



Smart Management for  
Small Water Systems

# Setting the Right Rates for your System

Thursday, September 8<sup>th</sup>  
9 am – 12:05 pm



SCHOOL OF GOVERNMENT  
Environmental Finance Center



*This program is made possible under a cooperative agreement with the US EPA.*



# Certificate of Completion

Registered attendees can receive a certificate for participating in this webinar today. This online training has approval for 0.3 hours of training credit.

- **You must attend the entire 3-hour session**
- **You must register and attend using your real name and unique email address**
- **You must participate (fill out polls, stay on the call) for the entire training**
- **You must pass the post-training quiz with a 70%**

Your certificate of attendance will be emailed to you within 30 days of the webinar date.

If you have questions or need assistance, please contact [smallsystems@syr.edu](mailto:smallsystems@syr.edu).

# About Us

**The Environmental Finance Center Network (EFCN)** is a university-based organization promoting innovative and sustainable environmental solutions while bolstering efforts to manage costs.



**Smart Management for  
Small Water Systems**

**The Smart Management for Small Water Systems Program** works in every state, territory, and the Navajo Nation. All small drinking water systems are eligible to receive free training and technical assistance.

# The Small Systems Water and Wastewater Teams

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



# Objectives

- Develop rate setting objectives
- Determine the cost of providing wastewater service
- Anticipate changes in revenues year-to-year by changes in use
- Measure the affordability of rates for all your customers
- Create rate structures that reflect your rate setting objectives

# Speaker

Elsemarie Mullins

EFC at UNC

919-843-8474

[mullins@sog.unc.edu](mailto:mullins@sog.unc.edu)





# Poll: What type of system are you?

1. Local government
2. Non-profit
3. For-profit
4. Other
5. Not a system



# Poll: How much experience and knowledge do you currently have about various rate structure designs?

1. It's new to me and I am NOT very familiar with rate designs
2. It's new to me but I AM familiar with various rate designs
3. I have worked on rates for 1-4 years
4. I have 5+ years of experience with water rate designs



# Agenda

- Financial Overview and Benchmarking
- Rate Objectives and Setting Rates
- Rates and Rate Structures
- 5 min Break
- Equity Considerations
- Q and A
- Post training quiz



# Financial Overview

Setting the stage for needed revenue



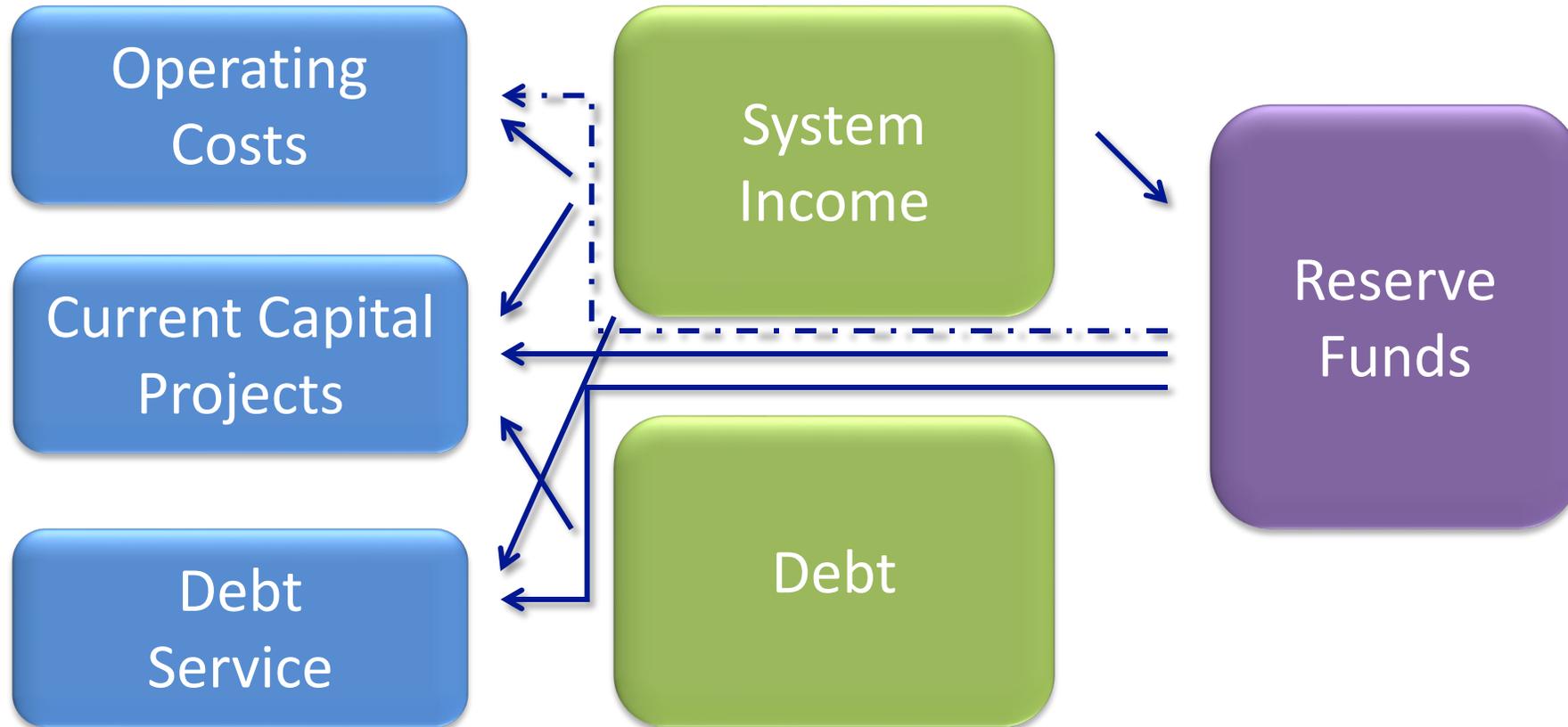
# A Guiding Principle for Enterprise Funds

Self-sufficiency

Revenues collected = Costs expended

Avoid or minimize transfers

# Water System Finance Diagram





# Budgeting for the full cost

- Operations & maintenance expenditures
- Taxes and accounting costs
- Contracts
- Principal and interest on long-term debt
- Contingencies for emergencies
- Reserves for capital improvement
- Indirect costs (fleet, buildings, shared expenditures, etc.)
- Related services (e.g.: source water protection for drinking water enterprise fund?)
- Opportunity costs



# Can You Sleep at Night?

- Is your utility (public enterprise) self sufficient?

Operating Ratio

If your customers stop paying their bills, how long can you maintain operations?

Days Cash on Hand

- Are you able to cover your debt service after paying for your day to day operations?

Debt Service  
Coverage Ratio

- How much of your utility's expected life has already run out (and how much is left)?

Asset Depreciation

# EFC's Financial Benchmarking Video





# Intro to CAFRs

- CAFR = Comprehensive Annual Financial Report
- Completed every year, includes financial data for the utility (and maybe the entire local government)
- This is where we find financial data that is necessary to calculate the financial indicators on the dashboard



# Why Care About Financial Benchmarks?

- Get a holistic picture of utility performance and needs
- Future goals/growth
- Capital planning
- Affordability
- Financing options

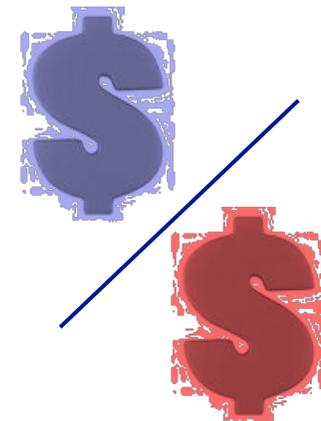
# Operating Ratio

$$= \frac{\textit{Operating Revenues}}{\textit{Operating Expenses}}$$

Natural Benchmark: > 1.0

A measure of self sufficiency.

The revenue you get from daily operations, divided by the expenditures or expenses you make to keep operations running (see next slides)

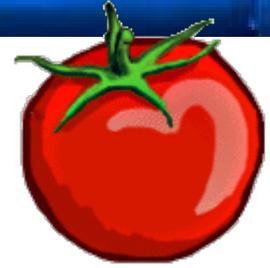




# This Funny Thing Called Depreciation

- This is an accounting solution to the problem of things getting old
- You have a “cost” every year of your infrastructure wearing out, a percentage of its value

# T'mayto, Tahmahto: Operating Ratio



- You may wish to include depreciation in your operating ratio
  - Operating revenues divided by operating expenses including depreciation and the provision for bad debts.
- National Association of Clean Water Agencies
  - Operating revenues divided by operating expenditures (excludes depreciation).

# Operating Ratio – **Mayberry** Including Depreciation

$$\begin{array}{r} \boxed{\$444,231} \\ \text{Operating Revenues (1)} \\ \hline \boxed{\$511,448} \\ \text{Operating Expenses (including depreciation) (2)} \end{array} = \boxed{0.87}$$

**1a.**

# Operating Ratio – **Mayberry** Excluding Depreciation

**1b.** 
$$\frac{\$444,231}{\$368,985} = 1.20$$

Operating Revenues (1)

Operating Expenses (excluding depreciation) (2-3)

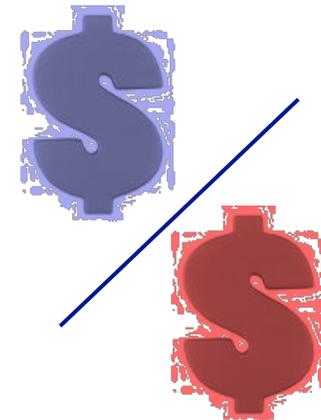
OE \$511,448  
- DEP \$142,463

# Debt Service Coverage Ratio

$$= \frac{\text{Operating Revenues} - \text{Operating Expenditures (excludes depreciation)}}{\text{Principal} + \text{Interest Payments on Long Term Debt}}$$

Natural Benchmark: > 1

A measure of the ability to pay debt service with operating revenue:  
Operating revenue left over after daily operation expenditures,  
divided by  
debt service



# Debt Service Coverage Ratio

## – Mayberry

OE \$511,448  
- Dep \$142,463

\$444,231 - \$368,985

Operating Revenues (1)    Operating Expenses (2-3)  
(excluding depreciation)

2. \_\_\_\_\_ = 0.89

\$84,783

Principal & Interest on Long-Term Debt (4)

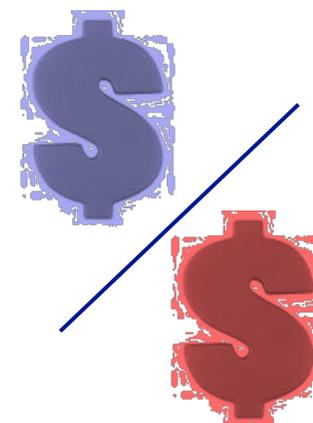
P \$49,655  
+ I \$35,128

# Days Cash on Hand

$$= \frac{\text{Unrestricted cash and cash equivalents} \times 365}{\text{Operating Expenses} - \text{Depreciation}}$$

Benchmark? At the very least, enough to last a billing cycle or when you expect a substantial inflow of cash

A measure of the ability of the utility to weather a significant temporary reduction in revenue to continue paying for daily operations



# Days of Cash on Hand – Mayberry

$$\begin{array}{r} \boxed{\$107,706} \\ \text{Unrestricted Cash \& Cash Equivalents (5)} \\ \hline \boxed{\$368,985} \quad / \quad 365 \\ \text{Operating Expenses (excluding depreciation) (2-3)} \end{array} = \boxed{107}$$

OE \$511,448  
- Dep \$142,463

# Asset Depreciation\*

$$= \frac{\textit{Accumulated Depreciation}}{\textit{Gross Plant and Equipment}}$$

Benchmark? Don't get close to 1.0

A measure of how much of your total assets have already depreciated. As you approach 1.0, your system is near the end of its expected life.



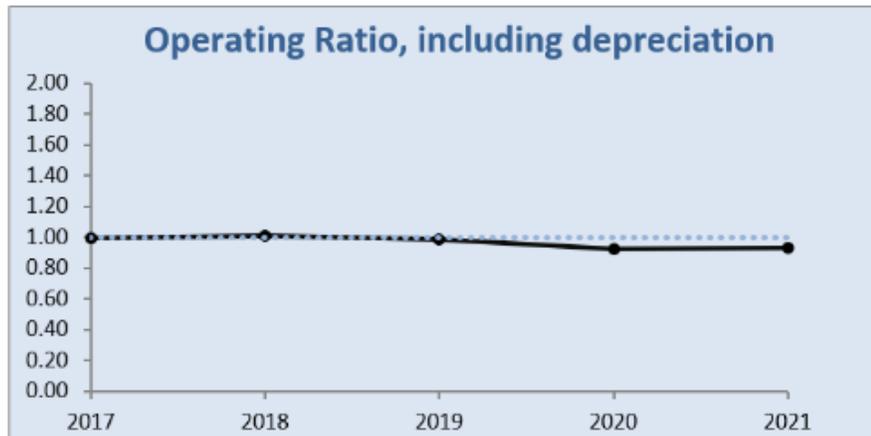
\*Caveat – This indicator is only as good as your depreciation schedule and even then historic pricing is likely to distort the results.

# Financial Health Check Up Tool

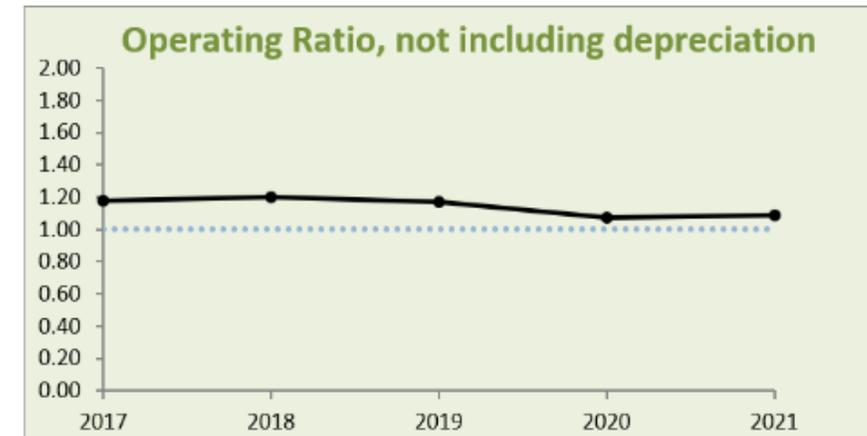
## Field in the financial statement/CAFR

	2017	2018	2019	2020	2021
Total Operating Revenues	\$ 2,093,254	\$ 2,205,669	\$ 2,224,051	\$ 2,334,927	\$ 2,403,480
Total Operating Expenses	\$ 2,103,759	\$ 2,179,448	\$ 2,252,873	\$ 2,521,833	\$ 2,591,843
Depreciation & Amortization Expenses	\$ 332,340	\$ 344,392	\$ 348,059	\$ 351,772	\$ 391,104
Debt Principal Payments	\$ 169,259	\$ 180,149	\$ 39,260	\$ 39,260	\$ 39,259
Debt Interest Payments	\$ 22,686	\$ 16,412	\$ 10,992	\$ 10,208	\$ 9,422
Current Assets, excluding inventories, restricted cash, prepaids	\$ 1,662,493	\$ 1,526,328	\$ 1,634,715	\$ 2,115,548	\$ 1,732,525
Current Liabilities, excluding deposits & bond anticipation notes	\$ 110,739	\$ 101,499	\$ 189,228	\$ 352,281	\$ 317,435
Unrestricted Cash & Investments	\$ 1,217,862	\$ 1,073,590	\$ 752,765	\$ 1,310,894	\$ 1,066,975
Total Accumulated Depreciation	\$ 4,004,617	\$ 4,345,792	\$ 4,693,851	\$ 5,045,623	\$ 5,436,727
Total Depreciable Capital Assets	\$ 12,889,349	\$ 13,664,784	\$ 13,651,528	\$ 13,400,817	\$ 15,917,091

Did you generate the revenues needed to pay for O&M and a little for capital?



Did you generate the revenues needed to pay for O&M by itself?



# Operating Ratio – **Mayberry** Including Depreciation

$$\begin{array}{r} \boxed{\$444,231} \\ \text{Operating Revenues (1)} \\ \hline \boxed{\$511,448} \\ \text{Operating Expenses (including depreciation) (2)} \end{array} = \boxed{0.87}$$

**1a.**



# Operating Ratio – **Mayberry**

## Including Depreciation

**1a.**

$$\frac{\boxed{\text{?????}}}{\text{Operating Revenues (1)}} = \boxed{1.2}$$
$$\frac{\boxed{\$511,448}}{\text{Operating Expenses (including depreciation) (2)}}$$

# Operating Ratio – **Mayberry** Including Depreciation

$$1.2 \times \boxed{\$511,448} = \boxed{613,737}$$

*Operating Expenses (including depreciation) (2)*      *Operating Revenues (1)*



# A Guiding Principle for Enterprise Funds

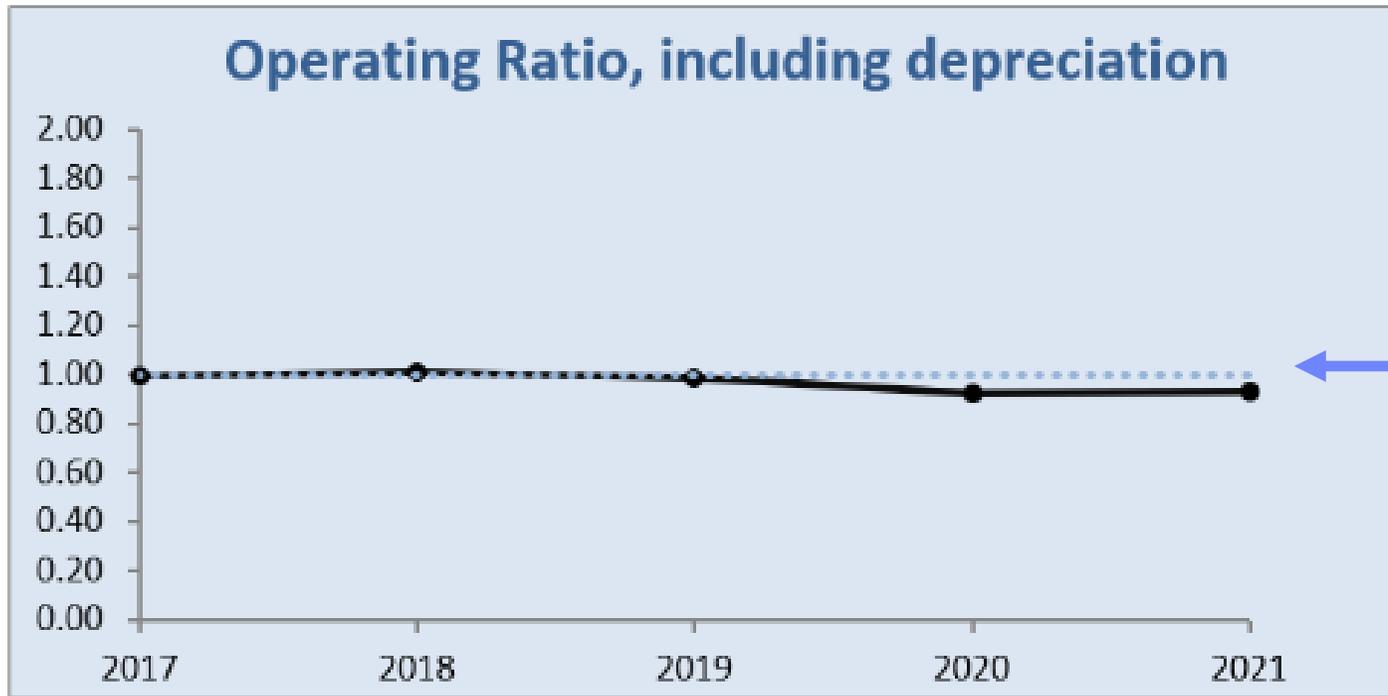
Self-sufficiency

Revenues collected = Costs expended

Avoid or minimize transfers

# Financial Health Check Up Target

Did you generate the revenues needed to pay for O&M and a little for capital?



