

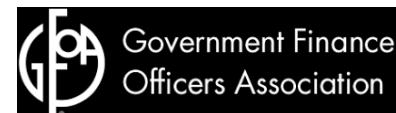


Smart Management for  
Small Water Systems

# Financial Viability for Water Systems: Dealing with Declining Customers or Demands

October 29, 2018 | Asheville, NC

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



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



# Workshop Objectives

- Discover the extent to which water systems have declining demands
- Understand the effects of declining demands on water systems' Enterprise Funds
- Learn strategies to mitigate the financial effects of losing customers/demand
- Provide forum for sharing perspectives, ideas, and experiences



SCHOOL OF GOVERNMENT

Environmental Finance Center



Dedicated to enhancing the ability of governments and other organizations to provide environmental programs and services in fair, effective and financially sustainable ways.

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



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Senior Project Director

Environmental Finance Center

UNC School of Government

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# Introductions

1. Name
2. Organization
3. Responsibility
4. Related issue(s) your water system is dealing with
5. Any questions you'd like us to address



# Thanks! And Housekeeping Items...

Thanks to the Land of Sky Regional Council  
for hosting us!





## **About the Environmental Finance Center Network (EFCN)**

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

## **The Smart Management for Small Water Systems Program**

This program is offered free of charge to all who are interested. The Program Team will conduct activities in every state, territory, and the Navajo Nation. All small drinking water systems are eligible to receive free training and technical assistance.

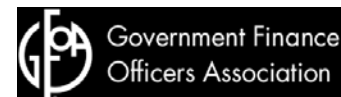
## **What We Offer**

Individualized technical assistance, workshops, small group support, webinars, eLearning, online tools & resources, blogs



# The Small Systems Program Team

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





# Areas of Expertise



Asset Management



Rate Setting and Fiscal Planning



Communication and Decision-Making Strategies



Water Loss Control



Controlling Energy Costs



Accessing Infrastructure Financing Programs



Workforce Development



Water Conservation Finance and Management



Collaborating with Other Water Systems



Resiliency Planning



Managing Drought



# Agenda

1. Trends in populations and customer demands in NC
2. Financial impacts of declining populations and demands on utilities
3. How to determine your community's trends and revenue risk
4. Perspectives from the Local Government Commission
5. Financial strategies to mitigate losses
6. Structural and managerial strategies to mitigate losses





# **Session 1:**

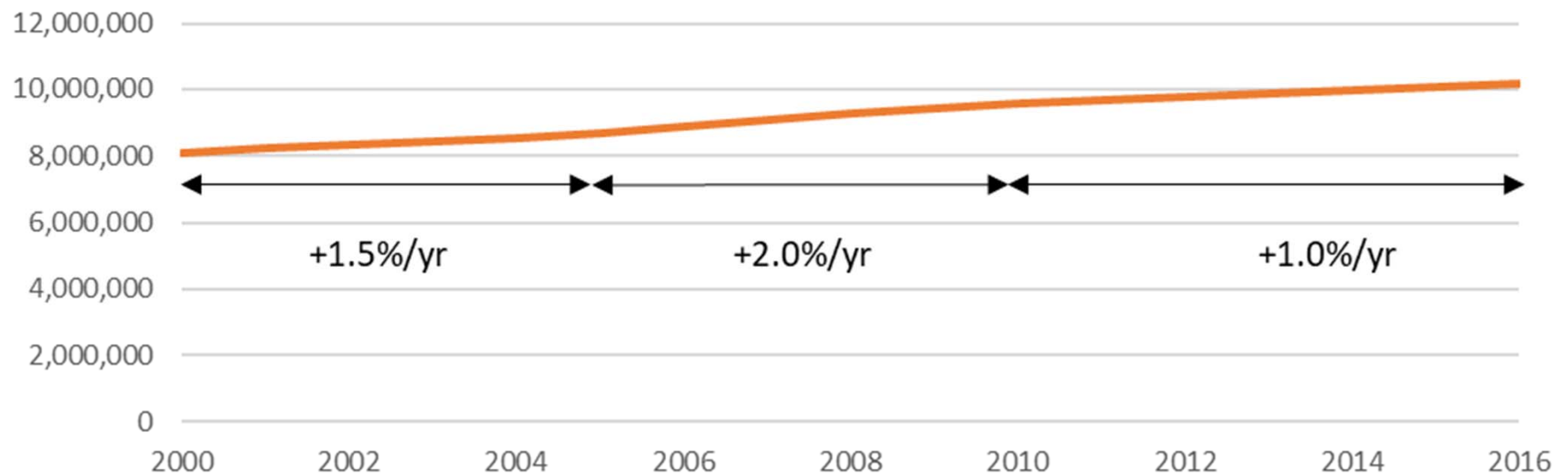
## **Trends in Populations and Water Demand in North Carolina**



# North Carolina is a Growing State

## North Carolina's Total Population Increased Each Year Since 2000

Average annual growth rate was 1.4%/year between 2000 and 2016

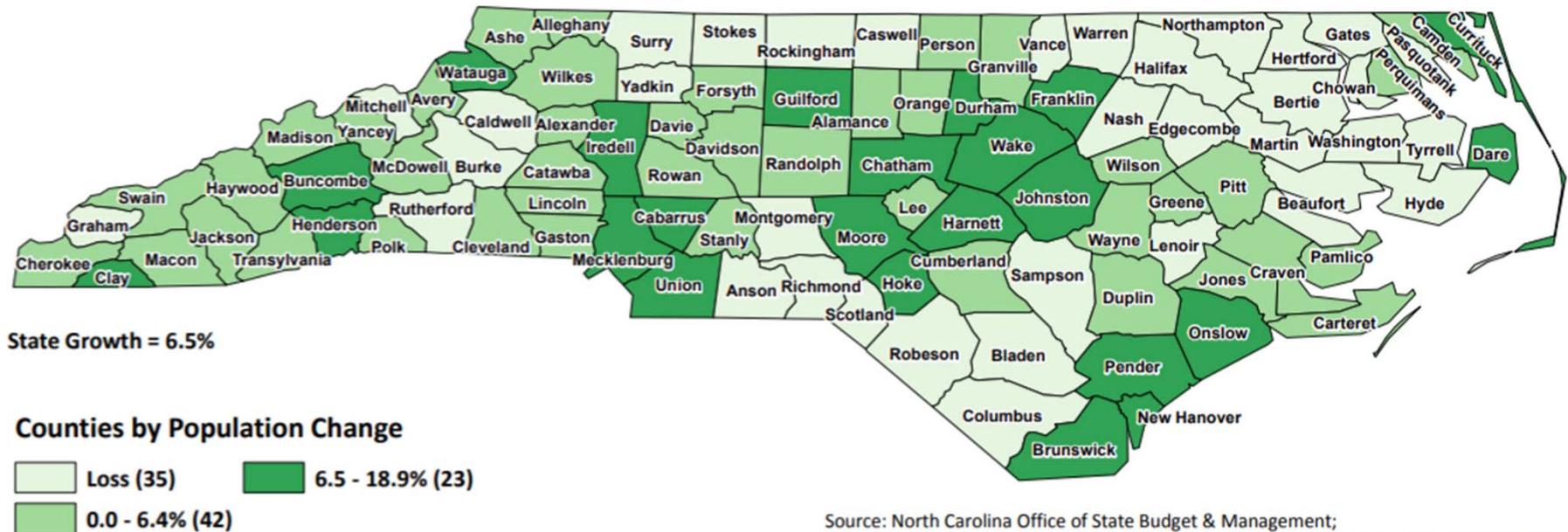


Source: North Carolina Office of State Budget & Management.



# But the Growth is Uneven

## Population Change in North Carolina Counties, April 1, 2010 - July 1, 2016



Source: North Carolina Office of State Budget & Management, “Population Dynamics”,  
[https://files.nc.gov/ncosbm/documents/files/Rec2018-19\\_PopulationDynamics.pdf](https://files.nc.gov/ncosbm/documents/files/Rec2018-19_PopulationDynamics.pdf)



## **Many Municipalities are Experiencing Population Declines**

- 160 municipalities (29%) had lower certified population estimates in 2010 than in 2000
  - These averaged a 10% decline in population over 10 years
- 199 municipalities (36%) had lower certified population estimates in 2016 than in 2010
  - These averaged a 3% decline in population over 6 years
- These numbers are even higher if using U.S. Census Bureau population estimates instead of the State Demographer's estimates



# And It Continues

<https://demography.cpc.unc.edu/2018/08/09/2017-population-estimates-declining-municipalities/>

The screenshot shows the header of the Carolina Demography website. On the left is the UNC Carolina Population Center logo. To its right is the text 'CAROLINA DEMOGRAPHY' in a large, outlined font. Below this is a black navigation bar with white text links: HOME, ABOUT, SERVICES, RESOURCES & DATA, BLOG, and CONTACT US. Below the navigation bar, there are two article teasers. The first is '← NC in Focus: Grandparents Living with their Grandchildren' and the second is 'NC in Focus: County Health Rankings – Length of Life in North Carolina →'. The main article featured is '2017 Population Estimates: Declining Municipalities', posted on August 9, 2018, by Jessica Stanford. The article text states: 'From 2010 to 2017, 247 North Carolina municipalities experienced population decline – approximately 45% of all cities, towns, and villages in the state. This represents an increase of 22 municipalities since [last year's population estimates](#) were reported. After accounting for municipalities growing at a stagnant pace – below the state growth rate of 8% – this figure rises to 427 in total. This means that

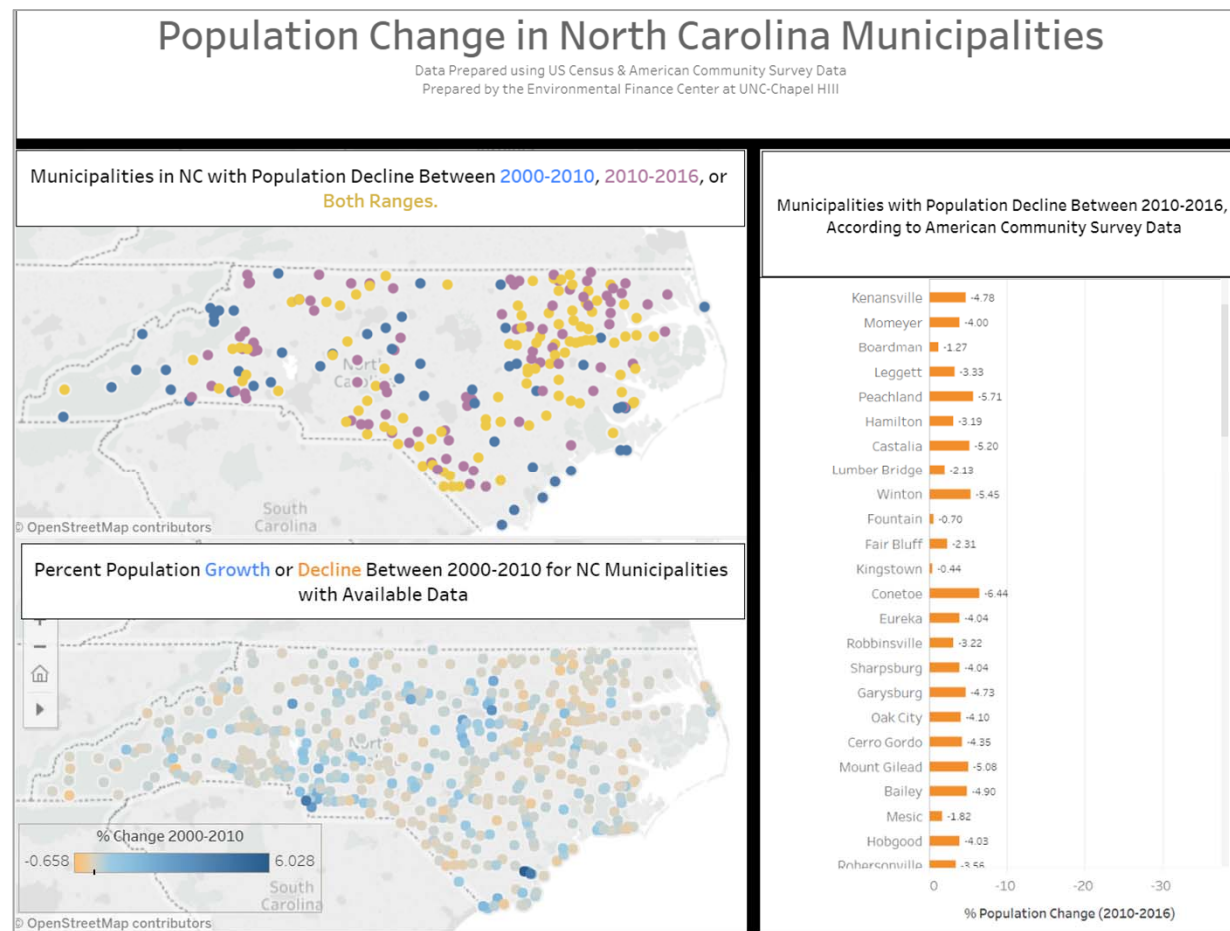
Carolina Demography:

“247 North Carolina municipalities experienced population decline [from 2010 to 2017]” and 427 municipalities experienced less than the state’s net growth of 8%.





# Municipal Population Declines in NC



<https://public.tableau.com/profile/efcatunc#!/vizhome/shared/MPFQ7BMY2>

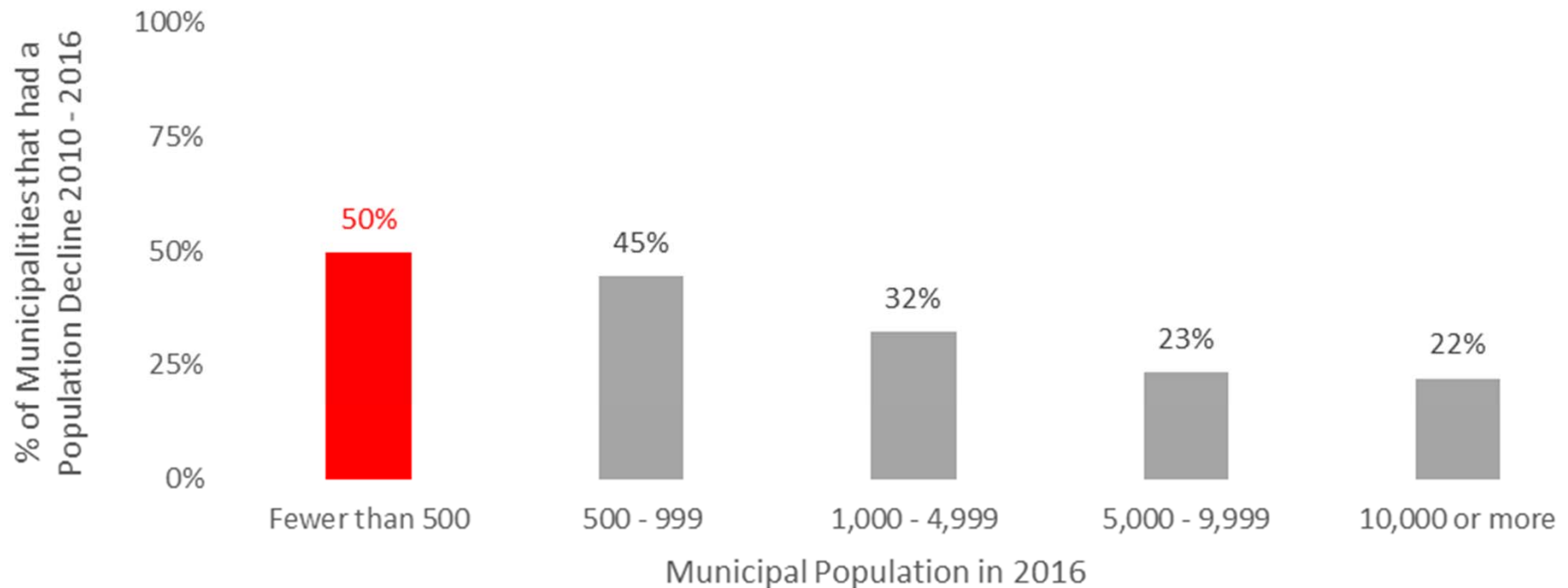




# Small Municipalities are More Vulnerable

## Small Municipalities are More Likely to be Declining than Large Municipalities

Half of municipalities with fewer than 500 people decreased in population between 2010 and 2016

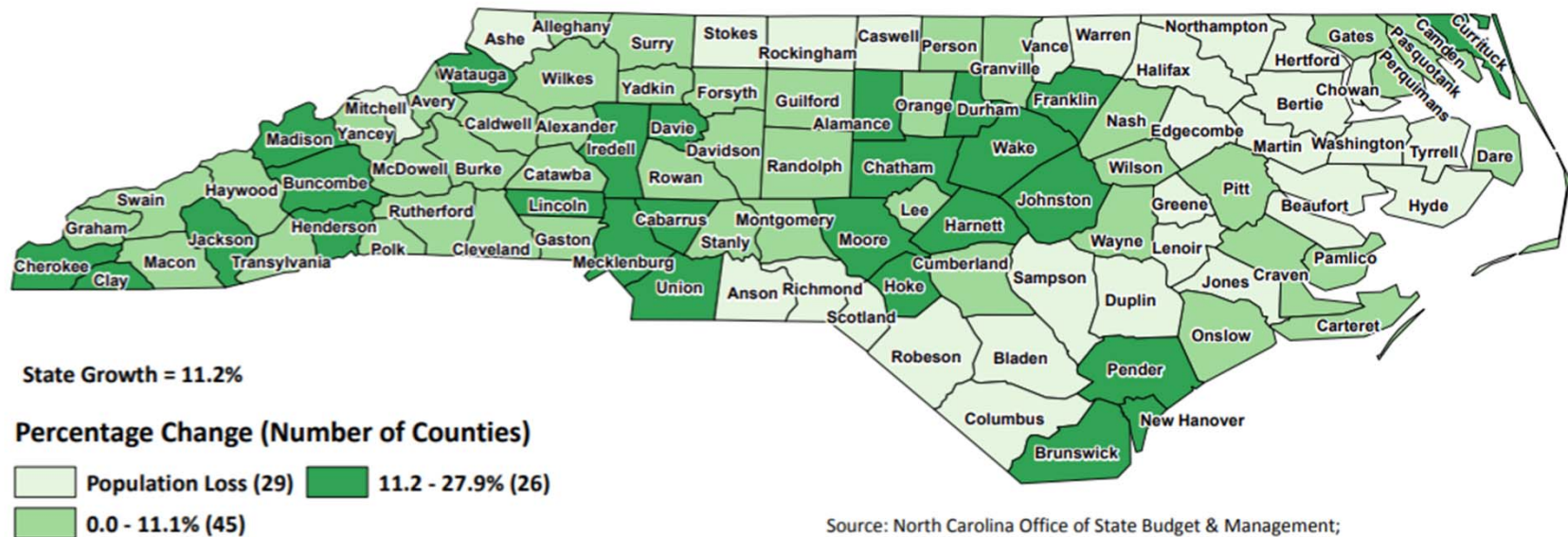


Data analyzed by the Environmental Finance Center at the UNC School of Government.  
Source: North Carolina Office of the State Budget & Management.



# Projections for Even More Declines

**Projected Population Change in  
North Carolina Counties, 2017 - 2027**



Source: North Carolina Office of State Budget & Management, “Population Dynamics”, [https://files.nc.gov/ncosbm/documents/files/Rec2018-19\\_PopulationDynamics.pdf](https://files.nc.gov/ncosbm/documents/files/Rec2018-19_PopulationDynamics.pdf)

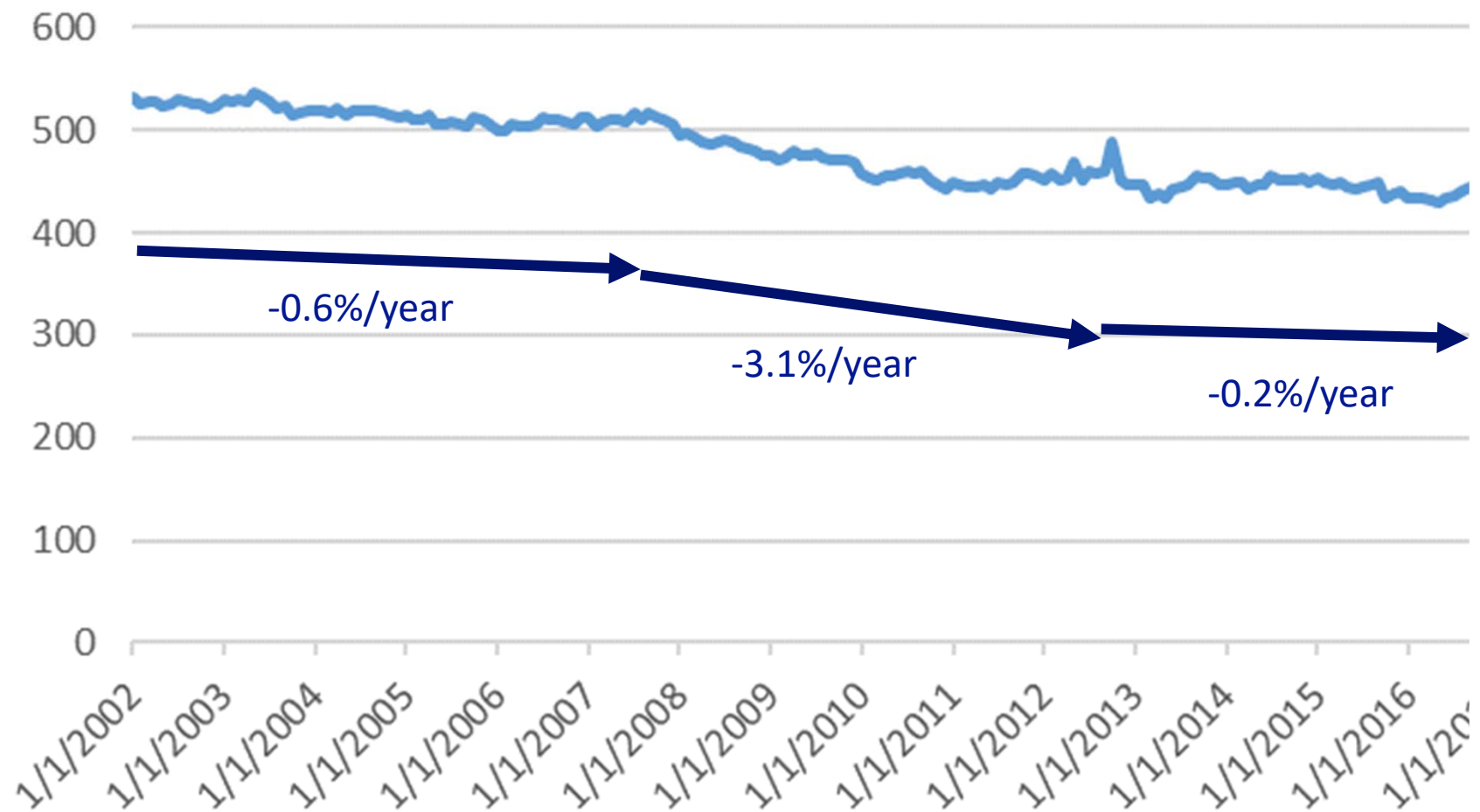


## **Municipal Population vs. Water System Service Population**

- Not identical, but trends will usually correlate if the water system primarily serves municipal residents.
- Possible exceptions if the water system is increasing connection rate, has a high percentage of outside customers, serves a regional area instead of primarily a single municipality, etc.
- Many water systems find that their service populations are also decreasing.

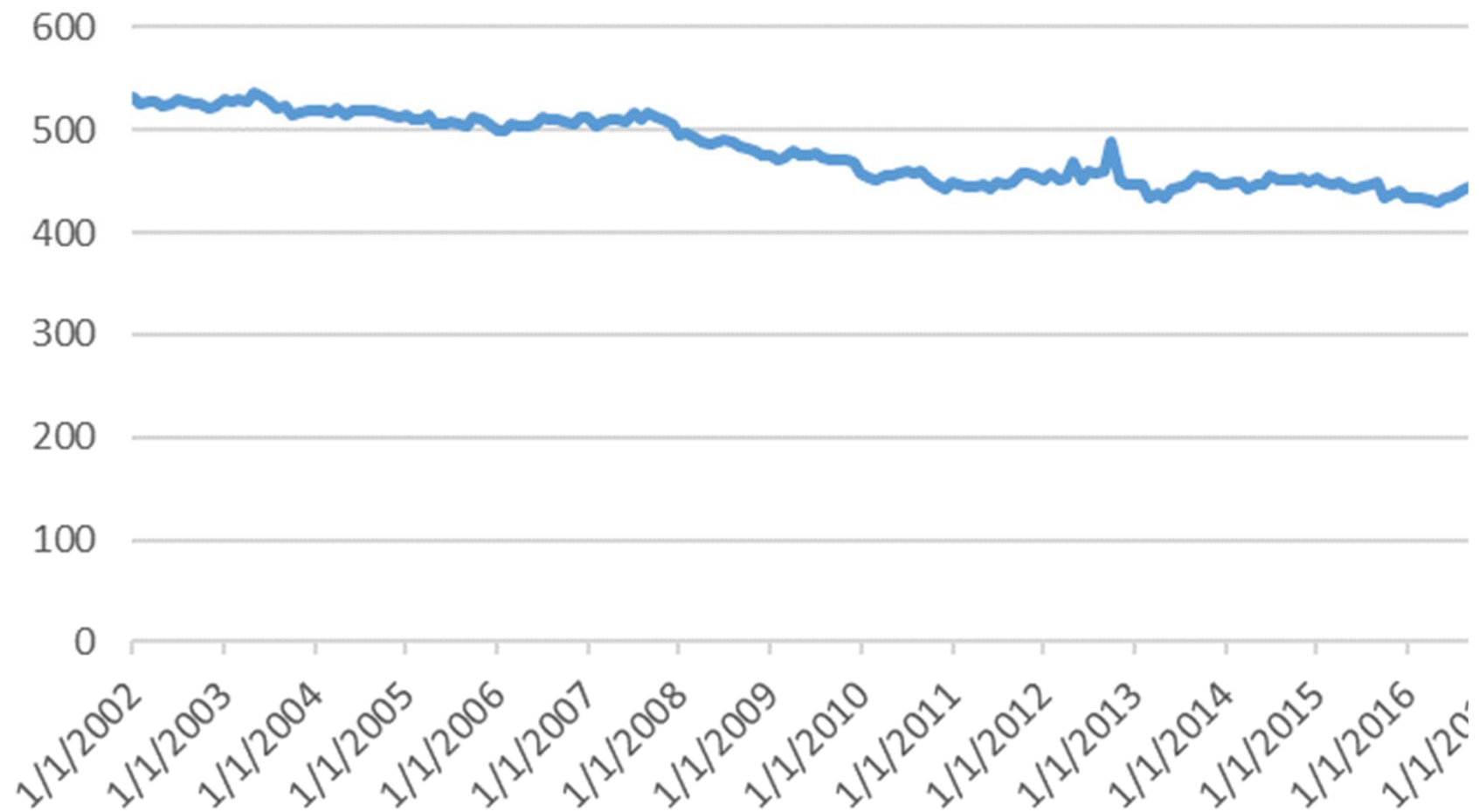


# Active Water Accounts from an Actual Water System in North Carolina





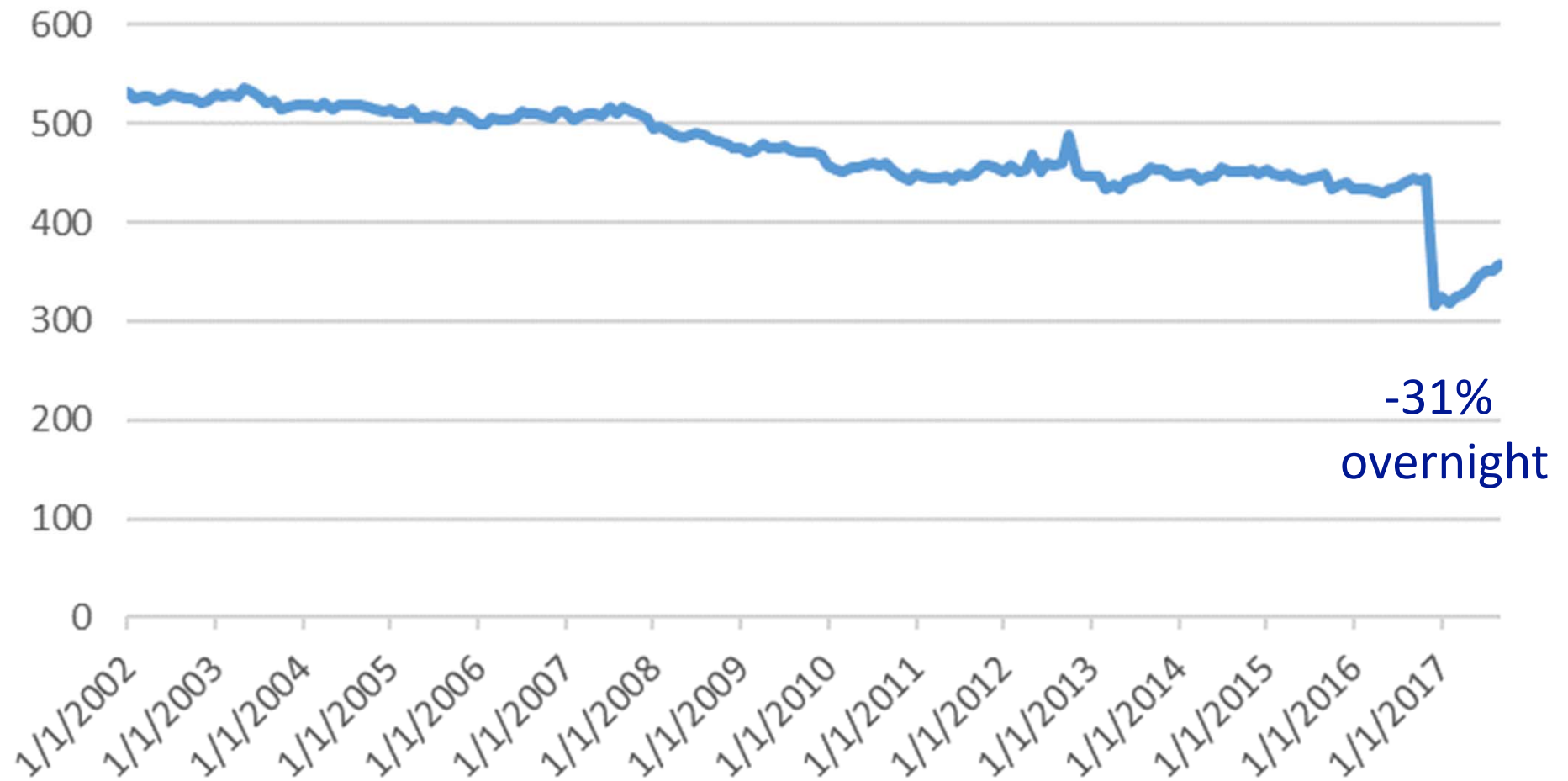
## Active Water Accounts from an Actual Water System in North Carolina







## Active Water Accounts from an Actual Water System in North Carolina







# Average Water Use is Also on the Decline

At least *residential* average water use has been declining for much more than a decade in many (majority?) of communities nationally.

