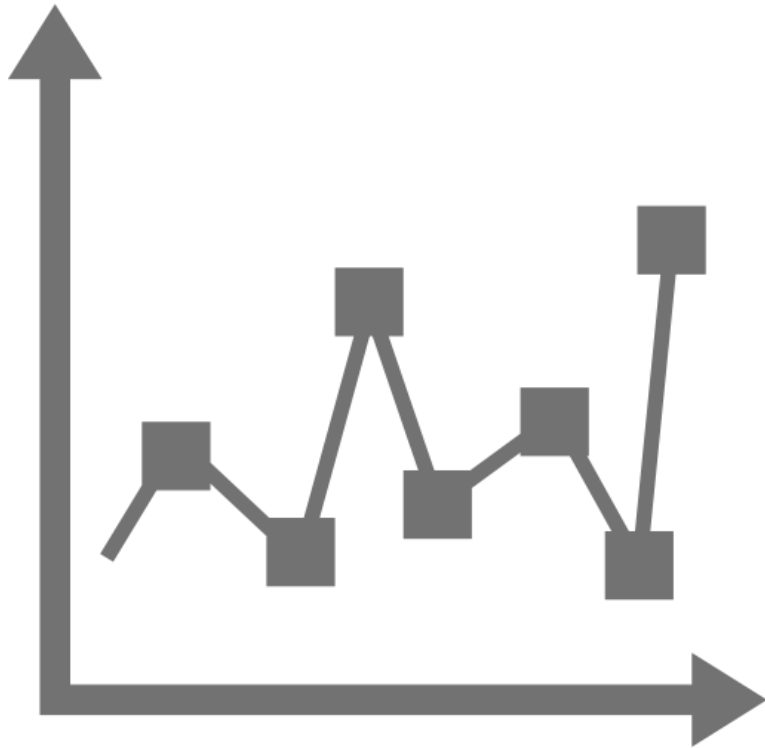


Loss of a Big Customer



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

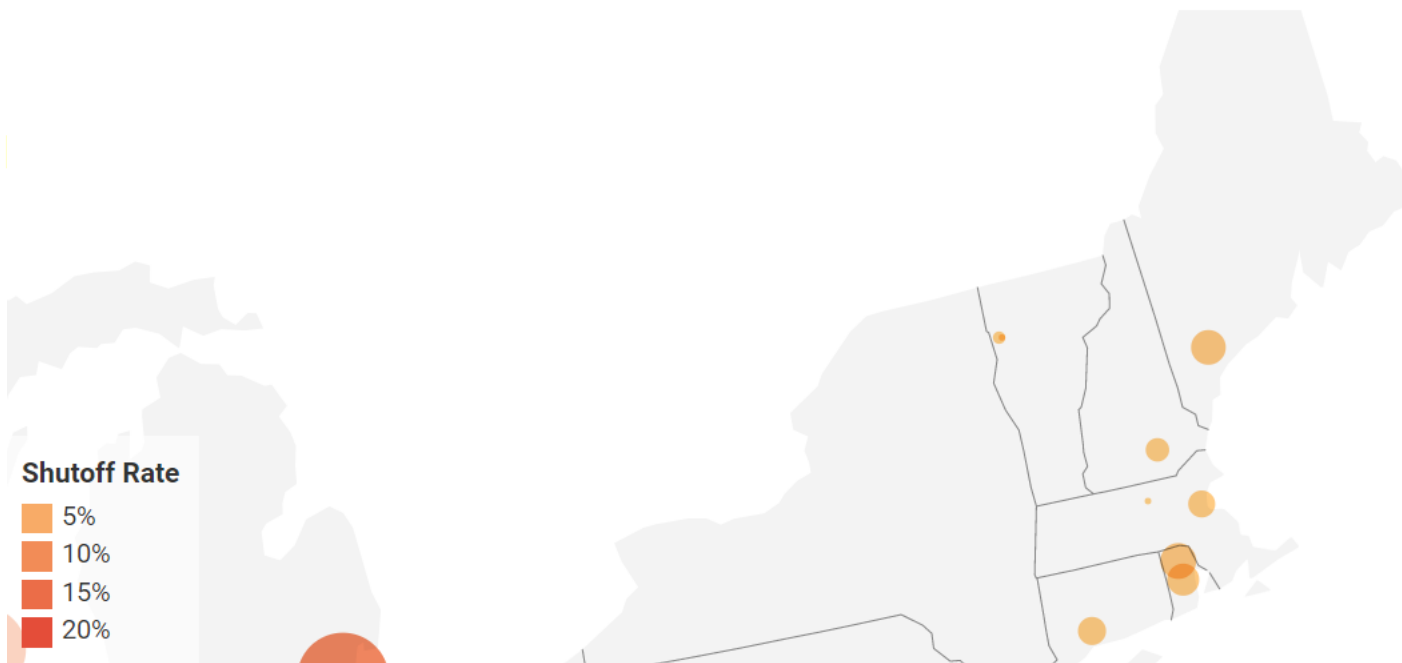


Even if the number of customers doesn't change, how often they are paying you may be changing

Changes in Collection Rates

Shutoffs in 2016

This survey is a first-of-its-kind nationwide assessment of water shutoffs for nonpayment. Food & Water Watch requested the number of households