Set a target and track the trend



# Rate setting objectives

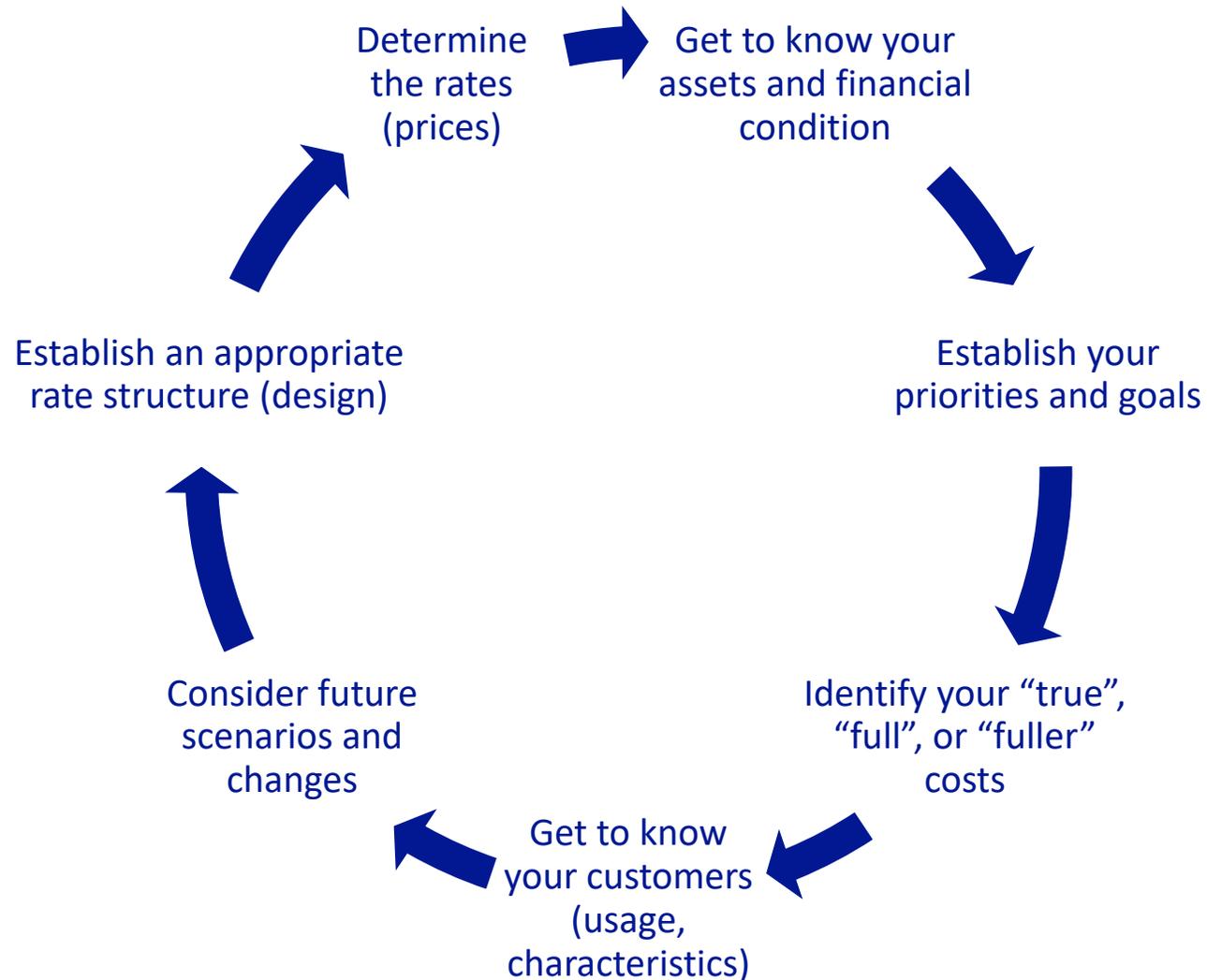
How a system's priorities influence rates setting



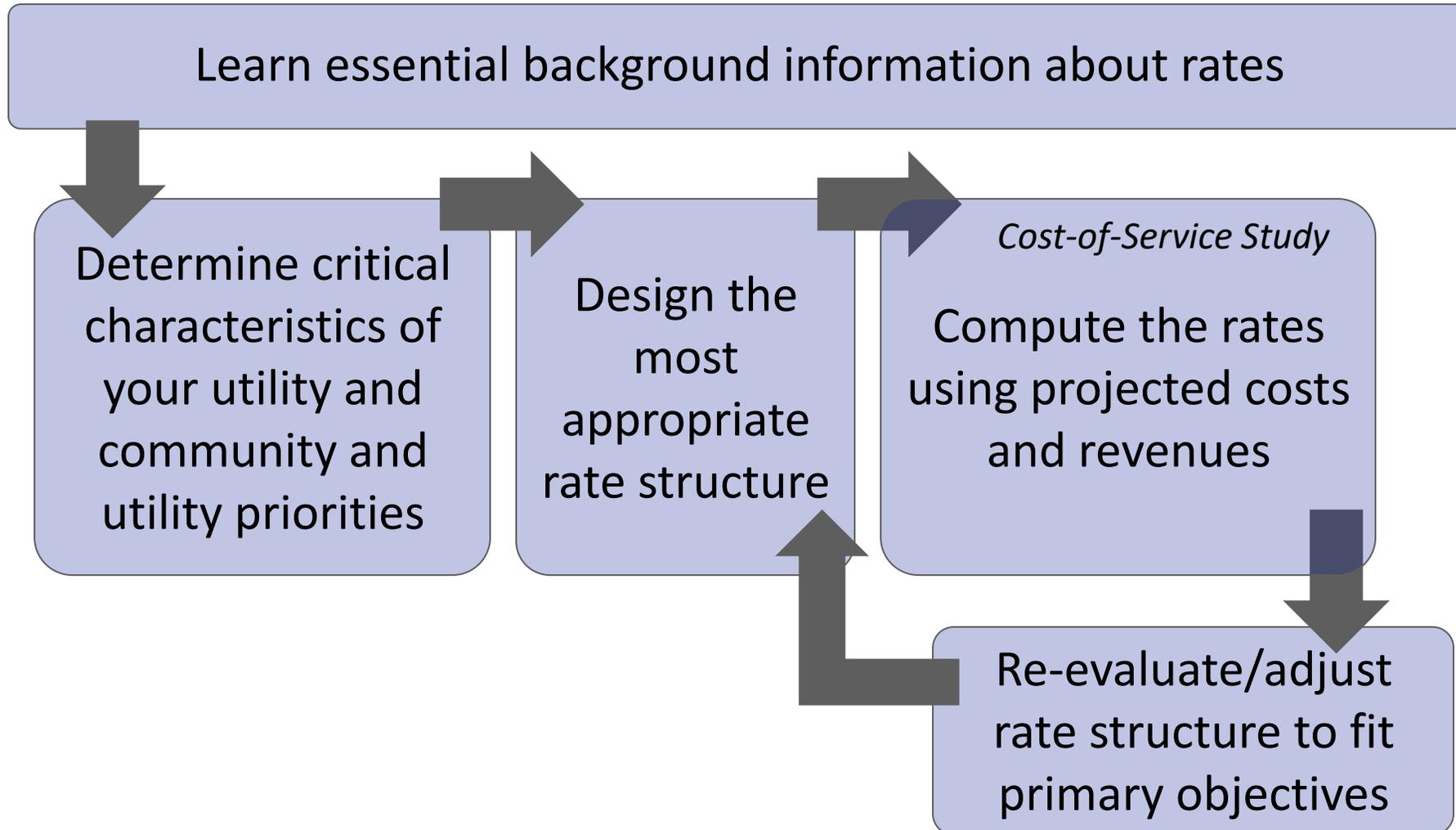
## Rates that are “right” can:

- ✓ Provide adequate funds to support public health
- ✓ Provide adequate funds to support environmental protection
- ✓ Support local and state policies and objectives
- ✓ Communicate in a certain way with customers
- ✓ Allocate costs in an intentional and fair way

# Path Towards Financial Sustainability



# The Process of Setting Rates

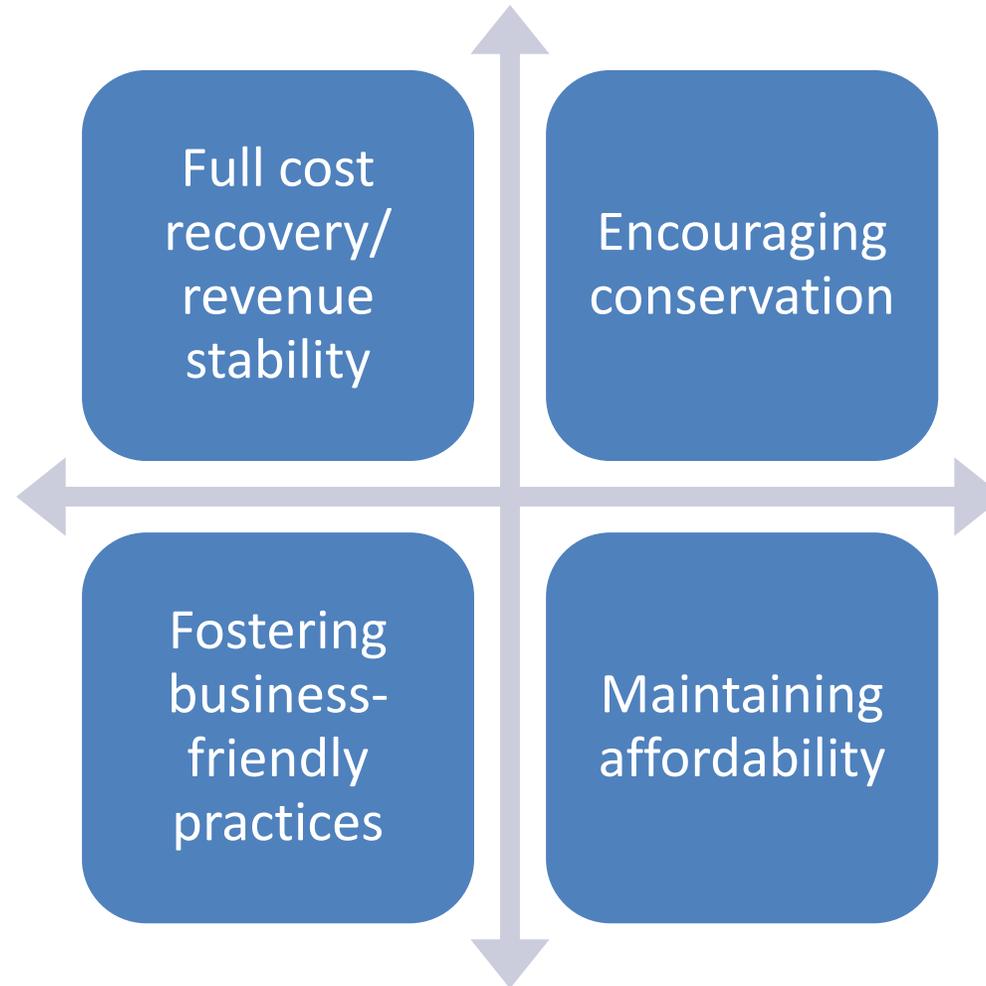


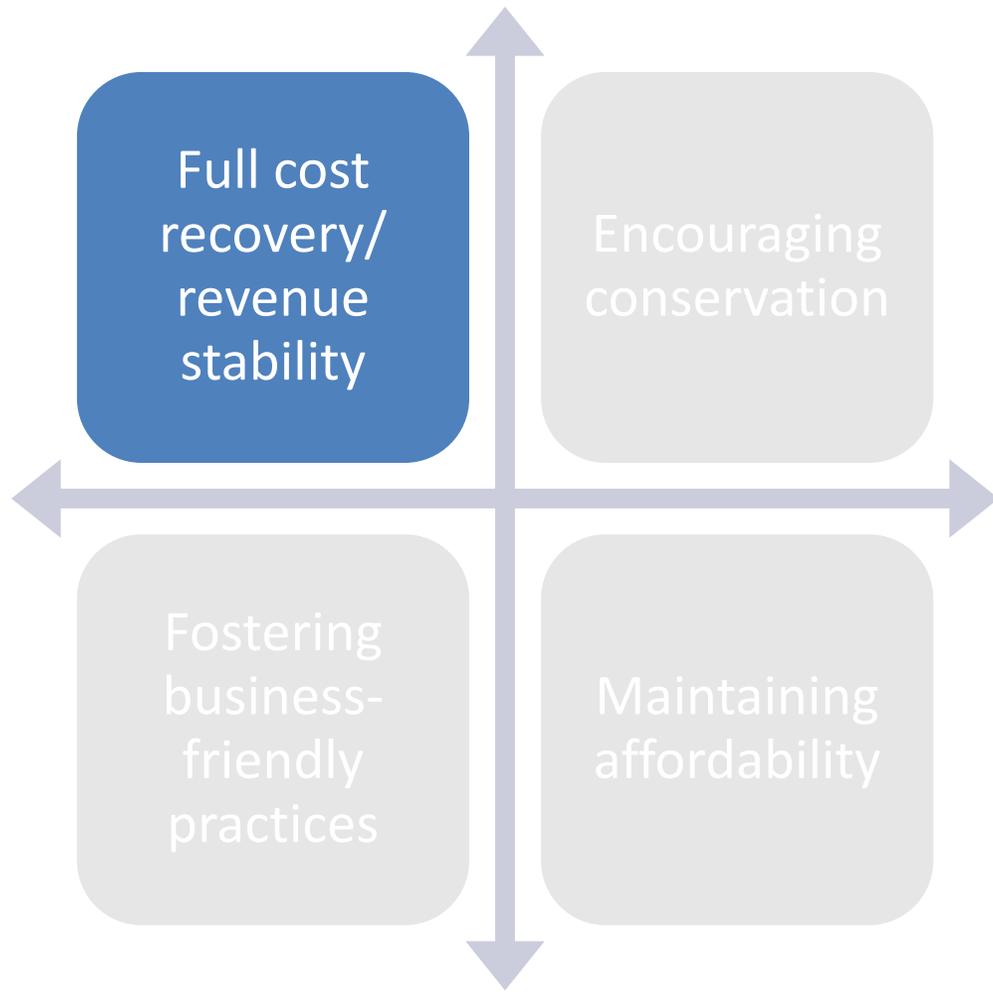


## Poll: What are your biggest challenges to setting rates?

- 1. Falling consumption trends/difficulty with projections
- 2. Governing board's unwillingness to raise rates
- 3. Communities ability to pay more for water and wastewater service
- 4. Pressure to keep rates comparable to other water utilities
- 5. Rising cost of other governmental taxes and fees

# Examples of water system objectives

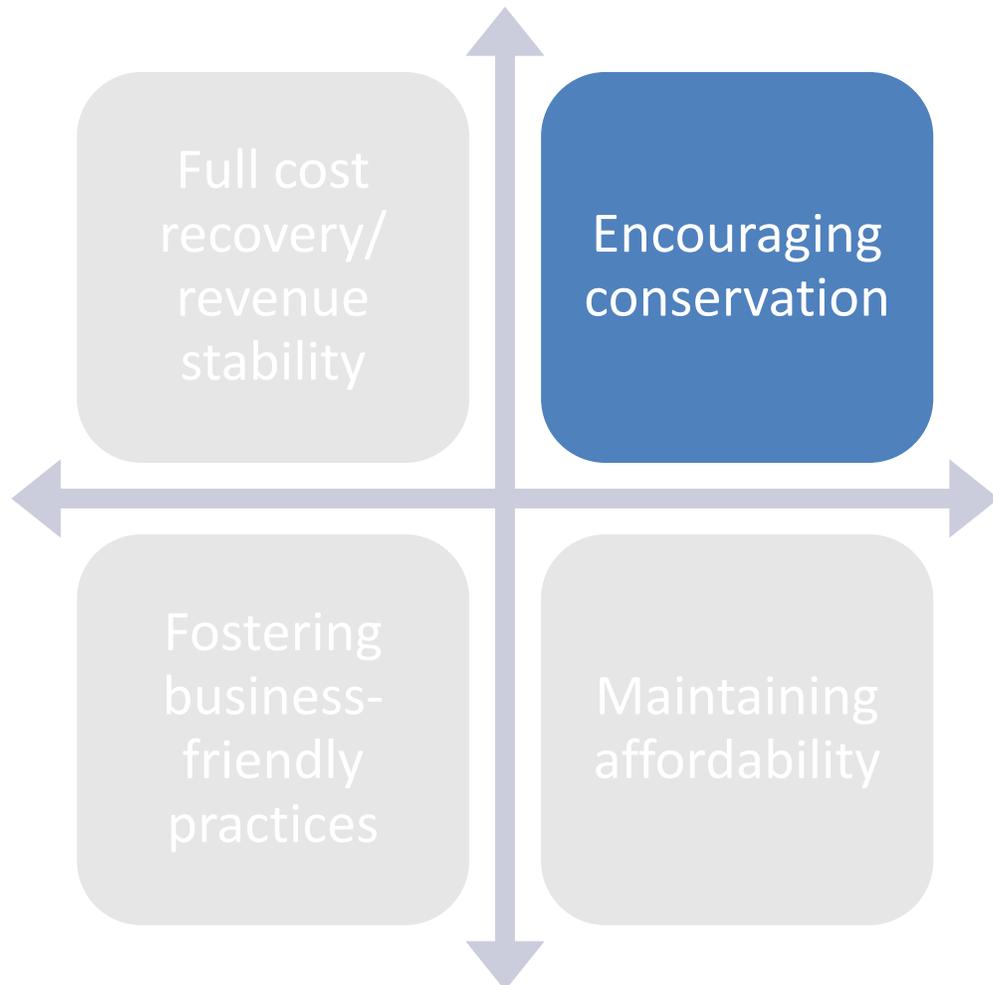




Bring in enough revenue to cover the full cost of running the system:

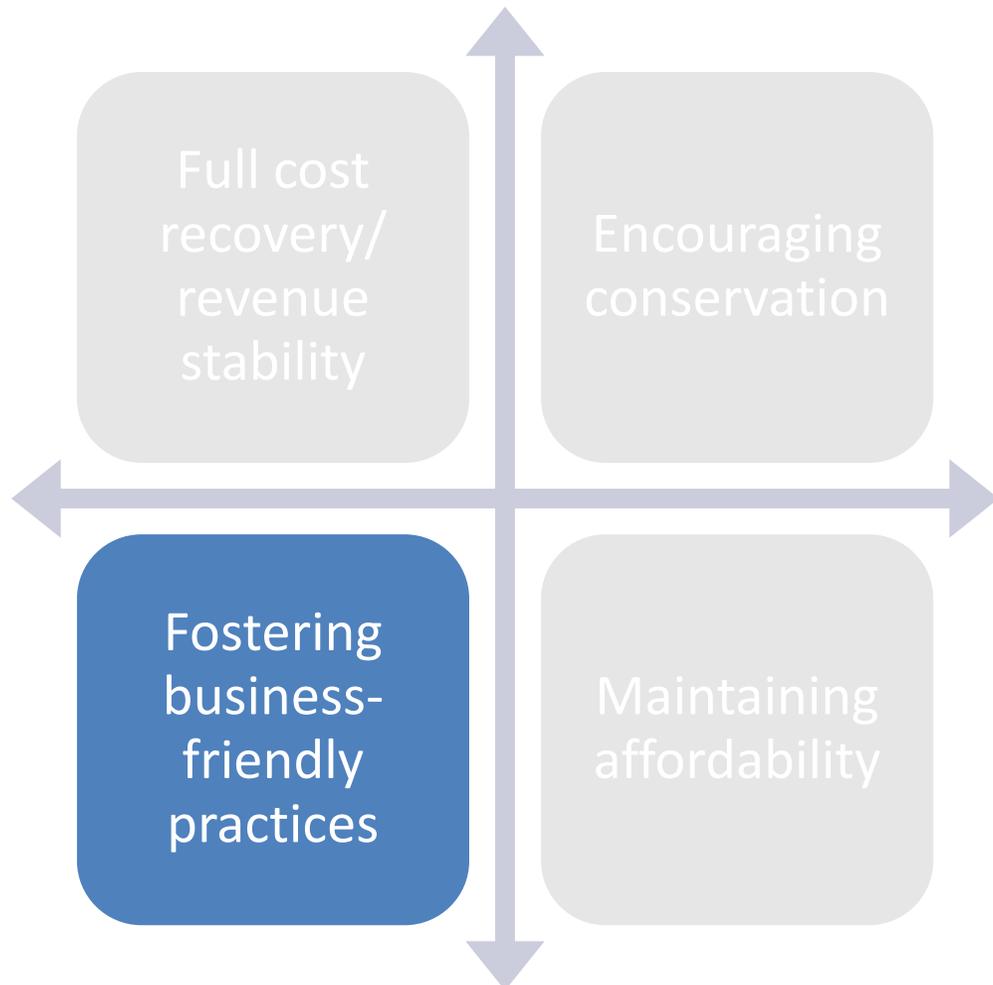
- O&M
- Capital needs
- Debt service

Why do this?