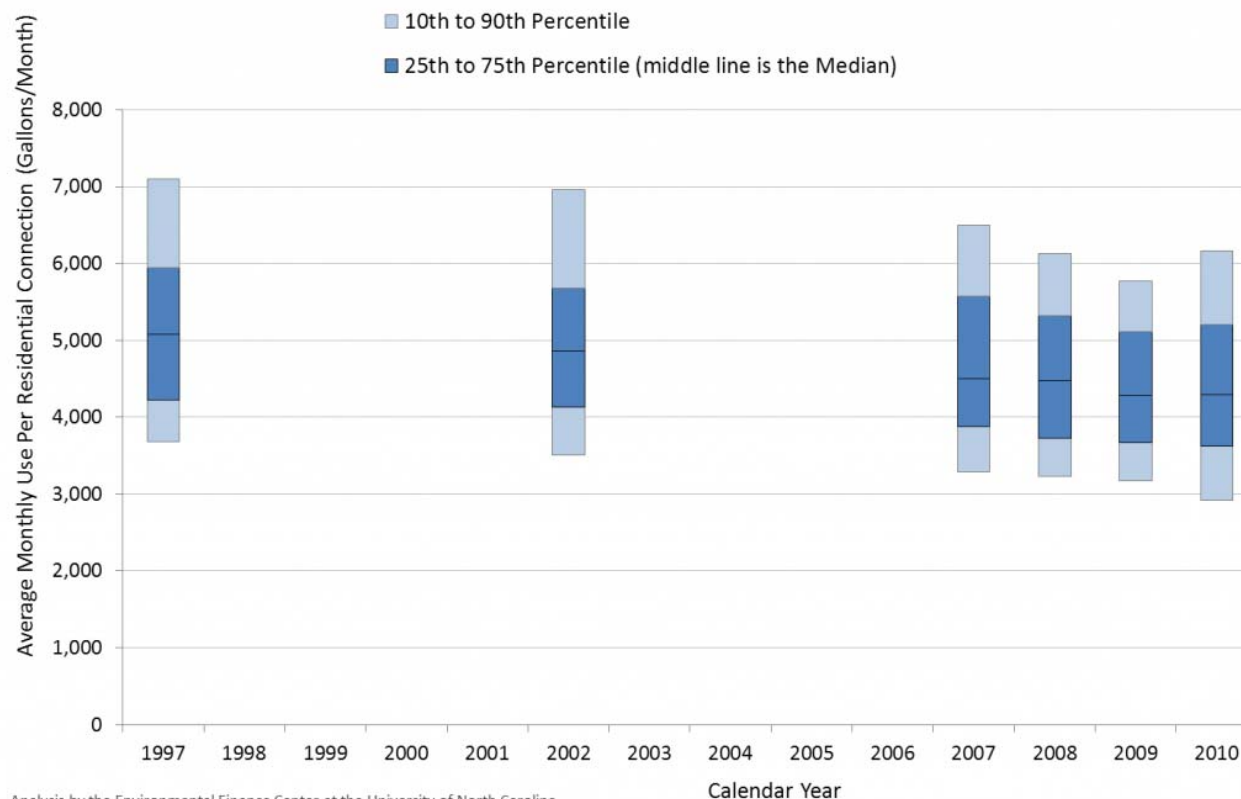
Rockaway et al. explore why in their [\*Journal AWWA\* article](#) (Feb. 2011, 103:2, pages 76-89)





# Residential Average Water Use in North Carolina Has Been Declining Since the 2000s

Monthly Residential Water Use Among the Same 217 Water Systems in NC



Analysis by the Environmental Finance Center at the University of North Carolina.  
Data source: NC Local Water Supply Plans (NC Department of Environment and Natural Resources, Division of Water Resources)

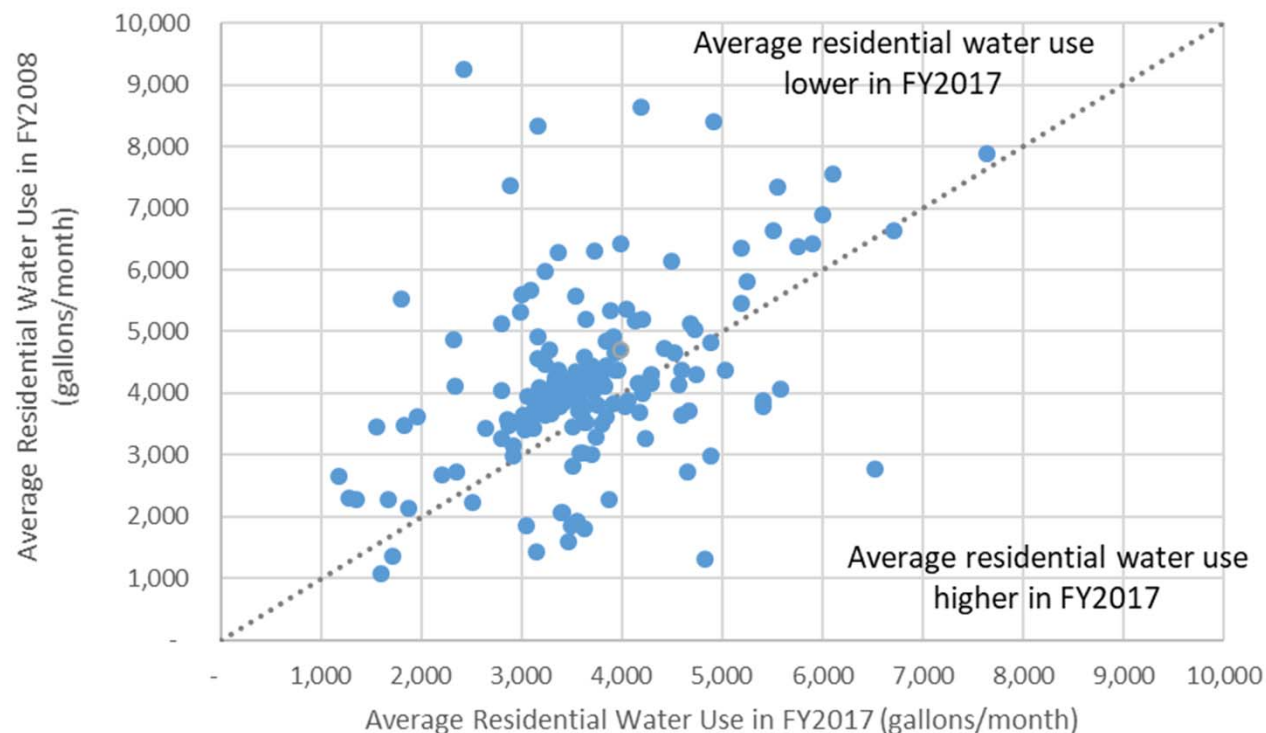
Source: Environmental Finance blog, “Declining Residential Water Use, Part One: North Carolina”, <http://efc.web.unc.edu/2012/05/24/residential-water-use-is-declining-in-north-carolina/>



# Average Water Use in North Carolina in 2017 is Lower than in 2008

**Average residential water use declined for 72% of 163 municipal water systems in North Carolina with water use data in FY2008 and FY017**

Half of the water systems reported average use of 3,500-4,700 gallons/month in FY2008. In FY2017, half of the water systems reported average use of 3,100-4,100 gallons/month.

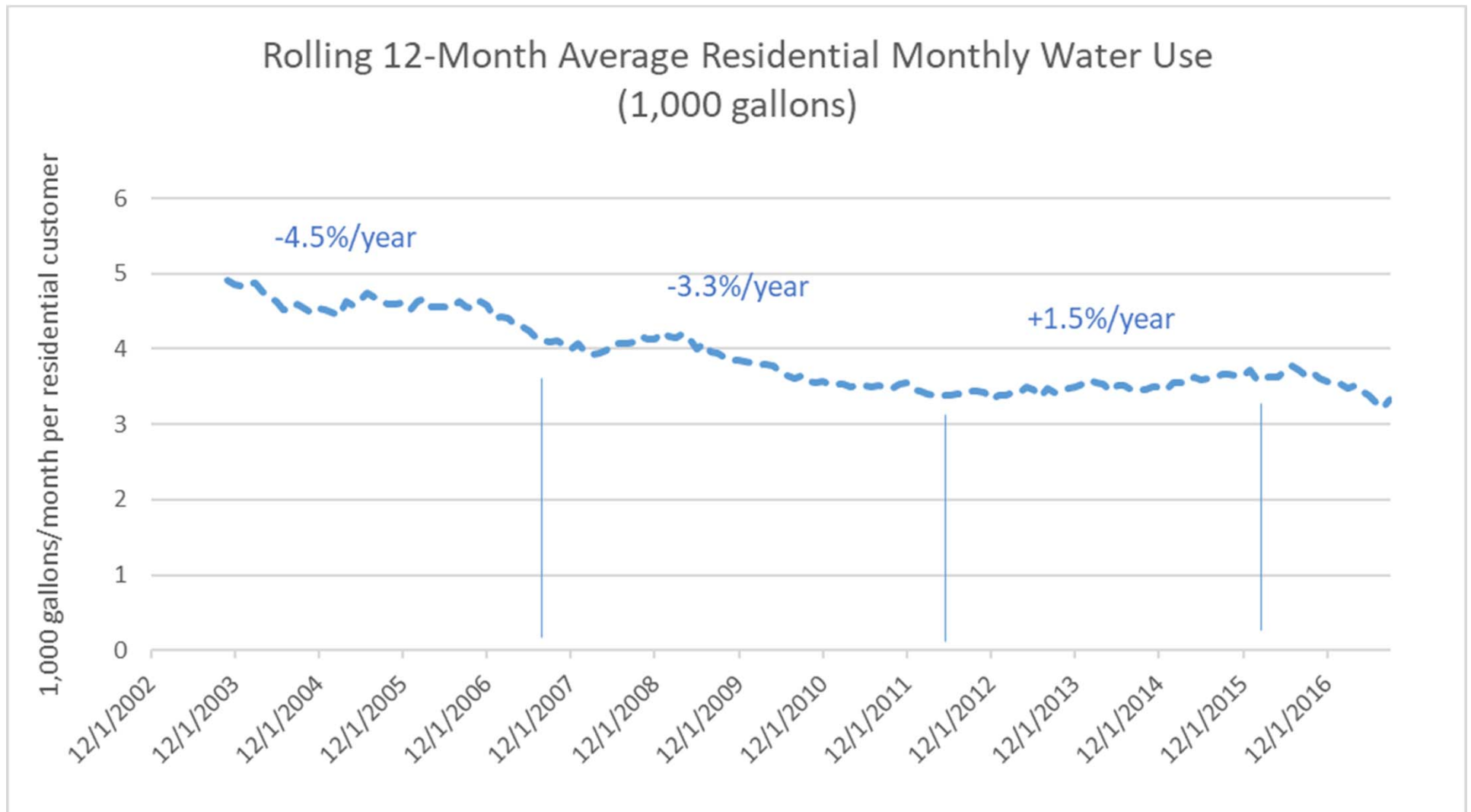


Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

Source: Municipality-reported data in the FY2008 and FY2017 Annual Financial Information Reports to the NC Department of State Treasurer, Division of State and Local Government



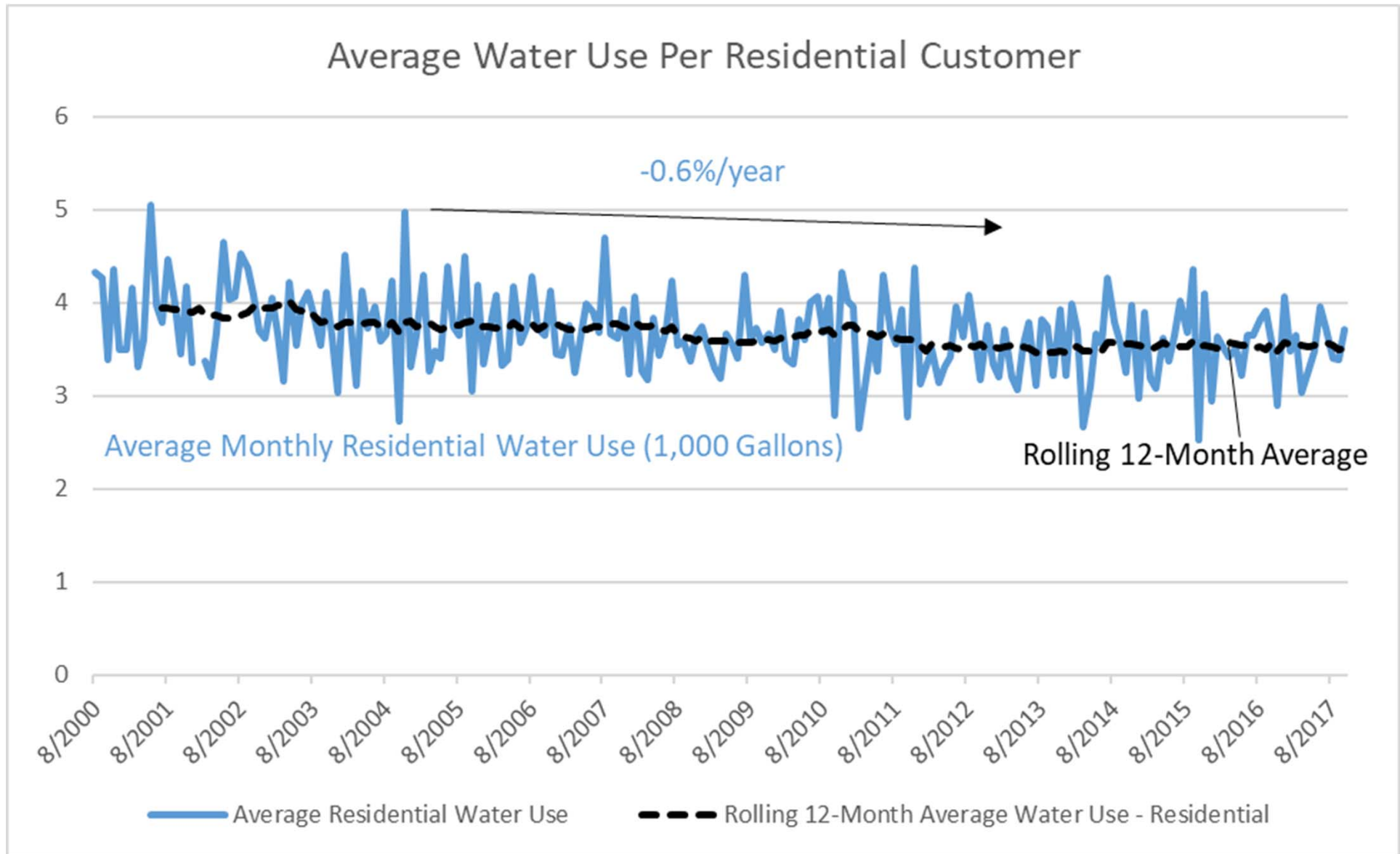
# Average Residential Water Use in the Example Water System in North Carolina





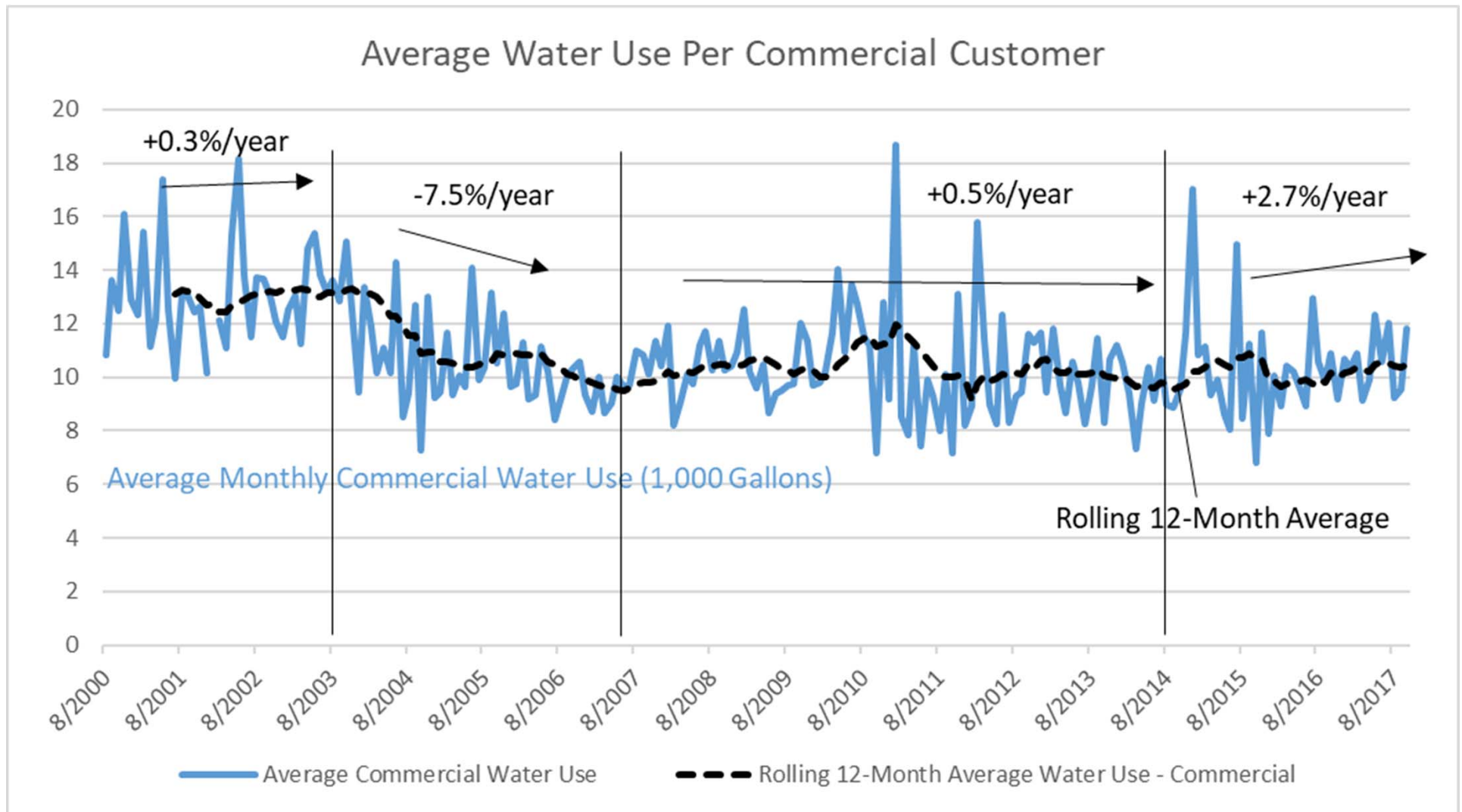


## Another Utility Example – Residential Water Use





# Nonresidential Water Use is Less Predictable

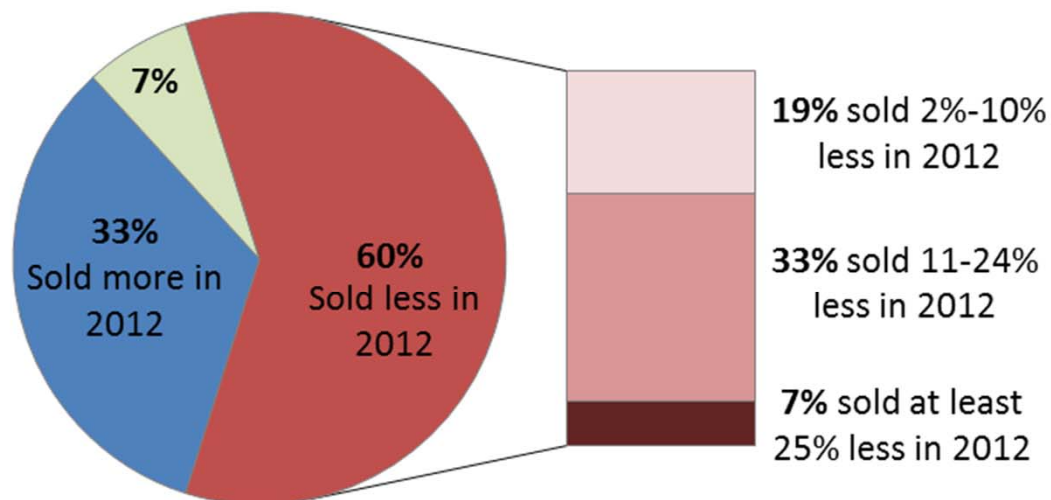






# **TOTAL Water Use has Been on the Decline, *Despite* Growing Communities in Many Cases**

**Total Water Volume Sales in 2012 Compared to 2006 in  
129 Utilities Nationwide**



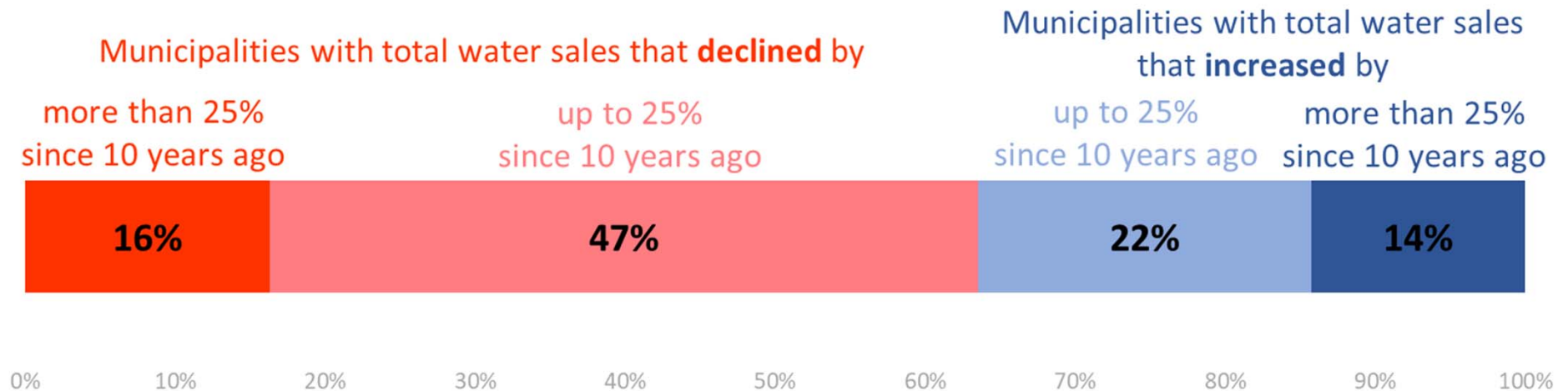
Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: Biennial, national AWWA-RFC Water and Wastewater Rate Surveys in 2006 and 2012. Water utilities that reported their total daily gallons sold (MGD) in 2006 and 2012 are included in this analysis. 81% of the sampled utilities increased total number of accounts from 2006 to 2012.

Source: Environmental Finance blog, “Even Total Water Demand is on the Decline at Many Utilities”, <http://efc.web.unc.edu/2014/04/15/total-water-demand-on-the-decline/>



# Many in North Carolina Are Experiencing Declining Water Sales

In FY2017, **63%** of municipalities in North Carolina **sold less water** than they did in FY2008 (ten years prior)  
n = 203 municipalities with water sales data



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

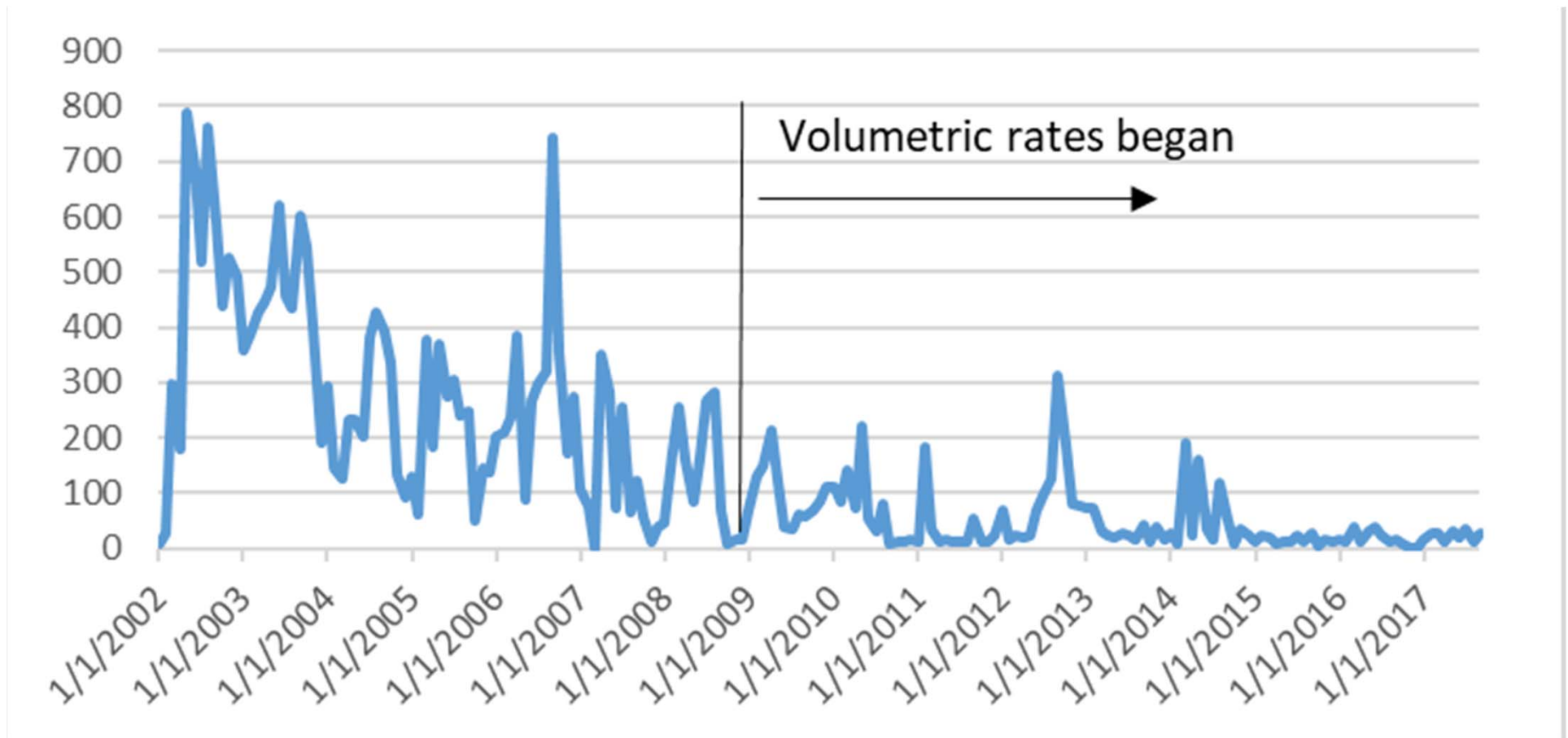
Source: North Carolina Department of State Treasurer, Division of State and Local Government's Annual Financial Information Reports for FY2008 and FY2017 for municipalities. Municipalities with missing water sales data in either year were excluded from this analysis.

Proportionally the same for small water systems.



## Loss or Reduction of Industry/Large Users

From the same example utility, this is the water sales (in thousands of gallons) to their single largest customer, which is a small industrial plant.





