UNC SCHOOL OF GOVERNMENT Environmental Finance Center

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

EFCN environmental finance center network

NADO National Association of Development Organizations Research Foundation

GFOA Government Finance Officers Association

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

UNC | 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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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!

LAND OF SKY
REGIONAL COUNCIL

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)

UNC Environmental Finance Center

Southwest Environmental Finance Center

Environmental Finance Center, Syracuse University

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

EFCWest, Environmental Finance Center West

University of Maryland Environmental Finance Center

New England Environmental Finance Center

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

Government Finance Officers Association

NADO Research Foundation

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

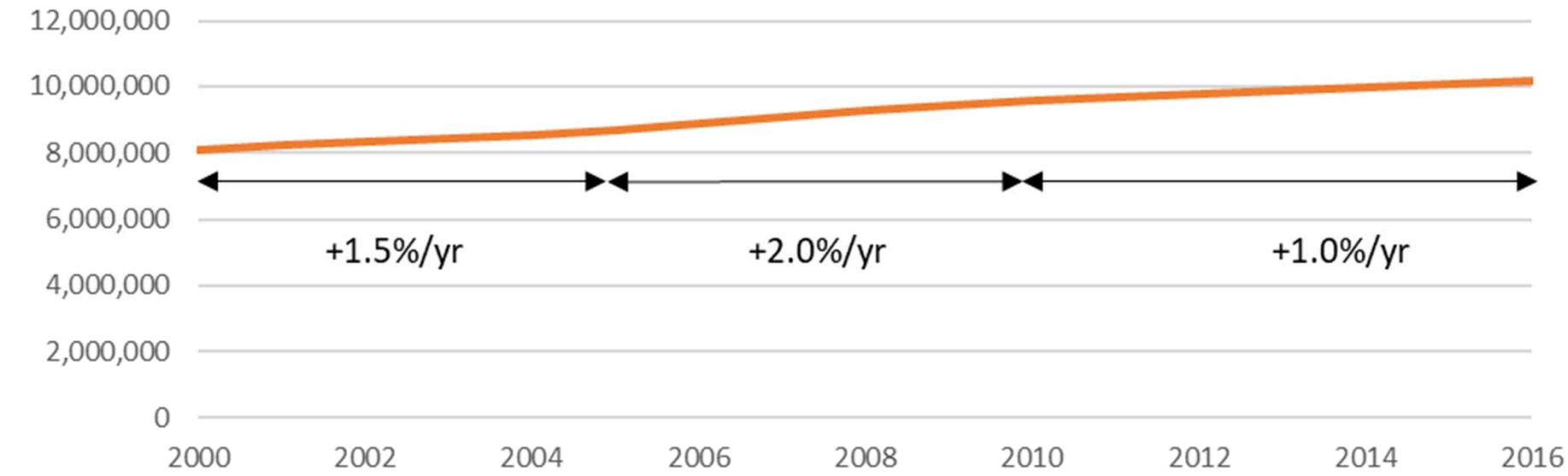
Session 1:

Trends in Populations and Water Demand in North Carolina

North Carolina is a Growing State

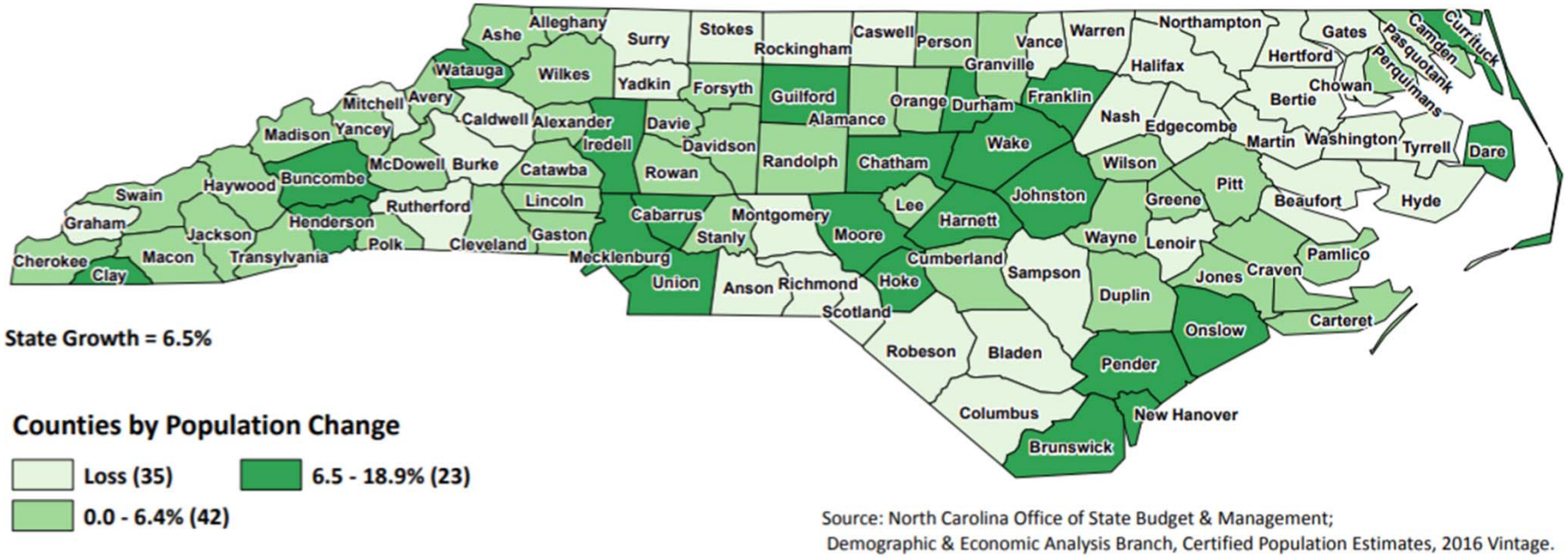
North Carolina's Total Population Increased Each Year Since 2000

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



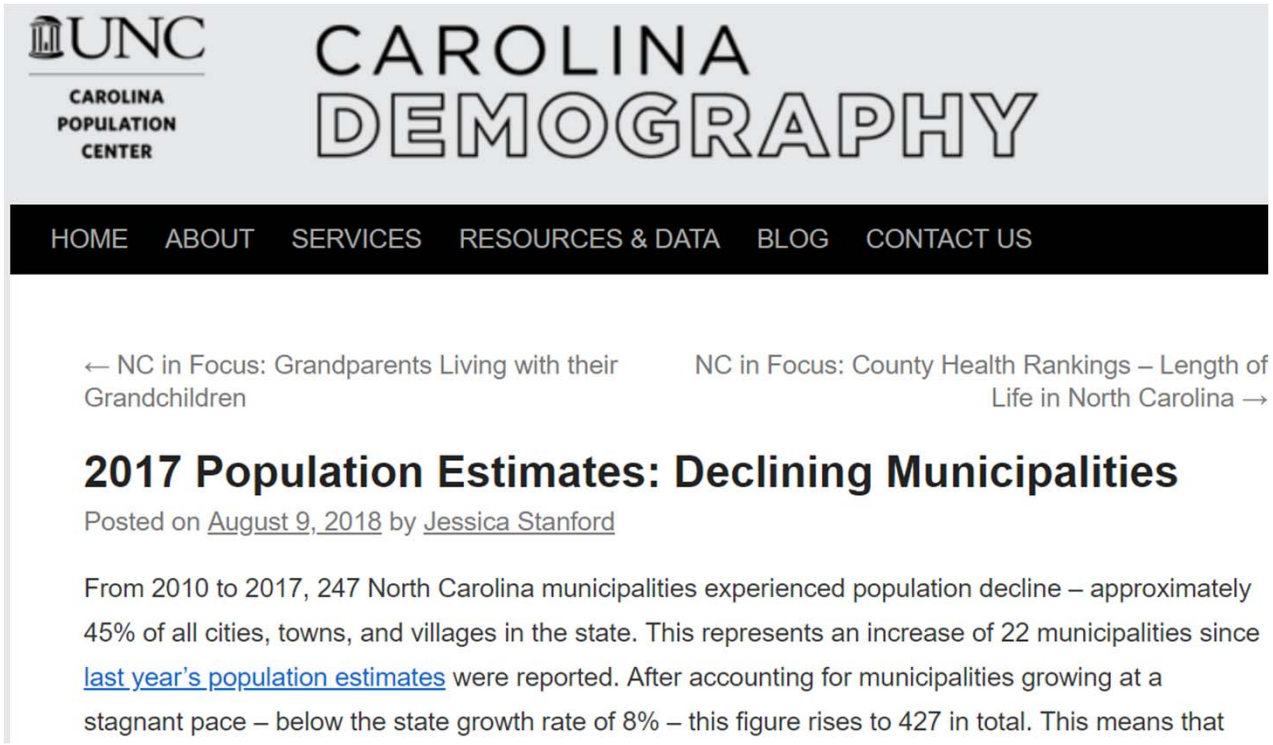
Source: North Carolina Office of State Budget & Management, “Population Dynamics”, https://files.nc.gov/ncosbm/documents/files/Rec2018-19_PopulationDynamics.pdf