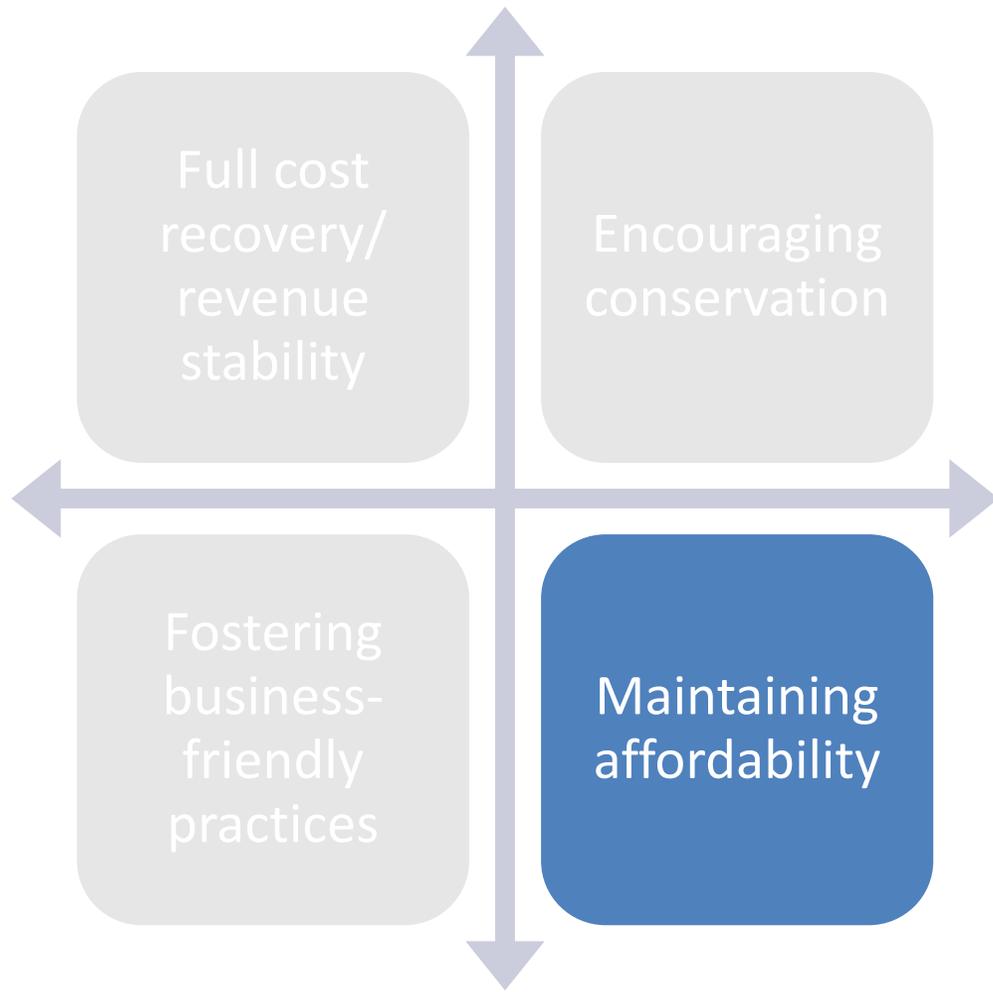
Use pricing to encourage customers to reduce their consumption

Why do this?



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

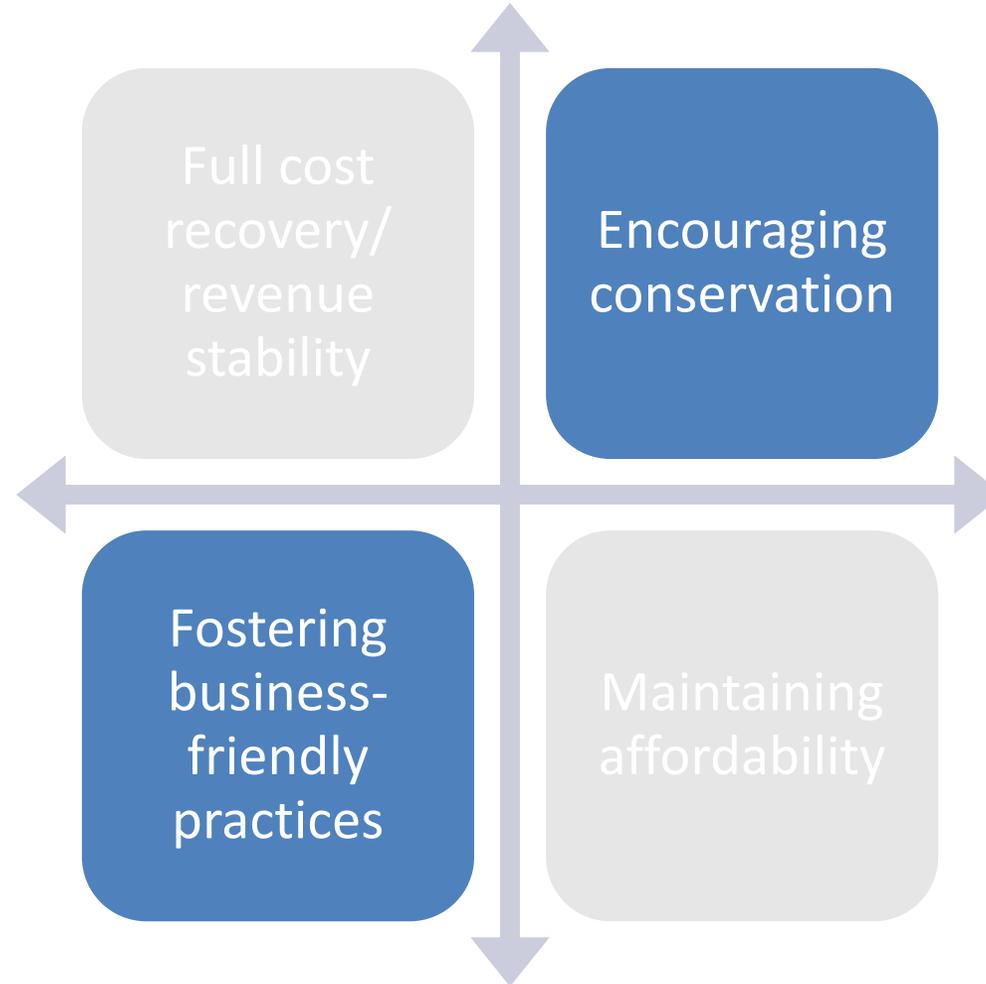
Why do this?



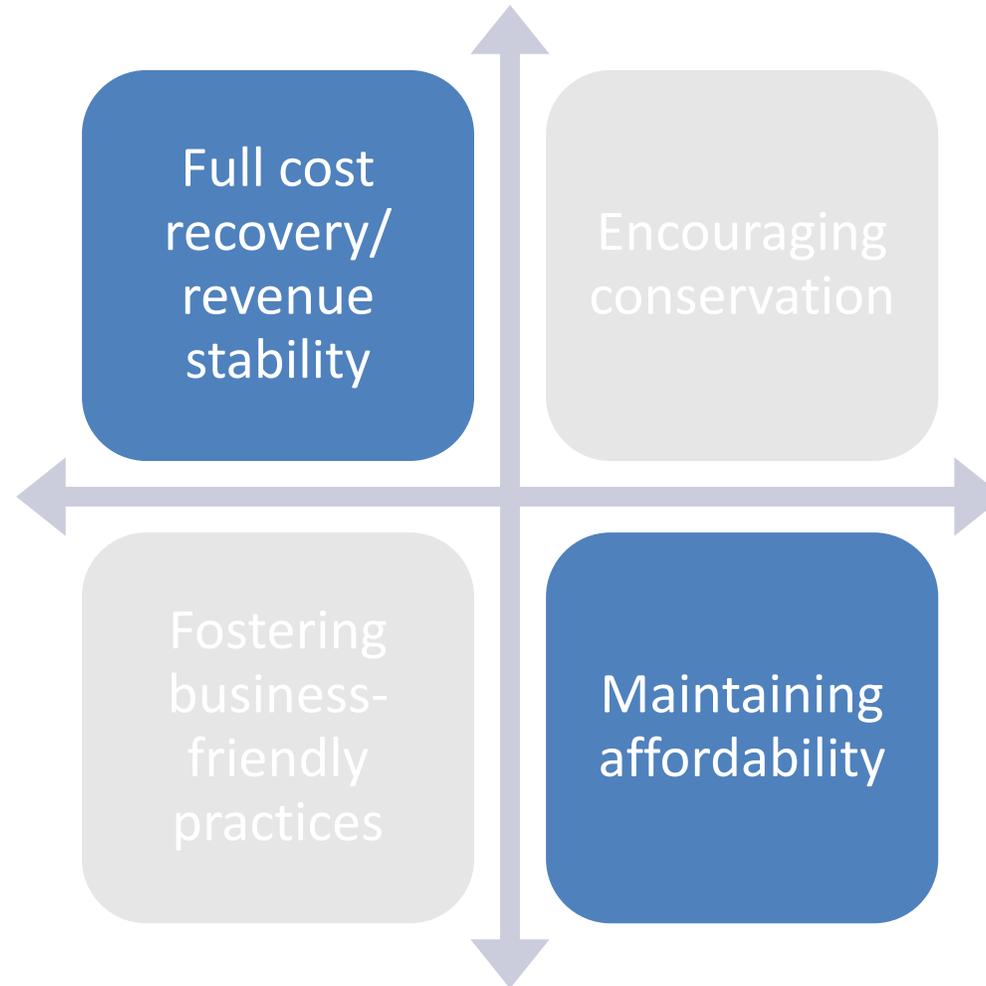
Ensure that all customers in your system can afford the minimum service needed to live.

Why do this?

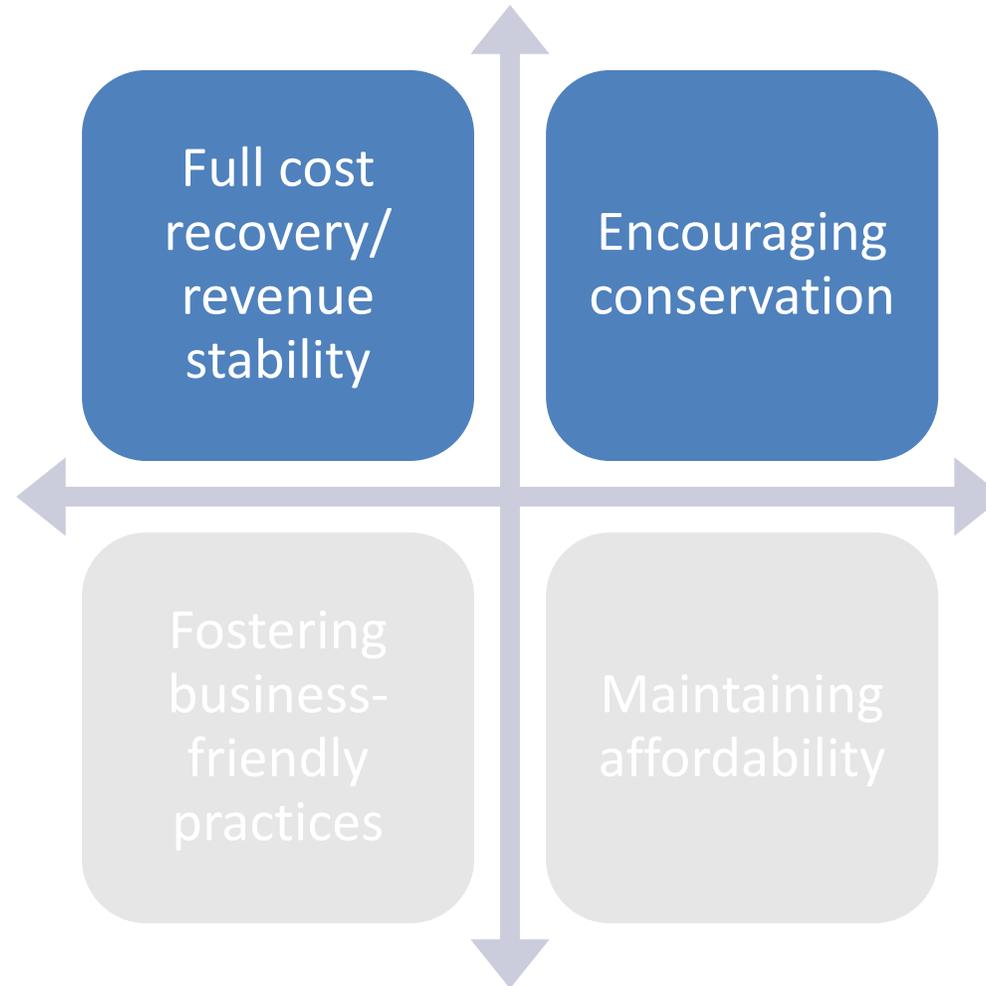
# Competing Objectives



# Competing Objectives



# Synergistic Objectives





## Poll: What is your number one rate setting objective?

1. Full cost recovery/revenue stability
2. Encouraging conservation
3. Fostering business friendly practices
4. Maintaining affordability
5. Charging seasonal customers fairly
6. Keeping it simple
7. Other



## Poll: What is your number two rate setting objective?

1. Full cost recovery/revenue stability
2. Encouraging conservation
3. Fostering business friendly practices
4. Maintaining affordability
5. Charging seasonal customers fairly
6. Keeping it simple
7. Others?



# Rates, Rate Structures

Overview of rates, rate structures, and other considerations when setting rates



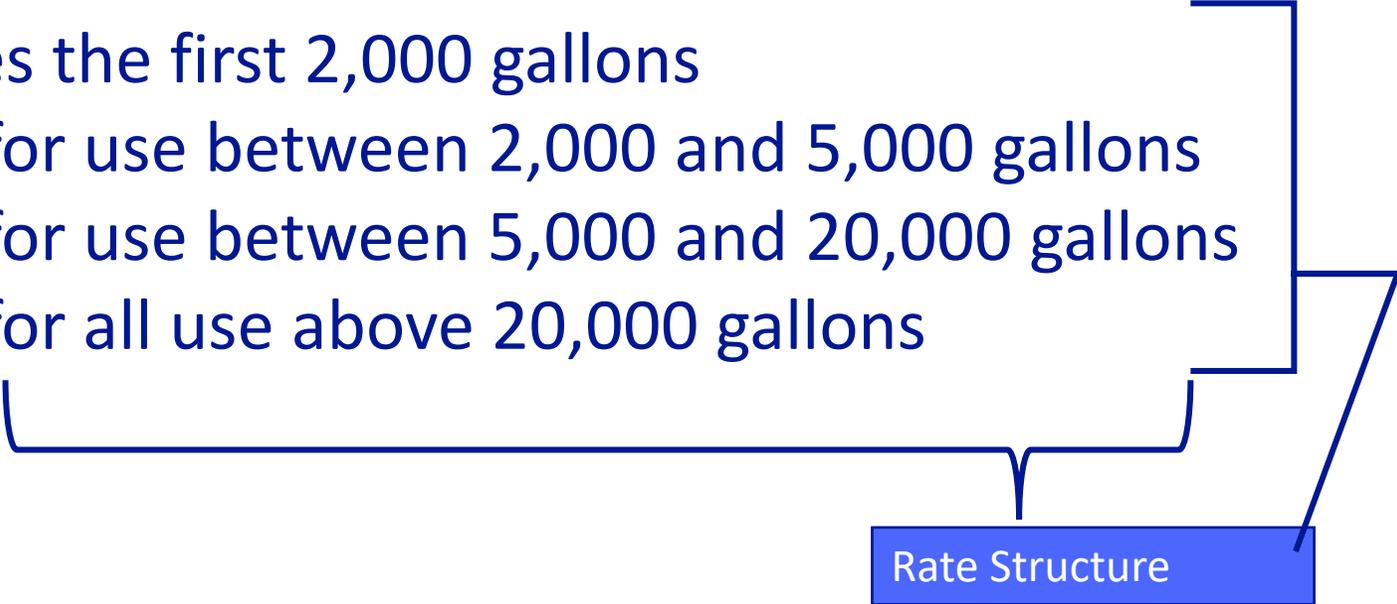
## Terminology: Rates vs. Rate Structure

Rates



\$ 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

Rate Structure



# Terminology for Rate Structure

Base Charge

Consumption Allowance

\$ 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

Volumetric Rates

Blocks

**There is no one rate structure that works perfectly for all utilities**



# Get to know your customers and future scenarios

- 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?



# Get to know your costs and future scenarios

- 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?