## **Session 2:**

# **Financial Impacts of Declining Populations and Demands**



# Revenue Sources for Many Water Systems

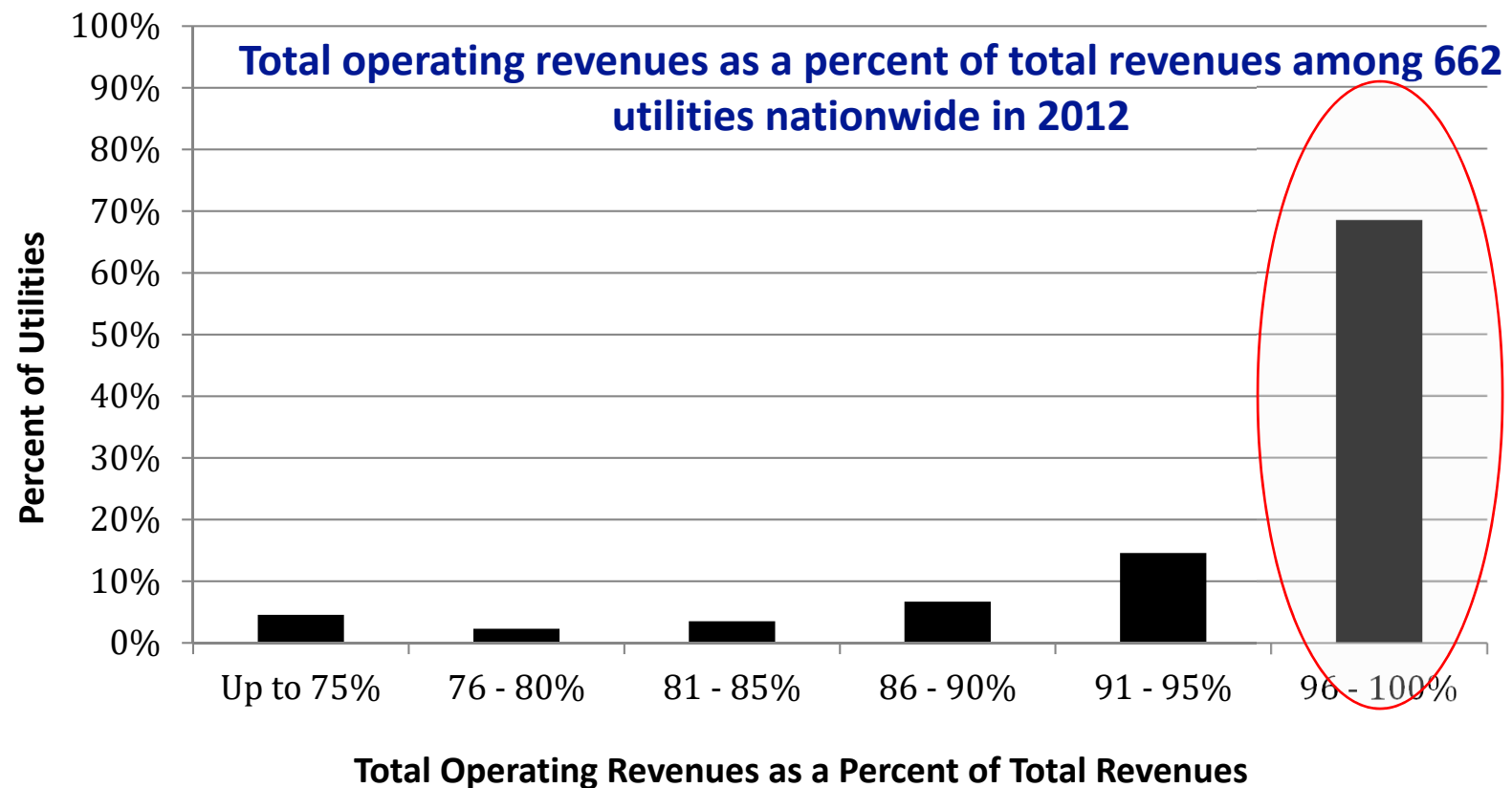


Source: Water Research Foundation / EFC whiteboard video "New Business Models for the Water Industry"  
<https://www.youtube.com/watch?v=2yt1Z0GGEsE>





# Operating Revenues are the Primary Source of Revenues for Water Utilities



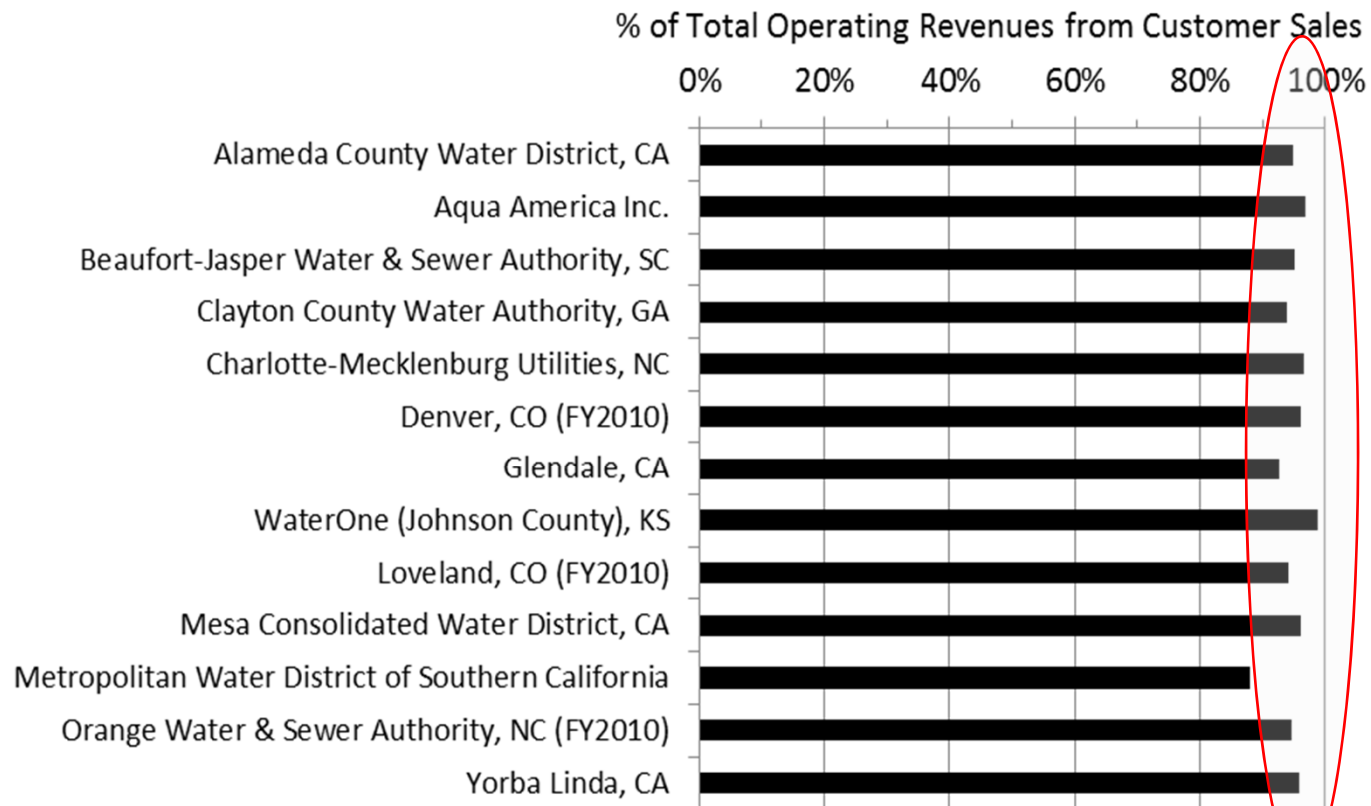
Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: Moody's Water and Sewer Municipal Financial Ratio Analysis.

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.





# Customer Sales are the Primary Source of Operating Revenues



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: FY2011 Income Statements and Comprehensive Annual Financial Reports. FY2010 data used where noted.

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# Revenues from Customer Sales

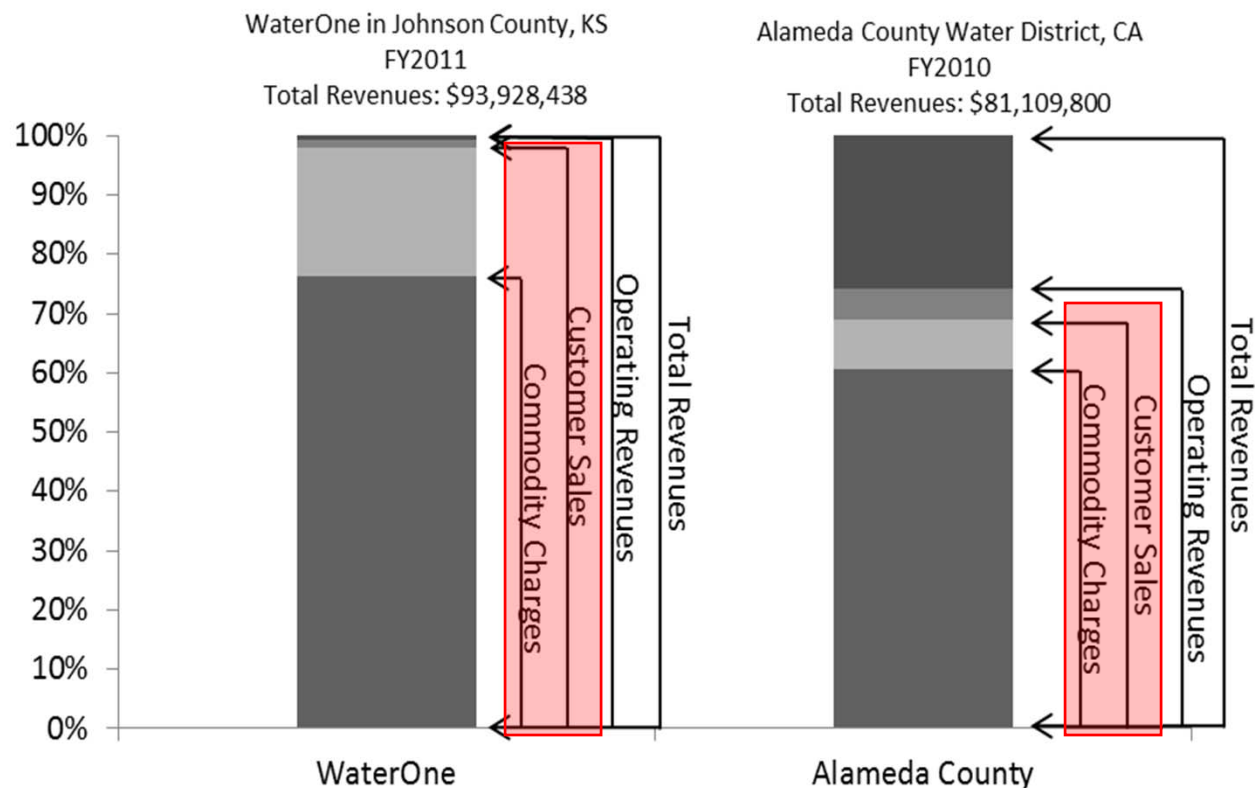
Fixed revenues from the fixed (base) charges  
(e.g. \$25.00/month minimum charge)

+

Variable revenues from the volumetric (commodity) charges  
(e.g. \$5.00/1,000 gallons)



## Commodity Charges (from Volumetric Rates) are Often a Large Proportion of Customer Sales and Total Revenue



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: Income Statements and Comprehensive Annual Financial Reports, and data provided directly by the utilities.

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



## % Water Sales Revenues Coming from the Variable (Commodity) Charges in NC

	Cary	Durham	Raleigh
Fiscal Year	% of revenue collected from volumetric charges as a percent of all revenue collected from households (base & volumetric)		
'07	91.4%	82.0%	76.3%
'08	90.8%	82.2%	74.5%
'09	90.4%	71.0%	74.7%
'10	91.1%	73.5%	75.4%
'11*	92.3%	72.1%	78.0%
*FY11 does not include all 12 months in any of the data sets			

Data analyzed by the Environmental Finance Center at the University of North Carolina.  
Data source: Each utility's customer billing records, project funded by NC Urban Water Consortium

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# Revenue Exposure to Declines

1. When water use declines → revenues from volumetric rates (commodity charges) decline
2. When number of customers decline → revenues from fixed monthly charges (base charges) decline, and, likely, water use declines ... see “1”.



For many water systems, the majority of revenues are generated from the **volumetric charges**, which are dependent on water use.

As water use declines, volumetric revenues (the primary source of revenue) will decline.



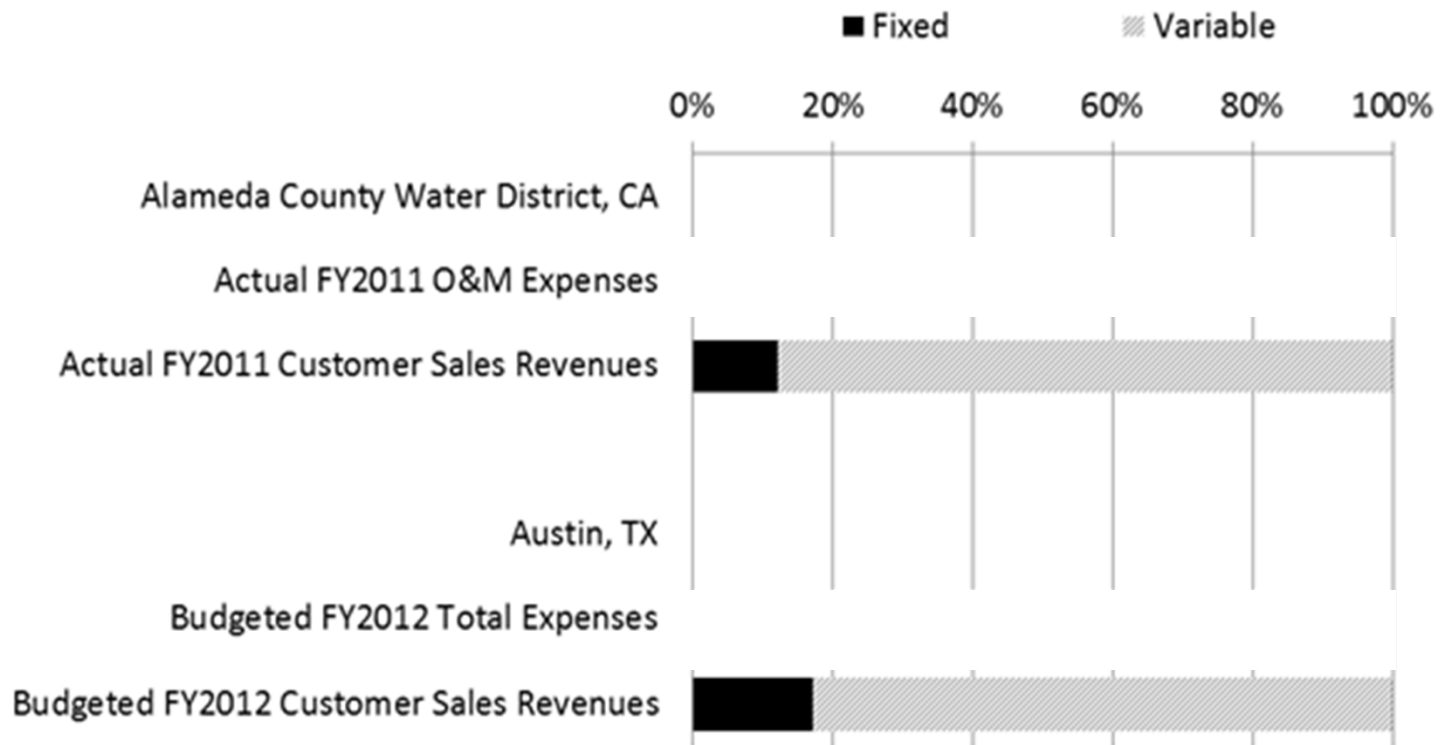


## **But What about Costs?**

When water use declines, operating costs will also go down too. Will this offset the declines in revenue?



# Fixed versus Variable Costs and Revenues

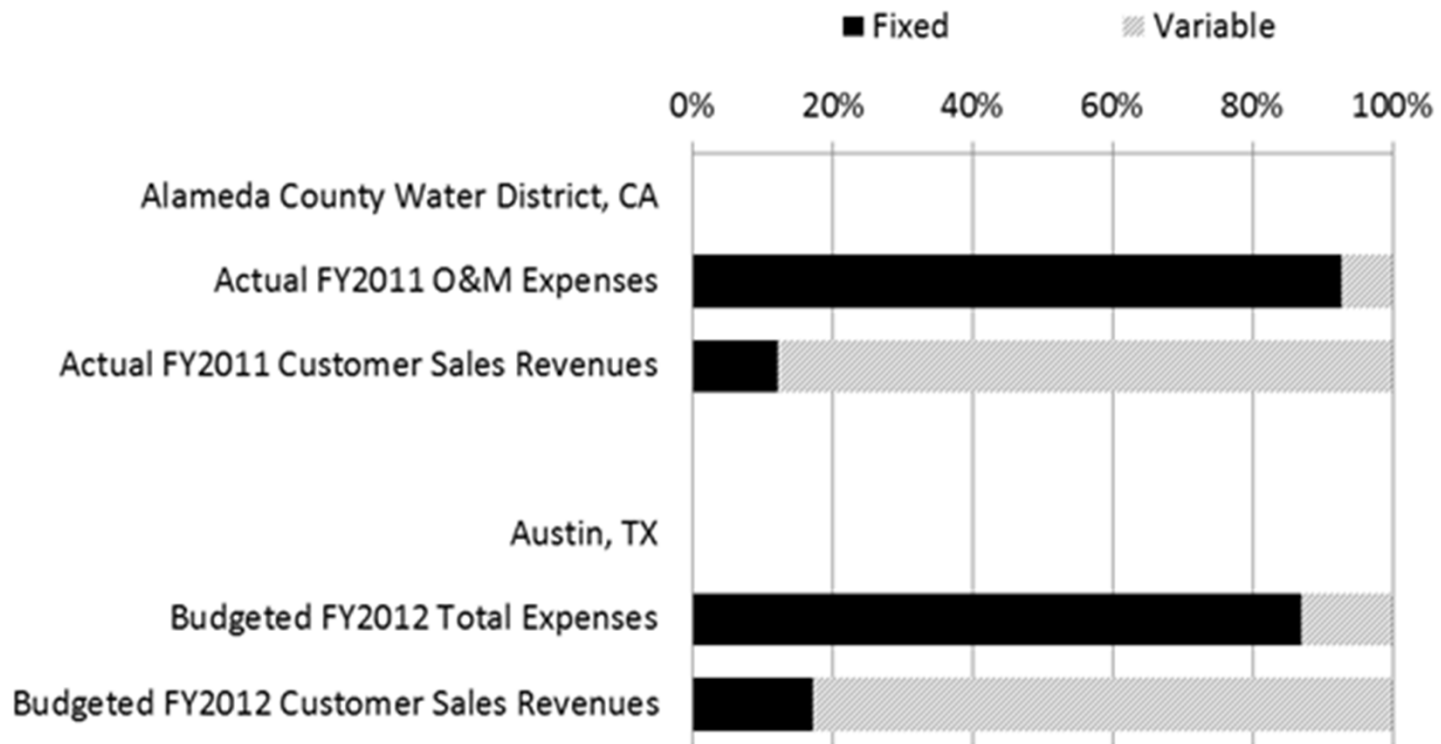


Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Sources: Alameda County Water District's Financial Plan model and Austin Water's FY2012 budget estimations in the Reference Material to the Joint Subcommittee on Resource Management Commission, Water & Wastewater Commission, and Impact Fee Advisory Committee.

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# Fixed versus Variable Costs and Revenues



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Sources: Alameda County Water District's Financial Plan model and Austin Water's FY2012 budget estimations in the Reference Material to the Joint Subcommittee on Resource Management Commission, Water & Wastewater Commission, and Impact Fee Advisory Committee.

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# Expenses in the Short-Term

Variable (depends on  
volume of water)

Chemicals

Power

Water purchase

Perhaps small portion of  
maintenance costs

Fixed (does not depend  
on volume of water)

Debt service

Capital projects

Payroll

Billing

Supplies

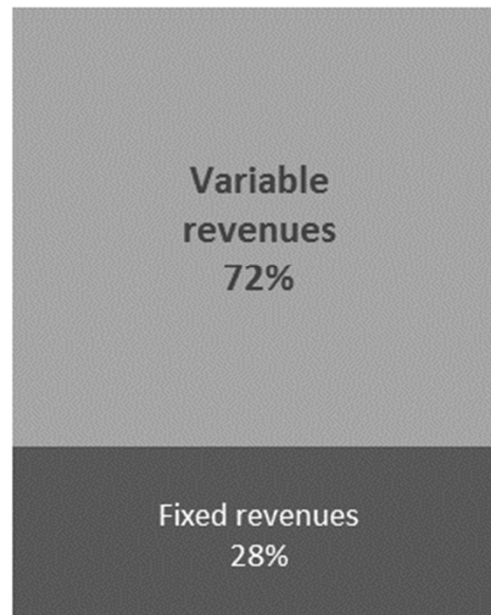
Lab

Contracts, etc.



# How Much of the Revenues are *Truly* Vulnerable to Declining Demands?

Total Water Revenues from Customer Sales



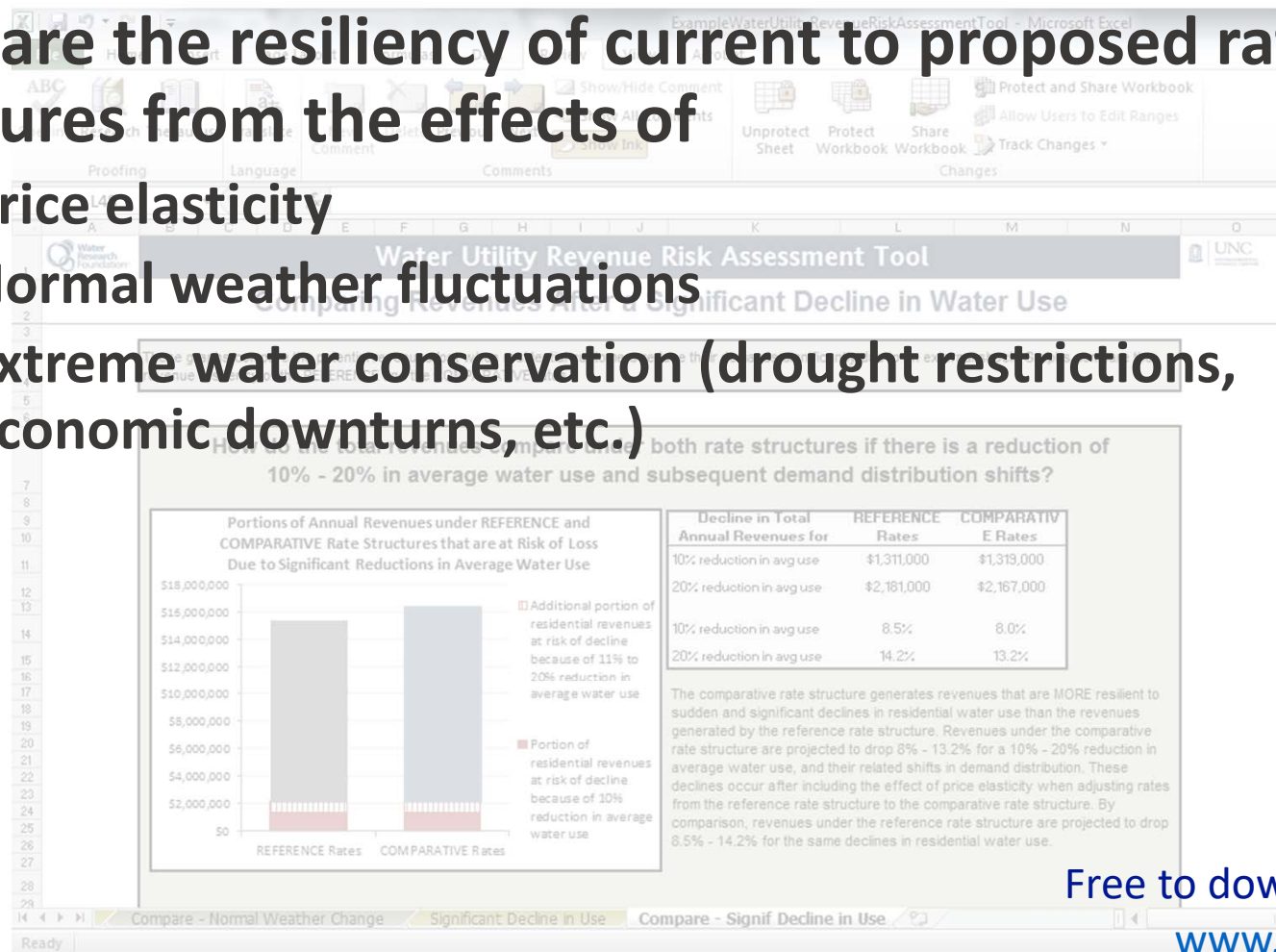




# Water Utility Revenue Risk Assessment Tool

Compare the resiliency of current to proposed rate structures from the effects of

- Price elasticity
- Normal weather fluctuations
- Extreme water conservation (drought restrictions, economic downturns, etc.)



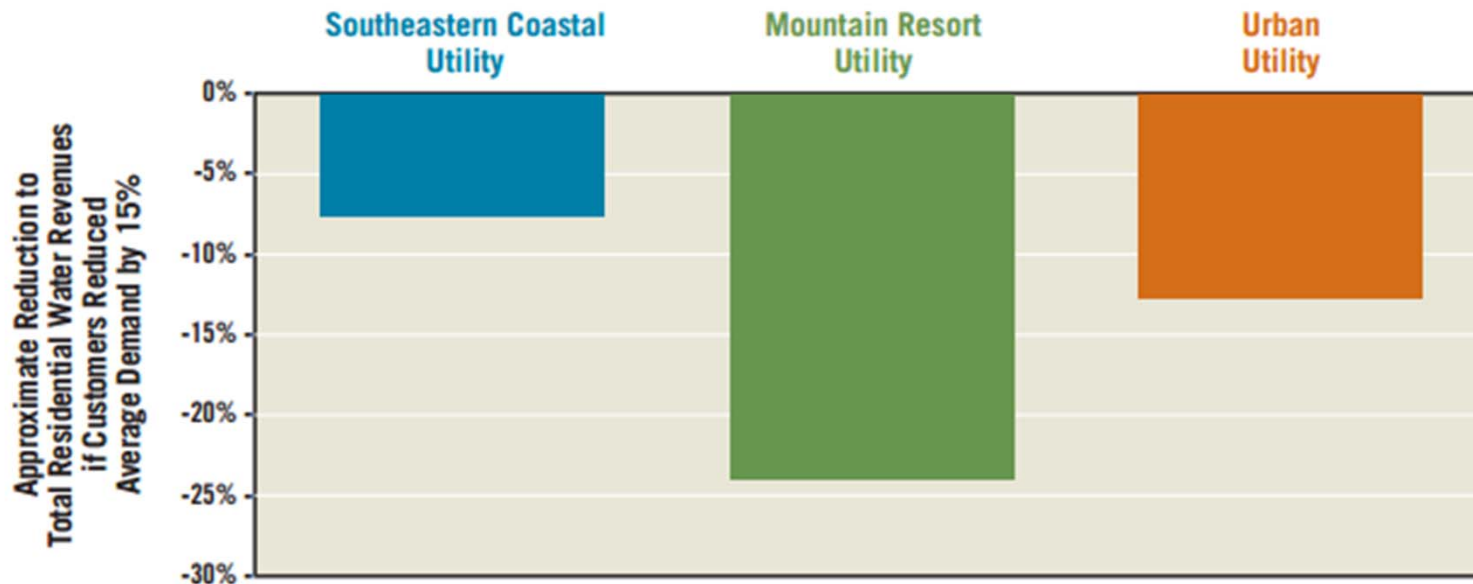
Free to download and use at

[www.waterrf.org](http://www.waterrf.org)  
[www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)



# Effect of Reducing Average Demand by 15% on Three Utilities' Revenues

Figure 3: Revenue Variability Due to One-Time Significant Declines in Residential Demands

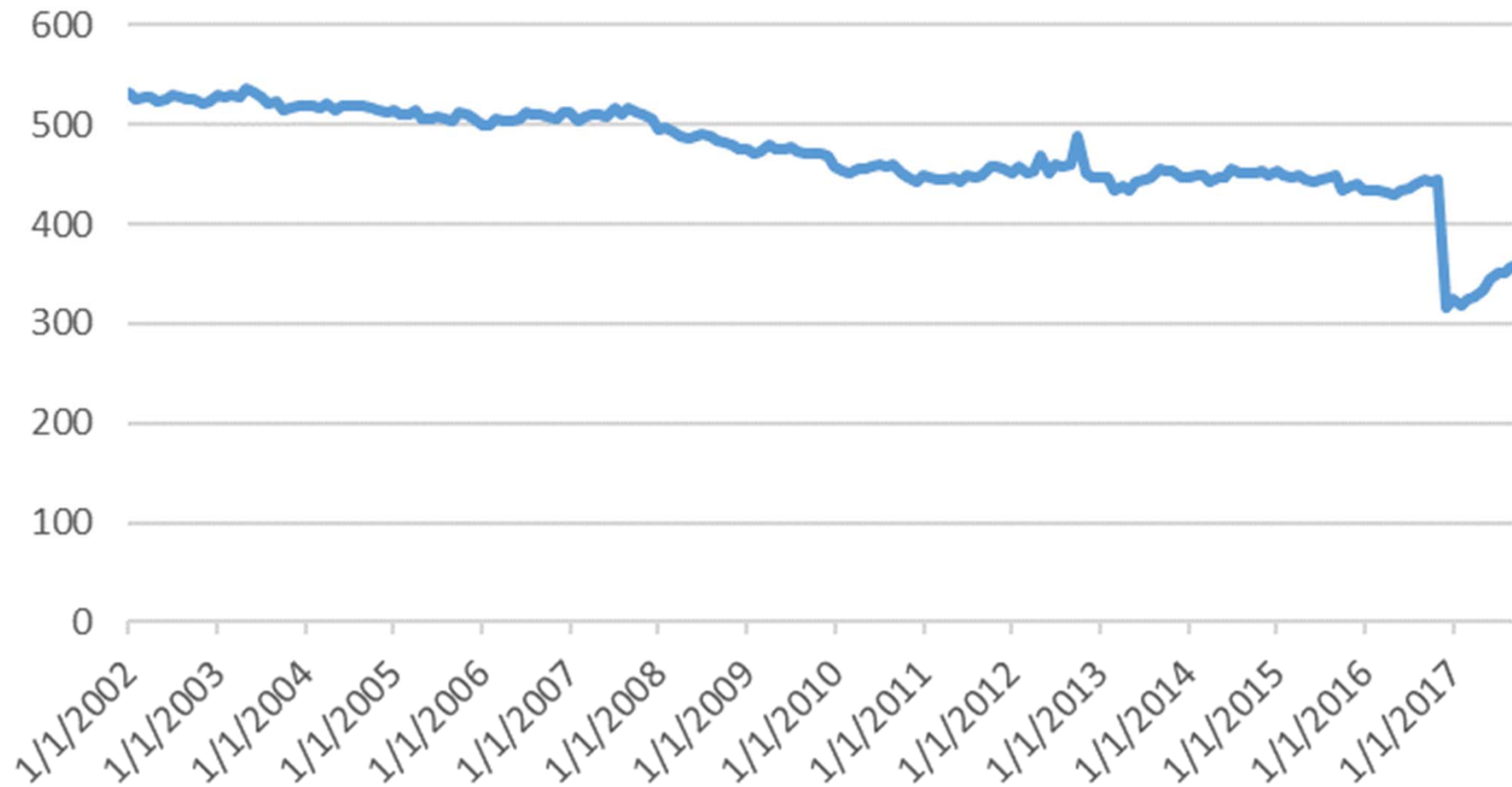


Source: Eskaf, S. et al. (2014). *Measuring & Mitigating Water Revenue Variability: Understanding How Pricing Can Advance Conservation without Undermining Utilities' Revenues Goals*. Ceres report. [www.ceres.org](http://www.ceres.org) or [www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)



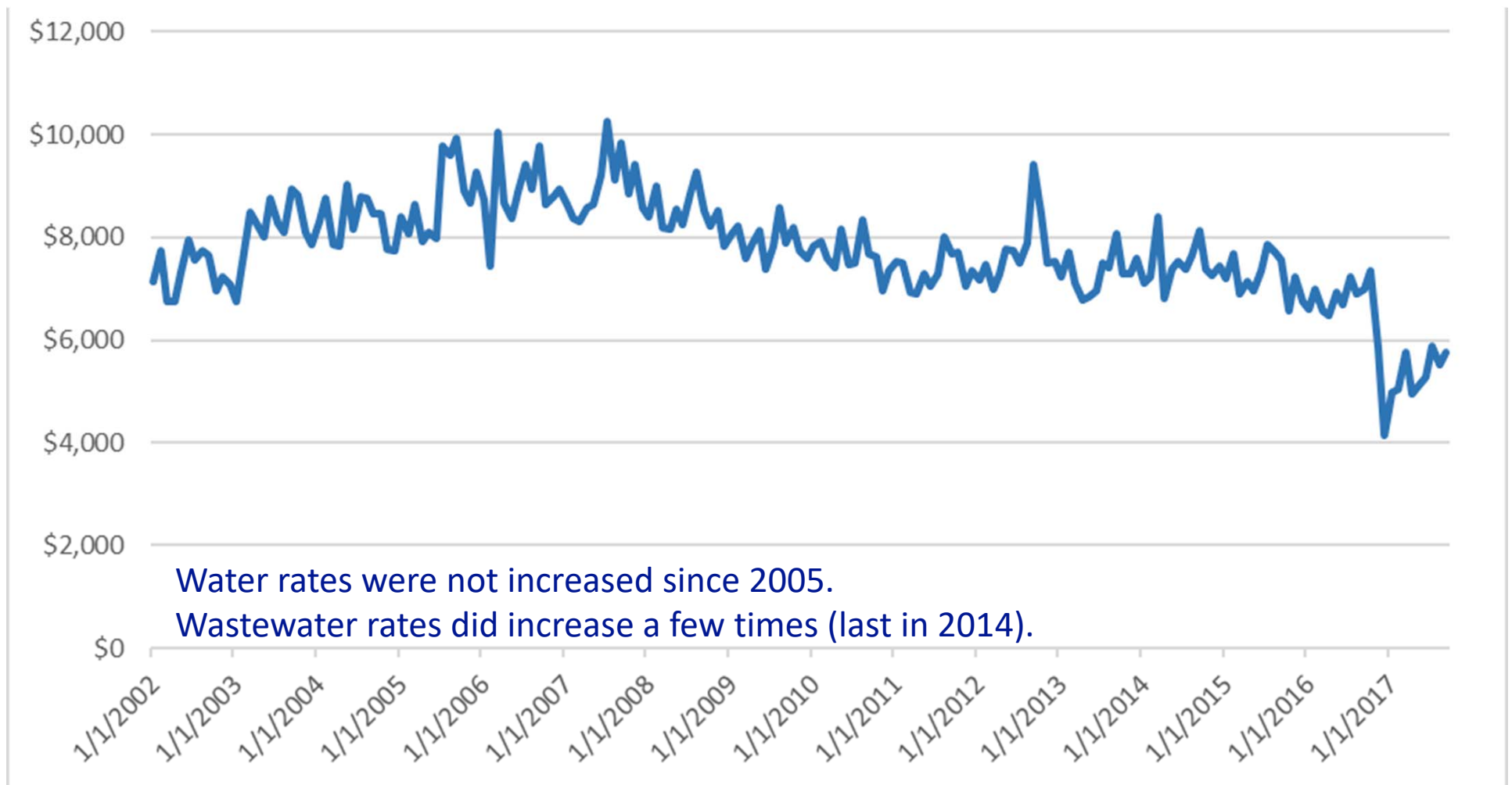
# Financial Outcome of this Utility?