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/



UNC CAROLINA POPULATION CENTER

CAROLINA DEMOGRAPHY

HOME ABOUT SERVICES RESOURCES & DATA BLOG CONTACT US

← NC in Focus: Grandparents Living with their Grandchildren

NC in Focus: County Health Rankings – Length of Life in North Carolina →

2017 Population Estimates: Declining Municipalities

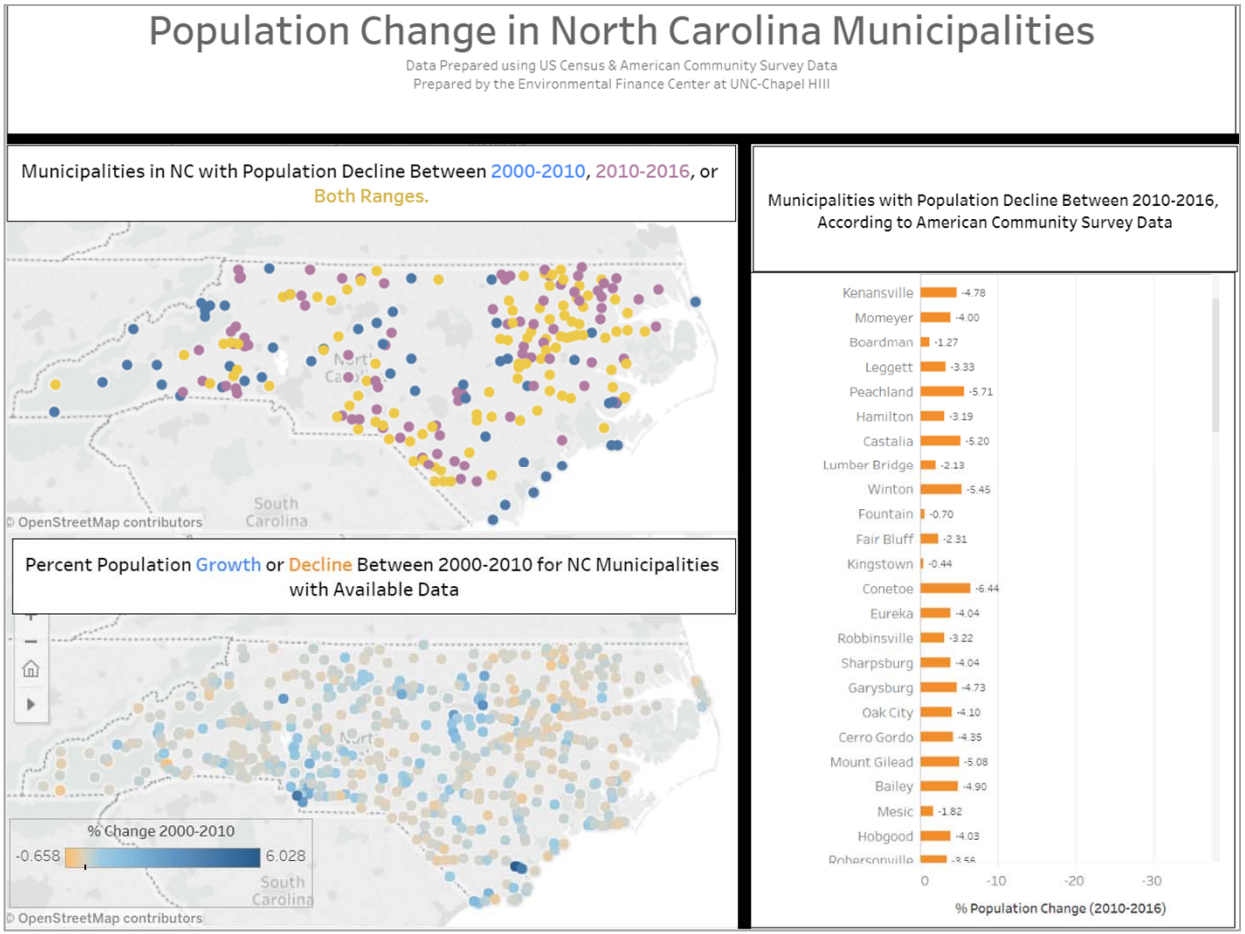
Posted on August 9, 2018 by Jessica Stanford