# 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



# Elements of Rate Structure Designs:

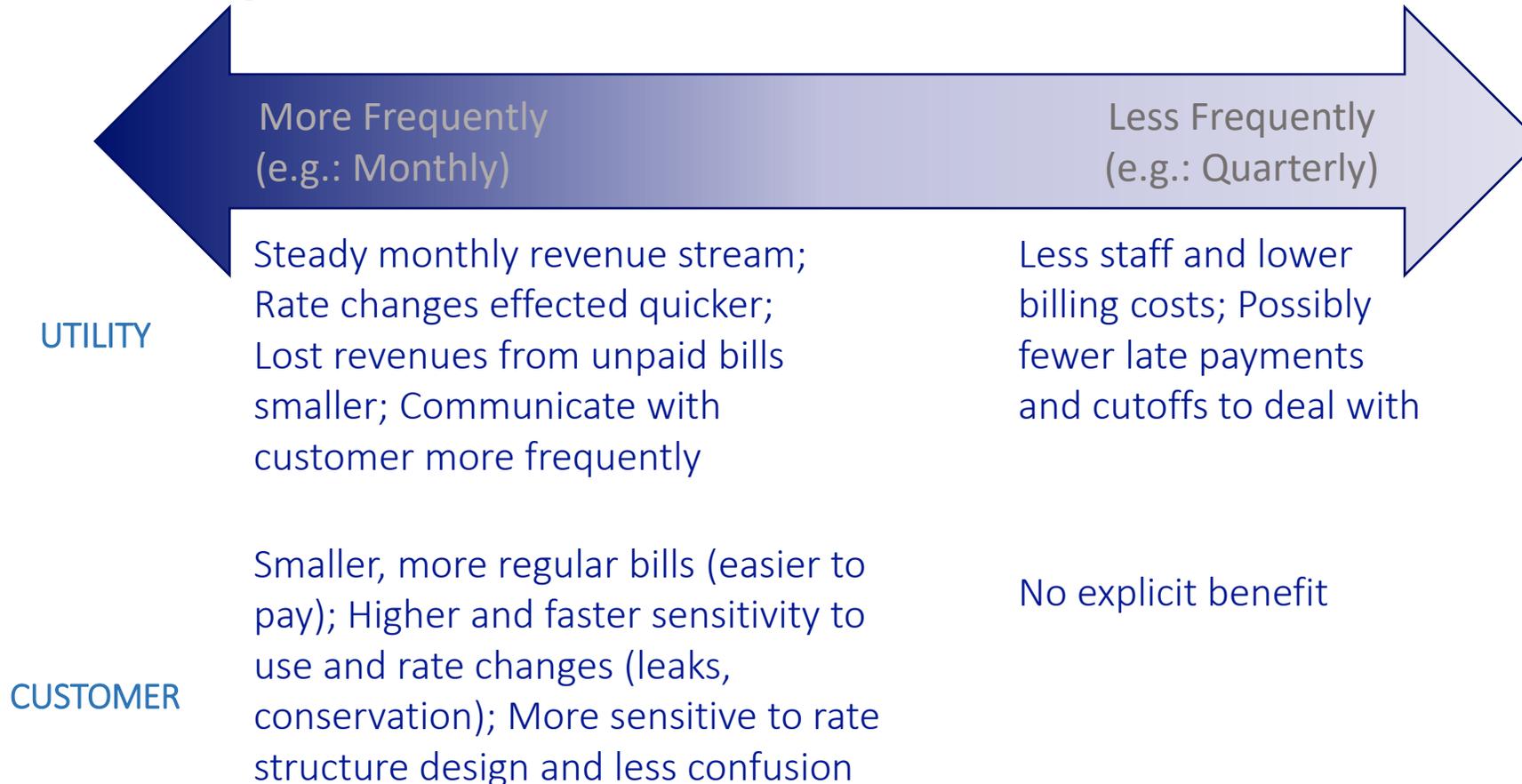
## 1. Customer Classes/Distinction

Alternative	Targets
One rate structure for all	All are equal
Separate rate structure for residential, 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



# Elements of Rate Structure Designs:

## 2. Billing Period



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



# Poll: How often do you bill?

1. Monthly
2. Quarterly
3. Twice a year
4. Yearly
5. Other
6. Not a system

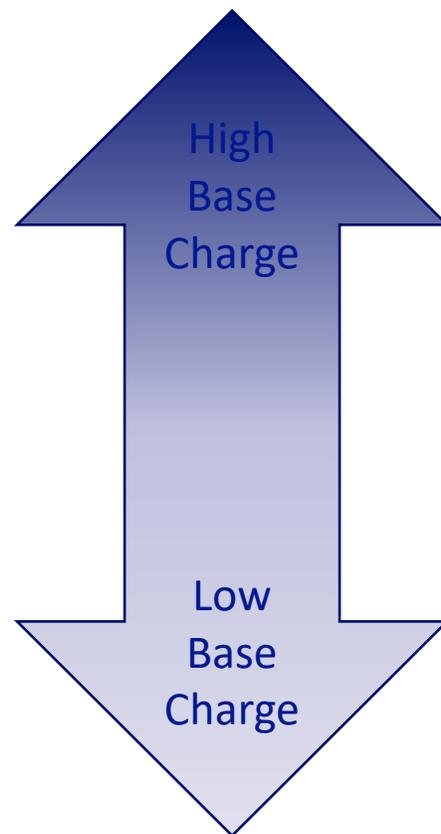
# Elements of Rate Structure Designs:

## 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 they use less

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 structure a base charge:

- **Constant** (by customer class): \$35.00/month
- **By meter size:**
  - \$35.00/month for 5/8" or 3/4" meter
  - \$55.00/month for 1" meter
  - \$105.00/month for 2" meter, etc.



# Example of Equivalent Meter-and-Service Ratios

Example described in AWWA M1 Manual, but **you should calculate your own** cost of connection and meter investment ratios. See M1 Manual for method. Based on area of pipe cross section.

<b>Meter Size</b>	<b>Ratio Equivalent to 5/8" Meter (example only; do not use as a rule of thumb)</b>
5/8"	1.0
3/4"	1.1
1"	1.4
1.5"	1.8
2"	2.9
3"	11.0
4"	14.0
6"	21.0
8"	29.0



# 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 service to offset some of the effects of high base charges

Provides a greater offset for the customer, but discourages conservation

Do not include any (0 gallons)

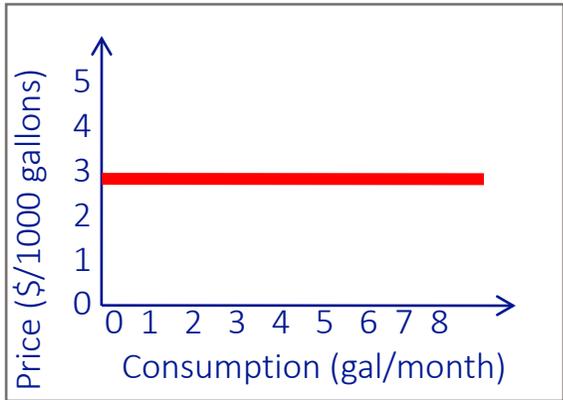
Include some amount (e.g.: 1,000 gallons/month)

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.*

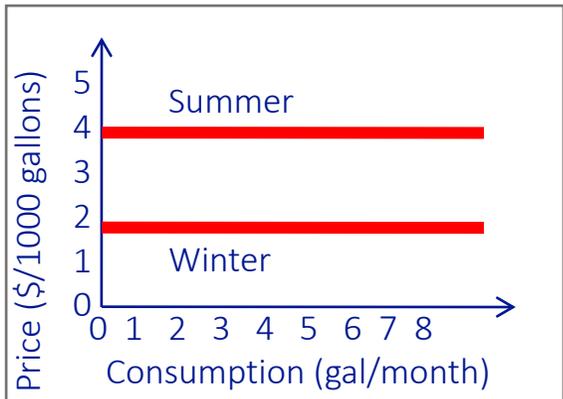
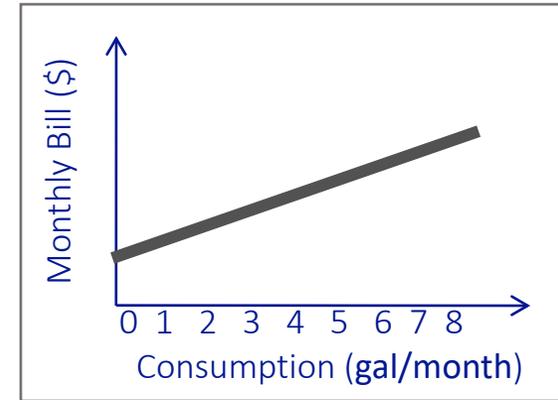
# Elements of Rate Structure Designs:

## 5. Volumetric Rate Structure



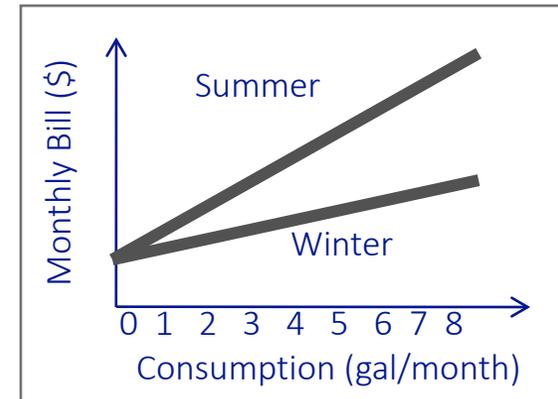
Uniform (“Flat”) Rates

Simple and Fair



Seasonal (Uniform) Rates

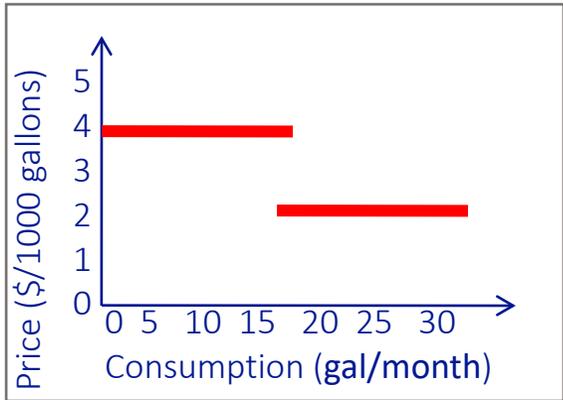
Conservation-oriented, good for seasonal communities



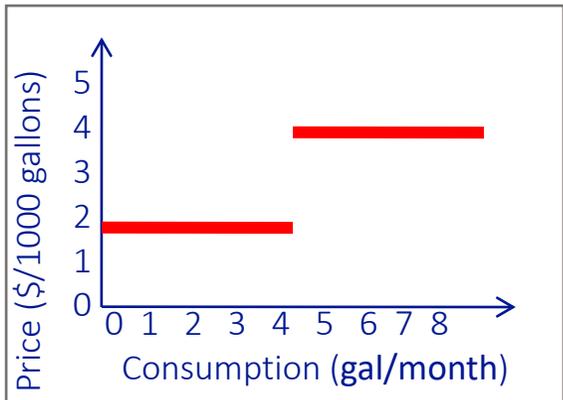
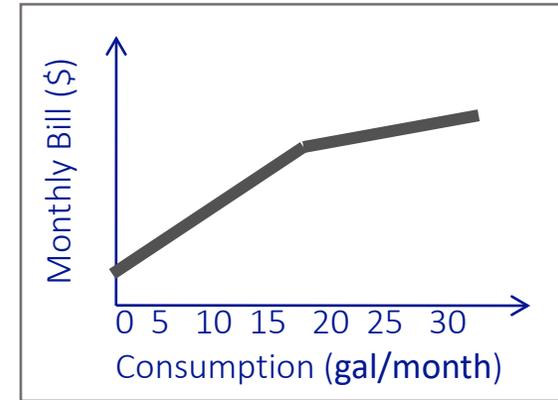
*Suggestion: Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.*

# Elements of Rate Structure Designs:

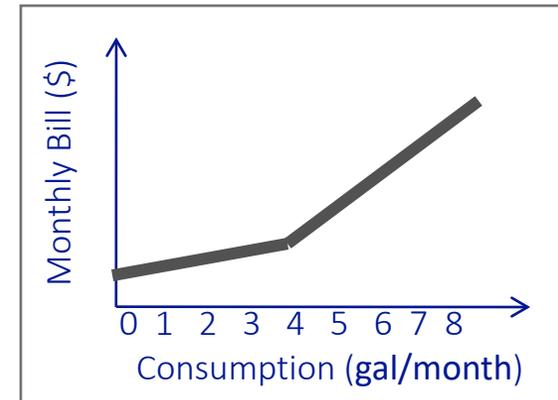
## 5. Volumetric Rate Structure



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



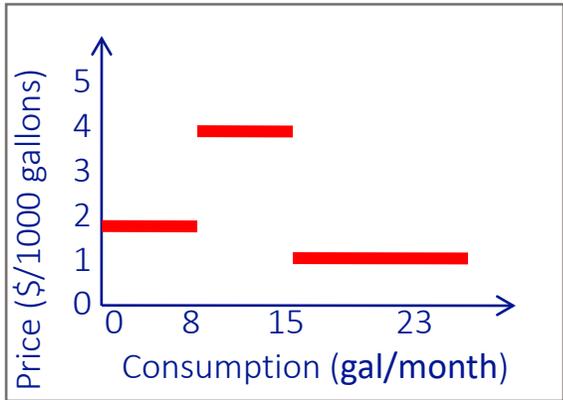
**Increasing Block Rates**  
Conservation-oriented. Consider large families.



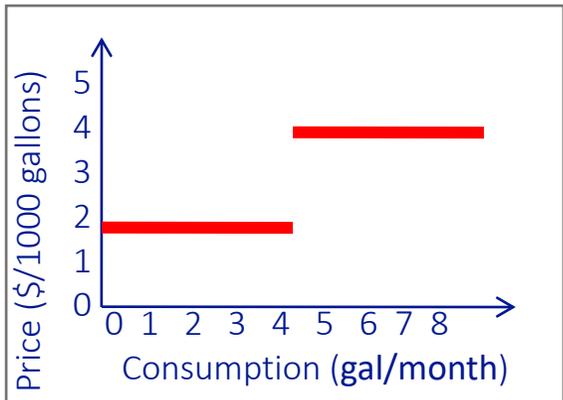
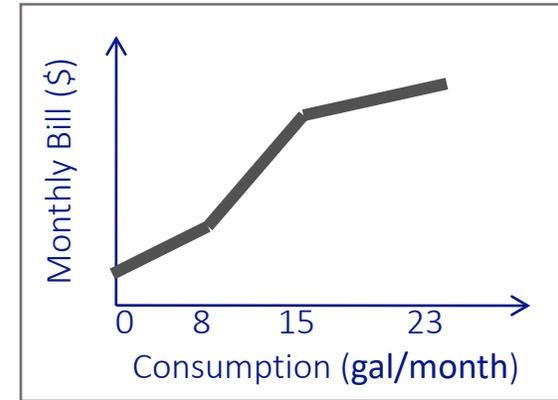
*Suggestion: Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.*

# Elements of Rate Structure Designs:

## 5. Volumetric Rate Structure

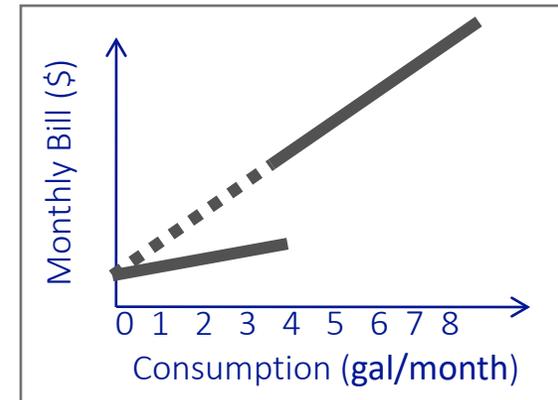


Targeted Block Rates  
Increase *and* decrease based on desired targets: increasing for residential, decreasing for commercial



Uniform At One Block

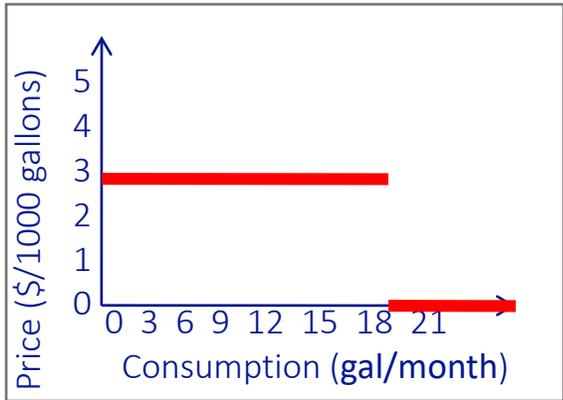
Complex, but greater price incentives over traditional block rate structures



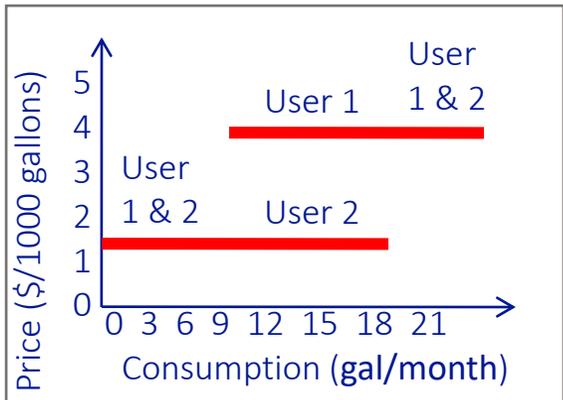
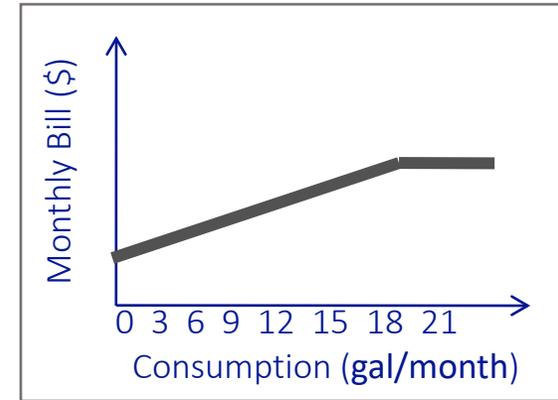
*Suggestion: Pick the volumetric rate structure that fits your stated primary objectives best. Do not use decreasing blocks for residential consumption.*

# Elements of Rate Structure Designs:

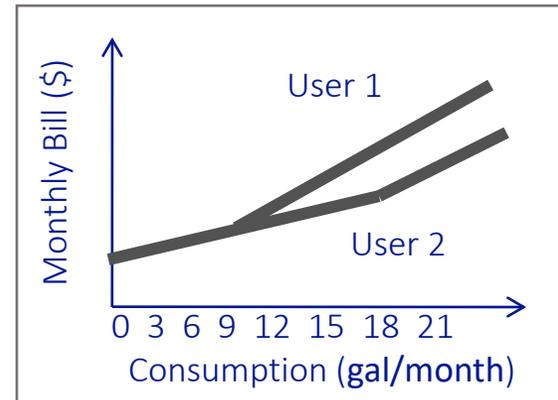
## 5. Volumetric Rate Structure



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 (block is different for each customer)



*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 service with rent.

Not reading meters. Simplest and cheapest option.  
Gives the customer zero financial incentive to be efficient in their utility use



## Poll: Which volumetric rate structure does your utility use?

1. Uniform or uniform with a cap
2. Increasing block
3. Decreasing block
4. Tiered flat fee
5. Flat Fee
6. Some combination of the above
7. Does not apply—not a system



## 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.

- **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 customers to conserve.



## 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 usage from last few days 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.

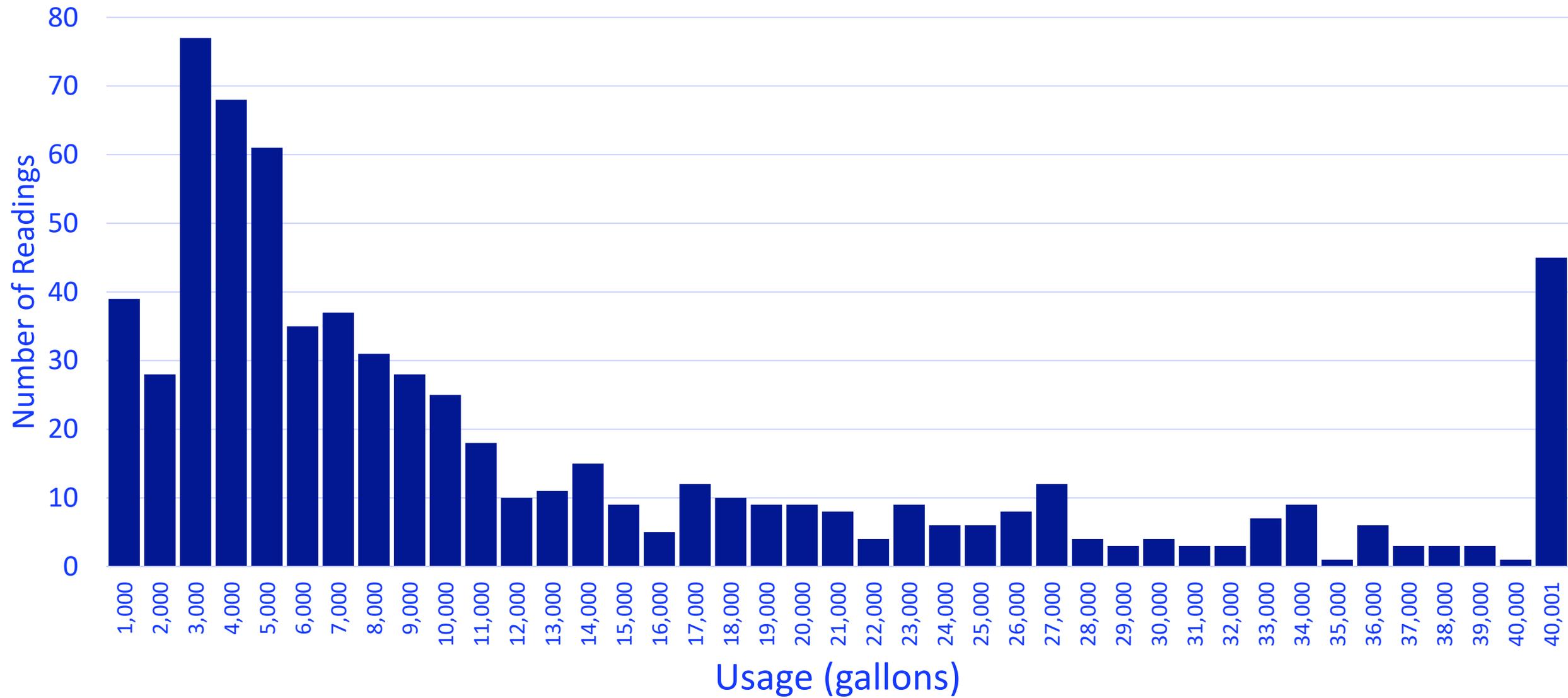


## Elements of Rate Structure Designs: 6. (If Applicable) Block Designs

For block rate structures to be effective:

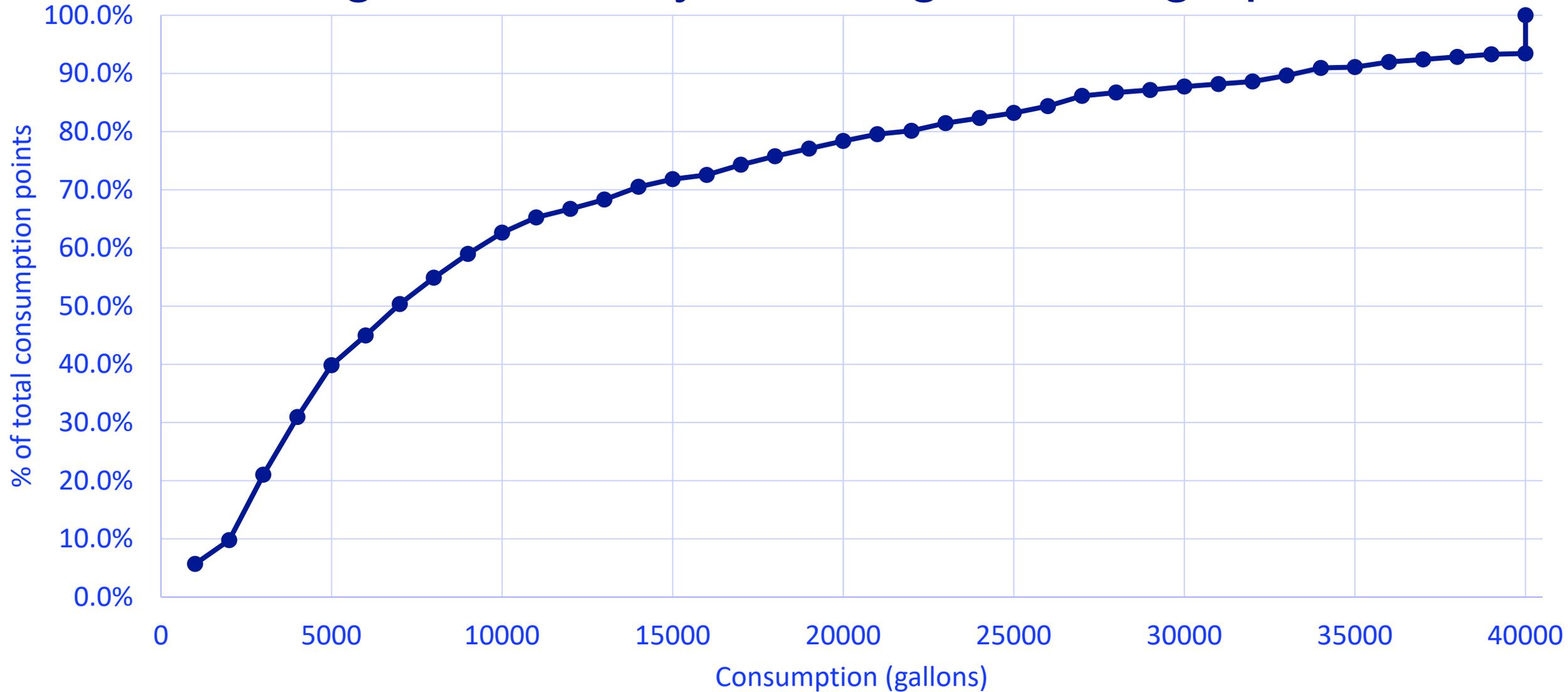
- Consider the adverse effect on large families

Large families consistently use high amounts of water and wastewater 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 services 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.



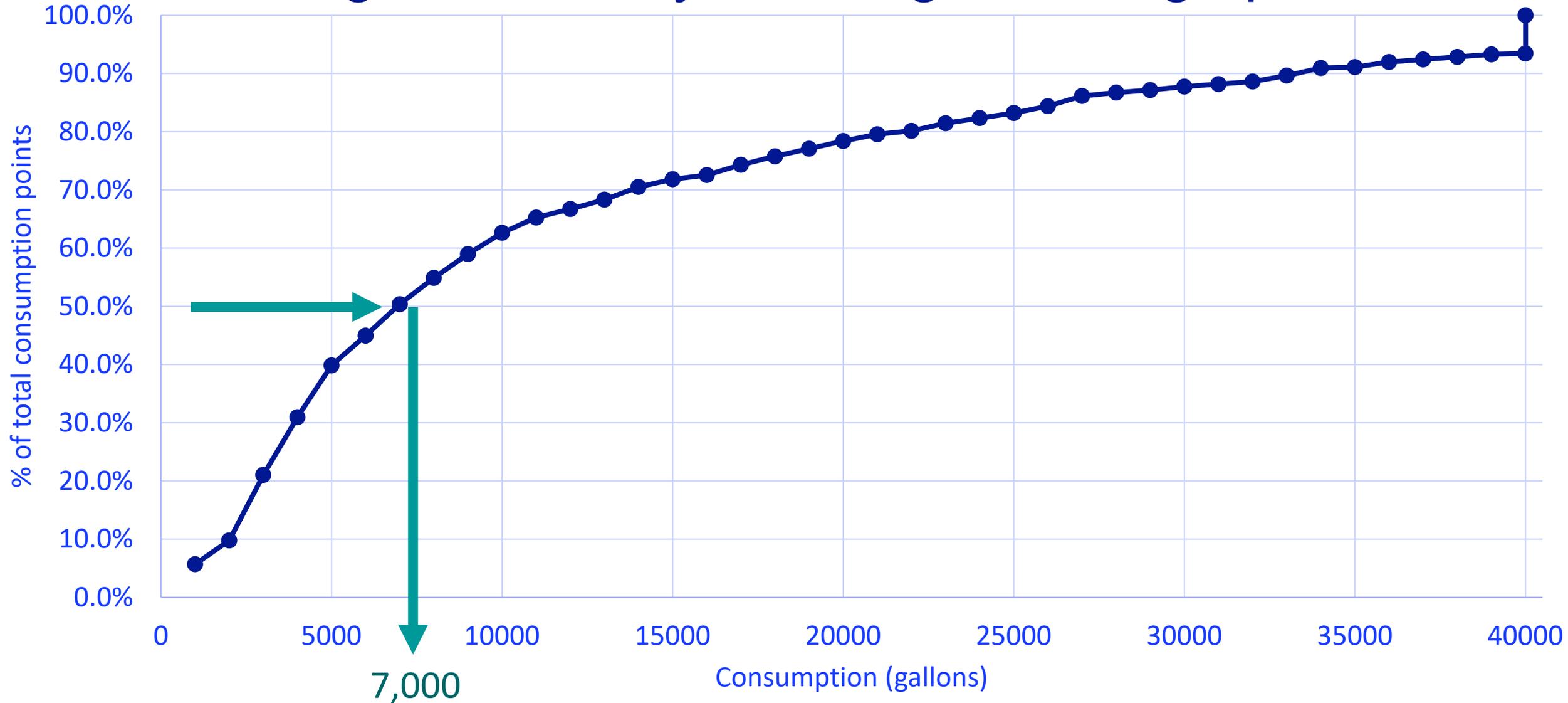


# Percentage of Monthly Readings at Usage points



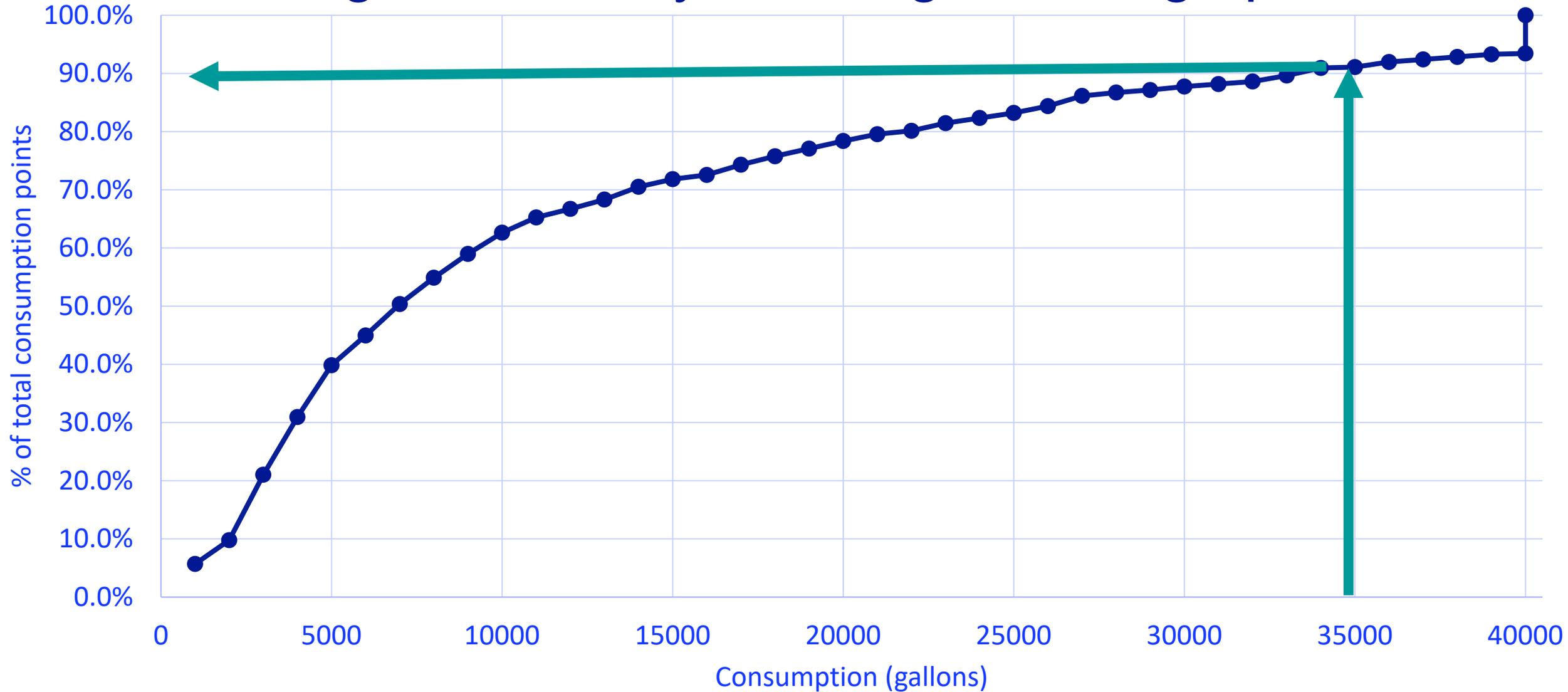


# Percentage of Monthly Readings at Usage points



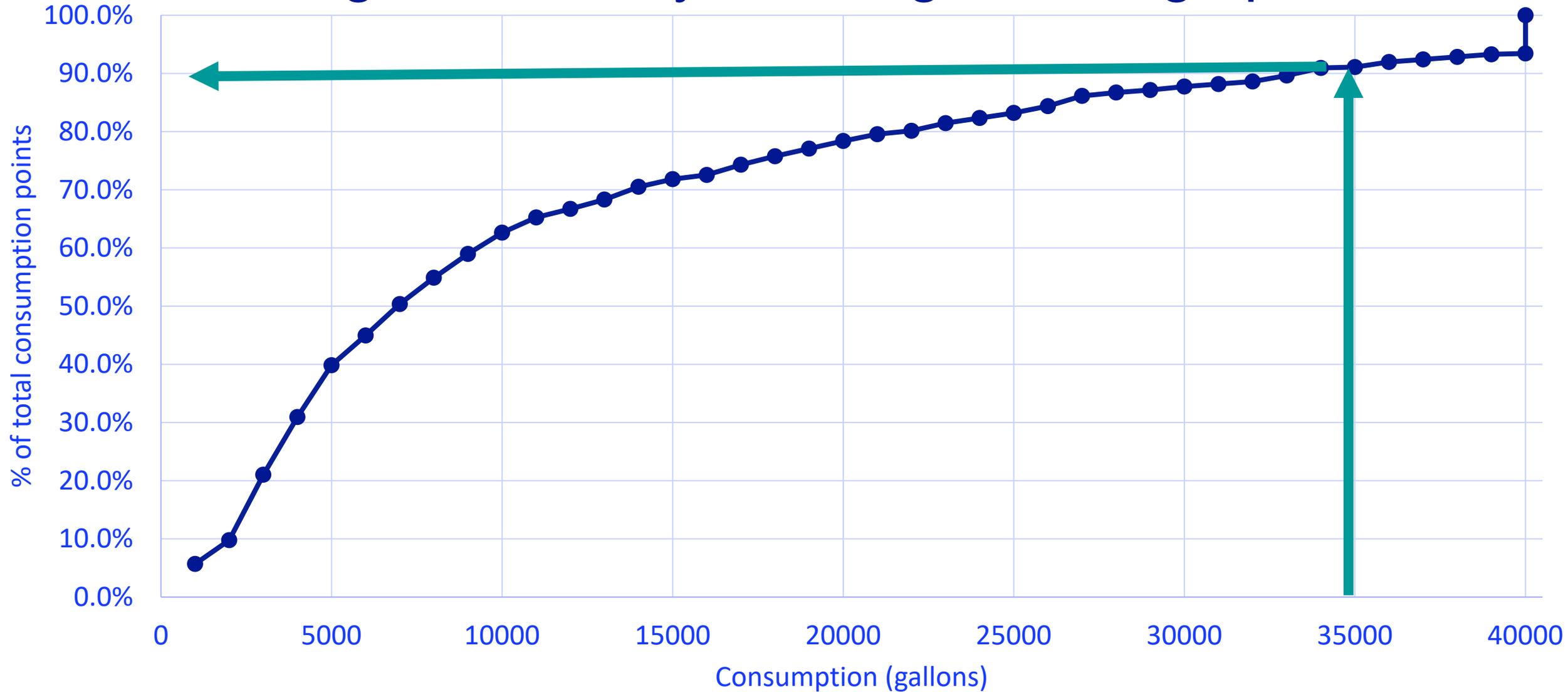


# Percentage of Monthly Readings at Usage points





# Percentage of Monthly Readings at Usage points





# 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

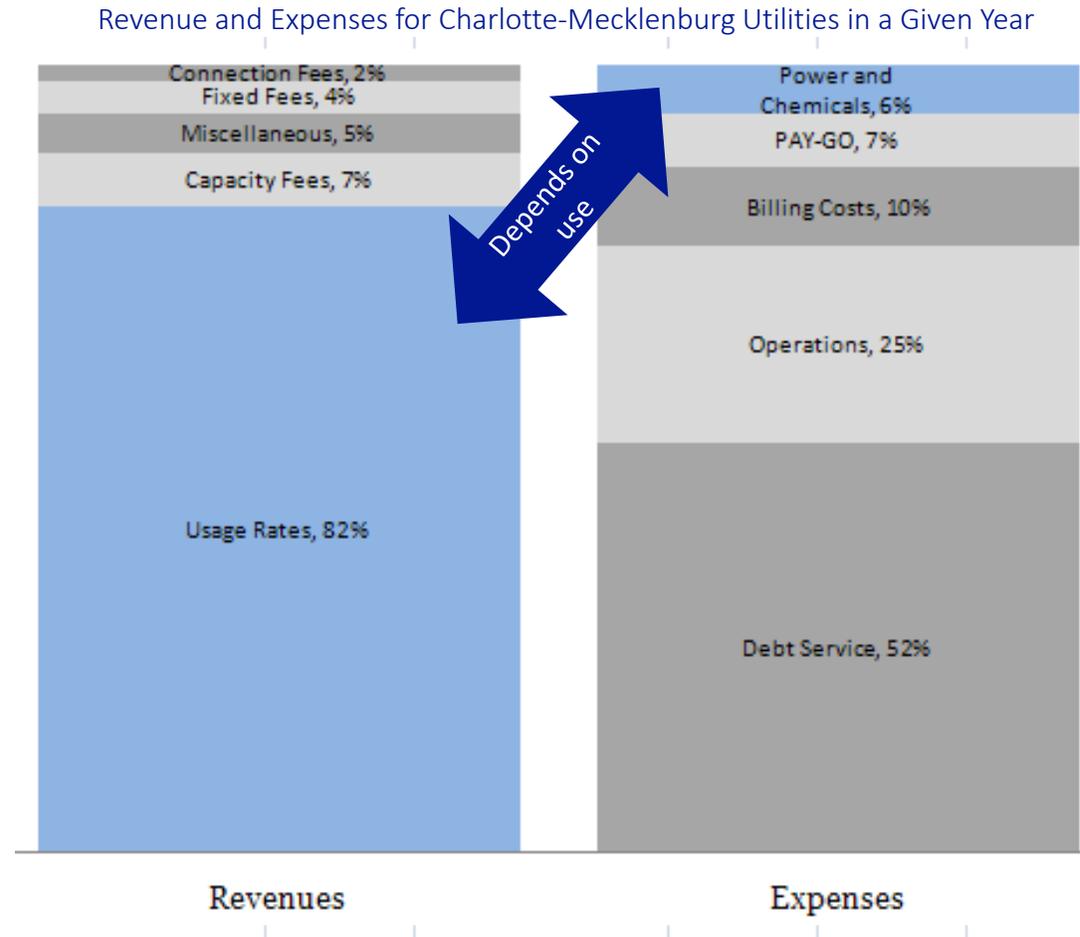


# Fixed vs. Variable Revenues

- Variable revenues are 100% dependent on the volume of use:
  - The volumetric rates
- Fixed revenues do not depend on volume of use in the short-term:
  - Base (minimum) charges, flat fees, penalties and charges, connection fees, etc.

# How Rates and Use Interact

Utilities' costs are mostly fixed, not dependent on the amount of volume billed to customers. But most revenues come from the amount of billed wastewater. If demand decreases, revenues drop significantly but not costs.



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

## Important

Avoid maintaining low rates at the expense of your utility's financial health.

It may either lead to the need for a sudden, massive rate increase in the future or to failing systems and endangered public health.



# A Few Scenarios

## Keep in mind:

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

## Avoid:

Comparing to utilities that are not similar

Comparing to only a few utilities

Comparing only one bill amount

Comparing nothing besides rates

- pressure to keep rates low ...

- ... regardless of financial condition of utility

- ignores customers' ability to pay

- ignores price signals and utility's policies

Showing the starting point of discussion – each utility would then have to evaluate and tailor rate structure according to own conditions.



## Scenario: Small System with 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 System with Regional Treatment Works Wholesale

*High variable costs, small number of customers*

- Lower base charges (sufficient to pay off the monthly fixed/minimum charge to the wholesale utility plus at least most of own fixed costs),
- No consumption allowance (unless included by the wholesale 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: Wastewater 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.