Remember that average water use for residential and commercial customers was also decreasing over this period.





# Water Revenues at the Utility





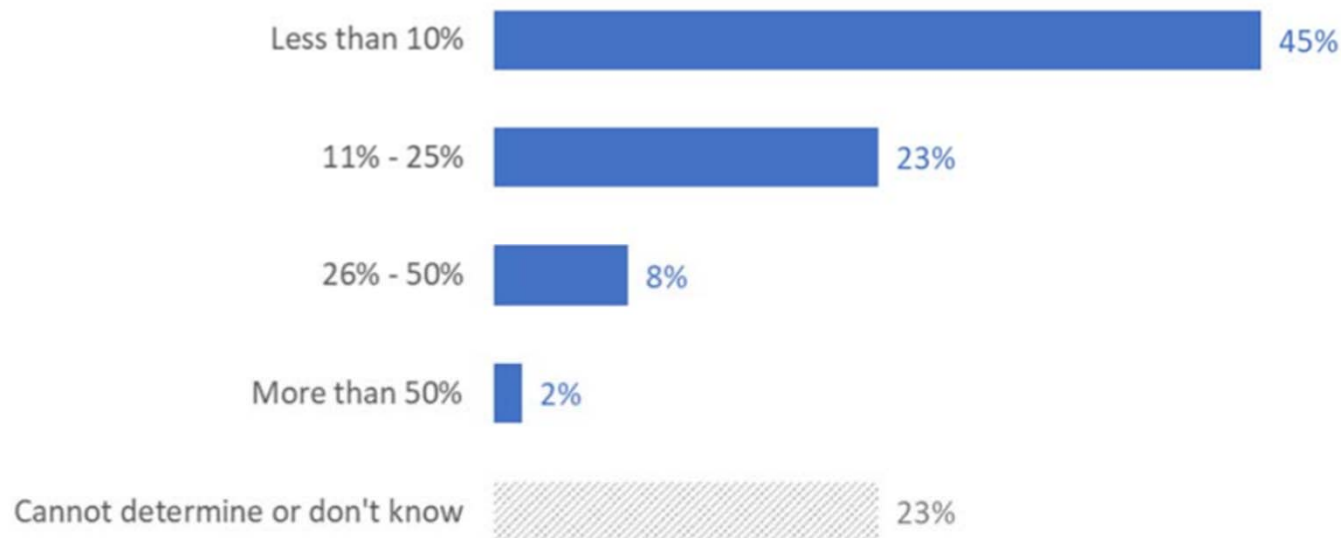
# How Vulnerable are Revenues to Loss of Large Customers?

Results of the 2017-2018 NC Water and Wastewater Utility Management Survey

NCLM & EFC

*34) What percentage of your utility's total annual revenue is normally billed to your 5 largest non-wholesale customers (i.e. the five largest industrial or commercial customers, but NOT sales to other utilities)?*

**Utilities are most likely to bill less than ten percent of their total annual revenue to their five largest non-wholesale customers (n = 190).**



Source: 2017-18 NC Water and Wastewater Utility Management Survey by the EFC and NCLM.





## **Session 3:**

# **How to Determine your Community's Trends and Revenue Risk**



# What to Assess for Your Utility?

Long-term trends from the past until today in:

1. Number of customers
2. Total water sales (by customer class)
3. Average water sales per customer

Projecting the near future in:

1. New developments/customers
2. Expected changes in existing customer water usage



## **Sources of Population/Customer Data**

Municipal or County Population:

- U.S. Census Bureau
- NC Office of State Budget & Management

Service Population or Accounts:

- Your billing records
- Local Water Supply Plans (NC DEQ)
- SDWIS database (NC DEQ or US EPA)

# Using US Census Bureau's American Community Survey (ACS) Data

The US Census Bureau uses a platform called “**American FactFinder**” to share demographic information about a specific *state, county, city, town, or zip code*.

- On the main page, find the text box below the header “Community Facts”
- Simply type in the name of the area of interest or select from the populated dropdown list, and press “GO.”



The screenshot shows the American FactFinder website. At the top, there is a header with the 'United States Census' logo and 'AMERICAN FactFinder' text. Below the header are navigation tabs: 'MAIN', 'COMMUNITY FACTS', 'GUIDED SEARCH', and 'ADVANCED'. A banner below the tabs says 'Check out the early preview of our new dissemination platform at data.census.gov'. The 'COMMUNITY FACTS' section is expanded, showing the text 'Find popular facts (population, income, etc.) and frequently requested data about your community. Enter a state, county, city, town, or zip code:'. Below this is a text input field containing 'carrboro' and a 'GO' button. A dropdown menu below the input field shows 'Carrboro town, North Carolina'. Arrows from the text block point to the 'Community Facts' section and the search input field.

<https://factfinder.census.gov/>

# “Community Facts”

Finding Useful Information

After searching for a community, the American FactFinder will produce this table.

The default is 2010 Census data, but this can be changed.

Click the arrow to produce a drop-down list.

**Community Facts** - Find popular facts (population, income, etc.) and frequently requested data about

Enter a state, county, city, town, or zip code:

**Population** Carrboro town, North Carolina

Population  
Census 2010 Total Population  
**19,582** Source: 2010 Demographic Profile

Popular tables for this geography:

- 2010 Census
  - General Population and Housing Characteristics (Population, Age, Sex, Race, Households and Housing, ...)
  - Race and Hispanic or Latino Origin
  - Hispanic or Latino by Type (Mexican, Puerto Rican, ...)
  - Households and Families (Relationships, Children, Household Size, ...)
- 2016 American Community Survey
  - Demographic and Housing Estimates (Age, Sex, Race, Households and Housing, ...)
- 2017 Population Estimates Program
  - Annual Population Estimates
- Census 2000
  - General Demographic Characteristics (Population, Age, Sex, Race, Households and Housing, ...)

Want more? Need help? Use [Guided Search](#) or visit [Census.gov's Quick Facts](#).



# “Community Facts” Finding Useful Information

**Population**

**Carrboro town, North Carolina**

**Population**

Census 2010 Total Population

Census 2010 Total Population

2017 Population Estimate (as of July 1, 2017)

**2016 ACS 5-Year Population Estimate**

Bookmark/Save | Print

**Popular tables for this geography:**

**2010 Census**

- General Population and Housing Characteristics (Population, Age, Sex, Race, Households and Housing, ...)
- Race and Hispanic or Latino Origin
- Hispanic or Latino by Type (Mexican, Puerto Rican, ...)
- Households and Families (Relationships, Children, Household Size, ...)

**2016 American Community Survey**

- Demographic and Housing Estimates (Age, Sex, Race, Households and Housing, ...)

**2017 Population Estimates Program**

- Annual Population Estimates

**Census 2000**

- General Demographic Characteristics (Population, Age, Sex, Race, Households and Housing, ...)

Want more? Need help? Use Guided Search or visit Census.gov's Quick Facts.

The dropdown list will show these options. Select the latest “ACS 5-year Population Estimate”

# “Community Facts”

## Finding Useful Information

The screenshot displays the American FactFinder interface. On the left is a sidebar with a list of categories: Population, Age, Business and Industry, Education, Governments, Housing, Income, Origins and Language, Poverty, Race and Hispanic Origin, Veterans, and Show All. The main content area is titled "Carrboro town, North Carolina". Under the "Population" section, a dropdown menu shows "2016 ACS 5-Year Population Estimate". Below this, the population is listed as "20,867" with a source note: "Source: 2012-2016 American Community Survey 5-Year Estimates". A blue oval highlights this source text, with an arrow pointing from a callout box. Below the population data, there is a section titled "Popular tables for this geography:" which lists various data tables from the 2010 Census, 2016 American Community Survey, 2017 Population Estimates Program, and Census 2000.

American FactFinder will refresh the table with new information, and show the latest population estimate\*.

To see past years of population estimates, click where it says "2012-2016 American Community Survey 5-Year Estimate"

\* “The Census” takes place every 10 years (2000, 2010, 2020, etc.), but between these intervals, the Census Bureau conducts samples to produce intermediate estimates of population and demographics every year. These samples are the American Community Surveys and **include a margin of error**.

# “Community Facts” Finding Useful Information

Versions of this table are available for the following years:

**2016** ▶

2015

2014

2013

2012

2011

2010

Subject	Carrboro town, North Carolina			
	Estimate	Margin of Error	Percent	Percent Margin of Error
SEX AND AGE				
Total population	20,867	+/-41	20,867	(X)
Male	9,000	+/-122	47.2%	+/-2.0
Female	11,028	+/-428	52.8%	+/-2.0
Under 5 years	1,131	+/-196	5.4%	+/-0.9
5 to 9 years	1,436	+/-194	6.9%	+/-0.9
10 to 14 years	1,528	+/-217	7.3%	+/-1.0
15 to 19 years	1,020	+/-224	4.9%	+/-1.1
20 to 24 years	2,324	+/-370	11.1%	+/-1.6
25 to 34 years	4,333	+/-470	20.8%	+/-2.3
35 to 44 years	3,152	+/-398	15.1%	+/-1.9
45 to 54 years	2,732	+/-348	13.1%	+/-1.7
55 to 59 years	1,114	+/-232	5.3%	+/-1.1
60 to 64 years	848	+/-211	4.1%	+/-1.0
65 to 74 years	737	+/-177	3.5%	+/-0.8
75 to 84 years	394	+/-131	1.9%	+/-0.6
85 years and over	118	+/-72	0.6%	+/-0.3
Median age (years)	31.1	+/-1.4	(X)	(X)
18 years and over	16,105	+/-332	77.2%	+/-1.6
21 years and over	15,499	+/-402	74.3%	+/-1.9
62 years and over	1,702	+/-219	8.2%	+/-1.1
65 years and over	1,249	+/-177	6.0%	+/-0.8
18 years and over	16,105	+/-332	16,105	(X)
Male	7,524	+/-421	46.7%	+/-2.5
Female	8,581	+/-460	53.3%	+/-2.5
65 years and over	1,249	+/-177	1,249	(X)
Male	525	+/-126	42.0%	+/-9.8
Female	724	+/-176	58.0%	+/-9.8

A new table will appear, showing the population estimates for the year highlighted on the left (2016).

The top number shows the *population estimate* and *margin of error* in 2016.

To see other years of data, simply **click a different year** on the left and the table will automatically update.



# “Community Facts”

How is this useful?

The American Community Surveys are full of interesting data!

Versions of this table are available for the following years:

2016  
2015  
2014  
2013  
2012  
2011  
2010

By looking at population estimates across the years listed, you can determine if your community is growing or shrinking.

Subject	Carrboro town, North Carolina			
	Estimate	Margin of Error	Percent	Percent
SEX AND AGE				
Total population	20,867	+/-41	20,867	
Male	9,839	+/-422	47.2%	
Female	11,028	+/-428	52.8%	
Under 5 years	1,131	+/-196	5.4%	+/-0.9
5 to 9 years	1,436	+/-194	6.9%	+/-0.9
10 to 14 years	1,528	+/-217	7.3%	+/-1.0
15 to 19 years	1,020	+/-224	4.9%	+/-1.1
20 to 24 years	2,324	+/-370	11.1%	+/-1.8
25 to 34 years	4,333	+/-470	20.8%	+/-2.3
35 to 44 years	3,152	+/-398	15.1%	+/-1.9
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85 years and over	118	+/-72	0.6%	+/-0.2
Median age (years)	31.1	+/-1.4	(X)	
18 years and over				
21 years and over				
62 years and over				
65 years and over				
18 years and over				
Male				
Female				
65 years and over				
Male				
Female				

The data also shows how this population is distributed across age groups, and median

This is just the beginning! The Census Bureau also collects information on housing, income, poverty, business & industry, and more.



# Exercise


- 1) Go to <http://factfinder.census.gov>
- 2) Find out your town's or county's population
  - in 2010 (decennial survey)
  - and in 2016 (ACS 2012-2016).



# State Demographers

<https://www.osbm.nc.gov/facts-figures/demographics>

[Home](#) [Budget ▾](#) [Management ▾](#) [Facts & Figures ▾](#) [Library](#) [About OSBM ▾](#) [Contact ▾](#) [...](#)



[County Estimates](#)

There are three parts of the questionnaire as follows:

**Part 1: Demographic of research**


1. Gender

- ☐ 1. Male
- ☐ 2. Female

2. Age

- ☐ 18 – 29 years
- ☐ 30 – 39 years
- ☐ 40 – 49 years

[Municipal Estimates](#)



[County Projections](#)

The State Demographer's Office at OSBM is responsible for producing population estimates and projections. The annual certified [estimates of the population of North Carolina counties](#) and municipalities are used in the distribution of state shared revenues to local governments. In addition, the State Demographer produces standard and revised municipal and county population estimates and [county and state population projections](#) that are used for long range planning by state agencies, regional and local governments and other entities. The county population estimates and projections are available by age, race, Hispanic origin, and sex.

To produce these estimates and projections, the State Demographer develops and enhances complex mathematical computer models, and collects and reviews a variety of data from federal, state, and local government sources. Information about annexations, building activity, and select institutional populations are collected annually from North Carolina municipalities

## Access Population Data



[State Highlights](#) [↗](#)



[Historic Census Data](#)



[Log Into North Carolina \(LINC\)](#)



# Water Billing Data

Account number	Service Address	Monthly Period	Volume (gallons)
1000001	123 Main Street	Jul-13	23000
1000001	123 Main Street	Aug-13	15000
1000001	123 Main Street	Sep-13	14000
1000001	123 Main Street	Oct-13	12000
1000001	123 Main Street	Nov-13	7000
1000001	123 Main Street	Dec-13	6000
1000001	123 Main Street	Jan-14	3000
1000001	123 Main Street	Feb-14	0
1000001	123 Main Street	Mar-14	3000
1000001	123 Main Street	Apr-14	5000
1000001	123 Main Street	May-14	15000
1000001	123 Main Street	Jun-14	21000
578	1000 Apple Drive	Jul-13	1000
578	1000 Apple Drive	Dec-14	6000
578	1000 Apple Drive	May-14	12300
578	1000 Apple Drive	Jun-14	3000
9234	750 Wonder Ave	Nov-13	0
9234	750 Wonder Ave	Dec-13	6500
9234	750 Wonder Ave	Jan-14	7300
9234	750 Wonder Ave	Feb-14	8000
9234	750 Wonder Ave	Mar-14	9000
9234	750 Wonder Ave	Apr-14	0



# Sources of Water Use (Sales) Data

- Your billing records
- Local Water Supply Plans (NC DEQ)
- AFIR data submitted to the Local Government Commission



# Water Billing Data

Account number	Service Address	Monthly Period	Volume (gallons)
1000001	123 Main Street	Jul-13	23000
1000001	123 Main Street	Aug-13	15000
1000001	123 Main Street	Sep-13	14000
1000001	123 Main Street	Oct-13	12000
1000001	123 Main Street	Nov-13	7000
1000001	123 Main Street	Dec-13	6000
1000001	123 Main Street	Jan-14	3000
1000001	123 Main Street	Feb-14	0
1000001	123 Main Street	Mar-14	3000
1000001	123 Main Street	Apr-14	5000
1000001	123 Main Street	May-14	15000
1000001	123 Main Street	Jun-14	21000
578	1000 Apple Drive	Jul-13	1000
578	1000 Apple Drive	Dec-14	6000
578	1000 Apple Drive	May-14	12300
578	1000 Apple Drive	Jun-14	3000
9234	750 Wonder Ave	Nov-13	0
9234	750 Wonder Ave	Dec-13	6500
9234	750 Wonder Ave	Jan-14	7300
9234	750 Wonder Ave	Feb-14	8000
9234	750 Wonder Ave	Mar-14	9000
9234	750 Wonder Ave	Apr-14	0





# Local Water Supply Plans

[https://www.ncwater.org/Water Supply Planning/Local Water Supply Plan/](https://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/)

Annually submitted by all local government and large community water systems to DWR in NC DEQ.

NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

**DIVISION OF WATER RESOURCES**

LOCAL WATER SUPPLY PLANS

About Calendar Contact Jobs News Staff

Login to your report

Overview Learn **Plans** Tour

County:  No-Basin:  Year: 2017

Your search returned 548 results.

PWSID	Water System	Ownership
<a href="#">03-63-020</a>	Aberdeen	Municipality
<a href="#">04-46-010</a>	Ahoskie	Municipality
<a href="#">02-01-035</a>	Alamance	Municipality
<a href="#">01-84-010</a>	Albemarle	Municipality
<a href="#">01-02-020</a>	Alexander County WD	County
<a href="#">01-20-020</a>	Andrews	Municipality
<a href="#">03-43-015</a>	Angier	Municipality
<a href="#">03-04-010</a>	Anson Co	County
<a href="#">03-04-012</a>	Ansonville	Municipality
<a href="#">03-92-045</a>	Apex	Municipality
<a href="#">01-95-101</a>	Appalachian State University	State
<a href="#">02-76-030</a>	Archdale	Municipality
<a href="#">02-76-010</a>	Asheboro	Municipality
<a href="#">01-11-010</a>	Asheville	Municipality
<a href="#">04-16-035</a>	Atlantic Beach	Municipality



# Annual Financial Information Reports

<https://www.nctreasurer.com/slg/lfm/forms-instructions/Pages/Annual-Financial-Information-Report.aspx>

Water sales data annually submitted by *municipalities* to the LGC.

State and Local Government  
State Debt  
Local Debt  
LGC Staff Blog  
Feedback Form  
Local Fiscal Management

**Forms and Instructions**

- Audit and Accounting Resources
- Sample Financial Statements
- Financial Analysis Tools
- Memos
- Other Worksheets and Resources
- Web Links

**LOCAL FISCAL MANAGEMENT**

## Annual Financial Information Report (AFIR)

**Annual Report due by October 31<sup>st</sup> of each year for all Municipalities and Counties in North Carolina**

The Annual Financial Information Report form and process has changed beginning with fiscal year ended June 30, 2012. This form was redesigned in consultation with representatives of local governments, state agencies, Legislative Research, the N.C. League of Municipalities and the N.C. Association of County Commissioners. The US Census and the Department of State Treasurer have partnered to provide a website and data upload process for municipalities and counties in North Carolina.

It is important that you read the PDF instructions below and the instructions on the first tab of the form itself. An AFIR Feedback Form also is supplied below to aid us in making improvement to the process next year. If you have any questions, please call 919-814-4299.

AFIR Forms	Description
<a href="#">PDF Instructions on the AFIR Process</a>	Instructions provide an overview of the Annual Financial Information Report preparation and submission process.
<a href="#">Login Instructions for Year 2017</a>	Instructions for the login process and the email verification process for year 2017.
<a href="#">US Census Website - AFIR</a>	This is a link to the U.S. Census website where the current AFIR form is available for download.
<a href="#">2018 AFIR Template Current Excel Version</a>	The completed 2018 AFIR must be submitted through the U.S. Census website.
<a href="#">2018 AFIR Template Excel Version 97-2003</a>	2018 AFIR Template for Excel Version 97-2003. This template is not available on the U.S. Census website, but may be used and uploaded by those without access to the latest Excel version.
<a href="#">2018 AFIR Feedback Form</a>	Use this form to let us know of any changes you would recommend for next year's process.
<a href="#">AFIR Reports - 2012-Current</a>	Obtain reports of the data collected from Municipalities and Counties for current and past years.

[Explore Forms and Instructions](#)  
[Annual Financial Information Report \(AFIR\)](#)  
[Annual Audit Forms and Resources](#)  
[Cash and Investments](#)  
[Other Post-Employment Benefits \(QPEB\) Resources](#)  
[Non-Audit Services](#)  
[Aids to Financial Statement Preparation](#)  
[Secondary Market Disclosure](#)  
[Ancillary Governmental Participant Investment Program \(AGPIP\)](#)

Click on  
"AFIR Reports – 2012-Current"



## **Figuring Out How Nonresidential Use Might Change**

- Look at trends in billing records
- Talk with the non-residential customers
- Talk with the planners, Councils of Government, Chamber of Commerce, economic development staff, etc.
- Look at trends in industry in your county/community from the Bureau of Labor Statistics



# Using Bureau of Labor Statistics (BLS) Industry Data

BLS provides several methods for comparing employment and wage data. For example, users can *search by*:

- Industry for each county
- County, State for each industry
- County for *all industries*, over time (2014-2017)

Geographic Cross-Sections
1. <a href="#">All states, one industry</a>
2. <a href="#">All counties, one industry</a>
3. <a href="#">All counties in a state, one industry</a>
4. <a href="#">All MSAs, one industry</a>
5. <a href="#">All geographic areas, one industry</a>
NAICS Industries by Geography
6. <a href="#">High-level industries, one area</a>
7. <a href="#">NAICS sectors, one area</a>
8. <a href="#">NAICS sub-sectors, one area</a>
9. <a href="#">NAICS 4-digit industries, one area</a>
10. <a href="#">NAICS 5-digit industries, one area</a>
11. <a href="#">NAICS 6-digit industries, one area</a>
12. <a href="#">All industry levels, one area</a>
Data by Establishment Size Class
13. <a href="#">National, one industry group, by size</a>
14. <a href="#">National, one industry, all sizes</a>
15. <a href="#">All states, one industry, by size</a>
16. <a href="#">One state, one industry group, by size</a>
17. <a href="#">One state, one industry, all sizes</a>
Multi-Year Data
18. <a href="#">One area, one industry, quarterly</a>
19. <a href="#">One area, one industry, annually</a>
20. <a href="#">One state, one industry, by size, quarterly</a>
21. <a href="#">National, one industry, by size, quarterly</a>

[https://data.bls.gov/cew/apps/data\\_views/data\\_views.htm](https://data.bls.gov/cew/apps/data_views/data_views.htm)



## Creating a Table: *All Counties in a State, One Industry*

1. Navigate to the [BLS Quarterly Census of Employment and Wages](#) site
2. Click on **3. All counties in a state, one industry** under “tables” on the left.
3. Select your **state**, the **year** and **quarter** of interest, and the **industry ownership type**.
4. Scroll through the industry types and select **one**.
5. Click “Get Table”

**All Counties in a State, One Industry**

Counties in:

Year:

Quarter:

Ownership:

Industry:

- 101 Goods-producing
- 1011 Natural resources and mining
- 1012 Construction
- 1013 Manufacturing
- 102 Service-providing
- 1021 Trade, transportation, and utilities
- 1022 Information
- 1023 Financial activities
- 1024 Professional and business services
- 1025 Education and health services
- 1026 Leisure and hospitality

Search Industry:

☐ Show records with suppressed employment and wages.



## Creating a Table: *All Industry Levels, One Area*

1. Navigate to the [BLS Quarterly Census of Employment and Wages](#) site
2. Click on **12. All industry levels, one area** under “tables” on the left.
3. Select the **year and quarter** of interest and the **industry ownership type**.
4. Scroll through the list of “Areas” (or use the search bar) and **select a county and state**.
5. Click “Get Table”

**All Industry Levels, One Area**

Year: 2018 ▾

Quarter: First Quarter ▾

Ownership: Private ▾

Area: US000 - U.S. TOTAL

- 01000 - Alabama - Statewide
- 01001 - Autauga County, Alabama
- 01003 - Baldwin County, Alabama
- 01005 - Barbour County, Alabama
- 01007 - Bibb County, Alabama
- 01009 - Blount County, Alabama
- 01011 - Bullock County, Alabama
- 01013 - Butler County, Alabama
- 01015 - Calhoun County, Alabama
- 01017 - Chambers County, Alabama
- 01019 - Cherokee County, Alabama

Search Area:  Find

Get Table

☐ Show records with suppressed employment and wages.





## Creating a Table: *One Area, One Industry, Annually*

1. Navigate to the [BLS Quarterly Census of Employment and Wages](#) site
2. Click on **19. One area, one industry, annually** under “tables” on the left.
3. Select the **beginning and ending years** of interest
4. Scroll through the “**Areas**” (or use the search bar) and select ***the county and state*** of interest.
5. Select the **ownership** type.
6. Scroll through the “**Industry**” list (or search) and select *one*.
7. Click “Get Table”

**Multi-Year Annual Data,  
One Area and Industry**

Period: 2016 ▼ to 2017 ▼

Area: US000 - U.S. TOTAL  
01000 - Alabama - Statewide  
01001 - Autauga County, Alabama  
01003 - Baldwin County, Alabama  
01005 - Barbour County, Alabama  
01007 - Bibb County, Alabama  
01009 - Blount County, Alabama

Search Area:  Find

Ownership: Private ▼

Industry: 10 Total, all industries  
101 Goods-producing  
1011 Natural resources and mining  
1012 Construction  
1013 Manufacturing  
102 Service-providing  
1021 Trade, transportation, and utilities

Search Industry:  Find

Get Table





# “Get Table”...What does the output mean?

Example: using 12. All industry levels, one area

Private, All Industry Aggregations, Montgomery County, North Carolina  
2018 First Quarter, All Establishment Sizes  
Source: Quarterly Census of Employment and Wages - Bureau of Labor Statistics

We selected  
this  
information

Table Filter: (Filter Value)  Apply Clear

Page 1 of 3 < >

Display 75 rows per page

[Download Source Data](#) [Build Another Table](#)

Industry	Quarterly Establishments	January Employment	February Employment	March Employment	Total Quarterly Wages	Average Weekly Wage	March Employment Location Quotient	Total Quarterly Wages Location Quotient
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
10 Total, all industries	468	7,458	7,464	7,486	\$64,881,479	\$668	0.96	0.93
101 Goods-producing	139	3,772	3,778	3,800	36,688,604	746	2.81	2.69
1011 Natural resources and mining	22	152	152	159	1,228,174	612	1.39	1.11
1012 Construction	54	423	439	446	4,324,148	763	1.01	1.11
1013 Manufacturing	63	3,197	3,187	3,195	31,136,282	750	4.00	3.61
102 Service-providing	329	3,686	3,686	3,686	28,192,875	588	0.57	0.50
1021 Trade, transportation, and utilities	119	1,134	1,143	1,137	8,668,325	586	0.66	0.69
1022 Information	5	36	35	34	415,175	912	0.19	0.13
1023 Financial activities	36	206	206	207	2,511,991	936	0.40	0.26
1024 Professional and business services	43	507	504	495	3,977,796	610	0.38	0.26
1025 Education and health services	42	1,106	1,103	1,105	9,062,539	631	0.77	0.87
1026 Leisure and hospitality	49	446	435	455	1,723,085	298	0.45	0.51
1027 Other services	35	251	260	253	1,833,964	554	0.90	1.16
NAICS 11 Agriculture, forestry, fishing and hunting	22	152	152	159	1,228,174	612	2.19	3.34
NAICS 112 Animal production and								

This is our  
quantity of  
output

# “Get Table”...What does the output mean?

Example: using 12. All industry levels, one area

Private, All Industry Aggregations, Montgomery County, North Carolina  
2018 First Quarter, All Establishment Sizes  
Source: Quarterly Census of Employment and Wages - Bureau of Labor Statistics

Table Filter: (Filter Value)  Apply Clear

Page 1 of 3 < >

Display 75 rows per page

[Download Source Data](#) [Build another table](#)

Industry	Quarterly Establishments	January Employment	February Employment	March Employment	Total Quarterly Wages	Average Weekly Wage	March Employment Location Quotient	Total Quarterly Wages Location Quotient
<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
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NAICS 11 Agriculture, forestry, fishing and hunting	22	152	152	159	1,228,174	612	2.19	3.34
NAICS 112 Animal production and								

To download this data into Excel, click this link.

Each row shows the employment, wages, and “location quotient” for the associated industry



# “Get Table”...What does the output mean?

Example: using 12. All industry levels, one area

Private, All Industry Aggregations, Montgomery County, North Carolina  
 2018 First Quarter, All Establishment Sizes  
 Source: Quarterly Census of Employment and Wages - Bureau of Labor Statistics

Table Filter:

Page 1 of 3

[Download Source Data](#) [Build Another Table](#)

Display 75 rows per page

Industry	Quarterly Establishments	January Employment	February Employment	March Employment	Total Quarterly Wages	Average Weekly Wage	March Employment Location Quotient	Total Quarterly Wages Location Quotient
<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>	<input type="button" value="V"/> <input type="button" value="A"/>
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NAICS 11 Agriculture, forestry, fishing and hunting	22	152	152	159	1,228,174	612	2.19	3.34
NAICS 112 Animal production and								

The location quotient is an industry's share of employment/wages in this area *relative to the nation as a whole*.

Example:  
 In March 2018 in Montgomery Co, NC,  
**Manufacturing is 4x more concentrated in the region than average.**



## “Get Table”...How is this output useful?

- Depending on what you're interested in, the data can help tell a compelling story...

What is the dominant industry in my area?

How have employment and wages changed over time in my area?

How important is a single industry to my area?

What industries pay the highest average weekly wage?

How important is a single industry to the entire state?