shut off for nonpayment in 2016 from the two largest water systems in each state. We received responses back from 73 utilities.



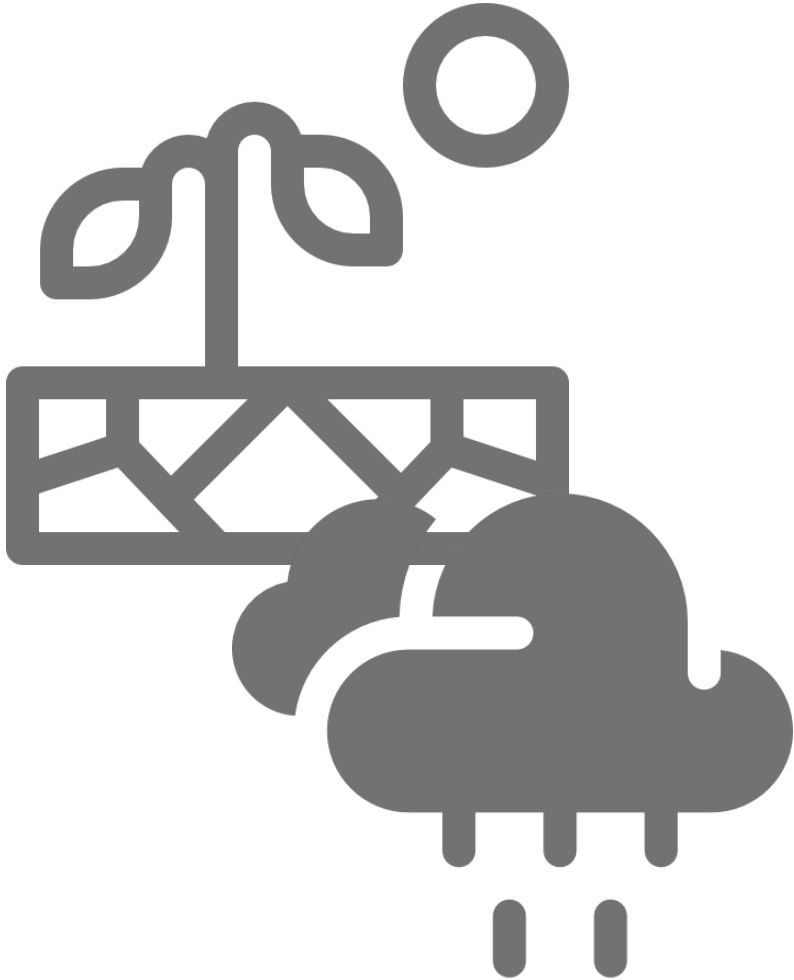
Notes:

*When the AP contacted the Oklahoma City utility, their spokesperson said they had provided data for both residential and commercial shutoffs in error, instead of just for residential shutoffs. The data in the report reflects the original responses from the utilities.