*Warning: No one rate structure design fits all utilities, even in this scenario.*



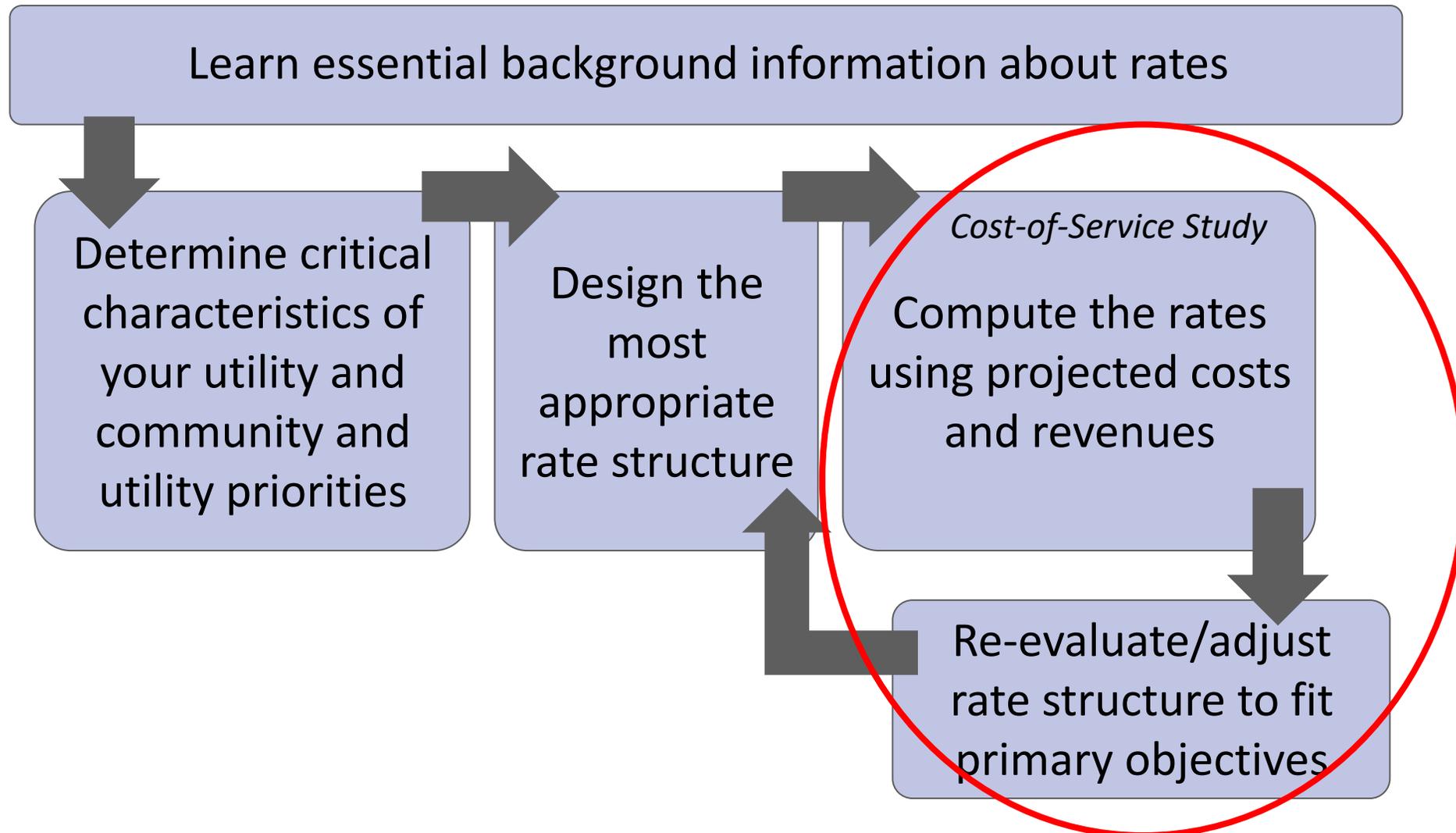
## Scenario: Have Highly Seasonal Demands

*Resorts, second home communities, etc.*

- Charge a base charge year-round
- Consider seasonal rate structure: higher rates during high season(s)

*Warning: No one rate structure design fits all utilities, even in this scenario.*

# The Process of Setting Rates





# Compute the Rates

- Assess your budgeted expenses and allocate them to different customer groups
- Assess usage patterns and accounts in each of the customer groups
- Attempt to charge rates that would generate revenues from each customer group that is proportional to their allocated expenses
- Resources available



# 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?



# Re-evaluate the Proposed Rate Structure

- ✓ 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?



# Irvindale, USA Exercise

Small town with a water and wastewater system

Population: 1,100



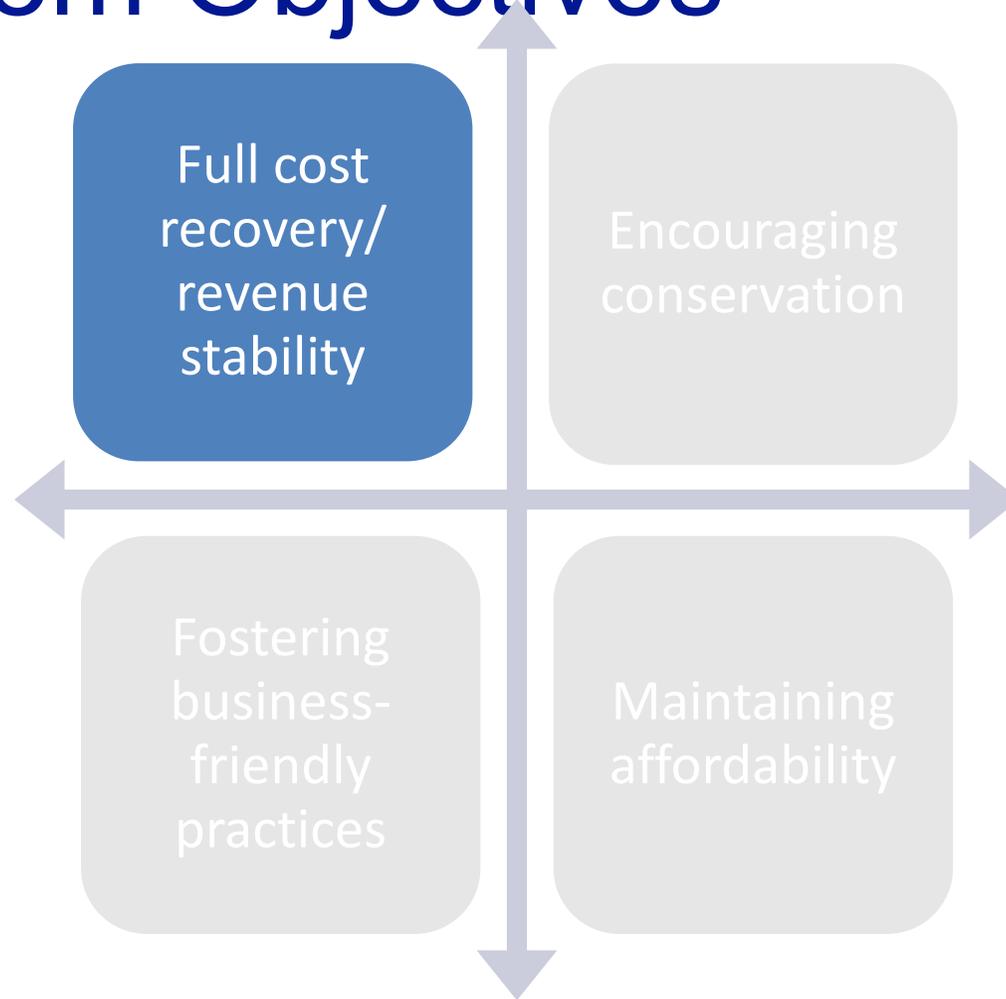
Service Connections: 450



MHI: \$24,432



# Water System Objectives





# 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



## 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.

# 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 SEWERAGE



# 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 Annual Bill*

*Total Accounts*

*Monthly Bill*



# 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

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

*Total Needed Revenue*

*Total Gallons Sold*

*Price per 1,000 Gallons*



# 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



# 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

$$\frac{\$292,045}{450} = \frac{\$648.99}{12} = \$54.08$$

*Fixed Annual Costs* / *Total Accounts* = *Total Annual Bill* / *12* = *Monthly Base Bill*

---

$$\frac{\$52,400}{32,877,590} \times 1,000 = \$1.59$$

*Variable Annual Costs* / *Total Gallons Sold* × 1,000 = *Price per 1,000 Gallons*



# 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

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

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

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



# How This Impacts Customers



1,000 gallons/month



4,000 gallons/month



12,000 gallons/month



34,000 gallons/month

# 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



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

Will they generate \$344,445 next

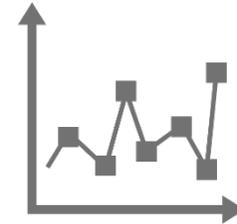
Most probably not



What causes variation in YOUR revenue?

# What causes variation?

- Rate Changes
- Population Change
- Loss of a Big Customer
- Economic Conditions
- Changes in collection rates
- Weather
- Water use restrictions
- Technology





# 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

## Important

Avoid maintaining low rates at the expense of your utility's financial health.

It may either lead to the need for a sudden, massive rate increase in the future or to failing systems and endangered public health.



# Additional considerations

- Best practice to tie rates and fees to cost of service; e.g. charging for fire protection at large institutions, charging extra for wastewater treatment of commercial customers
- Base charges provide stable revenue
- Examine fees and charges regularly to ensure they reflect cost recovery, too.



# Break

5 minutes!



# Equity Considerations

Different options for including affordability in rates and rate structures

# Rate Structures + Affordability

- Rates Analysis Tool; consumption data from small system
- Keep total revenue consistent

		Base % increase							
		5%	5%	5%	5%	5%			
		Volumetric % increase							
		5%	5%	5%	5%	5%			
Rate Structure(s)	Fiscal Year:	2020	FY2021	FY2022	FY2023	FY2024	FY2025		
	Existing		New						
<b>Rate Structure 1:</b>	<b>5/8 by 3/4 Single Family</b>								
Monthly Base Charge:		\$17.04	\$17.89	\$18.79	\$19.73	\$20.71	\$21.75		
Consumption allowance included with the base charge (gallons/month):									
	<i>Block Start:</i>		<i>Block End:</i>						
Block rate 1 (\$/1,000 gal)	- gal/mo	7,480	gal/mo	\$2.45	\$2.57	\$2.70	\$2.84	\$2.98	\$3.13
Block rate 2 (\$/1,000 gal)	- gal/mo		gal/mo						
Block rate 3 (\$/1,000 gal)	- gal/mo		gal/mo						
Block rate 4 (\$/1,000 gal)	- gal/mo		gal/mo						
Block rate 5 (\$/1,000 gal)	- gal/mo		gal/mo						
Block rate 6 (\$/1,000 gal)	- gal/mo		gal/mo						
Block rate 7 (\$/1,000 gal)	- gal/mo		gal/mo						
Block rate 8 (\$/1,000 gal)	- gal/mo		gal/mo						
Block rate 9 (\$/1,000 gal)	- gal/mo		gal/mo						
Final block rate (\$/1,000 gal)	7,481 gal/mo	and beyond		\$3.86	\$4.05	\$4.26	\$4.47	\$4.69	\$4.93

Monthly Consumption that was Charged Volumetric Rate	
All Volume Above Consumption Allowance in FY2020, by Block	
<a href="#">See example of how to determine volumes by blocks</a>	
<b>5/8 by 3/4 Single Family</b>	
	Gallons/month in FY2020
Block 1 sales	6,691,574
Final block sales	1,440,062
Total:	8,131,637

[Back to top](#)



# Rate Structures + Affordability

- Consumption allowance
- Changing block charges
- Incorporating customer classes



# Rate Structures + Affordability

Base rate: \$20.00

Volumetric rate: \$6.00/thousand gallons

Total revenue: \$1.45 mil/year

2,052 connections

# Consumption Allowance

- Included in the base rate
- Also called “lifeline rate”

	Base	Volumetric
No consumption allowance	\$20	\$6/kgal
2,000 allowance	\$25	\$6.83/kgal
4,000 allowance	\$30	\$7.95/kgal

# Consumption Allowance

	Base	Volumetric	2,000	5,000	12,000	20,000
No allowance	\$20	\$6/kgal	\$32.00	\$50.00	\$92.00	\$140.00
2,000 allowance	\$25	\$6.83/kgal	\$25.00	\$45.49	\$93.30	\$147.94
4,000 allowance	\$30	\$7.95/kgal	\$30.00	\$37.95	\$93.60	\$157.20

# Consumption Allowance

	Base	Volumetric	2,000	5,000	12,000	20,000
No allowance	\$20	\$6/kgal	\$32.00	\$50.00	\$92.00	\$140.00
2,000 allowance	\$25	\$6.83/kgal	\$25.00 -21%	\$45.49 -9%	\$93.30 +1.4%	\$147.94 +5.7%
4,000 allowance	\$30	\$7.95/kgal	\$30.00 -6%	\$37.95 -25%	\$93.60 +1.7%	\$157.20 +12.3%

# Consumption Allowance

	Base	Volumetric	2,000	5,000	12,000	20,000
No allowance	\$20	\$6/kgal	\$32.00	\$50.00	\$92.00	\$140.00
2,000 allowance	\$25	\$6.83/kgal	\$25.00 -21%	\$45.49 -9%	\$93.30 +1.4%	\$147.94 +5.7%
4,000 allowance	\$30	\$7.95/kgal	\$30.00 -6%	\$37.95 -25%	\$93.60 +1.7%	\$157.20 +12.3%

# Consumption Allowance

	Base	Volumetric	2,000	5,000	12,000	20,000
No allowance	\$20	\$6/kgal	\$32.00	\$50.00	\$92.00	\$140.00
2,000 allowance	\$25	\$6.83/kgal	\$25.00 -21%	\$45.49 -9%	\$93.30 +1.4%	\$147.94 +5.7%
4,000 allowance	\$30	\$7.95/kgal	\$30.00 -6%	\$37.95 -25%	\$93.60 +1.7%	\$157.20 +12.3%

# Consumption Allowance

	Base	Volumetric	2,000	5,000	12,000	20,000
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# Consumption Allowance

	Base	Volumetric	2,000	5,000	12,000	20,000
No allowance	\$20	\$6/kgal	\$32.00	\$50.00	\$92.00	\$140.00
2,000 allowance	\$25	\$6.83/kgal	\$25.00 -21%	\$45.49 -9%	\$93.30 +1.4%	\$147.94 +5.7%
4,000 allowance	\$30	\$7.95/kgal	\$30.00 -6%	\$37.95 -25%	\$93.60 +1.7%	\$157.20 +12.3%



# Increasing block rates

	Base	Volumetric
Uniform block	\$20	\$6/kgal
Increasing block	\$20	0-2k: \$4.50 2-6k: \$5.40 6-12k: \$6.50 Over 12k: \$7.50
Even more increasing block	\$20	0-2k: \$3.00 2-5k: \$4.75 5-12k: \$6.50 Over 12k: \$9.15



# Increasing block rates

	Base	Volumetric	2,000	5,000	12,000	20,000
Uniform	\$20	\$6/kgal	\$32.00	\$50.00	\$92.00	\$140.00
Increasing	\$20	\$4.50- \$7.50/kgal	\$29.00 -9.4%	\$45.20 -9.6%	\$89.60 -2.6%	\$149.60 +6.9%
Even more increasing	\$20	\$3.00- \$9.15/kgal	\$26.00 -18.8%	\$40.25 -19.5%	\$84.00 -8.7%	\$157.20 +12.3%



# Customer Classes

	Base	Volumetric
Residential	\$18.65	\$5/kgal
Nonresidential	\$25.00	\$7/kgal

# Customer Class

	Base	Volumetric	2,000	5,000	12,000	20,000
One class	\$20	\$6/kgal	\$32.00	\$50.00	\$92.00	\$140.00
Residential	\$18.65	\$5/kgal	\$28.65 -10.4%	\$43.65 -12.7%	\$78.65 -14.5%	\$118.65 -15.3%
Nonresidential	\$25	\$7/kgal	\$39.00 +22%	\$60.00 +20%	\$109.00 +18.5%	\$165 +17.9%



## Rate Structures key takeaways:

- There are many paths to the same revenue requirement
- Let your rate setting objectives be your guide
- No 2 utilities are the same—compare with caution!
- Make sure you meet your revenue requirement



# Water Affordability Self Assessment (WASA) tool

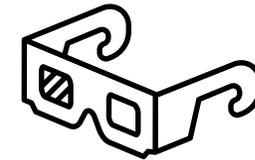
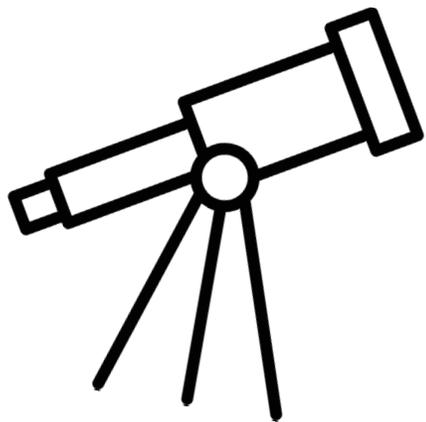
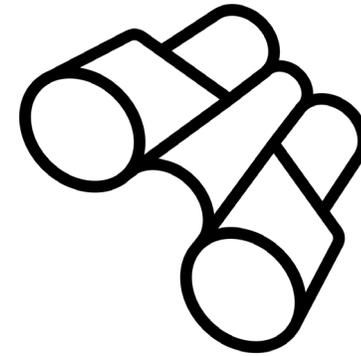
Input different rate structures, see impact on  
customers in a geographic location

[See previous webinar's recording: minutes 1:10-1:17](#)