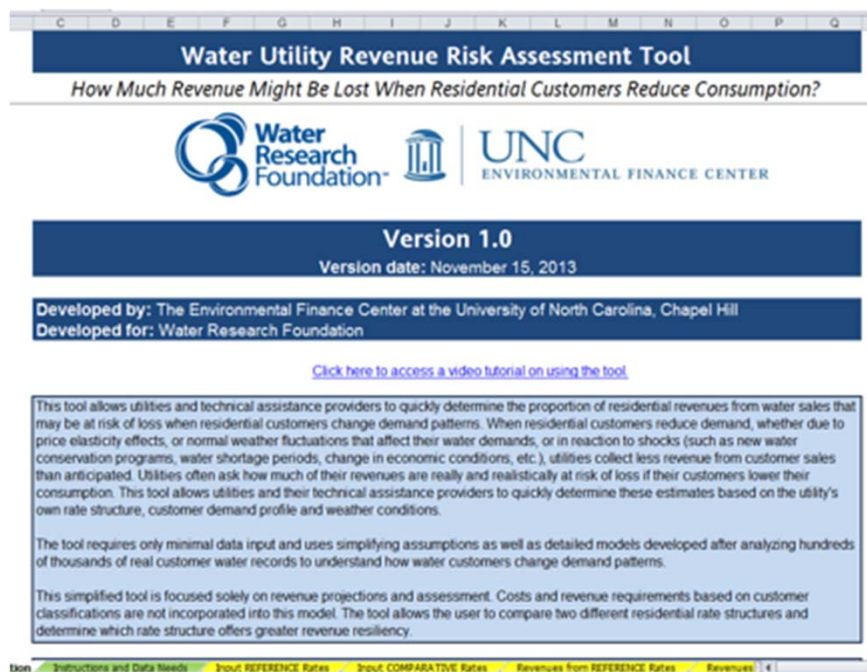
## **What to Assess for Your Utility – Part 2**

Potential risk to your revenues:

- From your billing records, calculate revenues generated from volumetric rates and by the number of customers (fixed charges)
- Or use existing tools to make these assessments



# Water Utility Revenue Risk Assessment Tool



Free to download and use at  
[www.waterrf.org](http://www.waterrf.org)  
[www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)

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



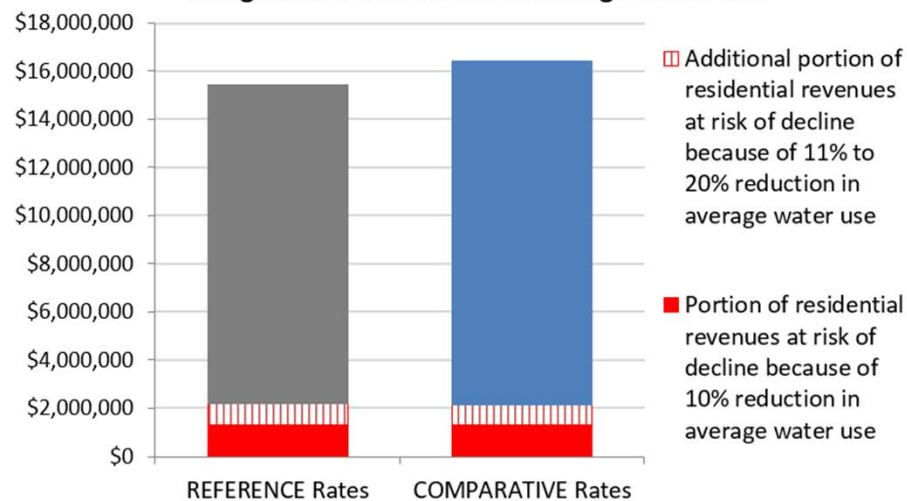


## Water Utility Revenue Risk Assessment Tool

### Comparing Revenues After a Significant Decline in Water Use

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

**Portions of Annual Revenues under REFERENCE and COMPARATIVE Rate Structures that are at Risk of Loss Due to Significant Reductions in Average Water Use**



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

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



# AWE Sales Forecasting and Rate Model

Available for  
Alliance for Water Efficiency members  
<http://www.financingsustainablewater.org/>

A project of the  
 Alliance for Water Efficiency

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**Building Better Water Rates for an Uncertain World**

**AWE Sales Forecasting and Rate Model**

Rate Model Video Tutorials

Request Tools

**Rate Model User Guide**

**Appendices: Costing Methods, Demand Forecasting and Revenue Modeling**

**Communications Tools**

**RATES HANDBOOK**  
Building Better

## AWE Sales Forecasting and Rate Model

The AWE Sales Forecasting and Rate Model is a new analytical tool that can explicitly model the effects of rate structures. Typical water rate models assume that future sales are known with certainty, and do not respond to price, weather, the economy, or supply shortages — that is to say, not the world we live in. The AWE Sales Forecasting and Rate Model addresses this deficiency and enables analysis of the following:

- Customer Consumption Variability – weather, drought/shortage, or external shock
- Demand Response – Predicting future block sales (volume and revenue) with empirical price elasticities
- Drought Pricing – Contingency planning for revenue neutrality
- Probability Management – Risk theoretic simulation of revenue risks
- Fiscal Sustainability – Sales forecasting over a 5 Year Time Horizon

The Rate Design Module can answer these questions:

- What effect would increasing the top tier rate by 15% have on water demand?
- Will shifting to seasonal rates cause water use to increase or decrease?
- What block rate design could allow us to preserve our current level of revenue while reducing demand?
- How should we adjust rates to support our water demand management objectives during water shortages?
- What proportion of customer bills will

The visualization includes a table titled 'No Change in Average and Median Annual Water Consumption for Customer Class' comparing 'Average Annual Water Volume (GPD)' and 'Median Annual Water Volume (GPD)' for different customer classes. It also features a 'Probability Index' color scale from 0.00 to 1.00, a 'Rate Design' table showing 'No. of Bills Increasing by' and 'No. of Bills Decreasing by' for various rate scenarios, and a 'Single Family Customer Class Bill Impact Histogram' showing the distribution of bills.



# **Perspectives from the Local Government Commission**



# **Strategies to Mitigate Losses from Declining Demands**



## **Group Exercise: What Would You Do?**

You will be assigned into groups.

Please discuss and list as many strategies you can think of to deal with the scenario provided to your group.

If you need more information than what's in your handout, please note it down.

Need one note-taker and someone to report out to the whole room at the end.





## **Group Exercise – Report Out:**

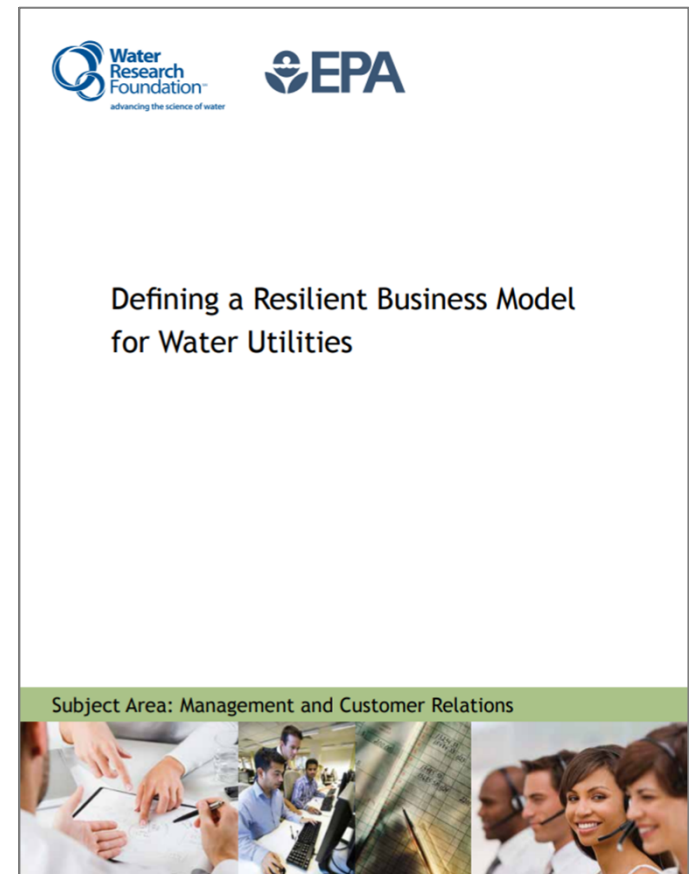
- Scenario 1: ACME Industries Leaving Town!
- Scenario 2: Where's Everyone Going?
- Scenario 3: Change is the Only Constant.



# Defining a Resilient Business Model for Water Utilities

<http://www.waterrf.org/Pages/Projects.aspx?PID=4366>

1. Background and Methods
2. Assessing the Revenue Resilience of the Industry's Business Model
3. Factors Influencing Revenue Resiliency
4. **Strategies and Practices for Revenue Resiliency**
5. Conclusions and Recommendations





# Surviving or Thriving in Economic Recession

<https://efc.sog.unc.edu/resource/surviving-or-thriving-economic-recession-strategies-water-utility-leaders>

Notes from a forum of leading water utility executives from across the country in 2009.



Surviving or Thriving  
in Economic Recession:

Strategies of Water  
Utility Leaders

Subject Area: Management and Customer Relations





## **Session 4:**

# **Financial Strategies to Mitigate Losses from Declining Demands**



# Financial Strategies

- Reduction and management of operating costs
- Management of capital expenditures and debt refinancing
- Build up reserves
- Revenue enhancement and rethinking utility services
- Rate adjustment approaches
- Alternative rate designs
- Financial performance targets



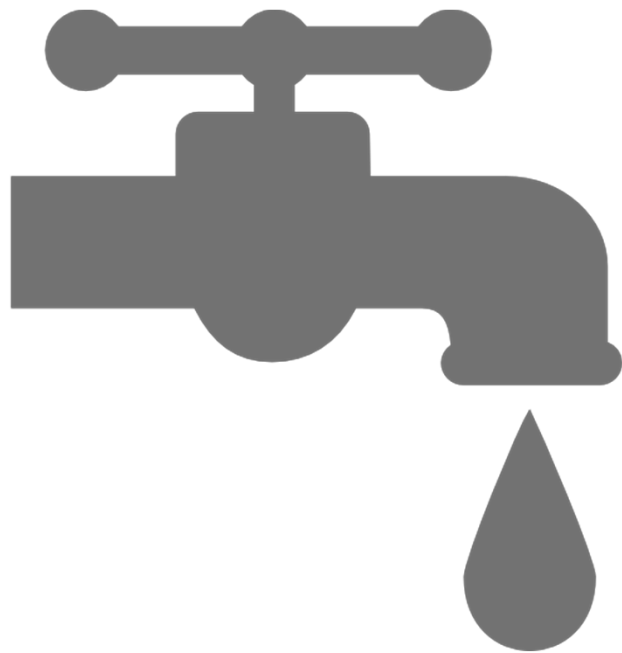


# O&M Cost Reductions

What are some ways you can reduce or manage your operating and maintenance costs?



## Non-Revenue Water / Water Loss



Limit the amount of water that leaks out of pipes and the amount for which we don't charge.



# Asset Management



Maximize the useful life of assets, and reduce maintenance costs by prioritizing rehabilitation/replacement projects on what needs it the most.



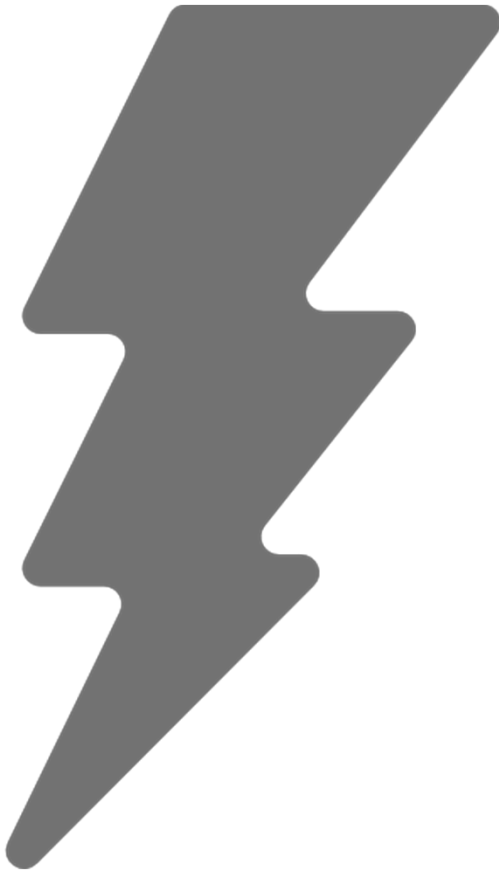
## Partnerships with Other Water Systems



Purchase supplies in bulk.  
Contract labor part-time.  
Share equipment. Train  
each other.



# Energy Management



Reduce and optimize  
energy use.





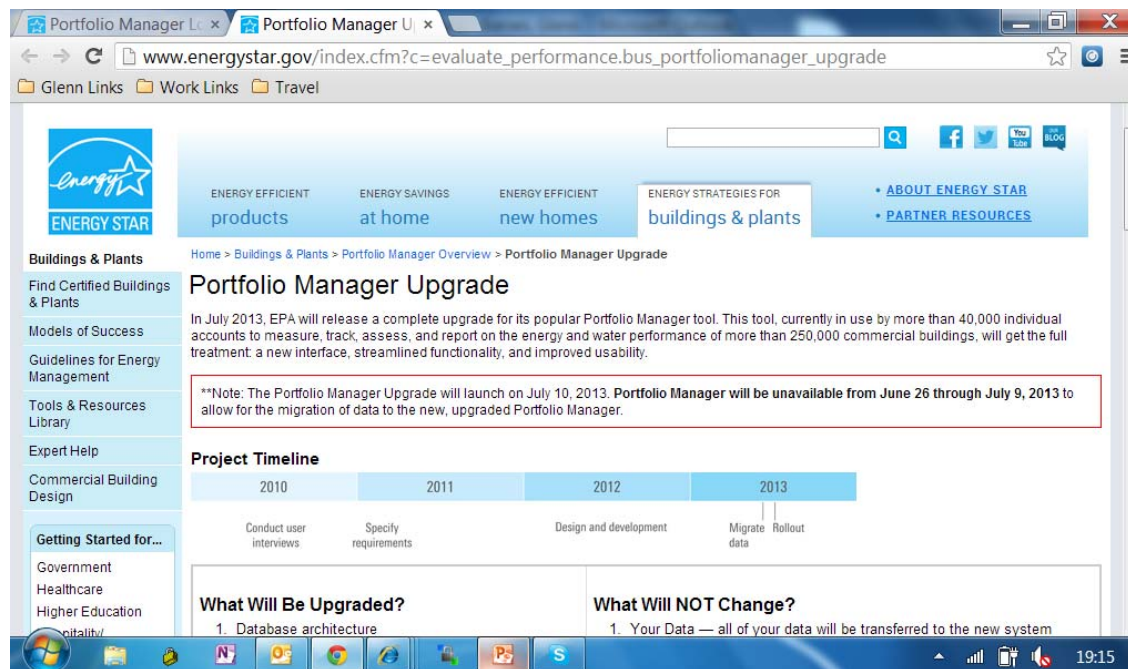
# Energy Management Techniques

- Equipment changes
- Process changes
- Time of operation changes
- Billing rates changes
- Electricity generation
- Reducing water loss

# Use the Energy Portfolio Manager

<https://www.energystar.gov/istar/pmpam/>

Portfolio Manager is an interactive energy management tool that allows you to track and assess energy consumption online.



The screenshot shows a web browser window with the URL [www.energystar.gov/index.cfm?c=evaluate\\_performance.bus\\_portfolio.manager\\_upgrade](http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfolio.manager_upgrade). The page features the Energy Star logo and navigation links for 'ENERGY EFFICIENT products', 'ENERGY SAVINGS at home', 'ENERGY EFFICIENT new homes', and 'ENERGY STRATEGIES FOR buildings & plants'. A sidebar on the left lists categories like 'Buildings & Plants', 'Find Certified Buildings & Plants', 'Models of Success', 'Guidelines for Energy Management', 'Tools & Resources Library', 'Expert Help', and 'Commercial Building Design'. The main content area is titled 'Portfolio Manager Upgrade' and includes a notice: 'In July 2013, EPA will release a complete upgrade for its popular Portfolio Manager tool. This tool, currently in use by more than 40,000 individual accounts to measure, track, assess, and report on the energy and water performance of more than 250,000 commercial buildings, will get the full treatment: a new interface, streamlined functionality, and improved usability.' A red-bordered box contains a note: '\*\*Note: The Portfolio Manager Upgrade will launch on July 10, 2013. Portfolio Manager will be unavailable from June 26 through July 9, 2013 to allow for the migration of data to the new, upgraded Portfolio Manager.' Below this is a 'Project Timeline' table showing the progression from 2010 to 2013. The timeline is as follows:

2010	2011	2012	2013
Conduct user interviews	Specify requirements	Design and development	Migrate data, Rollout

At the bottom, there are two sections: 'What Will Be Upgraded?' with the point '1. Database architecture' and 'What Will NOT Change?' with the point '1. Your Data — all of your data will be transferred to the new system'.



## **Other Strategies to Reduce O&M Costs**

- Apply integrated planning strategies
- Change policies and practices
- Track, monitor, and manage expenditures



# Management of Capital Expenditures

- Have a capital plan
- Have a plan on how to fund capital (debt or cash?)
- Explore and test funding scenarios
- Look into debt refinancing if applicable
- Get a (higher) credit rating
- Partner with other utilities on regional capital projects to reduce costs and achieve higher priority points



# Plan to Pay: Scenarios to Fund your C.I.P.

<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 list your capital projects and plans for funding them, and automatically estimates rate increases

Tool developed by  
**UNC ENVIRONMENTAL FINANCE CENTER**

## Plan to Pay: Scenarios to Fund your C.I.P. (Capital Improvement Plan)

Version 2.6 (Updated November 2015)

20-year capital planning    Debt and/or capital reserve financing options    Guided data inputs    Simple data needs

Financial dashboard outputs    Estimates necessary rate increases over time to pay for capital projects

**Start**

1) Use tabs at bottom of screen and buttons to navigate to different pages.

2) In **"Data Input 1"**, enter utility characteristics, rates and usage information in blue cells.

3) In **"Data Input 2"**, enter details on capital improvement projects in the light blue cells. Each row is a different project.

4) In **"20-Year Projections"**, view your fund balance projections for 20 years and observe the estimated rate increases needed each year to pay for your Capital Improvement. No data entry required on this page.

5) After all your utility information and capital improvement project details are entered, go to the **"Dashboard"** to view long term trends in your financial reserves, rate increases and average bills, and capital investments.

**INSTRUCTIONS**

**FINANCED**

Financed	\$	950,000
at	\$	750,000

**Pre-Exist**

Input amount incurred for

**NAME OF UTILITY**

Type of Utility

Water or

**Current Fiscal Year**

FY15

Only capital projects that start next year (i.e., in FY16) for the next 20 years can be included in this Capital Improvement Plan.

**Water and Sewer Rates in FY15**

Input the residential customer water & sewer rates at 5,000 gallons/month of use for FY15. Round to monthly rates.

Volume Rate at 5,000 gallons/month (5,000 gallons)

Monthly Rate (Volume Rate)

Monthly Rate (Sewer Rate)

**Expected Revenues and Expenses in FY15**

Annual Operating and Non-Operating Revenues

Annual Non-Capital Expenses (Water, Sewer, etc.)

Expected Annual Deficit of Expenses (FY15)

**Usage Billed to Customers in FY15**

Residential

Non-Residential

Number of Customers

Total Monthly Use (1,000's of gallons)

Annual Customer Rate (Monthly Payment)

**CAPITAL IMPROVEMENT PROJECTS - 20 YEARS**

Project Name	Project Construction Period	Project Construction Cost	Annual Construction Cost	Estimated Cost at the End of the Year
Project 1	FY15 - FY16	\$1,000,000	\$500,000	\$500,000
Project 2	FY16 - FY17	\$1,000,000	\$500,000	\$1,000,000
Project 3	FY17 - FY18	\$1,000,000	\$500,000	\$1,500,000
Project 4	FY18 - FY19	\$1,000,000	\$500,000	\$2,000,000
Project 5	FY19 - FY20	\$1,000,000	\$500,000	\$2,500,000

**20-Year Projections**

	FY15	FY16	FY17	FY18
<b>Estimated Rate Changes Needed to Maintain the Fund Balance</b>				
Year Increase (Decrease) in Rates (Sewer and Water)	N/A	0.0%	0.1%	2.0%
Increase (Decrease) in the Monthly Bill for 5,000 Gallons	N/A	\$0.00	\$1.01	\$0.79
Increase (Decrease) in the Monthly Rate Charge	N/A	\$0.00	\$0.61	\$0.34
Monthly Rate Charge (Minimum Charge)	\$12.34	\$12.34	\$12.95	\$13.31
Volume Rate at 5,000 gallons/month (5,000 gallons)	\$1.67	\$1.67	\$1.96	\$1.11
Volume Included with the Base Charge (1,000's of gallons)	2	2	2	2
Approximate Monthly Charge for 5,000 gallons (S)	\$29.35	\$29.35	\$30.96	\$31.65
<b>Projected Fund Balance</b>				
Total Assets	\$ 1,110,000	\$ 1,001,000	\$ 1,000,000	\$ 1,000,000
Base Charges	\$ 1,110,000	\$ 1,110,000	\$ 1,110,000	\$ 1,110,000
Usage Charges	\$ 3,170,000	\$ 3,170,000	\$ 3,170,000	\$ 3,170,000
Interest Earned from Previous Year's Positive Balance	\$ 0	\$ 0	\$ 0	\$ 0
Revenues from Other Sources (Reserve Charges)	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000

**Financial Reserves (End of Year)**

**Rate Increases**

**Total Capital Expenses**

**Total Cumulative System Investment**





# Build Up Reserves

Do this early – before signs of problems.

If you are already suffering from loss of customers or water use, it might be too late, unless you can raise rates.



## Many Types of Reserve Funds

- **Capital Reserve Fund**—Infrastructure rehabilitation and replacement
- **Repair Fund**—Known, ongoing maintenance issues
- **Emergency Fund**—Unknown, unanticipated maintenance issues
- **Rainy Day Fund**—Unexpected revenue shortfalls



# Many Types of Reserve Funds

- Debt Service Reserves
- Rate Stabilization Reserves
- Operating Reserves
- Renewal and Extension Reserves
- Capital Project Reserves
- Insurance Reserves



# How Much Do You Need In Your Reserves?

It depends.

- Enough to pay for your most expensive piece of equipment?
- Enough to cover your costs if you had no revenue for two months?
- Enough to cover the projects in your capital improvement plan?



## **How Much Do You Need In Your Reserves Specifically to Deal with Declining Demands?**

Look into setting a minimum target for a reserve fund to cover a reasonable decline in revenues so that you can continue to operate the water system and buy yourself enough time to make additional adjustments to mitigate the loss.





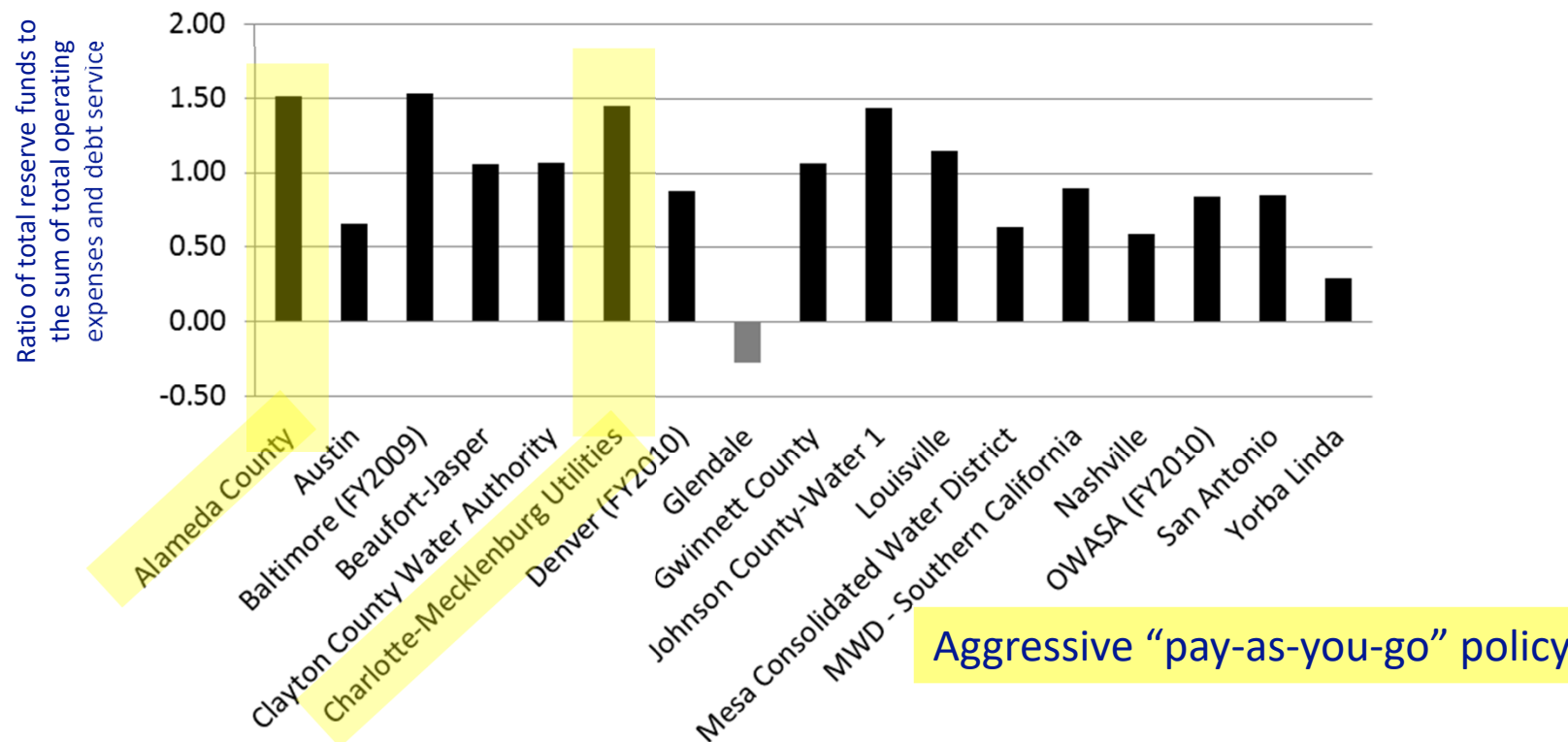
## Examples of Targets for Rate Stabilization Reserves

Utility	Reserve Fund Targets
City of Minneapolis <sup>1</sup>	15% of revenue budget for the next year
Orange Water and Sewer Authority <sup>2</sup>	The greater of 33% of O&M budget or 20% of the total estimated cost of the succeeding 3 years of the CIP budget
Baltimore Dept. of Public Works <sup>3</sup>	Minimum of 90 days cash on hand
Alameda County Water District <sup>4</sup>	Sufficient to meet operating, capital, and debt service obligations
Charlotte-Mecklenburg Utilities <sup>5</sup>	100% of operating expenses for the current budget
Water District No.1 of Johnson County <sup>6</sup>	The Board will be notified when the rate stabilization reserve reaches a minimum level of \$2 million

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# Reserve: Levels



Data obtained from partner utility CAFRs. Unless otherwise indicated, the data used in these calculations is from the 2011 fiscal year. These ratios were obtained by taking the total reserve fund level and dividing it by total operating expenses including depreciation for the most recent fiscal year with available data.

**Ratio of total reserve funds to the sum of total operating expenses and debt service**

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# Minimum Cash on Hand Target

Shallotte, NC (2,300 accounts):

“Our Board of Aldermen have always used a 90% rule: keeping at least 90% of current budget on hand in case of emergencies.

Being a coastal community, **we realize that a hurricane could do significant damage.”**

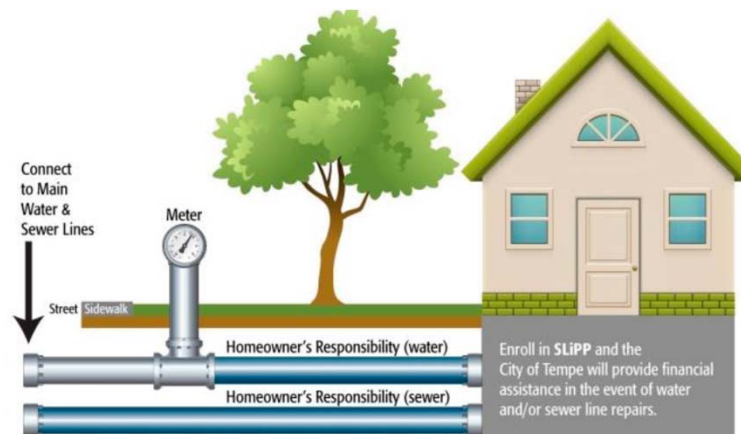


# Revenue Enhancement

- Raise rates and fees
- Generate new revenue from other sources: rethink your utility services!

# Rethinking Utility Services – Generating Revenue Beyond Rates

- Water Research Foundation Report on:  
*Expanding Water Utility Services Beyond Water Supply.*  
#4171.  
<http://www.waterrf.org/Pages/Projects.aspx?PID=4171>
- Specific services profiled
  - Service Line Protection
  - Public Fire Protection







# Other New Sources of Revenue

- Rent space for use or advertisement
- Lease water towers for antennas
- Recreational access fees
- Generate and sell renewable energy
- Sell bottled water
- Reuse water sales
- Sell your services to neighboring water systems:
  - Meter reading
  - Billing
  - Lab / water testing
  - Engineering / planning
  - Project management



# Automatic Rate Increases

If it's politically difficult to raise rates as often as you need to, consider ways to set automatic rate increases.