**Eau Claire, WI, Champlain, VT, and Leominster, MA each had zero shutoffs.



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

A blue-tinted photograph of industrial machinery, possibly a large pipe or valve, serves as the background for the top portion of the slide.

What to do?

- Multiple forecasts based on different assumptions
- Ideally, be conservative
- Don't forget that average use will go down when rates go up
- Use tools to stress test projections
- Give board options

Rates analysis and tools environmentalfinance.org

- State level rates surveys and analysis
- Utility rates affordability assessment tools
- Survey results and presentations

The screenshot shows the UNC Environmental Finance Center website. The header includes the UNC logo, navigation links (About, Services, Programs, Resources, Events, Blog), and a search bar. The main content area is titled "Finance Dashboards" and includes a breadcrumb trail: HOME / RESOURCES / FINANCE DASHBOARDS. Below the breadcrumb is a "Return to All Our Programs" link and social media sharing options. A navigation bar contains five tabs: Summary (selected), Partners, Resources, Events, and Dashboard Tutorial. The main content area is titled "Access the Dashboards" and features a map of the United States with a legend that says "Click a state in blue to view its dashboard".

ers who meet income eligibility criteria.^{***} As a result

Figure 19. Affordability of Water & Wastewater Rates in Raleigh Assessed at 5,000 Gallons/ Month and 2015 Income Levels*



* These charts were generated from the "Water and Wastewater Residential Rates Affordability Assessment Tool" created by the Environmental Finance Center at UNC Chapel Hill. This free tool can be accessed at <http://www.efc.org/unc.edu/resbb/item/water-wastewater-residential-rates-affordability-assessment-tool>


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

Water & Wastewater Rates Analysis Model

Version 2.8.2 (last updated August 4, 2015)



UNC
ENVIRONMENTAL FINANCE CENTER



Division of
WATER
RESOURCES
Public Water
Supply Section

Developed by the Environmental Finance Center at the University of North Carolina, Chapel Hill
<http://efc.sog.unc.edu>

Funded by the U.S. Environmental Protection Agency and the Public Water Supply Section
of the North Carolina Department of Environment and Natural Resources

Get Started

Download a copy of the
model populated with data
from an example utility

DESCRIPTION

A do-it-yourself, simplified financial model to assist utility managers and private system owners in setting water and wastewater rates.

FEATURES

- Comparisons of annual fund balance projections (for up to 20 years) under proposed new rates vs. staying with existing rates
- Adjust rates for the next 1-5 years
- Up to 12 rate structures
- Uniform or block rates (up to 10 blocks)
- Model changes to accounts and water use
- Customizable list of operating and capital expenses
- Building up reserves through rates
- Compare monthly bills under new rates vs. existing rates
- Assess revenue sufficiency and fund balance
- Error notifications

INSTRUCTIONS

- 1) Navigate using worksheet tabs at bottom of screen or following arrows and clicking on buttons
- 2) In the green "Data Input" worksheets, input data in the dark green cells

Instructions

Data Input 1

Data Input 2

Financial Forecast

Comp

View Results

Financial forecast of the next few years under 'Existing' rates versus 'New' rates (graphs of cost recovery and end-of-year fund balance)

How new rates compare to existing rates (graphs of monthly bills)

Year:	2015	2016	2017	2018	2019	2020
Existing	\$11.50	\$13.00	\$14.00	\$17.00	\$20.00	\$21.00
New	2,000	2,000	2,000	2,000	2,000	2,000

Block End:

4,000 gal/mo	\$2.78	\$2.78	\$2.78	\$3.00	\$3.50	\$4.00
7,000 gal/mo	\$4.00	\$4.50	\$5.00	\$5.50	\$6.00	\$6.50
10,000 gal/mo	\$5.00	\$5.50	\$6.00	\$6.50	\$7.00	\$7.50

Back to top

Error: missing block rates
Error: missing block size

Debt Service and Other Known Annual Expenses for Next 20 Years

Year	2015	2016	2017	2018	2019	2020
Debt Service	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000
Other Known Annual Expenses	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000	\$ 1,500,000
Total	\$ 3,500,000	\$ 3,500,000	\$ 3,500,000	\$ 3,500,000	\$ 3,500,000	\$ 3,500,000

Functional Utility Expenses that Grow Every Year

Category	2015
Administrative	\$ 100,000
Capital Expenses	\$ 200,000
Construction	\$ 100,000
Engineering	\$ 100,000
General Services	\$ 100,000
Information Systems	\$ 100,000
Legal Services	\$ 100,000
Plant Operations & Maintenance	\$ 100,000
Public Works	\$ 100,000
Regional Sewer Authority operations & maintenance	\$ 100,000
Regional Sewer Authority capital expenses	\$ 100,000
Regional Sewer Authority debt service	\$ 100,000
Regional Sewer Authority other	\$ 100,000
Regional Sewer Authority total	\$ 1,000,000
Regional Sewer Authority debt service	\$ 100,000
Regional Sewer Authority other	\$ 100,000
Regional Sewer Authority total	\$ 1,000,000
Regional Sewer Authority debt service	\$ 100,000
Regional Sewer Authority other	\$ 100,000
Regional Sewer Authority total	\$ 1,000,000
Regional Sewer Authority debt service	\$ 100,000
Regional Sewer Authority other	\$ 100,000
Regional Sewer Authority total	\$ 1,000,000

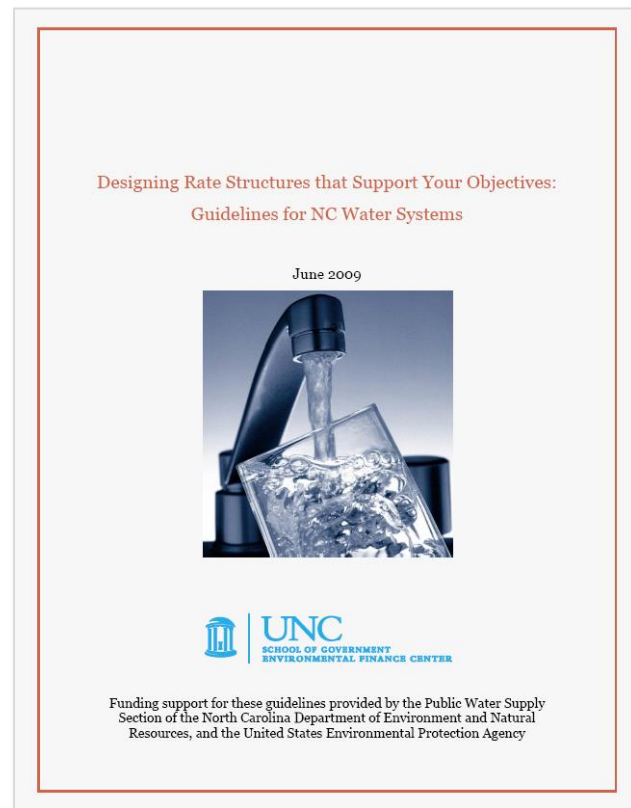
Watch out for red "Error" messages describing where data entry errors

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 Environmental Quality

Designing Rate Structures That Support Your Objectives

Free guide
written for
system
managers

Available at:
<http://efc.sog.unc.edu/>



A blue-tinted photograph of industrial machinery, possibly a large pipe or valve, serves as the background for the top portion of the slide.

Up Next...

- 2nd Priority Objective
- Dashboard Presentation