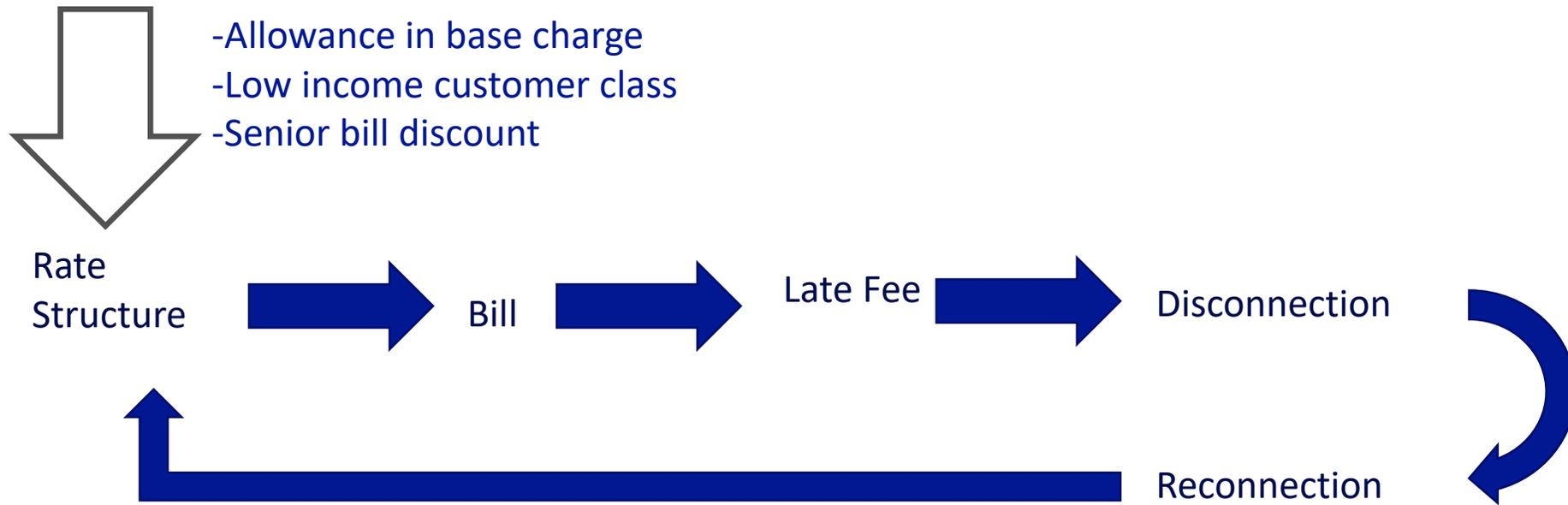


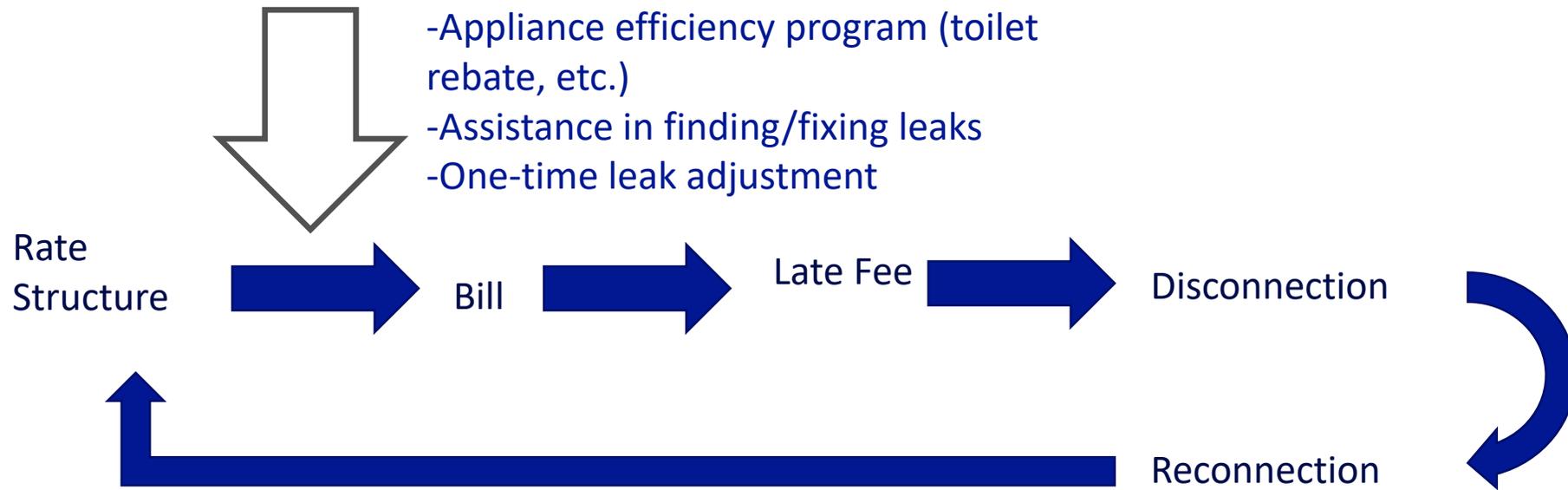
# **Beyond the rate structure**

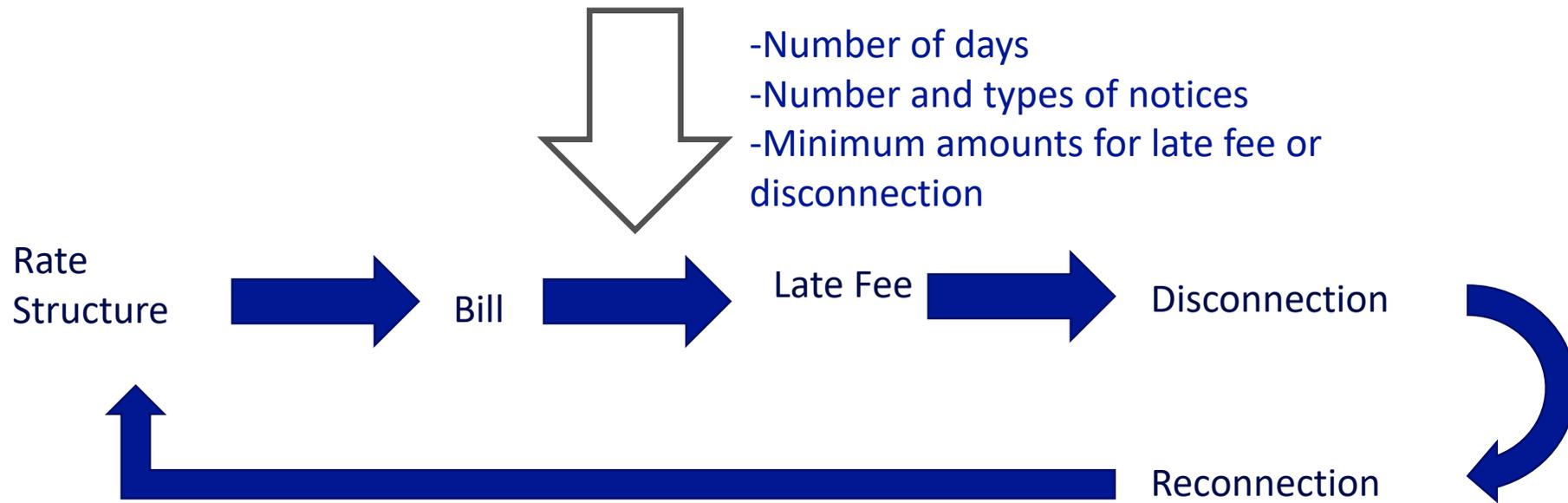
Affordability considerations for policies and procedures

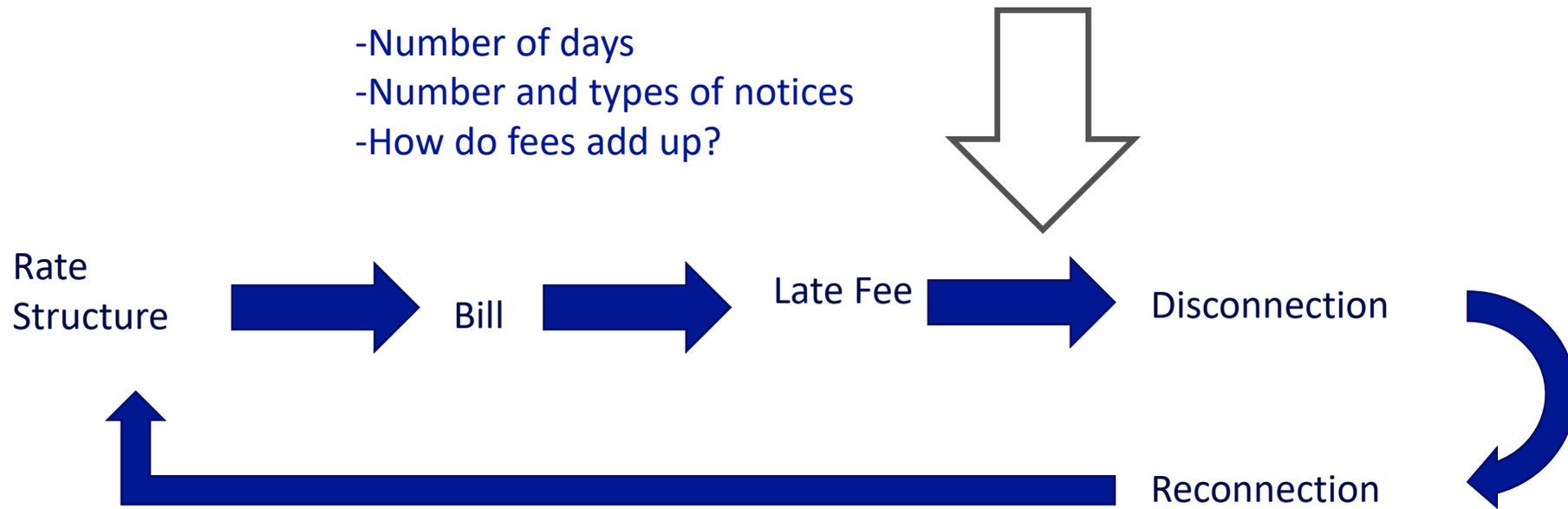


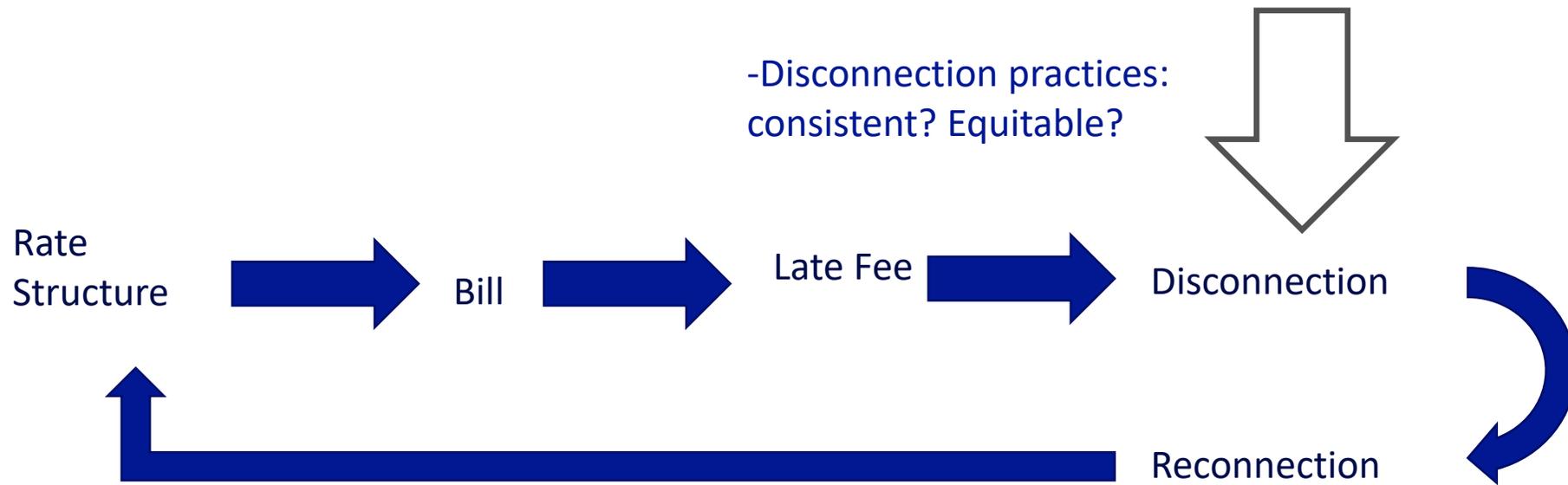
## Policies and practices: beyond the rate structure





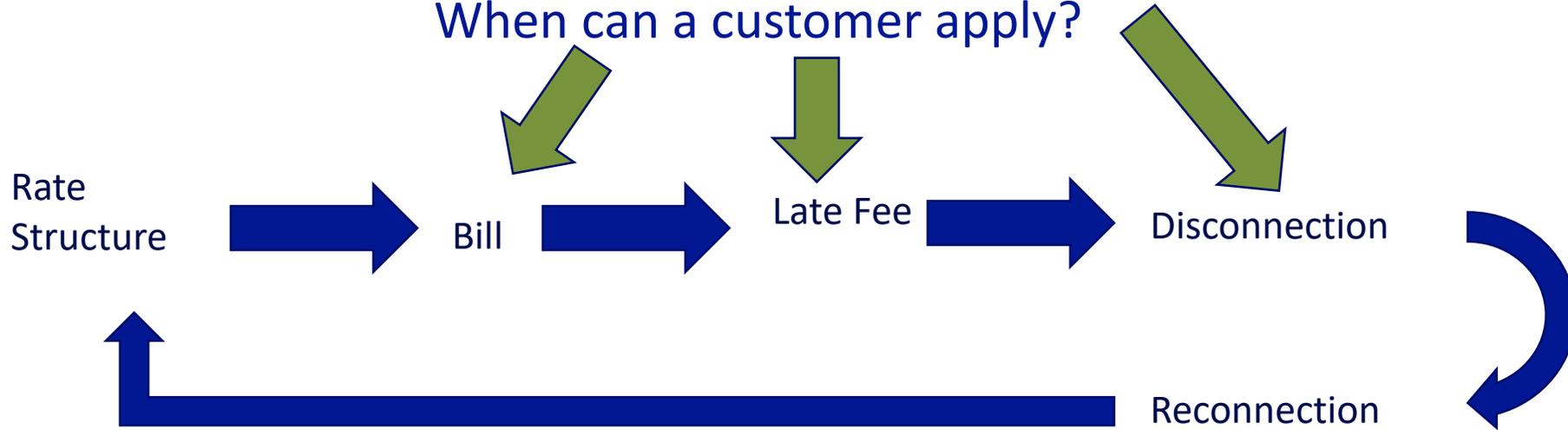








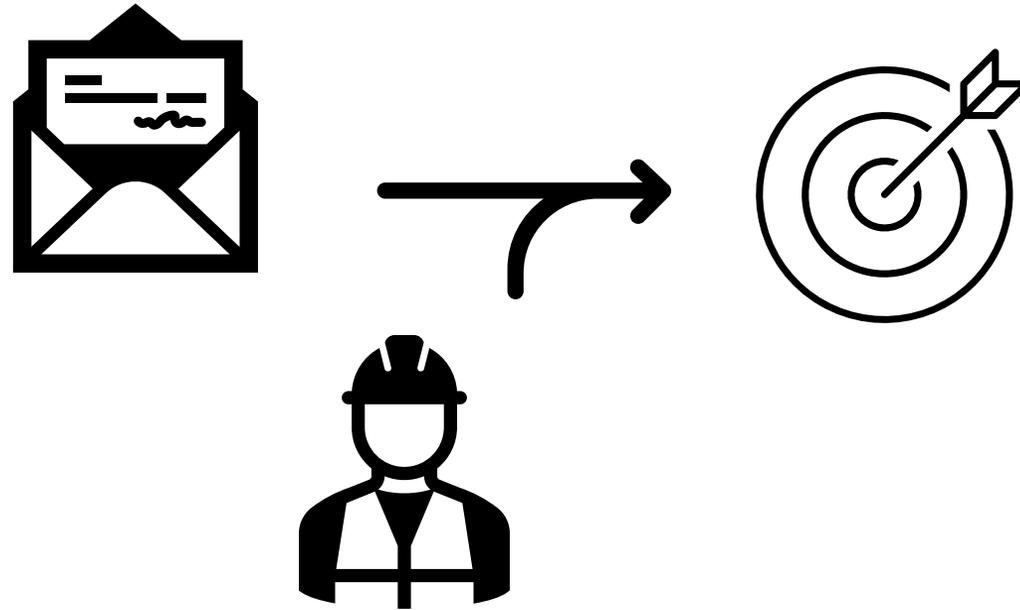
Bill payment assistance program?  
When can a customer apply?





What about this process?  
Can you target communication to customers who usually  
get disconnected?

Policies and practices:







**Q and A**



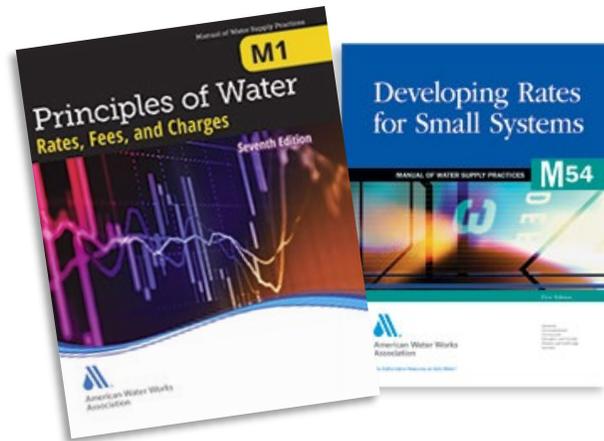
# **Additional Rate Setting Resources**

# 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>



# **Free Assistance and Resources to Small Water Systems by the Environmental Finance Center Network**

**The Environmental Finance Center at UNC-CH offers free one-on-one technical assistance for systems providing drinking water for up to 10,000 people and wastewater services for up to 1 million gallons per day.**



**FINANCIAL HEALTH CHECK UP**

Get a snapshot of your utility's financial health and demonstrate the strengths and weaknesses of your utility over the last 5 years.



**AFFORDABILITY ASSESSMENT**

Assess how affordable rates are to your customer base using multiple metrics.



**RATES ANALYSIS MODEL**

Review your rates to ensure projected revenues cover projected expenses and keep the utility financially self sufficient.



**FUNDING ASSISTANCE**

We can help explore the American Rescue Plan Act (ARPA) and other potential funding opportunities at the state and national levels.



**PAYMENT PLAN ASSISTANCE**

We can provide guidance and do a cost assessment for Customer Assistance Programs.



**PARTNERSHIP GUIDANCE**

We can help you explore options and guide you through considerations for partnerships to enhance your system's stability and resiliency.

**WEBINARS and ASSISTANCE in partnership with [the EFC Network](#)**

As part of a nationwide network, we provide trainings and webinars geared for Small Systems. View options and [sign up here](#).

Our EFC network partners can also provide assistance with asset management, compliance and reporting, water loss management, and energy management.



**INTERESTED IN GETTING  
STARTED?**

**CONTACT US**

Evan Kirk  
[emkirk@sog.unc.edu](mailto:emkirk@sog.unc.edu)

Elsemarie Mullins  
[mullins@sog.unc.edu](mailto:mullins@sog.unc.edu)

# Financial Health Checkup for Water Utilities

<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 track and benchmark financial performance metrics for your water/sewer fund in the past 5 years

## Financial Health Checkup for Water Utilities



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



A resource for water systems through the Environmental Finance Center Network's Smart Management for Small Water Systems project, funded under a cooperative agreement with the U.S. Environmental Protection. <http://efcnetwork.org>

### What does this tool do?

This tool assists in the assessment of the financial performance of a water (and/or wastewater) utility fund. Financial data readily available in annual financial statements are copied into this tool, which computes key financial indicators that measure a variety of important metrics, such as the ability to pay debt service, availability of cash to pay for operations and maintenance, the sufficiency of revenues generated, etc. Each metric is color-coded for the user. The tool demonstrates the financial strengths and weaknesses of the utility fund in the past 5 years.

### Features:

- Simple data entry (uses data already reported in your audited financial statements)
- 6 financial performance indicators with explanations
- Set your own targets
- Assessment of last year's financial ratios, improvements since previous year, and five-year trends
- Guided navigation through hyperlinked images

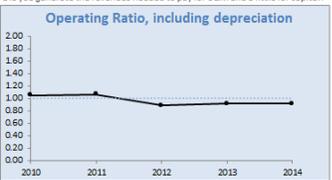
### What are financial indicators?

Watch a whiteboard video explaining financial performance indicators in lay terms.



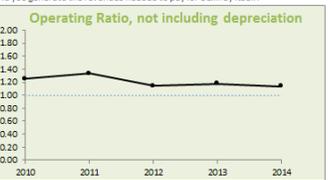
### Assessment for Town of Anywhere

Did you generate the revenues needed to pay for O&M and a little for capital?



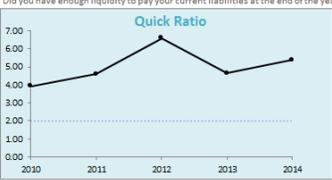
Year	Operating Ratio, including depreciation
2010	1.00
2011	1.05
2012	0.95
2013	0.95
2014	0.95

Did you generate the revenues needed to pay for O&M by itself?



Year	Operating Ratio, not including depreciation
2010	1.25
2011	1.35
2012	1.15
2013	1.15
2014	1.15

Did you have enough liquidity to pay your current liabilities at the end of the year?



Year	Quick Ratio
2010	4.00
2011	4.50
2012	6.50
2013	4.50
2014	5.50

How many days could you continue to operate the utility with the cash levels available?