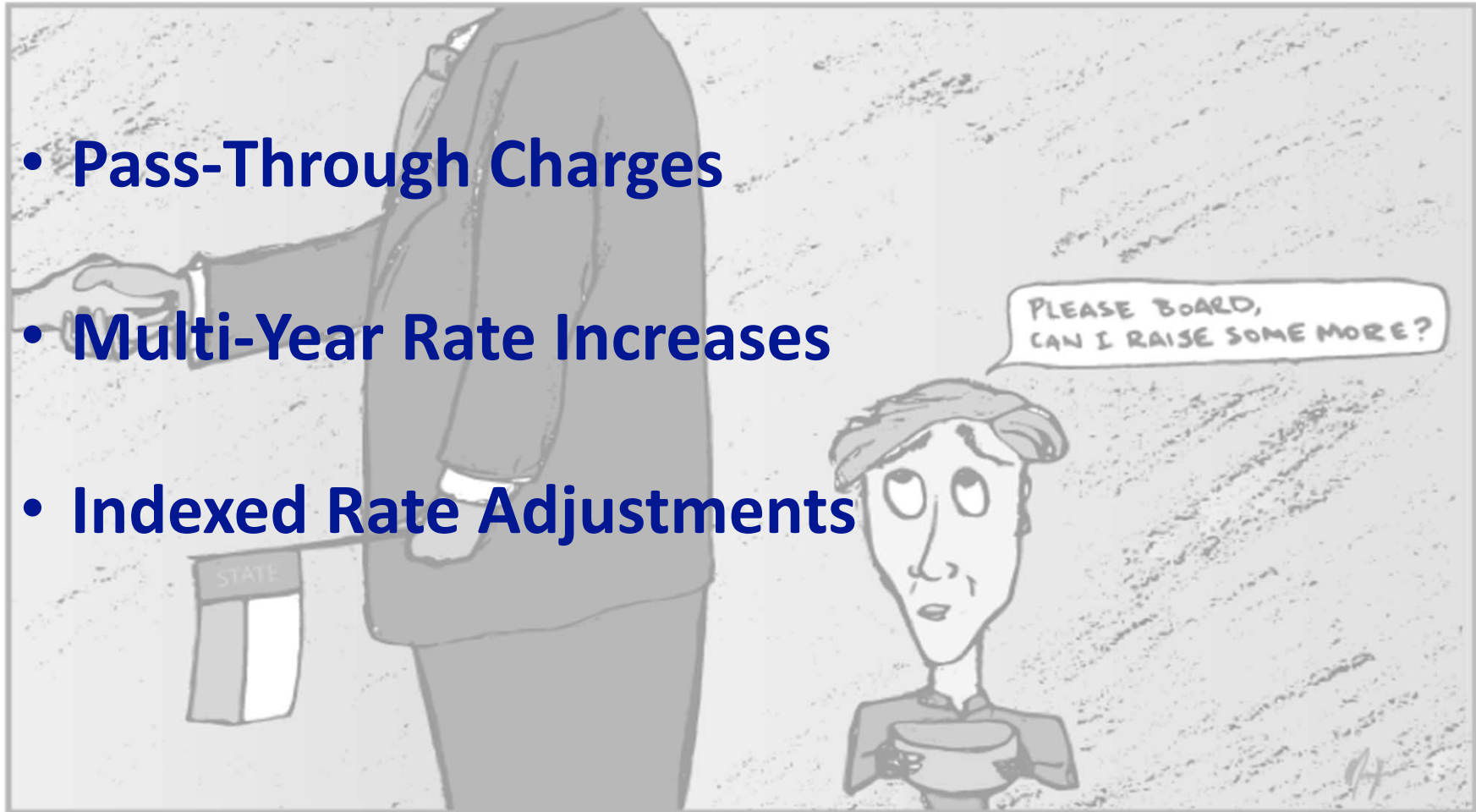
# Rate Adjustment Approaches





# Rate Adjustment Approaches

- **Pass-Through Charges**
- **Multi-Year Rate Increases**
- **Indexed Rate Adjustments**



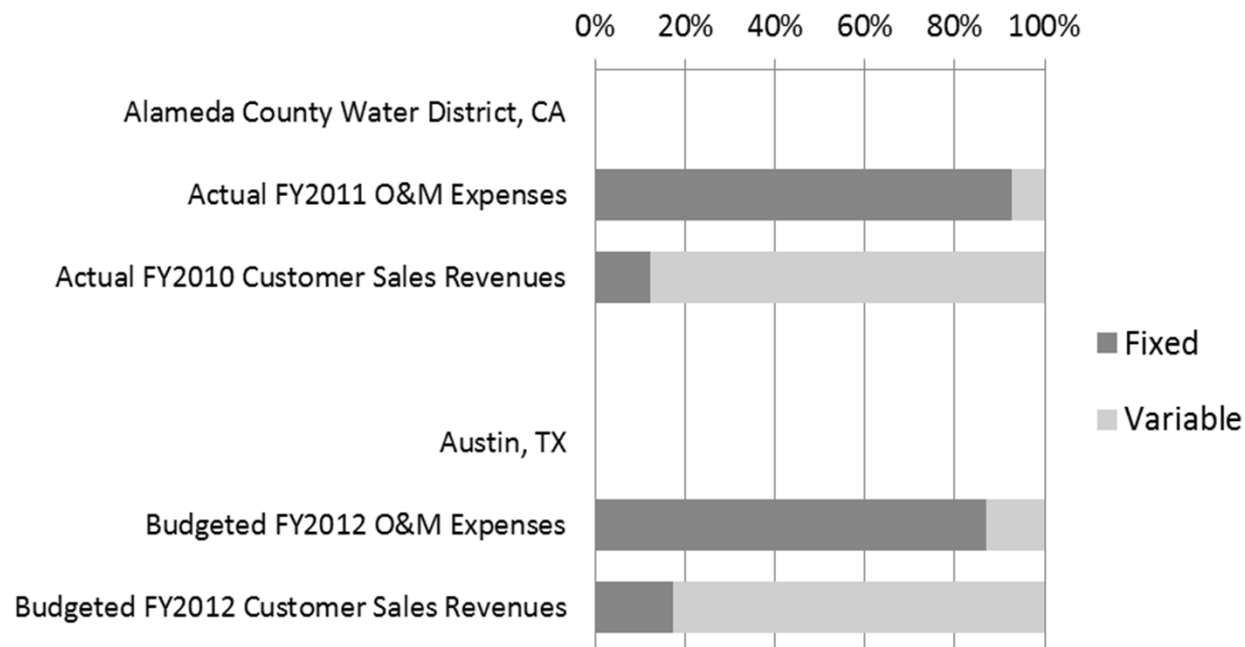


# Adjust Rate Structure Design

- If average water use is declining but number of customers is not, consider shifting revenue generation more towards the fixed charges
- Consider alternative innovative rate models that with have much less (or nearly no) dependence on revenues from high volume or high block sales



# Fixing this Disparity



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Sources: Alameda County Water District's Financial Plan model and Austin Water's FY2012 budget estimations in the Reference Material to the Joint Subcommittee on Resource Management Commission, Water & Wastewater Commission, and Impact Fee Advisory Committee.

**Fixed versus variable operations and maintenance (O&M) expenses and customer sales revenues**





# Higher Base Charge

## Maysville, NC

**\$7.50/month**

+ \$4.75/1000 gallons between 0 – 10k  
+ \$5.25/1000 gallons between 11k – 25k  
+ 2 more blocks

Resulted in:

72% variable revenues

**28% fixed revenues**

## Readsboro, VT

**\$38.00/month** includes 4,000 gallons

+ \$9.50/1000 gallons above 4,000

Resulted in:

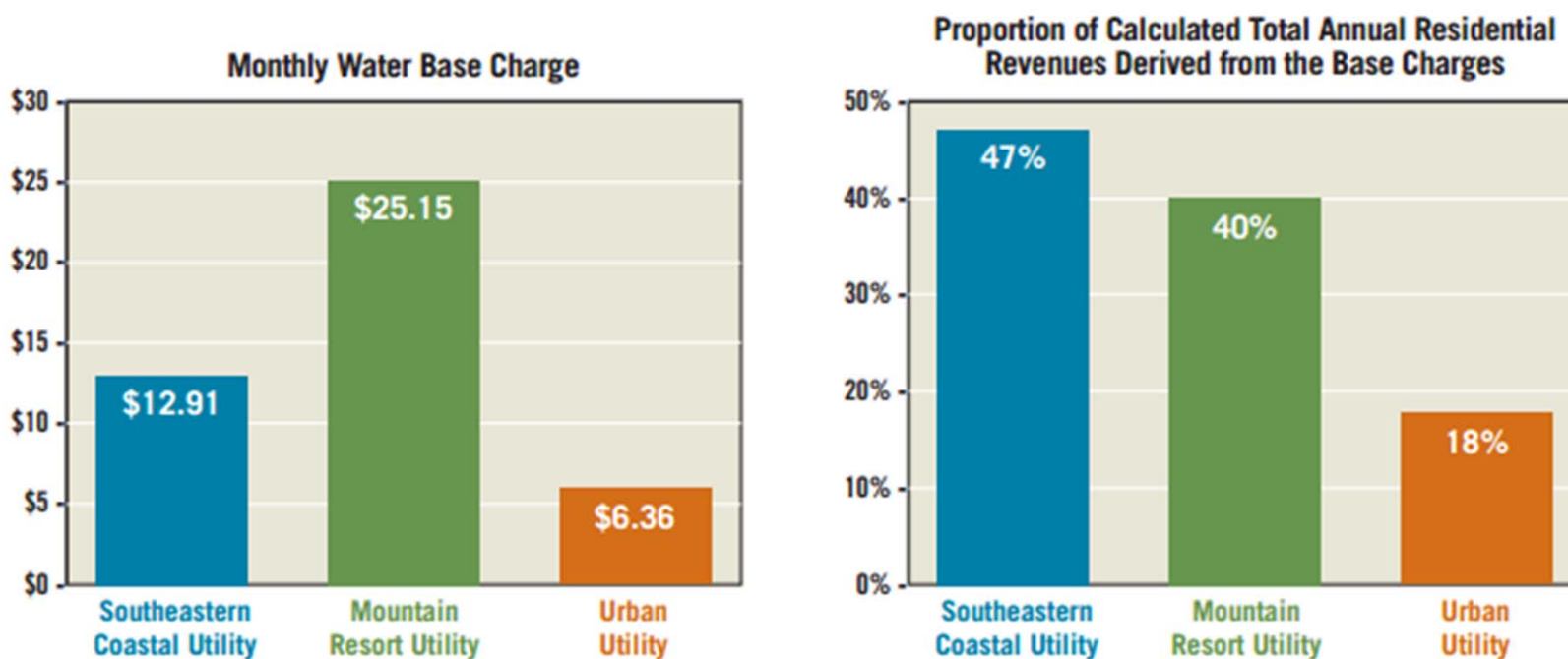
24% variable revenues

**76% fixed revenues**



# However High Base Charges Alone Do Not Shield All Utilities from Revenue Vulnerability

**Figure 5: Monthly Water Base Charge & the Proportion of Annual Revenues Derived from Base Charges in the Three Utilities in 2013**



Source: Eskaf, S. et al. (2014). *Measuring & Mitigating Water Revenue Variability: Understanding How Pricing Can Advance Conservation without Undermining Utilities' Revenues Goals*. Ceres report. [www.ceres.org](http://www.ceres.org) or [www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)



# Alternative Pricing Models

Shift nearly all revenue generation onto the base charge. But the base charge are customized on each individual customer's water demands.

Three alternative rate models described in a whiteboard video:  
<http://www.waterrf.org/Pages/Projects.aspx?PID=4366>



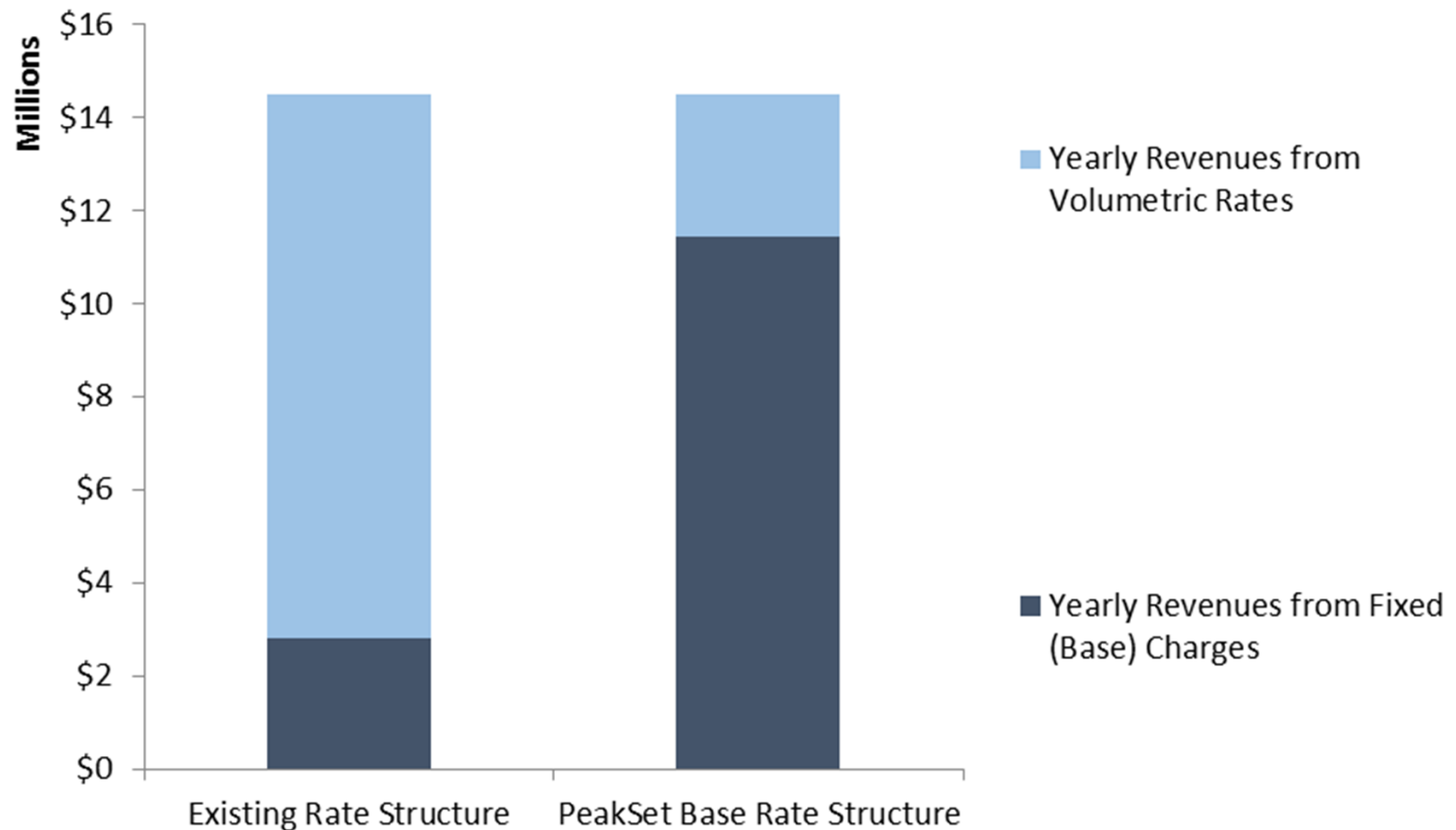
water\$lips



Read more at <http://www.efc.sog.unc.edu/project/alternative-water-pricing-models>

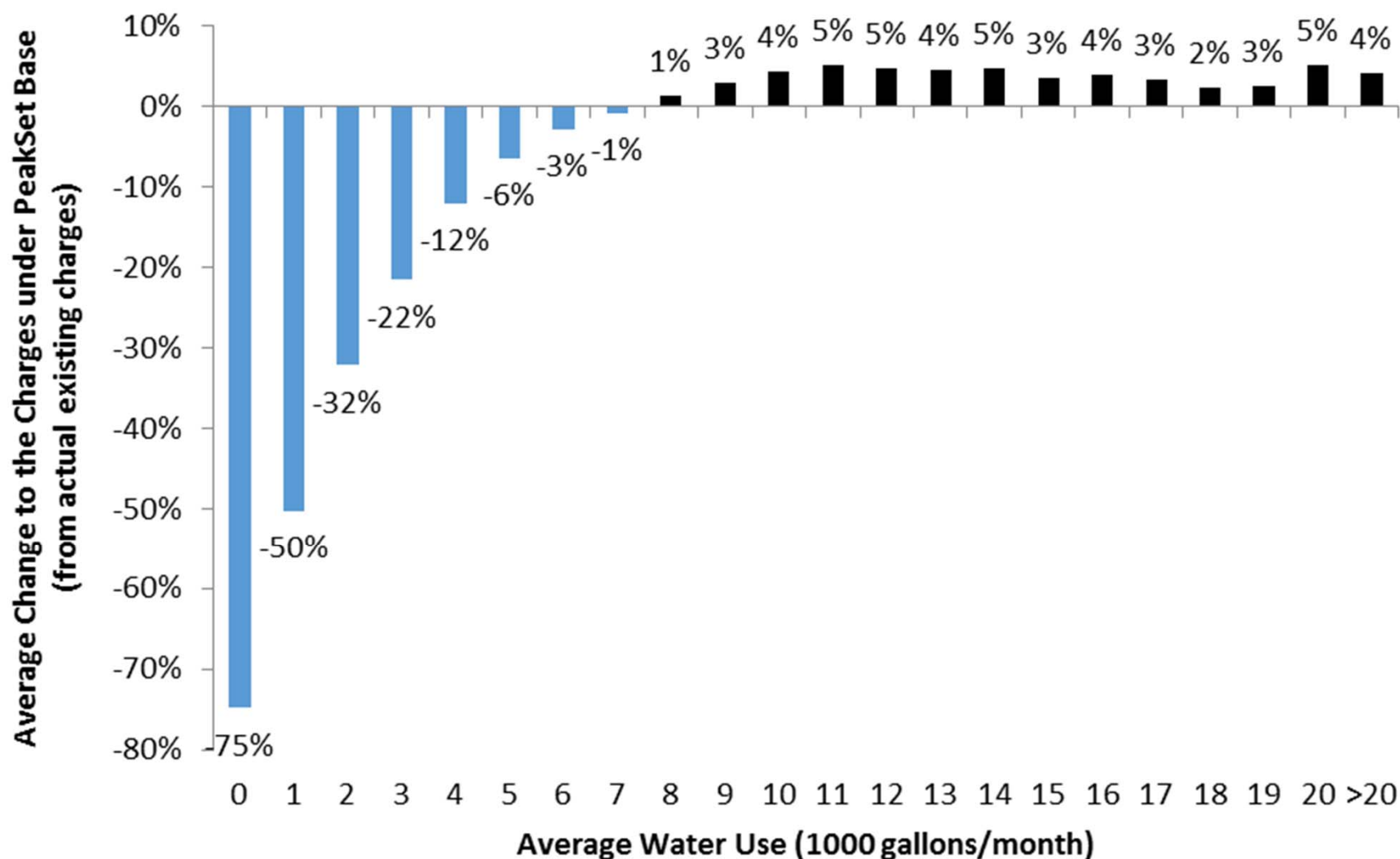


**In this revenue-neutral scenario, the PeakSet Base rate structure would generate much greater fixed charges than the existing rate structure**





## Low water use customers would pay much less under PeakSet Base than under the current rate structure





# PeakSet Base Model

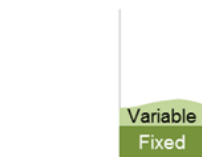
A customer's base charge for next 12 months would be individually set based on their individual historic peak demand

Monthly Water Use

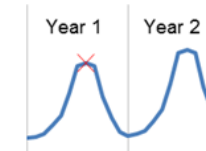
Monthly water bills under a **typical** uniform rate structure

Monthly water bills under a PeakSet Base rate structure

Residential Customer with Low Seasonal Water Use



Residential Customer with High Seasonal Water Use



Fixed charge = customer's historic peak volume (X) times a PeakSet Base rate

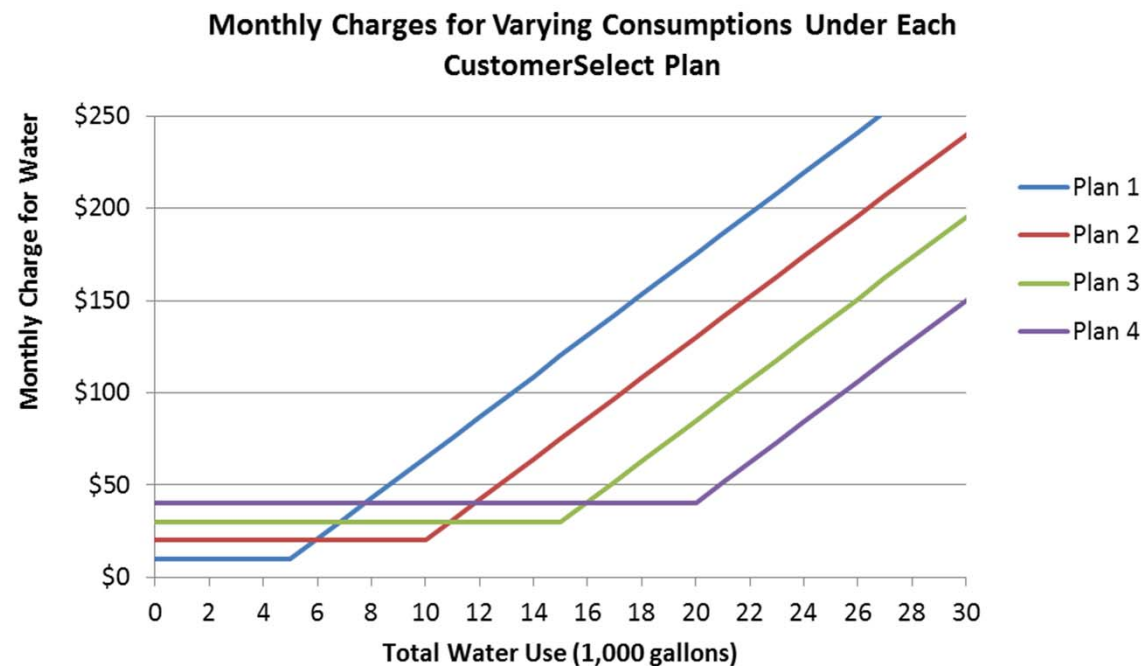
Graphic: Eskaf, S. et al. (2014). *Measuring & Mitigating Water Revenue Variability: Understanding How Pricing Can Advance Conservation without Undermining Utilities' Revenues Goals*. Ceres report. [www.ceres.org](http://www.ceres.org) or [www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)





# Customer*Select* Rate Model

Individual customers choose and enroll in a “plan” that best works with their consumption for the year, and pay a steep overage rate if they use more than the plan’s allowance in any month






# Dividend Models

- Utility clearly defines its total revenue needs (including O&M, debt service, capital reserves, etc.)
- Charge full cost prices, plus refundable “revenue stabilization” rates to guarantee revenues (add to base charge)
- At end of the year, keep the revenues that are needed and then return any excess funds to the customers



# More on Alternative Pricing Models

[www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)



search this site

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### Mission Statement

We work to enhance the ability of governments and other organizations to provide environmental programs and services in fair, effective and financially sustainable ways.

### Project Publications

#### Measuring & Mitigating Water Revenue Variability: Understanding How Pricing Can Advance Conservation Without Undermining Utilities' Revenue Goals

*Shadi Eskaf, Jeff Hughes, Mary Tiger, Katie Bradshaw, Sharlene Leurig*  
Report, 07/01/2014

As water utilities across North America undertake capital campaigns to finance the replacement and expansion of their systems, the need for confident revenue projections grows.

#### Defining a Resilient Business Model for Water Utilities: Executive Summary

*Jeff Hughes, Mary Tiger, Shadi Eskaf, Stacey Isaac Berahzer, Sarah Royster, Christine Boyle, Dayne Batten, Peiffer Brandt, Catherine Noyes*  
Report, 01/06/2014

The Environmental Finance Center, Raftelis Financial Consultants, and the Water Research Foundation partnered to produce a new report that helps utilities address the challenges of revenue gaps, which are exacerbated by rising customer expectations, declining water consumption, aging...

123next>last>


### Project Presentations

#### Simulating Alternative Water Rate Structures

*Shadi Eskaf*  
CFO Connect Meeting 2015 - Denver, CO  
Cape, Denver Water

## PROJECT

### INNOVATIVE ALTERNATIVE PRICING MODELS FOR UTILITIES



Since 2010, the EFC has worked with water utilities to investigate alternative pricing models to improve the resiliency of revenues for utilities. Some of these models are inspired by strategies typical in other industries, but can be applied to water utilities. The EFC partners with water utilities and utilities commissions to model these alternative rate structures on actual customer water use records, comparing how a utility's revenues are more resilient under the alternative models versus under the existing rate structures. The EFC also evaluates the effects on individual customers' bills, determining which types of customers would pay less under the alternative rate structure compared to the existing rate structures, and which would pay more.

#### Why are Alternative Rate Models Needed?

Almost all water utilities charge customers a fixed base charge ("minimum charge") and/or a volumetric charge that is determined by the volume of water used by the customer during the billing period. In most cases, the revenues that are generated by the volumetric charges exceed the revenues that are generated by the fixed charges. Since average water demand is generally declining across the country, many utilities are realizing that their revenues are more vulnerable to demand changes than their short-term expenses. For some utilities, reserves are adequate to mitigate these year-to-year fluctuations. Other utilities, though, may be operating with narrower margins, and revenue stability and predictability is more critical.

There are a few ways to improve the resiliency of revenues for utilities (see [Defining a Resilient Business Model for Water Utilities](#)). One way is to design new rate structures for water utilities that increase revenue generation from fixed charges while providing stronger financial incentives (price signals) to customers to reduce peak demands. This can be accomplished by setting [fixed base charges that are tied to the water use and needs of the customer](#). Another way is for a utility to implement a plan that triggers an automatic surcharge or credit (refund) on current rates when utility-wide water use diverges from a range used to set water rates.

Generally, alternative rate structures can be designed in such a way to vastly increase the utility's revenue resiliency against demand fluctuations, lower the bills for low-using low-peaking water customers, and significantly increase the bills for high-using high-peaking water customers.

#### Learn More

- [New Business Models for the Water Industry](#) (Video) - This whiteboard video introduces three potential business models that can help a utility meet its operational needs while also sending a clear signal to its customers about the value of water service.
- [Best-Case Scenario: A Pricing Model for Utility Revenue Stability and Customer Conservation](#) (Blue Book)



## **Set Up and Monitor Internal Financial Performance Targets**

Set up specific financial performance targets, measure and monitor performance indicators, and adjust financial decisions to maintain success.



# Recorded Webinar on Setting Financial Targets

<https://efc.sog.unc.edu/event/setting-financial-targets-water-utilities-beyond-budget>


**Setting Financial Targets For Water Utilities  
Beyond The Budget**

Webinar  
September 25, 2018

Shadi Eskaf  
Environmental Finance Center at the UNC School of Government

Maria Hunnicutt  
Broad River Water Authority, NC

Stephen Winters  
Orange Water and Sewer Authority, NC

 **UNC** | SCHOOL OF GOVERNMENT  
Environmental Finance Center

[www.efc.sog.unc.edu](http://www.efc.sog.unc.edu)





## **Example of Targets from Charlotte Water in 2012**

- Debt service coverage ratio minimum 1.80
- Fund balance to be maintained at level equal to 100% of the operating expenses for the current budget for the operating year
- The City's goal is a 40-60% mix of PAYGO-to-debt financing capital projects within next 2 years





# Examples of Financial Targets

Minimum Reserves / Cash on Hand

Working Capital Reserves

Debt Service Coverage Ratio

Debt Burden or Debt-Per-Customer

Cash Financing of Capital Projects

Rates Affordability

Credit Rating



# Financial Policy Strawman

Financial Metric	Policy Target
Debt Service Coverage Ratio	<ul style="list-style-type: none"><li>• Parity coverage of 1.5x</li><li>• Total coverage of 1.2x</li></ul>
Debt Load	<ul style="list-style-type: none"><li>• Debt service less than 40% of total revenue requirements</li></ul>
Capital Funding	<ul style="list-style-type: none"><li>• Minimum of 25% of annual capital expenses funded through rate-funded capital (PAYGO)</li></ul>
Days Cash on Hand	<ul style="list-style-type: none"><li>• 180 days</li></ul>
O&M Budget Escalation	<ul style="list-style-type: none"><li>• Maximum annual O&amp;M budget escalation of 5%</li></ul>
Operating Reserve Fund	<ul style="list-style-type: none"><li>• Minimum fund balance of 90 days of annual O&amp;M expenses</li></ul>
Capital Reserve Fund	<ul style="list-style-type: none"><li>• Minimum fund balance of 25% of annual Capital expenses</li></ul>
Rate/Revenue Stabilization Fund	<ul style="list-style-type: none"><li>• Minimum fund balance target of 5% of projected annual revenues</li></ul>
Rate Revenue Composition	<ul style="list-style-type: none"><li>• Minimum of 25% of annual revenue from fixed charges</li></ul>
Rate Increases	<ul style="list-style-type: none"><li>• Minimum of automatic rate increases indexed to CPI</li></ul>
Service Affordability	<ul style="list-style-type: none"><li>• Maximum annual bill of an average customer of 2% of median household for each water and wastewater</li></ul>

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



**Table 4.7**  
**Summary of financial metrics in water utility debt and financial policies**

Utility	Board Approved	Debt Service Coverage Ratio Target	Debt Burden	Pay-As-You-Go	Description of Reserve Funds	Rating Goal	Reserves Targets
Alameda County Water District	Yes	1.25	NA	NA	Five - Debt Service, Emergency/Rate Stabilization, Retiree, Self-Insurance, Capital Projects and Contingencies	NA	Sufficient to meet operating, capital, and debt service obligations
Arlington Water Utilities Department	Yes	1.5	NA	All unbudgeted revenue beyond 60 days of O&M expenses	Restricted, Unrestricted, Rate Stabilization Fund	NA	Operating Reserve: 60 days of O&M expenses The remaining unbudgeted revenues will be used for capital expenditure in lieu of issuing debt Rate Stabilization Fund: ≤ 5% of the total Water Utilities expenditure budget
Baltimore Department of Public Works	Yes	1.4 and 1.1 for senior and total debt, respectively	Flexible	Between 10-15% of the recommended annual amount for new financing authorizations	Six - Specified by Water and Wastewater (Debt Service, Unrestricted, Future Capital Construction)	N/A	90 days cash on hand
Beaufort-Jasper Water and Sewer Authority	Yes	1.25	NA	NA	Two - Restricted for Capital and Debt Service, Unrestricted	NA	Flexible
Charlotte-Mecklenburg Utilities Department	No	1.8		Goal of 40-60% mix of PAYGO	Three - Operating Fund, Debt Service Fund, Capital Projects Fund	AAA	Fund balance target is 100% of operating expenses for the current budget

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



**Table 4.7 (Continued)**

Utility	Board Approved	Debt Service Coverage Ratio Target	Debt Burden	Pay-As-You-Go	Description of Reserve Funds	Rating Goal	Reserves Targets
Clayton County Water Authority	Yes	Minimum: 1.5	NA	“Whenever feasible”	Five - Debt Service, Construction, Renewal and Extension, Working Capital, Unrestricted	Best Possible	Renewal and Extension Fund: \$1.5 million Operating Reserves sufficient to comply with debt requirement and to provide the Authority with sufficient working capital and a comfortable margin of safety to address emergencies and unexpected declines in revenues without borrowing Irrevocable trust containing enough to cover future post-employment benefits as they are earned by employees
Denver Water	Yes	Debt service coverage in excess of 2.2 times	<=40% debt to fixed assets + working capital	Capital improvements of a normal recurring nature	Two- Operating/Insurance Reserve and Capital Reserve	AA or Better	Reserves that sufficient to provide 25% of next year's operating costs, the greater of average amortization cost and 2% of current total capital assets for R&R, 50% of annual debt service and \$10 million in exposure reserve
Northeast Ohio Regional Sewer District	Yes	1.25 for senior	NA	Target: 25% of the annual CIP	Working Capital Reserve, Capital Replacement, Insurance, Rate Stabilization	NA	Working Capital Reserve: 90 days of budgeted operating expenses Capital Replacement Fund: Identified through Asset Management Insurance: Flexible Rate Stabilization: Up to 5% of rate revenues
Orange Water and Sewer Authority	Yes	Debt service coverage ratio should be greater than 2.0; 1.5 in any single year when weather anomalies or other unforeseen circumstances occur (Bond Covenant: 1.2)	Total debt <=50% fixed assets  Debt service <=35% annual revenues	No less than 30% of funds required for CIP	Three Working Capital Reserves, Capital Improvement Reserve Fund and Rate/Revenue Stabilization Fund	Maintain at least Aa2 from Moody's and AA+ from S&P and Fitch	Working Capital Reserves: Greater of 33% of the O&M budget or 20% of the succeeding 3 years of CIP budget Capital Improvement Reserves: 2% of the annual depreciated capital costs Rate/Revenue Stabilization fund: 5% of the projected water and sewer revenue for the applicable year

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.