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

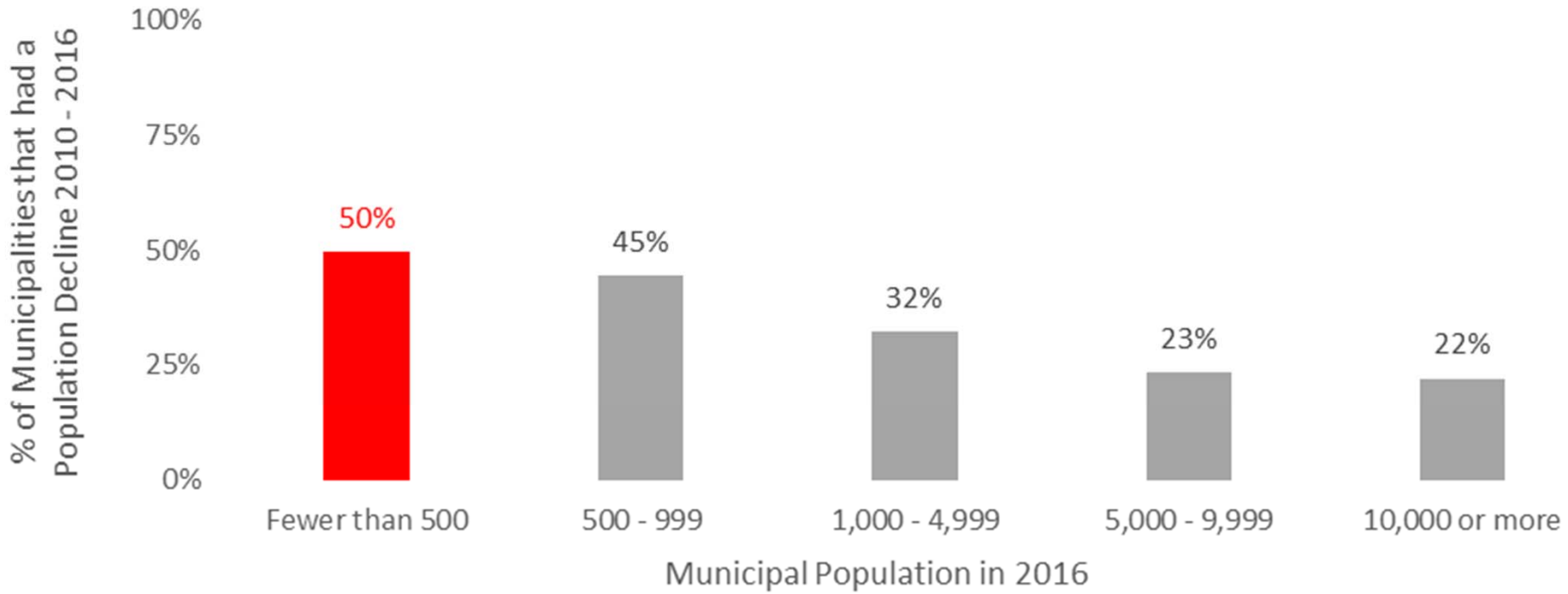


https://public.tableau.com/profile/efcatunc#!/vizhome/shared/MPFQ7BMY2