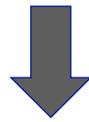
Year	Days Cash on Hand
2010	400
2011	550
2012	450
2013	450
2014	400

# Financial Health Checkup for Water Utilities

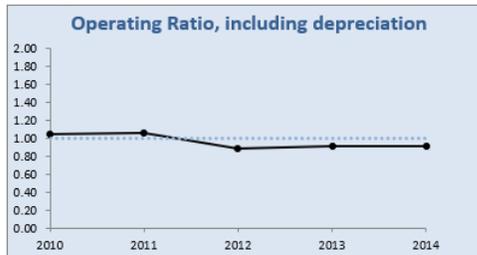
## Key Field in the financial statement/CAFR

- [1] Total Operating Revenues
- [2] Total Operating Expenses
- [3] Depreciation & Amortization Expenses
- [4] Debt Principal Payments
- [4b] Debt Interest Payments
- [5] Current Assets, excluding inventories, restricted cash, prepaids
- [6] Current Liabilities, excluding deposits & bond anticipation notes
- [7] Unrestricted Cash & Investments
- [8] Total Accumulated Depreciation
- [9] Total Depreciable Capital Assets

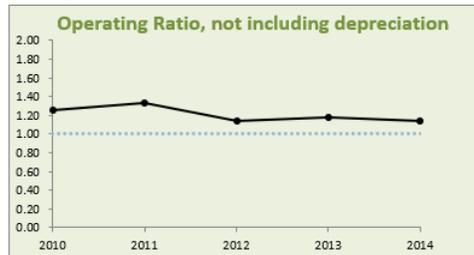
	Fiscal Year End					Instructions
	2010	2011	2012	2013	2014	
[1] Total Operating Revenues	\$ 2,341,857	\$ 2,556,399	\$ 2,271,777	\$ 2,334,236	\$ 2,501,286	Enter as shown in the Total Operating
[2] Total Operating Expenses	\$ 2,229,208	\$ 2,403,938	\$ 2,565,282	\$ 2,555,504	\$ 2,740,266	Enter as shown in the Total Operating
[3] Depreciation & Amortization Expenses	\$ 362,047	\$ 490,007	\$ 569,998	\$ 568,179	\$ 534,000	Depreciation and amortization are listed
[4] Debt Principal Payments	\$ 185,000	\$ 279,242	\$ 333,558	\$ 132,742	\$ 436,459	Enter \$0 if there were no debt service payments
[4b] Debt Interest Payments	\$ 84,859	\$ 81,330	\$ 72,808	\$ 71,620	\$ 55,535	Enter \$0 if there were no debt service payments
[5] Current Assets, excluding inventories, restricted cash, prepaids	\$ 2,986,691	\$ 3,565,601	\$ 3,266,234	\$ 3,050,573	\$ 2,941,629	Total Current Assets minus all inventoried
[6] Current Liabilities, excluding deposits & bond anticipation notes	\$ 757,776	\$ 776,266	\$ 495,555	\$ 656,257	\$ 547,019	Total Current Liabilities minus all refund
[7] Unrestricted Cash & Investments	\$ 1,961,851	\$ 2,883,569	\$ 2,411,154	\$ 2,273,697	\$ 2,415,013	Unrestricted Cash & Investments (and
[8] Total Accumulated Depreciation	\$ 5,125,329	\$ 5,520,510	\$ 7,661,024	\$ 8,229,207	\$ 8,763,207	Total accumulated depreciation on capital
[9] Total Depreciable Capital Assets	\$ 17,221,067	\$ 17,144,542	\$ 18,697,849	\$ 18,744,028	\$ 18,854,157	Enter the total value of capital assets listed



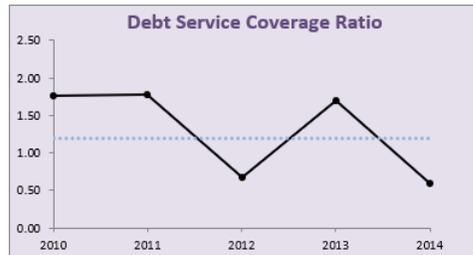
Did you generate the revenues needed to pay for O&M and a little for capital?



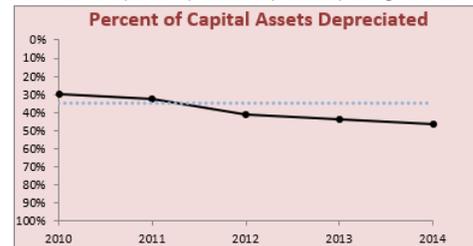
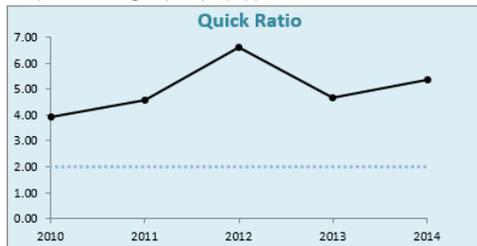
Did you generate the revenues needed to pay for O&M by itself?



Did you generate the revenues needed to pay for O&M and existing debt service?



Did you have enough liquidity to pay your current liabilities at the end of the year? How many days could you continue to operate the utility with the cash levels available? How much have your utility's assets depreciated (nearing the end of their lives)?



# 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

**Water & Wastewater Rates Analysis Model**  
Version 2.8.2 (last updated August 4, 2015)

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

**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  
Model changes to accounts and water use  
Compare monthly bills under new rates vs. existing rates  
Up to 12 rate structures  
Customizable list of operating and capital expenses  
Error notifications  
Uniform or block rates (up to 10 blocks)  
Building up reserves through rates  
Assess revenue sufficiency and fund balance

**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

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

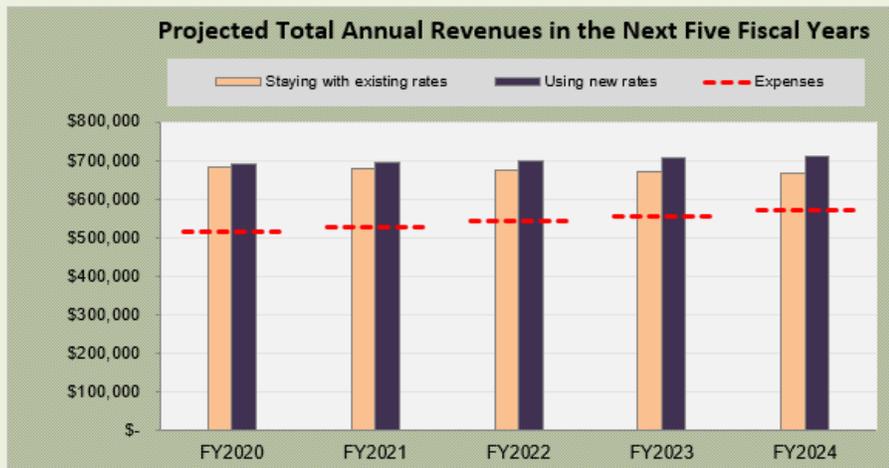
Year	2015	2016	2017	2018	2019	2020
Existing	\$13.00	\$13.00	\$13.00	\$17.00	\$20.00	\$21.00
New	7.00	7.00	7.00	7.00	7.00	7.00

Block End	4,000 gpm/mo	7,000 gpm/mo	10,000 gpm/mo	13,000 gpm/mo	16,000 gpm/mo	19,000 gpm/mo
Existing	\$2.78	\$2.78	\$2.78	\$3.00	\$3.50	\$4.00
New	\$4.00	\$4.00	\$4.00	\$5.00	\$5.00	\$5.00
Existing	\$6.00	\$6.50	\$7.00	\$8.00	\$9.00	\$9.00
New						



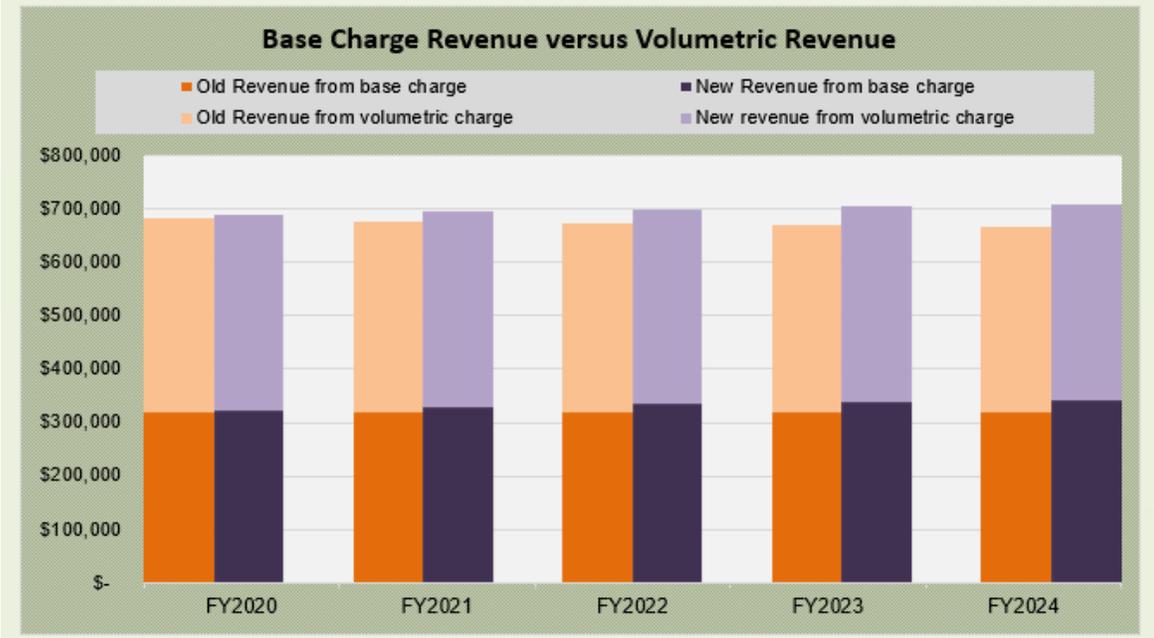
# Water and Wastewater Rates Analysis Model

## Outputs



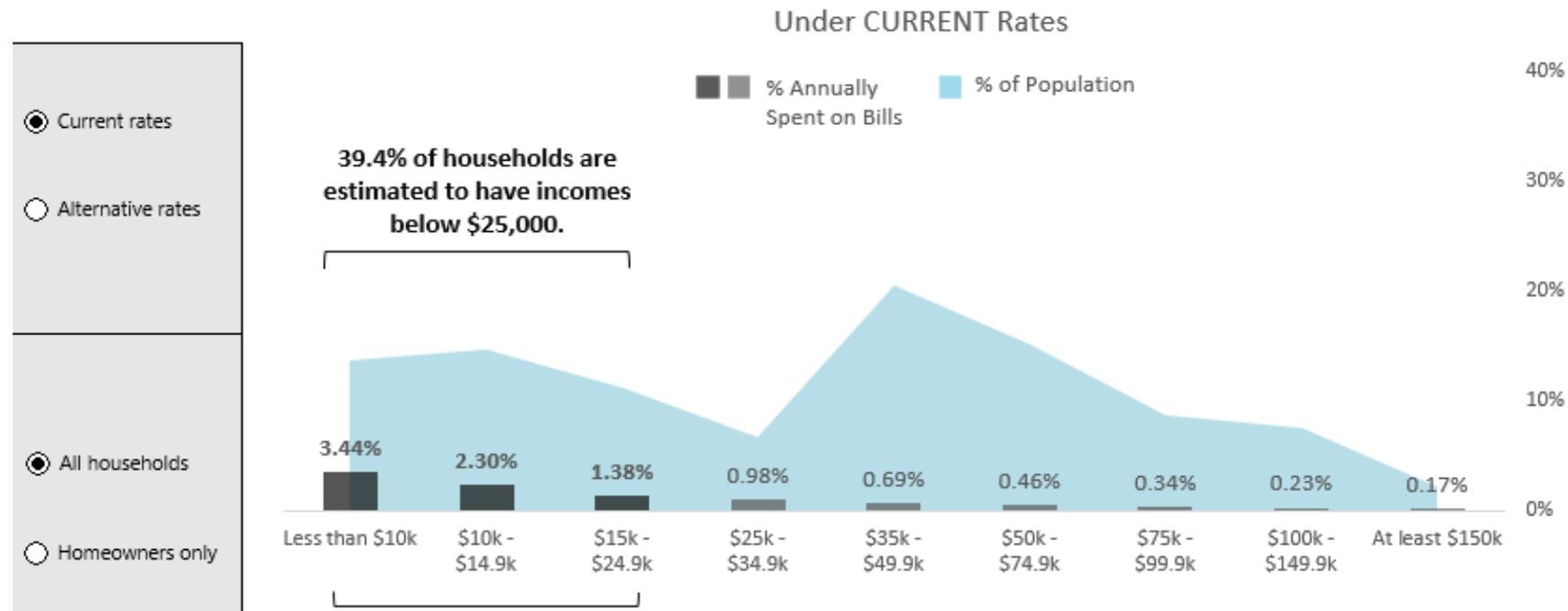
	FY2020	FY2021	FY2022	FY2023	FY2024
Net revenues without changing rates (existing rates)	\$166,199	\$149,665	\$132,780	\$115,532	\$97,909
Net revenues after changing rates (new rates)	\$174,771	\$166,844	\$158,602	\$150,036	\$139,817
<b>Net Revenues Gained (Lost) Using the New Rates</b>	<b>\$8,572</b>	<b>\$17,178</b>	<b>\$25,822</b>	<b>\$34,504</b>	<b>\$41,908</b>

If we stay with our existing rates, how much of our revenues will from fixed (base) charges, and how much will be from volumetric charges? If we change our rates, how will that affect the revenues from both fixed and volumetric charges?



# Residential Rates Affordability Assessment Tool

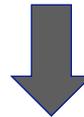
Affordability of Water Rates Assessed at 4000 Gallons/Month and the 2017 Income Levels



39.4% of residential customers are estimated to have had less than \$25,000 in annual income. These households will have spent more than 1.38% of their income under the current rates for water bills at 4000 gallons/month. 13.6% of households will have spent more than 3.44% of their income. However, a substantial number of low-income households may be living in rental homes and apartments and do not pay water bills, which may be included in their rent.

# Plan to Pay: Scenario to Fund Your Capital Improvement Plan

CAPITAL IMPROVEMENT PROJECTS - 20 YEARS		Project Construction Start Year	Project Expenditure/Construction Period (years)	Estimated Construction Cost ...		Annual Construction Cost Inflation Factor (%/year)	Expected Grants at Time of Construction	Financing Mechanism: Debt Financing or Capital Reserves?	Term of Debt (years)	Interest Rate Charged for Debt (%/year)	First Year of Capital Reserve Allocation	Additional Annual O&M Costs (\$/year)
▼ List all known projects for the next 20 years ▼		▼ Select here to sort by year ▼	▼	In the Start Year ... ▼	▼ Today (i.e. in FY18 ▼	▼	▼	▼	▼	▼	▼	▼
1	Project 1 - type in name or description	FY27	2	\$ 2,000,000			\$ 100,000	Capital Reserves			FY22	\$ 2,500
2	Project 2 - debt financed portion	FY21	3		\$ 2,200,000	2.8%	\$ -	Debt Financing	15	5.00%		\$ 10,000
3	Project 2 - capital reserves financed portion	FY21	3	\$ 500,000			\$ -	Capital Reserves			FY21	\$ -
4	Project 3 - immediate project. Start new year	FY19	1		\$ 350,000	2.0%	\$ -	Capital Reserves			FY19	\$ 1,500
5	Project 4 - energy efficiency reduces O&M	FY29	5		\$ 3,500,000	2.8%	\$ -	Debt Financing	20	2.50%		\$ (250,000)
6												
7												

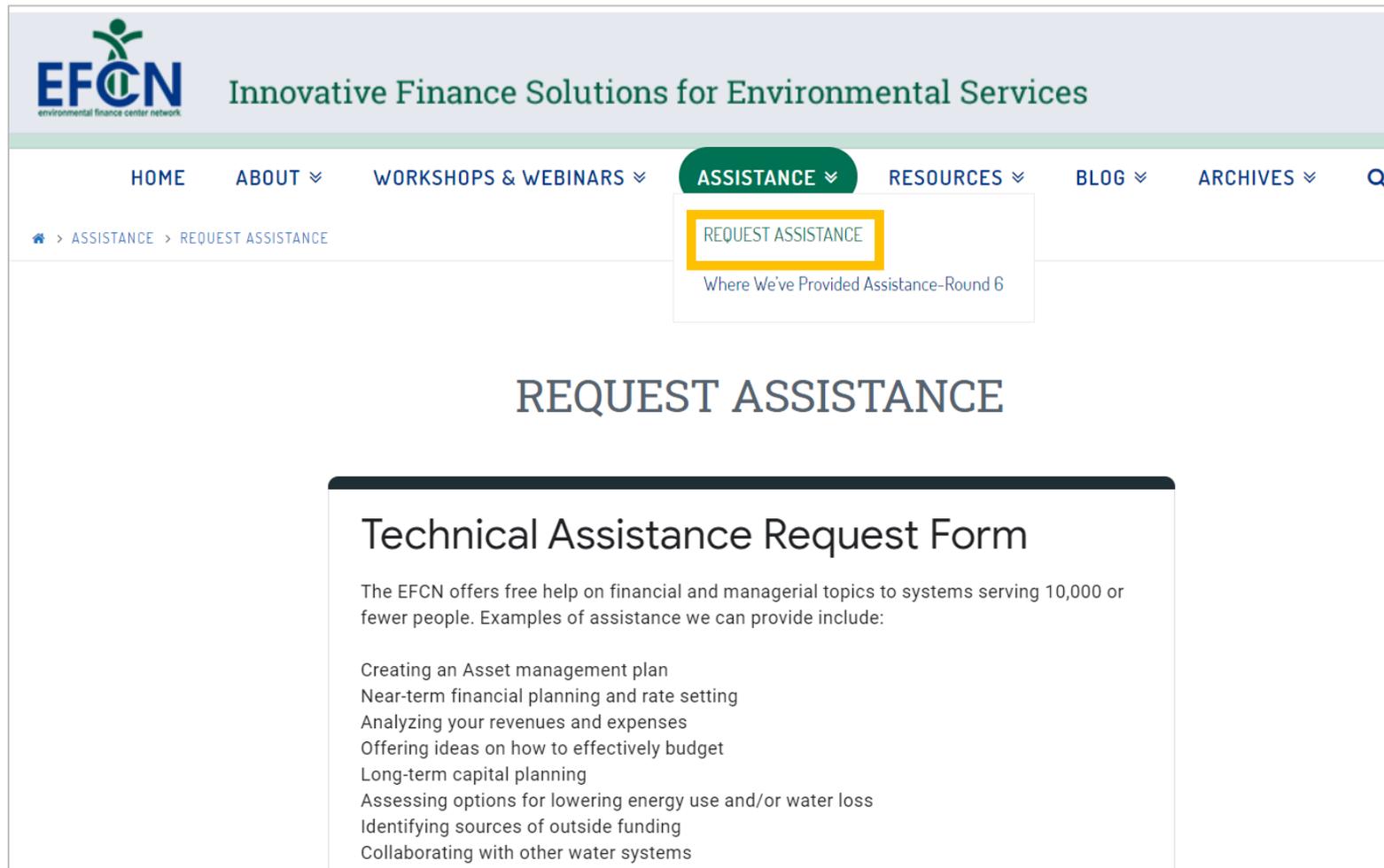


Project cost in the start year net of grants	Number of years before project starts	Years of construction	Year payments end	Yearly allocations to reserves for capital reserve-financed projects	Number of years allocating to reserves for capital reserve-financed projects	Annual payment: debt service if debt-financed or cash payments during construction years if capital reserve-financed
\$ 1,900,000	9	FY27-FY28	FY28	\$ 316,667	6	\$ 950,000
\$ 2,390,023	3	FY21-FY23	FY35			\$ 230,260
\$ 500,000	3	FY21-FY23	FY23	\$ 500,000	1	\$ 166,667
\$ 357,000	1	FY19	FY19	\$ 357,000	1	\$ 357,000
\$ 4,742,336	11	FY29-FY33	FY48			\$ 304,207

# Request Technical Assistance

<http://efcnetwork.org>

Select “Request Assistance” under the Assistance Tab off the EFCN homepage to access and submit the TA request form electronically.



The screenshot shows the EFCN website homepage with the 'ASSISTANCE' menu item highlighted in green. A dropdown menu is open under 'ASSISTANCE', with 'REQUEST ASSISTANCE' highlighted in yellow. Below the dropdown, the breadcrumb trail reads 'HOME > ASSISTANCE > REQUEST ASSISTANCE'. The main heading is 'REQUEST ASSISTANCE'. Below this, a box titled 'Technical Assistance Request Form' contains the following text:

The EFCN offers free help on financial and managerial topics to systems serving 10,000 or fewer people. Examples of assistance we can provide include:

- Creating an Asset management plan
- Near-term financial planning and rate setting
- Analyzing your revenues and expenses
- Offering ideas on how to effectively budget
- Long-term capital planning
- Assessing options for lowering energy use and/or water loss
- Identifying sources of outside funding
- Collaborating with other water systems



SCHOOL OF GOVERNMENT  
Environmental Finance Center

# Thank you!

Elsemarie Mullins  
Project Director  
[mullins@sog.unc.edu](mailto:mullins@sog.unc.edu)

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





Smart Management for  
Small Water Systems

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



SCHOOL OF GOVERNMENT  
Environmental Finance Center



*This program is made possible under a cooperative agreement with the US EPA.*