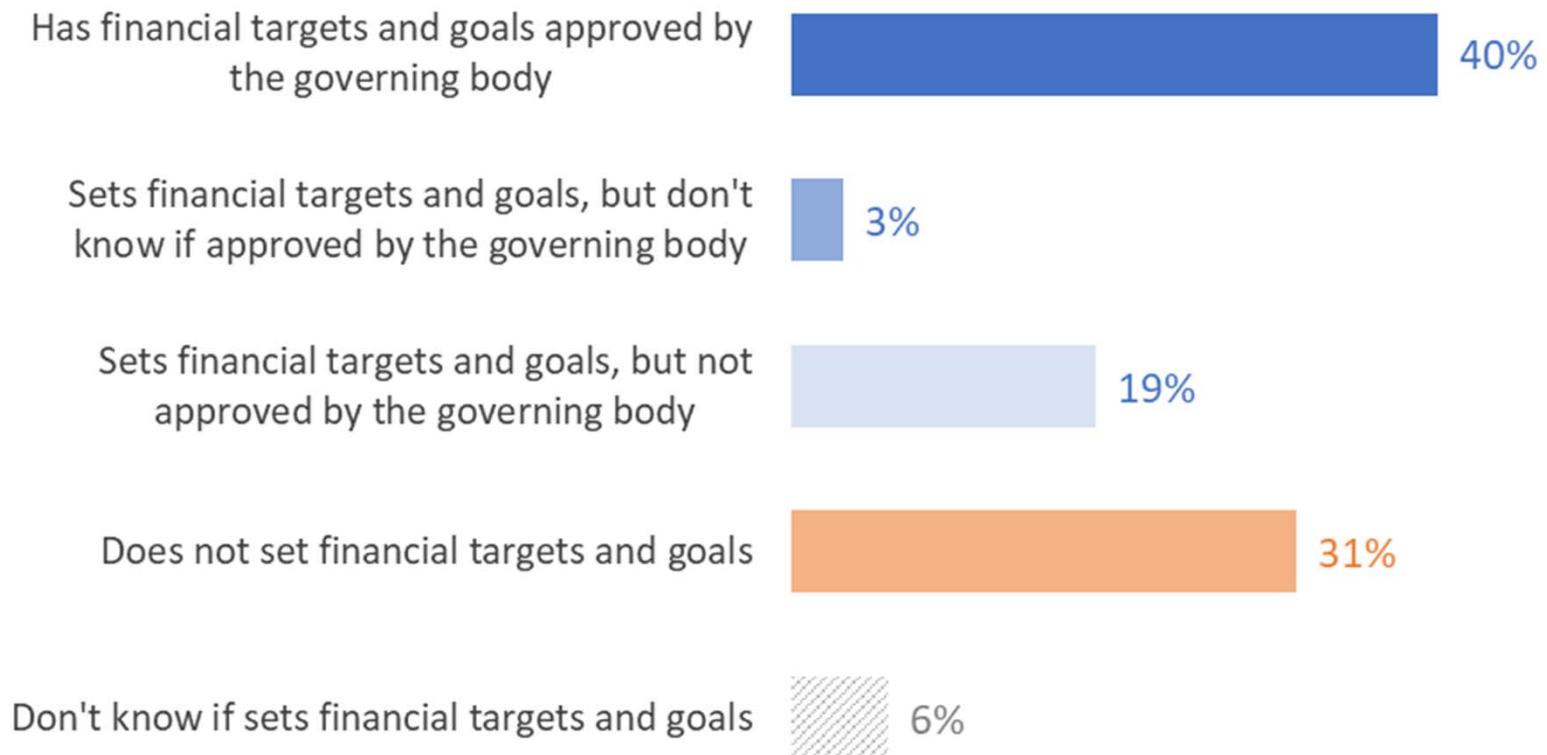
**Table 4.7 (Continued)**

Utility	Board Approved	Debt Service Coverage Ratio Target	Debt Burden	Pay-As-You-Go	Description of Reserve Funds	Rating Goal	Reserves Targets
City of Raleigh	Yes	2.0, or within a range necessary to maintain credit rating	NA	5-15% level with the expectation of increasing levels over next five years	Four - Water and Sewer Operating Fund, Water Capital Projects, Sewer Capital Projects, Water and Sewer Revenue Bond Fund	Aa1, AAA, AAA	Unrestricted fund balance: 50-75% of operating expenses
San Antonio Water System	Yes	Target: 2.0 on Senior Debt Service 1.5 on Total Debt Service (Bond covenant: 1.25)	NA	30-35% of annual capital expenditures	System, Operating Reserve, Debt Service, Renewal and Replacement Fund, Project		Operating Reserve: Two months of current year's O&M expenses
Water District No. 1 of Johnson County	Yes	Target: 2  Bond Covenant: 1.25	NA	NA	Four (Bond Reserve Fund, Operating Contingency, Negative Cash Flow Reserve, Rate Stabilization Fund)	AAA S&P; Aaa Moody's	Operating Contingency: 60-day reserves; Rate Stabilization Fund: The Board will be notified when the reserve reaches a minimum level of \$2 million

Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities*.



# NC Utilities with Financial Targets



**Over 62 percent of utilities set specific financial targets and goals.**  
Most have the targets and goals approved by the governing body (n = 216).

Source: 2017-18 NC Water and Wastewater Utility Management Survey by the EFC and NCLM.





## Evidence of Success

When comparing NC utilities against others of similar size, similar number of FTEs, and similar presence/absence of a full-time utility manager, the EFC found statistical evidence that:

Utilities that started using financial targets by 2013

- Had **higher operating ratios** in FY2017
- Were **twice as likely** to have higher operating revenues than operating expenses in FY2017



# Summary of Financial Strategies

- Reduction and management of operating costs
- Management of capital expenditures and debt refinancing
- Build up reserves
- Revenue enhancement and rethinking utility services
- Rate adjustment approaches
- Alternative rate designs
- Financial performance targets



## **Session 5:**

# **Structural and Managerial Strategies to Mitigate Losses from Declining Demands**



# Structural and Managerial Strategies

- Planning and adjusting demand forecasts
- Know your (biggest) customers
- Assist with economic development efforts
- Partnerships with other water systems
- Communication



# Planning and Adjusting Demand Forecasts

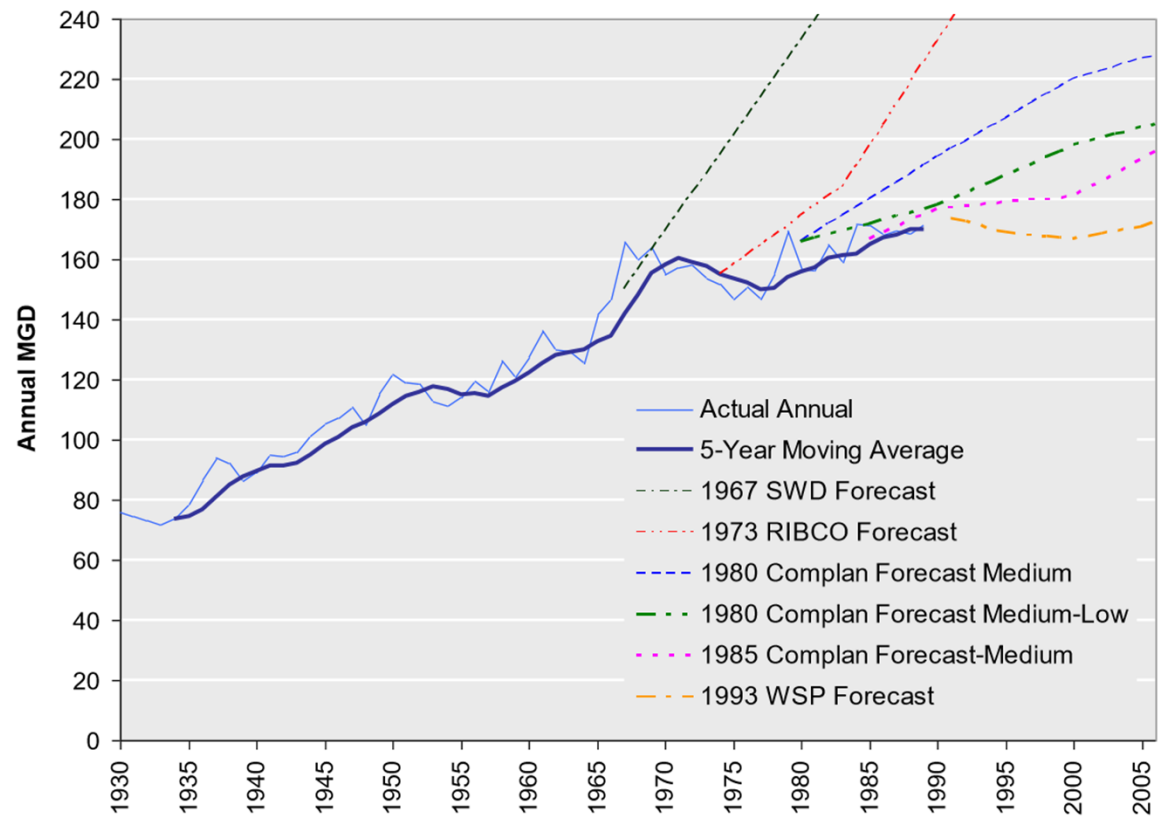
- Conservative forecasts
- Run scenarios, not a single forecast
- Look at your long-term trends to inform forecast
- Incorporate elasticity and short-term and long-term reductions in demand
- Establish a policy or protocol to move any “excess revenue” into a reserve fund or rate stabilization fund or use for pay-as-you-go cash capital funding





# Seattle's Demand Forecasts

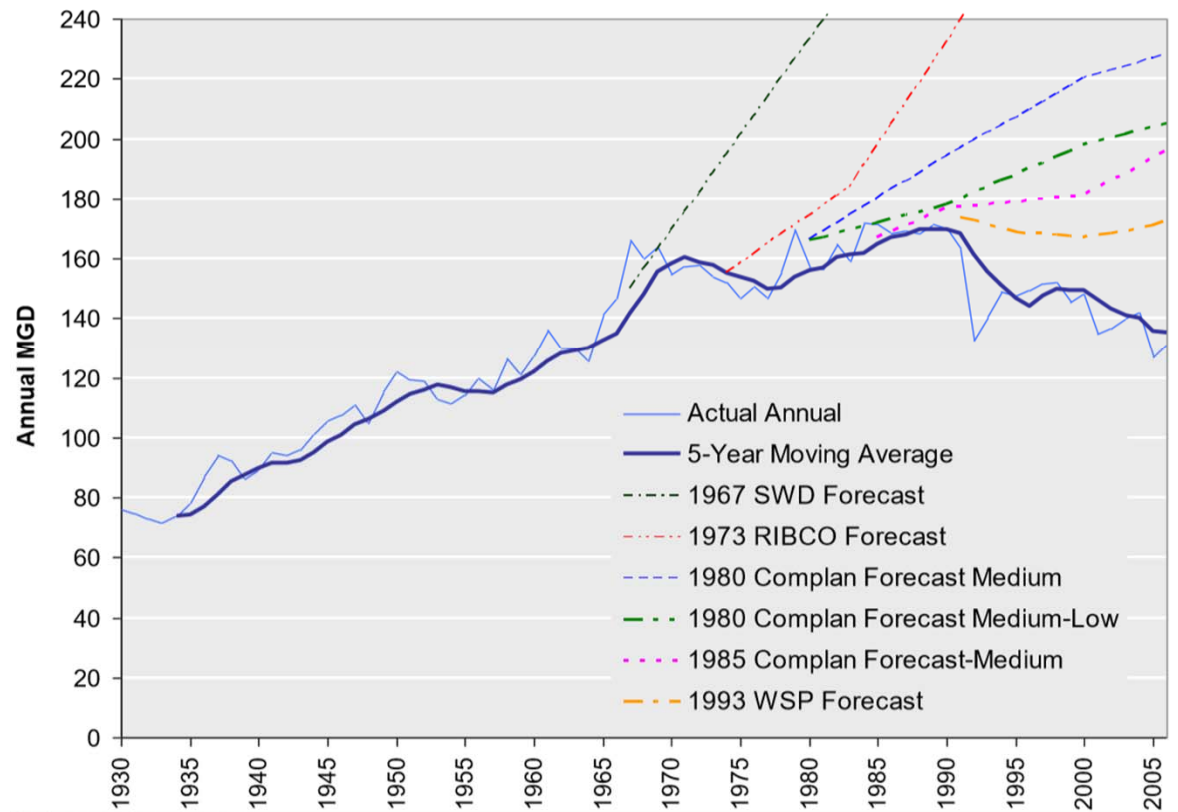
## Water Demand & Forecasts: 1930-1990





# Seattle's Demand Forecasts

## Water Demand & Forecasts: 1930-2006





# Demand Projections – Financial Repercussions of Being Wrong

	Actual demand decreases	Actual demand increases
Projected decrease in demand	Balanced budget; delayed capital investment delayed	Revenue surplus; potential capacity constraint
Projected increase in demand	Revenue deficit; underutilized capacity	Balanced budget; utilized capital

Financially safer to avoid over-predicting demand. Be conservative.


# 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

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

**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	2021	2022
Debt Service	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000	\$ 1,100,000
Other Known Annual Expenses	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000	\$ 2,000,000
<b>Total</b>	<b>\$ 3,100,000</b>	<b>\$ 3,100,000</b>	<b>\$ 3,100,000</b>	<b>\$ 3,100,000</b>	<b>\$ 3,100,000</b>	<b>\$ 3,100,000</b>	<b>\$ 3,100,000</b>	<b>\$ 3,100,000</b>

Category	2015	2016	2017	2018	2019	2020	2021	2022
Administrative	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Capital Expenses	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000	\$ 200,000
Operational Expenses	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Regional Sewer Authority operations & maintenance	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Interest Expense	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Chemical Expense	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Repairs and maintenance	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
Other charges	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000	\$ 100,000
<b>Total</b>	<b>\$ 1,000,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,000,000</b>	<b>\$ 1,000,000</b>

Year:	2015	2016	2017	2018	2019	2020
Existing	\$11.50	\$13.00	\$14.50	\$17.00	\$20.00	\$21.00
New	\$11.50	\$13.00	\$14.50	\$17.00	\$20.00	\$21.00
Block End	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo
Block Start	0 gal/mo	0 gal/mo	0 gal/mo	0 gal/mo	0 gal/mo	0 gal/mo
Block Rate	\$2.78	\$2.78	\$2.78	\$3.00	\$3.50	\$4.00
Block Size	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo
Block Rate	\$2.78	\$2.78	\$2.78	\$3.00	\$3.50	\$4.00
Block Size	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo	4,000 gal/mo

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 Environment and Natural Resources

# AWE Sales Forecasting and Rate Model

<http://www.financingsustainablewater.org/>



The screenshot displays the website for Financing Sustainable Water, a project of the Alliance for Water Efficiency. The page is titled "AWE Sales Forecasting and Rate Model" and provides a detailed overview of the tool. The left sidebar contains links to various resources, including "Building Better Water Rates for an Uncertain World", "AWE Sales Forecasting and Rate Model", "Rate Model Video Tutorials", "Request Tools", "Rate Model User Guide", "Appendices: Costing Methods, Demand Forecasting and Revenue Modeling", "Communications Tools", and "RATES HANDBOOK Building Better". The main content area describes the tool's purpose and lists the following key features:

- Customer Consumption Variability – weather, drought/shortage, or external shock
- Demand Response – Predicting future block sales (volume and revenue) with empirical price elasticities
- Drought Pricing – Contingency planning for revenue neutrality
- Probability Management – Risk theoretic simulation of revenue risks
- Fiscal Sustainability – Sales forecasting over a 5 Year Time Horizon

The page also includes a section titled "The Rate Design Module can answer these questions:" with a list of questions and a corresponding chart showing the impact of rate design changes on water demand and revenue.

**Questions:**

- What effect would increasing the top tier rate by 15% have on water demand?
- Will shifting to seasonal rates cause water use to increase or decrease?
- What block rate design could allow us to preserve our current level of revenue while reducing demand?
- How should we adjust rates to support our water demand management objectives during water shortages?
- What proportion of customer bills will

**Chart:** The chart displays the impact of rate design changes on water demand and revenue. It includes a table with columns for "Change in Average and Median Annual Water Demand (Gallons per Customer Day)", "Change in Annual Water Revenue (\$/Customer)", and "Change in Annual Water Revenue (\$/Customer)". The table shows the impact of increasing the top tier rate by 15%, shifting to seasonal rates, and implementing a block rate design. A color-coded legend indicates the magnitude of the change, with green representing a decrease and red representing an increase.





# Know Your (Biggest) Customers

- Find them out from billing records.
- Determine the potential revenue risk if your largest customer(s) leave.
- Meet with the largest non-residential customers. Tour their facilities. Find out how they use water and ask about any potential changes to their demands in the future.
- Use BLS data to find information about industry/commercial customers in your area.





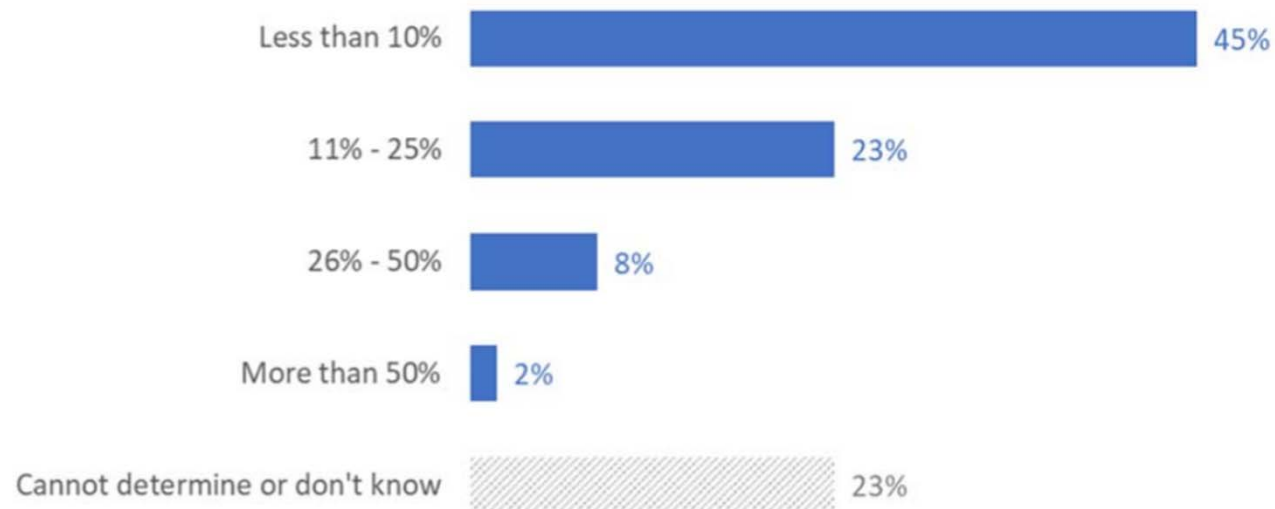
# What Happens if they Leave?

Results of the 2017-2018 NC Water and Wastewater Utility Management Survey

NCLM & EFC

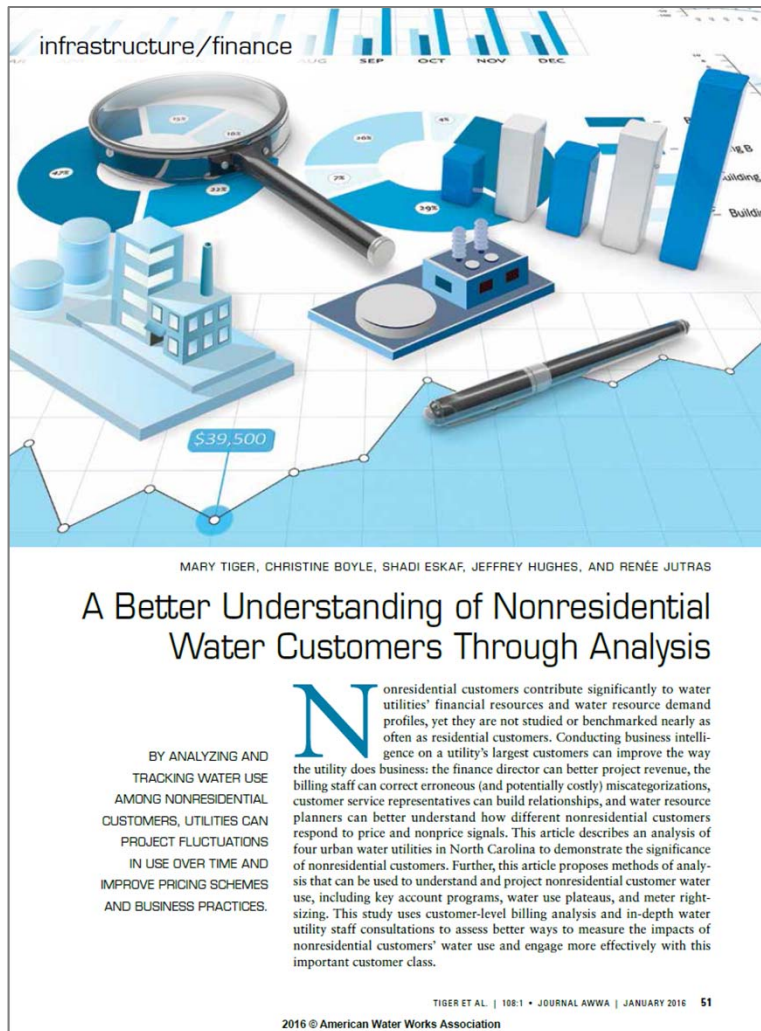
34) *What percentage of your utility's total annual revenue is normally billed to your 5 largest non-wholesale customers (i.e. the five largest industrial or commercial customers, but NOT sales to other utilities)?*

**Utilities are most likely to bill less than ten percent of their total annual revenue to their five largest non-wholesale customers (n = 190).**



Source: EFC and NCLM's 2017-18 North Carolina Utility Management Survey.

# Better Understanding of Nonresidential Water Customers through Analysis



*Journal AWWA* article, January 2016, pages 51-60.

Available on AWWA website.

Demonstrates how water billing data can be used to know your (largest) customers.



# Examples Described in the Article

FIGURE 4 Screenshot of a “top ten” dashboard

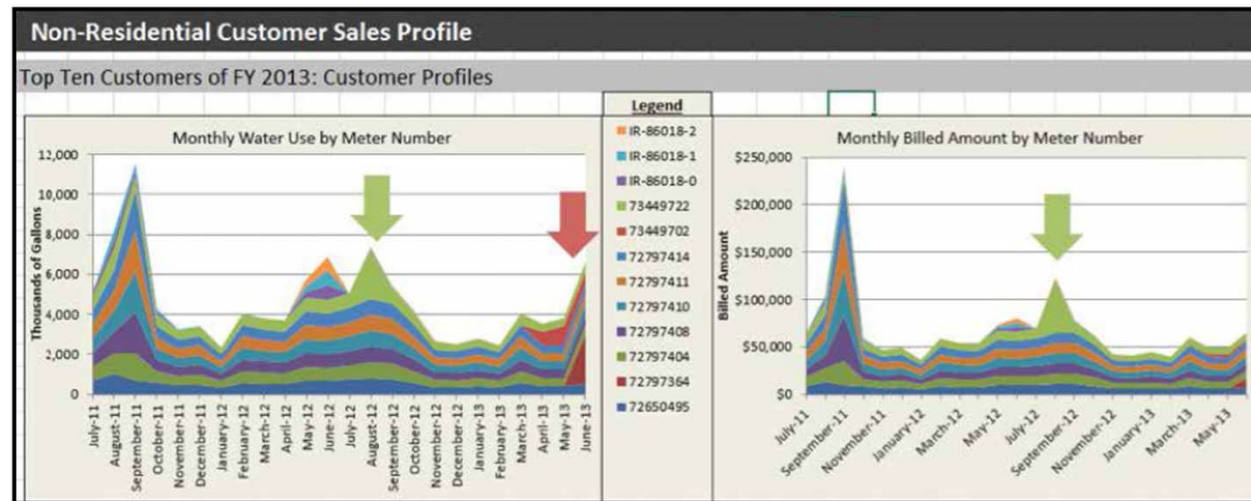
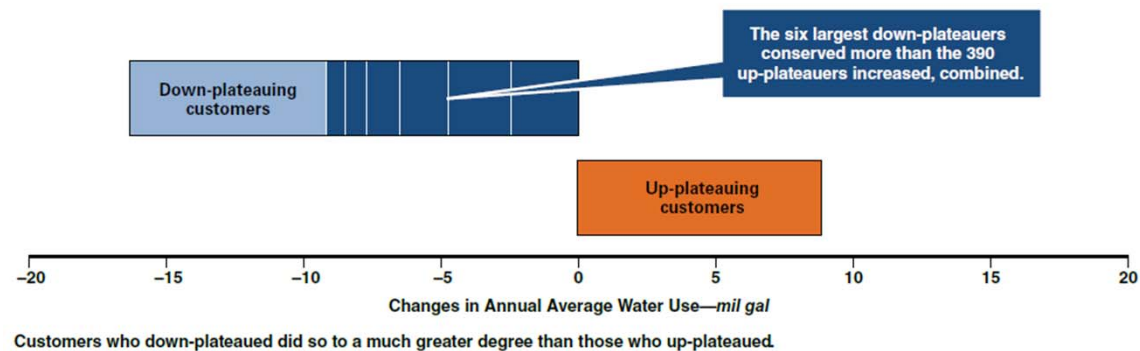


FIGURE 7 Cumulative water use changes of plateauing customers





## **Assist with Economic Development Efforts**

- Communicate your capacity excesses, water reliability and quality, and water rates to your elected officials, planners, County's economic development teams, Council of Government, and Chamber of Commerce as a way of advertising you are open for business.
- Consider adjusting rate structures to incentivize business development.





# Waiving Connection Fees

To fight downtown blight,  
North Bend approves  
waiver for new businesses

CAROL LADWIG • Tue Sep 12th, 2017 12:56pm • NEV



Empty buildings and downtown blight  
North Bend soon, but only time will tell

"I hope it's successful, in time," said  
the action, a waiver of water and  
businesses into the city's history.  
we'll change it."

The action, approved in a 6-1 vote will  
allow City Administrator Londi Lindell to  
Facilities Charges (GFCs) for specific target businesses, provided  
business owners have made an equivalent amount in property  
improvements, in buildings that have been vacant for at least a year.

The target businesses are primarily restaurants, breweries and other  
businesses with a high level of water use. The GFC waiver specifies the

"The target businesses  
are primarily  
restaurants, breweries  
and other businesses  
with a high level of  
water use."

<https://www.valleyrecord.com/news/to-fight-downtown-blight-north-bend-approves-fee-waiver-for-new-businesses/>



# Bill Discounts for New Businesses

**Discounts and Incentive Programs**

New qualifying Commercial customers are subject to Incentive Commodity Charges for the first forty-eight months of usage according the following schedule:

First 12 months of Billing .....	60% of approved commodity rate
Second 12 months of Billing.....	70% of approved commodity rate
Third 12 months of Billing .....	80% of approved commodity rate
Fourth 12 months of Billing .....	90% of approved commodity rate

Qualifications will be determined by the Hannibal Board of Public Works on a case-by-case basis and will consider such things as number and value of local jobs created, length and size of required water main extensions, and estimated annual consumption.





## Separate Rate Structure Category and (Typically Lower) Rates for Commercial/Industrial Customers

### Residential Rates

0 - 2,000 (Minimum)  
2,001 - 6,000  
6,001 - 10,000  
10,001 - 20,000  
All Over 20,000

### Current Rates

\$19.67  
\$5.79 / 1,000 gals.  
\$6.14 / 1,000 gals.  
\$9.22 / 1,000 gals.  
\$10.75 / 1,000 gals

### Commercial Rates

0 - 2,000 (Minimum)  
2,001 - 48,000  
All Over 48,000

\$29.49  
\$3.51 / 1,000 gals.  
\$4.10 / 1,000 gals.

### Agricultural Rates

0 - 2,000 (Minimum)  
2,001 - 48,000  
All Over 48,000

\$21.45  
\$2.57 / 1,000 gals.  
\$3.57 / 1,000 gals.