Small Municipalities are More Vulnerable

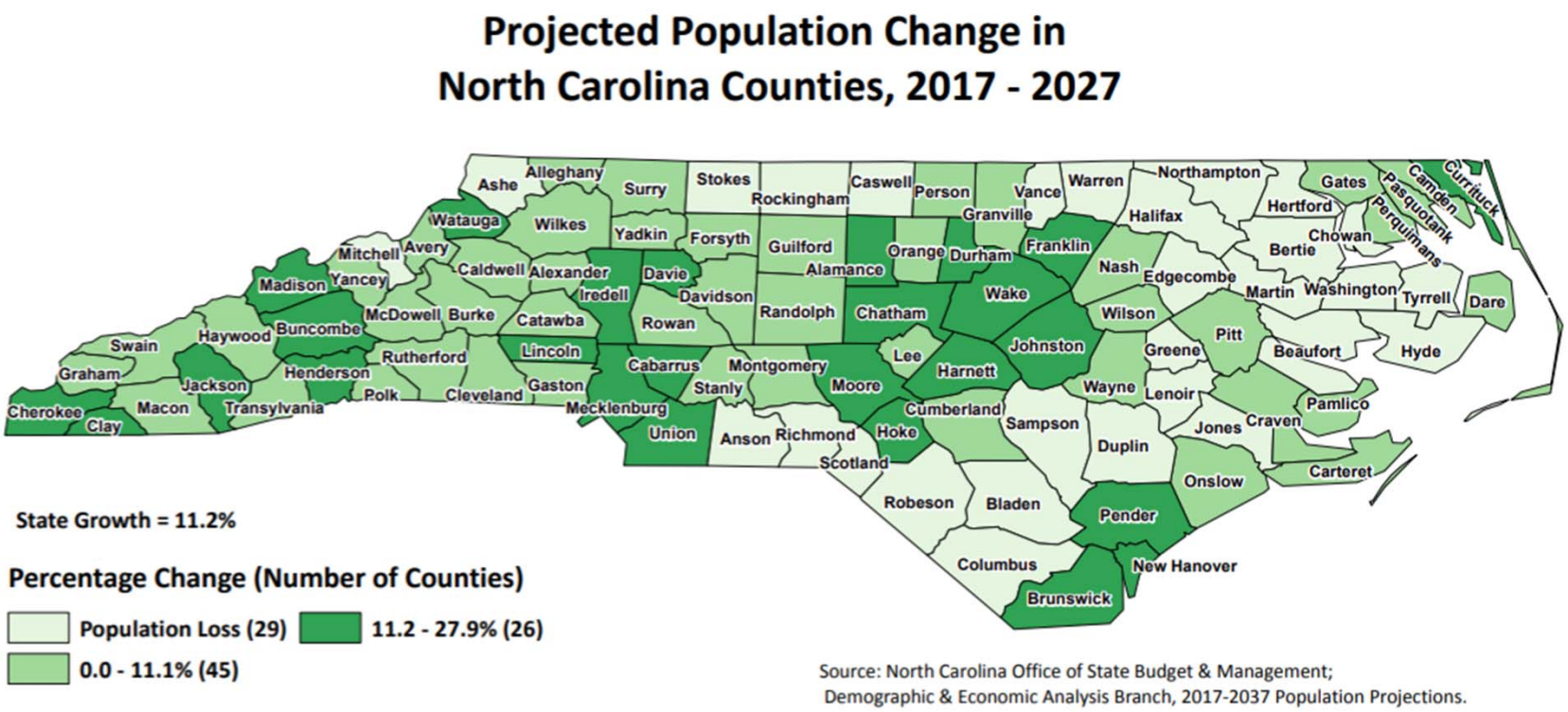
Small Municipalities are More Likely to be Declining than Large Municipalities