Wayne Water Districts, NC



# Decreasing Block Rates for Commercial Customers Only

## COMMERCIAL WATER:

0 to 2000 gallons:	-----	\$21.25 Minimum Bill
Additional:	-----	\$7.00 2001 – 12,000 gal
		\$6.75 12,001 – 27,000 gal
		\$6.50 27 001 gallon & up

Ardmore, AL



## **Decreasing Block Rates for Very High Volumes Only**

**WATER RATES –**

**CONSUMPTION RATES –**

**1000 – 1,000,000 = 3.75 per 1,000**

**1,000,000 + = \$0.30 per 1,000**

**BASE RATE –**

**80.00 per residential unit**

**150.00 per commercial unit**

Lancaster, NH



# Increasing then Decreasing Block Rates for All (Decreasing for High Volumes)

## Water Rates

EFFECTIVE JUNE 1, 2010 (ROUTES 1-9)

FIRST – 2000	GALLONS	\$12.30
2001-3000	GALLONS	\$3.30 PER 1000
3001-10,000	GALLONS	\$3.60 PER 1000
OVER 10,000	GALLONS	\$2.70 PER 1000

Chattooga County, GA



# Block Size Based on Meter Size

## 1" Meter (All Classes)

1 to 32,000 Gallons	\$6.72
Over 32,000 Gallons	\$10.34

## 1 ½" Meter (All Classes)

1 to 106,000 Gallons	\$6.72
Over 106,000 Gallons	\$10.34

## 2" Meter (All Classes)

1 to 195,000 Gallons	\$6.72
Over 195,000 Gallons	\$10.34

## 3" Meter (All Classes)

1 to 434,000 Gallons	\$6.72
Over 434,000 Gallons	\$10.34

A. Petersen Water Company, AZ





## Partnerships with Other Water Systems


- Share personnel / resources
- Sell excess water to other water systems
- Buy water from another water system and reduce or eliminate the need for treatment
- Consolidate with other water systems



# Water System Partnership Spectrum

————— Increasing Transfer of Responsibility —————→

Informal Cooperation	Contractual Assistance	Joint Powers Agency	Ownership Transfer
Work with other systems, but without contractual obligations	Requires a contract, but contract is under system's control	Creation of a new entity by several systems that continue to exist as independent entities	Takeover by existing or newly created entity
<b>Examples:</b> <ul style="list-style-type: none"><li>• Sharing equipment</li><li>• Sharing bulk supply purchases</li><li>• Mutual aid arrangements</li></ul>	<b>Examples:</b> <ul style="list-style-type: none"><li>• O&amp;M</li><li>• Engineering</li><li>• Purchasing water</li></ul>	<b>Examples:</b> <ul style="list-style-type: none"><li>• Shared system management</li><li>• Shared operators</li><li>• Shared source water</li></ul>	<b>Examples:</b> <ul style="list-style-type: none"><li>• Acquisition and physical interconnection</li><li>• Acquisition and satellite management</li><li>• Transfer of privately-owned system to new or existing public entity</li></ul>



Any kind of collaboration can be helpful



## Benefits of Partnerships

- Reduce capital and operating costs and prices (per gallon of finished water produced) through increased economies of scale and more efficient use of capacity and resources
- Help raise capital needed to replace and improve aging water-delivery infrastructure
- Favorable funding terms



## Benefits of Partnerships

- Improve operational performance through wider use of trained operators and advanced treatment technologies
- Adjust to changing demand patterns more quickly
- Enhance environmental protection, resource conservation, and contingency planning for conditions of scarcity, through increased coordination and integrated planning.



# Common Concerns with Partnerships

- Desire for autonomy
- Mistrust of other systems
- Lack of knowledge of other systems
- Lack of knowledge of the options
- No single “champion” to implement it
- No outside independent force to get collaboration started





# Sharing Services

- Bulk purchase agreements
- Sharing staff
- Sharing equipment
- Using the same accounting firm or billing firm
- Using the same contract operator
- Shared testing / planning / project management services



# Shared Management

- Consolidate management with other water systems to reduce the burden of managing an independent, shrinking water system
- Program of Shared Operation & Management (POSOM), MT
  - Provides operational and management assistance to very small community systems
  - Most important assistance is how to stay in compliance with SDWA
  - Individualized to a particular system's needs



## **Interconnections for Water Systems with Declining Demands to Buy/Sell Water**

- If demand is shrinking and you have excess capacity, seek to sell bulk water to a neighboring water system/service area at favorable rates
- If demand is shrinking and you have assets that need rehabilitation/replacement, consider connecting to a neighboring system to purchase water and shut down the treatment plant



# Crafting Inter-local Water Agreements

Available at

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

## Format

- Questions to consider, descriptions, example text
- Advice for getting inter-local agreements right, avoid pitfalls
- NOT draft contract
- NOT every issue that will come up in every document

Crafting Inter-local Water Agreements	
<i>Tips relating to issues you may not have thought of or that you were hoping to avoid....</i>	
Prepared by:	
UNC Environmental Finance Center	
For	
Public Water Supply Section	
Division of Environmental Health	
North Carolina Department of Environment and Natural Resources	
6/24/09	
<i>Note: Example text is provided in these guidelines to illustrate different concepts. These excerpts are designed to generate discussion and inspire development of agreement clauses appropriate to local conditions. These excerpts are <b>NOT</b> presented as, nor should they be considered as, model contract clauses that can be copied into agreements.</i>	
<b>Table of Contents</b>	
Background .....	2
Topics of Consideration: .....	3
✓ What does the agreement say about each partner's current and future service area? .....	3
✓ What does the agreement say about the relationship between water service, annexation and growth? .....	4
✓ How precisely does the agreement define key usage thresholds and limits? .....	5
✓ Does the agreement clearly outline meter maintenance and ownership responsibilities? .....	6
✓ How does the agreement address water quality problems? .....	7
✓ How does the agreement assure that water suppliers receive adequate payment for use of their capital? .....	9
✓ What does the agreement say about how commodity charges are calculated and modified over time? .....	12
✓ What does the agreement say about reselling water or capacity? .....	14
✓ What does the agreement say about water pressure? .....	15
✓ How does the agreement address communicating and handling supply interruptions or shortages? .....	16
✓ What does the agreement say about the transferability of conservation status/measures? .....	17



# System Interconnections - Example

- Tripp County Water User District, SD
  - 8 independent systems serving 2,700 customers
  - Systems are self-operated; no transfer of ownership
  - Shared source water and testing
  - Testing costs down \$3,000 per year per system
  - Better access to SRF funds





# System Interconnections - Example

- Logan-Todd Regional Water Commission, KY
  - 12 systems partnered together to share water source and treatment
  - Created to help drive economic development by serving a new poultry plant
  - State and federal funding agencies supported partnership by funding above normal levels



## **Water System Consolidation: Regional Utility**

- Work with other water system(s)/communities to create a combined utility that serves a regional area
- Different institutional models available to address governance concerns, including joint ownership
- Receives more favorable consideration of subsidized capital funds
- Receives more favorable outlook by credit rating agencies = lower interest rates



## **Consolidation into Regional Utility – Example**

- Mountain Regional Water Special Service District, UT
  - Consolidation of 12 public and private community systems into one new entity
  - Much greater access to paid, professional operators



## **Water System Consolidation: Transfer Management or Transfer Ownership**

- Could contract out management and operations of the water system to a neighboring (large) utility, perhaps with an interconnection.
- Could divest and transfer the water system to another water system or private entity



## Asset Transfer - Example

- Ellsworth Estates Water Company, CT
  - Small private HOA system serving 82 homes sold to Connecticut Water Company, a large private system serving 41 communities
  - Sale after elderly co-operator died; other elderly co-operator could not handle system on his own
  - Now has access to 30 operators and could spread capital costs over entire CWC system





# **Preparations Required Before Transfer Becomes Attractive**

- Current compliance status with regulatory agencies
- Potential interconnection
- Another organization with interest
- State of system's assets
- State of system's finances
- Number of customers



## Tips Guide

- To be published in early 2019
- Help stakeholders develop financing strategies, institutional and governance models, and enabling document to move through the consolidation process.
- Resource for the local utility to support planning and evaluation of regionalization/consolidation efforts.



## Tips Guide Will Cover

- Developing a process for evaluating options
- Arranging facilitation and planning assistance
- Evaluating ownership and selection of an institutional model
- Identifying options for valuing and making reimbursements for transferred assets
- Establishing a plan to address existing financial reserves
- Establishing a plan to address existing debt
- Crafting a robust and transparent rate adjustment process



# Communication

- With staff: recognize the challenges and empower staff to come up with solutions
- With the board: educate on the issues, enable longer-term planning
- With customers: explain why decisions have been made, get buy-in



# Communication

## Capital Improvement Projects and Investments

This map represents some of the water and sewer projects completed since 2000 to serve the needs of our community.



## Water and Sewer Improvements

Brier Creek Relief Sewer + Sugar Creek Treatment Plant Upgrades.....	\$90 million
Catawba Pump Station Expansion.....	\$20 million
Franklin Water Treatment Plant Expansion.....	\$18 million
Irwin Creek Relief Sewer.....	\$32.6 million
Lee S. Dukes Water Treatment Plant Improvements.....	\$13 million
Long Creek Lift Station and Relief Sewer.....	\$25 million
McAlpine Creek Wastewater Treatment Plant Improvements.....	\$2.7 million
McAlpine Creek Relief Sewer, Phase I and II.....	\$31 million
McAlpine Creek Wastewater Treatment Plant Improvements.....	\$114 million
McDowell Creek Wastewater Treatment Plant Expansion.....	\$94 million
New Ready Creek Sewer Line.....	\$39 million
New Rocky River Wastewater Treatment Plant.....	\$18 million
New South Water Main.....	\$40 million
New Southwest Water Main.....	\$84 million
Vest Water Treatment Plant Improvements.....	\$6 million
New West Water Main.....	\$19 million

## Rehabilitation

More than \$100 million invested in restoring and maintaining aging water and sewer lines.

## Fire Protection

Utilities provides water for fire protection throughout Mecklenburg County and is responsible for repairing 16,000 hydrants and valves.

## Cost of Improvements and Investments

Paying for capital and infrastructure projects accounts for 62 cents of every dollar spent by the utility, and is in many ways like a mortgage that has to be paid back over time. Utilities works hard to maintain a AAA-credit rating. This allows the utility to build new projects at the lowest possible borrowing rate and save millions in interest costs.

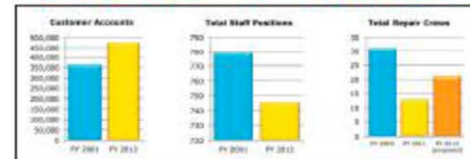


\*PayGo (Pay-As-You-Go) cash used for capital projects

## Operating Efficiently

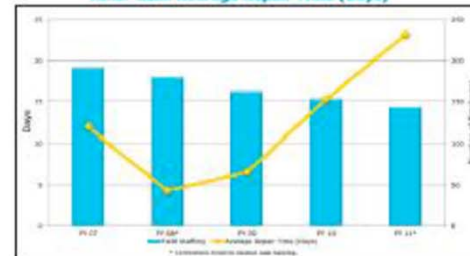
In an effort to maintain lower costs for customers, Utilities has increased its efficiencies in areas like energy management and reduced staffing levels. Utilities has fewer positions today than in 2001.

## Water and Sewer Customer Accounts and Staff Positions



The proposed rate increase will put crews back into the field to address water leak backlogs and other maintenance items. Currently, there are 13 pipe repair crews, down from 31. The rate increase will restore 8 additional crews. This would help reduce the service backlog by adding capacity to fix about 16 additional leaks each day on average.

## Minor Leak Average Repair Time (Days)



## New Rates

Effective July 1, the proposed rate increase will impact each customer differently based on their water usage. For most residential customers, the impact of the new rate structure and tier rates will lead to an increase from between \$.37 to \$.89 per month, with most seeing increases between \$.4 and \$.4.59 per month.

For the typical customer who uses 8 Ccf of water each month, the total monthly bill increase will be \$.4.59. Of this \$.4.59, \$.2.85 will pay back construction loans. The remaining \$.1.74 pays for increases for personnel, chemicals, maintenance and 311/customer service.

A very small percentage of customers will see their total bill decrease because of the reduction in the sewer cap.

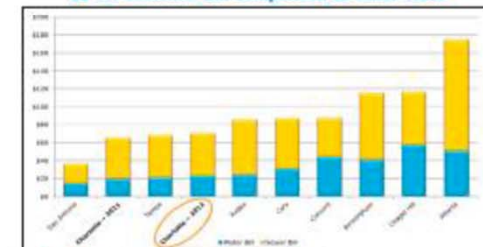


Utilities is a 24/7 operation. Maintenance and construction crews repair an average of 2 leaks per crew per day.

## Water and Sewer Rates 2011-2012

	2011 (current)	2012 (proposed)
Tier 1 (1-4 Ccf)	\$1.45	\$1.98
Tier 2 (5-8 Ccf)	\$1.64	\$1.95
Tier 3 (9-16 Ccf)	\$2.69	\$3.41
Tier 4 (over 16 Ccf)	\$5.32	\$5.32
Sewer Charges	\$4.31	\$4.14

## 10 Ccf Customer Bill Comparison to Other Cities



Utilities' water and sewer rates are among the lowest in the region.

## Did you know?

\$1 purchases 400 gallons of water from Utilities.



By comparison, \$1 purchases a single 16.9oz bottle of water from the store.

For the same \$1, Utilities delivers 400 gallons of water to customers any time, day or night.







# Summary of Structural and Managerial Strategies

- Planning and adjusting demand forecasts
- Know your (biggest) customers
- Assist with economic development efforts
- Partnerships with other water systems
- Communication





# **Other Resources for Small Water Systems**



## Visit the EFCN Website – *[www.efcnetwork.org](http://www.efcnetwork.org)*

for more information on upcoming events, funding, and resources.

The screenshot shows the EFCN website header with the logo and tagline "Innovative Finance Solutions for Environmental Services". Below the header is a navigation menu with links: HOME, ABOUT, WORKSHOPS & WEBINARS, ASSISTANCE, RESOURCES, BLOG, ARCHIVES, and a search icon. The main banner has a blue background with yellow text and graphics. It features a yellow stick figure on the left looking confused with question marks, and a yellow stick figure on the right working at a laptop. A dashed yellow line connects the two figures. The text in the banner reads: "Get Free Help Now! Small water systems can request free technical assistance from our experts on finance and management challenges." and a quote: "The thing about working with the EFCN is availability; I can call anytime with a quick question or to get outside advice."

**EFCN** Innovative Finance Solutions for Environmental Services

HOME ABOUT WORKSHOPS & WEBINARS ASSISTANCE RESOURCES BLOG ARCHIVES

### Get Free Help Now!

Small water systems can request free technical assistance from our experts on finance and management challenges.

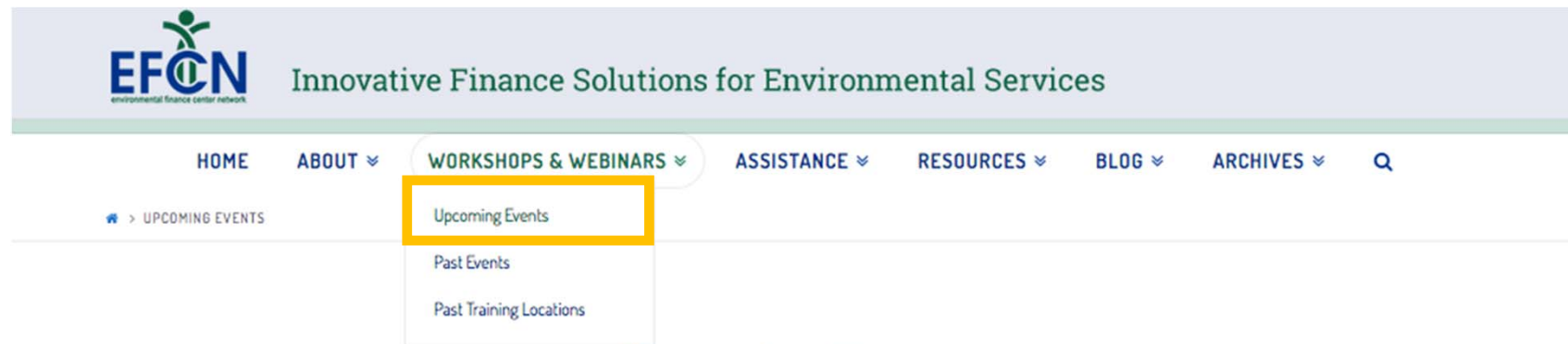
"The thing about working with the EFCN is availability; I can call anytime with a quick question or to get outside advice."





# Upcoming Events Calendar

Select “Upcoming Events” under the Workshops & Webinars Tab.



## Upcoming Events





# Funding Tables By State

Select “Funding Sources by State” under the Resources Tab.

The screenshot shows the EFCN website header with the logo and tagline "Innovative Finance Solutions for Environmental Services". The navigation menu includes links for HOME, ABOUT, WORKSHOPS & WEBINARS, ASSISTANCE, RESOURCES, BLOG, and ARCHIVES. The RESOURCES dropdown menu is open, showing options: Resource Library, E-Learning Modules, Funding Sources by State (highlighted with a yellow box), and Map of Water and Wastewater Rates Dashboards. Below the navigation bar is a large blue banner with the text "Get Free Help Now!" in yellow, followed by "Small water systems can request free technical assistance from our experts on finance and management challenges." and a quote: "The thing about working with the EFCN is availability; I can call anytime with a quick question or to get outside advice."

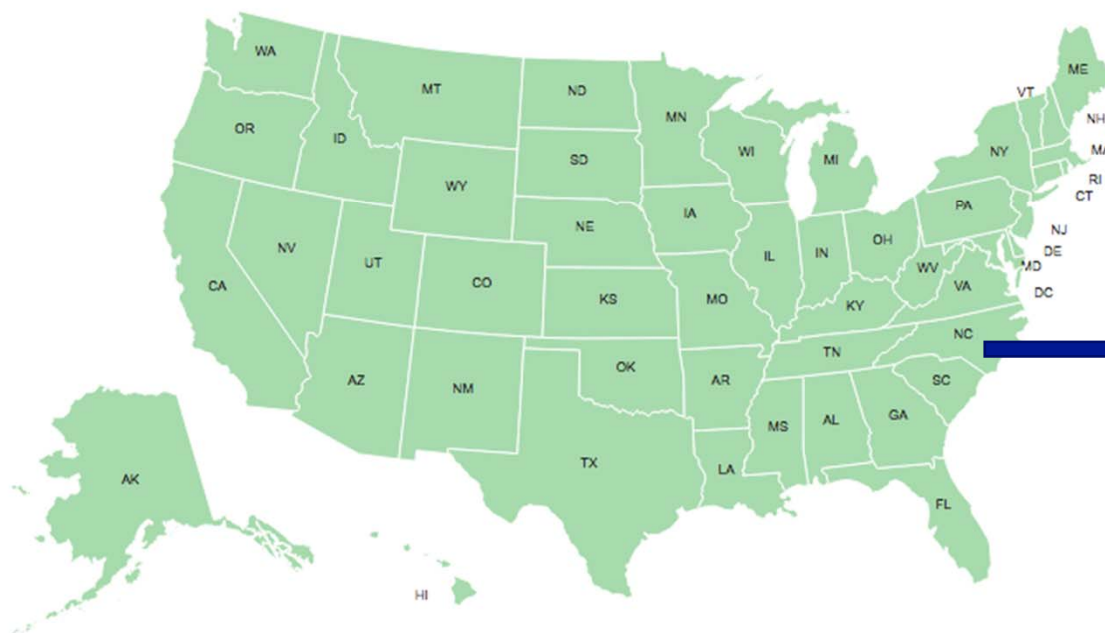




## Funding Sources by State

*Note: Some states may have additional resources listed below the map.*

Click on the map below to view funding sources for each state:



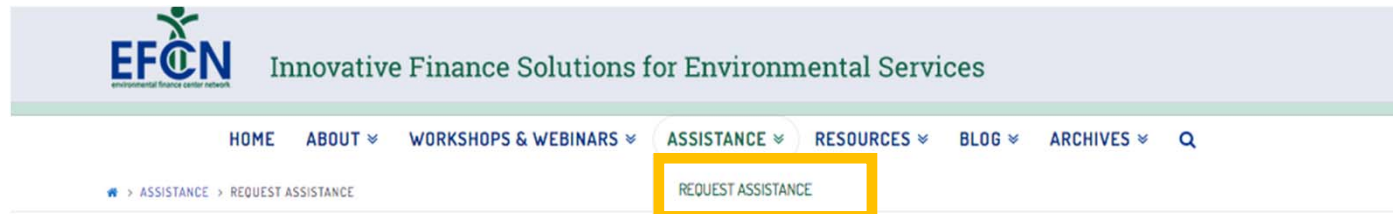
Click on an individual state to view funding table.

Oregon Water and Wastewater Funding Sources January 2019, Version 1.0					
Organization	Program Description	Purpose or Use of Funds	Application Dates	Website	Contact
Oregon Health Division	Safe Drinking Water Funding Grant Fund	Financial and technical assistance to public water utilities and local health departments to improve drinking water quality, protect public health, and address emerging contaminants.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/ohd/ehd/programs/sdwfgrants/index.aspx</a>	Dr. David Barnes dbarnes@ohd.state.or.us
	Community Development Block Grant (CDBG)	Financial assistance to local governments for community development projects, including housing, public facilities, and economic development.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/ohd/ehd/programs/cdbg/index.aspx</a>	Dr. David Barnes dbarnes@ohd.state.or.us
Oregon Department of Transportation	Transportation Planning Program	Financial assistance to local governments for transportation planning, including traffic studies, transit studies, and transportation planning studies.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/odot/transportation_planning/index.aspx</a>	Dr. David Barnes dbarnes@odot.state.or.us
	Transportation Planning Program	Financial assistance to local governments for transportation planning, including traffic studies, transit studies, and transportation planning studies.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/odot/transportation_planning/index.aspx</a>	Dr. David Barnes dbarnes@odot.state.or.us
Oregon Department of Education	Statewide Education Fund	Financial assistance to local governments for education, including teacher salaries, student services, and educational programs.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/ode/education_fund/index.aspx</a>	Dr. David Barnes dbarnes@ode.state.or.us
	Statewide Education Fund	Financial assistance to local governments for education, including teacher salaries, student services, and educational programs.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/ode/education_fund/index.aspx</a>	Dr. David Barnes dbarnes@ode.state.or.us
Oregon Department of Agriculture	Statewide Agriculture Fund	Financial assistance to local governments for agriculture, including farm income stabilization, farm income stabilization, and agricultural programs.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/oda/agriculture_fund/index.aspx</a>	Dr. David Barnes dbarnes@oda.state.or.us
	Statewide Agriculture Fund	Financial assistance to local governments for agriculture, including farm income stabilization, farm income stabilization, and agricultural programs.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/oda/agriculture_fund/index.aspx</a>	Dr. David Barnes dbarnes@oda.state.or.us
Oregon Department of Fish and Wildlife	Statewide Fish and Wildlife Fund	Financial assistance to local governments for fish and wildlife, including fish and wildlife, and wildlife programs.	Applications are accepted on a rolling basis.	<a href="#">http://www.oregon.gov/odfw/fish_and_wildlife_fund/index.aspx</a>	Dr. David Barnes dbarnes@odfw.state.or.us
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# Request Technical Assistance

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



## REQUEST ASSISTANCE

### Technical Assistance Request Form

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
- Resiliency Planning

If you are interested in requesting assistance from our experts, please fill out the form below. You will be asked a few questions to help us understand your water system and what kind of assistance you need.





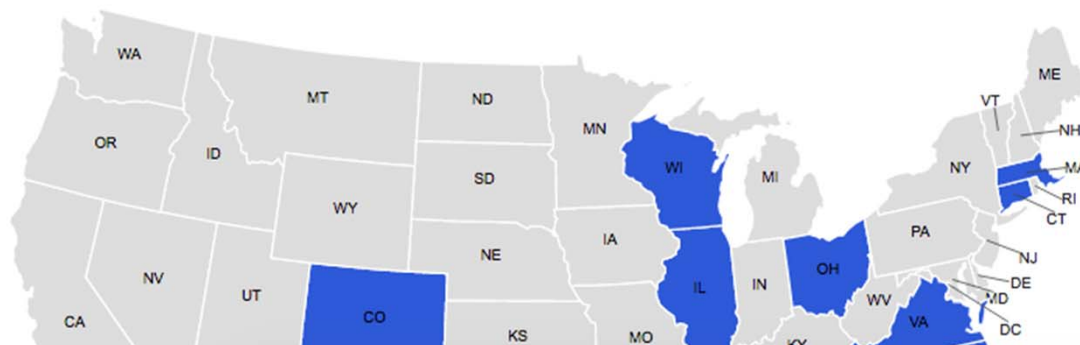
# Rates Dashboards

Select “Map of Water and Wastewater Rates Dashboards” under the Resources Tab, and click on any state in blue to view its dashboard.

The screenshot shows the EFCN website header with the logo and tagline "Innovative Finance Solutions for Environmental Services". The navigation bar includes links for HOME, ABOUT, WORKSHOPS & WEBINARS, ASSISTANCE, RESOURCES, BLOG, and ARCHIVES. The RESOURCES dropdown menu is open, showing options like Resource Library, E-Learning Modules, Funding Sources by State, and Map of Water and Wastewater Rates Dashboards, which is highlighted with a yellow box. Below the navigation bar, a breadcrumb trail reads "MAP OF WATER AND WASTEWATER RATES DASHBOARDS". The main heading "Map of Water and Wastewater Rates Dashboards" is partially visible.

This map shows Water and Wastewater Rates Dashboards created by the EFCN:

Click a state in blue to view its dashboard





# E-Learning Modules

Select “E-Learning Modules” under the Resources Tab off the EFCN homepage.



As part of its continued effort to provide resources and training to small water systems, the Environmental Finance Network is creating E-Learning modules on finance and management topics for system managers.

E-Learning modules provide training through pre-recorded content. You will be able to access the content, watch presentations, complete quizzes and exercises, and access tools and resources at your own pace.

## Financial Sustainability for Small Systems

[Click Here to Access the Course on AWWA's website](#)

This eLearning course is made possible through a USEPA grant for small systems training in conjunction with the EFCN's training partner, AWWA.



# Resource Library

Select “Resource Library” under the Resources Tab off the EFCN homepage.

The screenshot shows the EFCN website header with the logo and tagline "Innovative Finance Solutions for Environmental Services". The navigation menu includes links for HOME, ABOUT, WORKSHOPS & WEBINARS, ASSISTANCE, RESOURCES, BLOG, and ARCHIVES. The RESOURCES dropdown menu is open, highlighting the "Resource Library" option. Below the navigation bar, a breadcrumb trail shows "RESOURCE LIBRARY". The main heading "Resource Library" is partially visible.

EFCN  
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Innovative Finance Solutions for Environmental Services

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RESOURCE LIBRARY

Resource Library

E-Learning Modules

Funding Sources by State

Map of Water and Wastewater Rates Dashboards

## Resource Library

[View All Tools](#) | [View All Publications](#) | [View All Posts](#)

For an overview of some of the tools and resources available in our Resource Library, please view our [Tools and Resources flyer](#).

## What does your system need help with?

+ We treat more water than we sell.



# Resource Library Continued...

Click on a what your system needs help with to reveal tools and publications related to that topic.

✖ We have insufficient revenue to cover our costs.

## Tools

February 16, 2017

[Online Water Rate Checkup Tool](#)

February 17, 2016

[Water Utility Customer Assistance Program Cost Estimation Tool](#)

September 3, 2014

[Water & Wastewater Residential Rates Affordability Assessment Tool](#)

December 16, 2012

[Plan to Pay: Scenarios to Fund your C.I.P.](#)

November 15, 2012

[Dashboard for Using Capital Reserve Fund to Avoid Rate Shock](#)

November 7, 2016

[Modelo de Análisis para las Tarifas de Agua y Aguas Residuale](#)

January 26, 2016

[Financial Health Checkup for Water Utilities](#)

August 15, 2013

[Rates and Financial Benchmarking Dashboards](#)

November 20, 2012

[Water & Wastewater Rates Analysis Model](#)

November 4, 2012

[Loan Analysis Tool](#)

## Publications

April 14, 2014

[Rural and Small Systems Guidebook to Sustainable Utility Management](#)

August 29, 2013

[Asset Management: A Handbook for Small Water Systems](#)

August 29, 2013

[Setting Small Drinking Water System Rates for a Sustainable Future](#)

August 27, 2013

[Designing Rate Structures that Support Your Objectives](#)




# Small Systems Blog

Learn more about water finance and management through our Small Systems Blog! Blog posts feature lessons learned from our training and technical assistance, descriptions of available tools, and small systems “success stories.”

[efcnetwork.org/small\\_systems\\_blog/](http://efcnetwork.org/small_systems_blog/)


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Blog




### Magdalena, New Mexico: A Success Story from the Smart Management for Small Water Systems Project

Written by: Allison Perch Allison Perch is a Program Coordinator with the Environmental Finance Center at the University of North Carolina. What can a small town do when the financial health of its water system is at risk? This is the question that Stephanie Finch, the town clerk and treasurer for the ...



### The Virtuous Cycle: Internal Energy Revolving Funds for Small Water Systems

Written by: David Tucker David Tucker is a Project Director with the Environmental Finance Center at the University of North Carolina. How can small (and large) water systems pay for energy efficiency and renewable energy, helping cut utility costs? As energy is often the largest variable expense in a water system's operating ...



### Smart Management for Small Water Systems Program Newsletter | Fall 2015

View Full Issue The Environmental Finance Center Network has published the third issue in a series of quarterly newsletters. The Fall 2015 Program Newsletter announces



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

- Tools
- Rates Dashboards
- Blog posts (<http://efc.web.unc.edu>)
- Guidebooks
- Technical Assistance
- Courses
- Videos

**Mission Statement**  
We work to enhance the ability of government organizations to provide environmental programs and services in fair, effective and financially sustainable ways.

**Upcoming Events**

- EcoStream: Southeast Stream Restoration Conference  
Monday, November 17, 2014
- WEBINAR: Energy Management Planning for Water Systems and the NYSERDA Model  
Tuesday, December 2, 2014
- Environmental Public-Private Partnerships  
Tuesday, December 9, 2014

1 of 2 next >  
View all events

**Latest News**

- **New Video Series Highlights Critical Financial Practices for Water Utilities**  
A new series of educational videos produced by the Environmental Finance Center at UNC Chapel Hill, with support from the Water Research Foundation, offers an engaging, accessible, and easily shareable resource on financial management topics designed specifically for water utility governing boards. The WaterClips Video Series describes challenges faced by water utilities across the country using eye catching visualizations and easy to understand explanations of concepts that can otherwise be daunting.
- **The EFC Awarded \$2M for its Smart Management for Small Water Systems Project**  
To improve the country's smallest water systems - those serving fewer than 10,000 people - the U.S. Environmental Protection Agency (EPA) awarded \$2 million to the Environmental Finance Center at the University of North Carolina at Chapel Hill.

1 of 5 next >

**Tweets**

**Featured Work**

**Financial Management for Water Utilities**  
A new series of educational videos produced by the Environmental Finance Center at UNC Chapel Hill, with support from the Water Research Foundation, offers an engaging, accessible, and easily shareable resource on financial management topics designed specifically for water utility governing boards. The WaterClips Video Series describes challenges faced by water utilities across the country using eye catching visualizations and easy to understand explanations of concepts that can otherwise be daunting.

**Arizona Water and Wastewater Rates and Rate Structures**  
The Environmental Finance Center and the Water Infrastructure Finance Authority of Arizona conducted a water and wastewater rates survey of over 400 utilities in the state of Arizona. We used this data to create a summary report, interactive Rates Dashboard, and other resources to assist utilities and their stakeholders in analyzing and benchmarking their current rates and financial condition.

**Smart Management for Small Water Systems**  
Through the Smart Management for Small Water Systems project, the EFC works to improve the financial and managerial capabilities of the nation's smallest, most plentiful, and neediest public water systems - those serving fewer than 10,000 people.

**Water & Wastewater Residential Rates Affordability Assessment Tool**  
The EFC's new easy-to-use Excel tool guides a utility to assess the relative affordability of its water and wastewater rates on its residential customers using





# Thank you for participating

- CEU Credits
- Please fill out an evaluation form

Shadi Eskaf

Environmental Finance Center

UNC School of Government

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

919-962-2785



Smart Management for  
Small Water Systems

**Thank you for participating today.  
We hope to see you at a future workshop!**

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