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

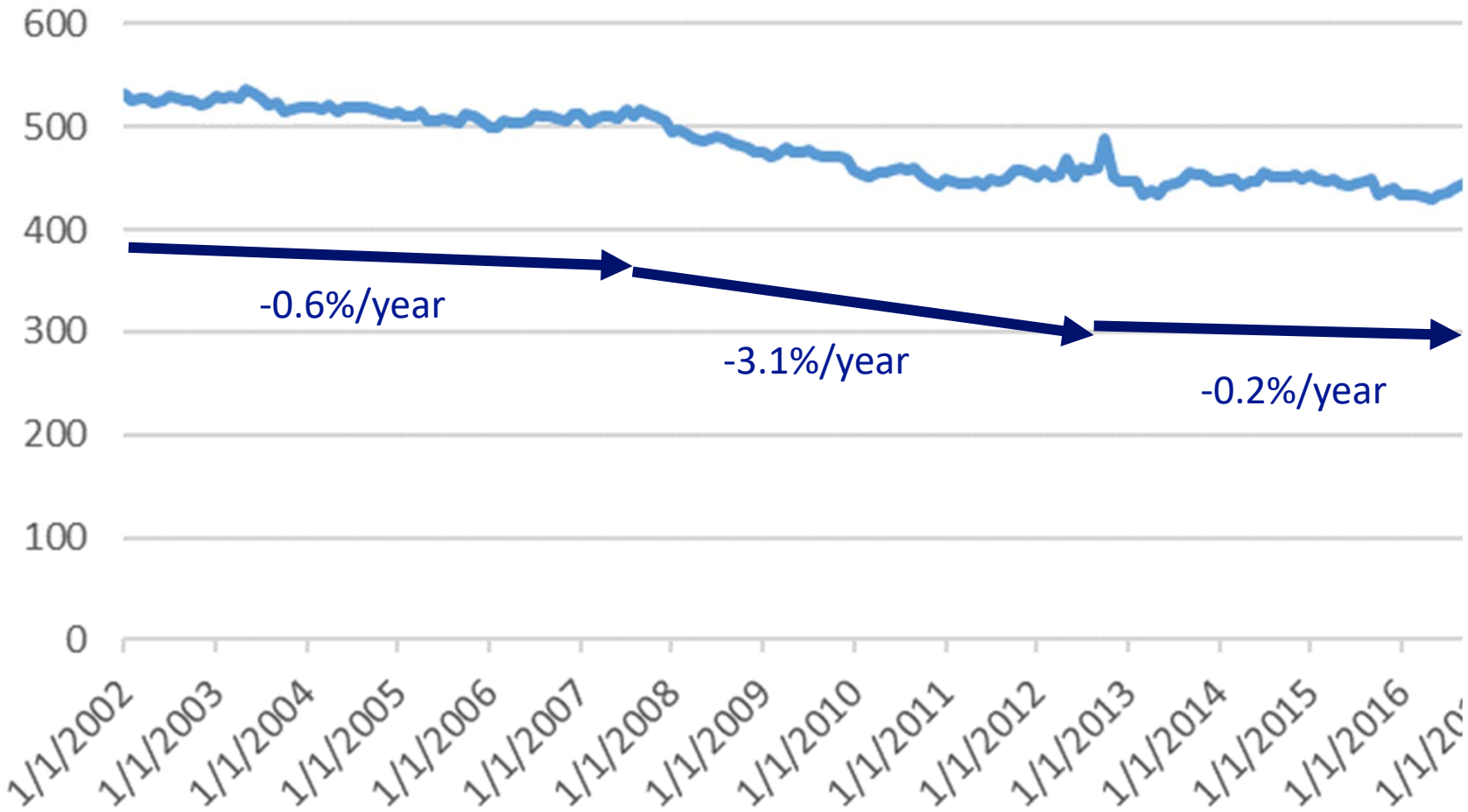


Source: North Carolina Office of State Budget & Management, “Population Dynamics”, https://files.nc.gov/ncosbm/documents/files/Rec2018-19_PopulationDynamics.pdf

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



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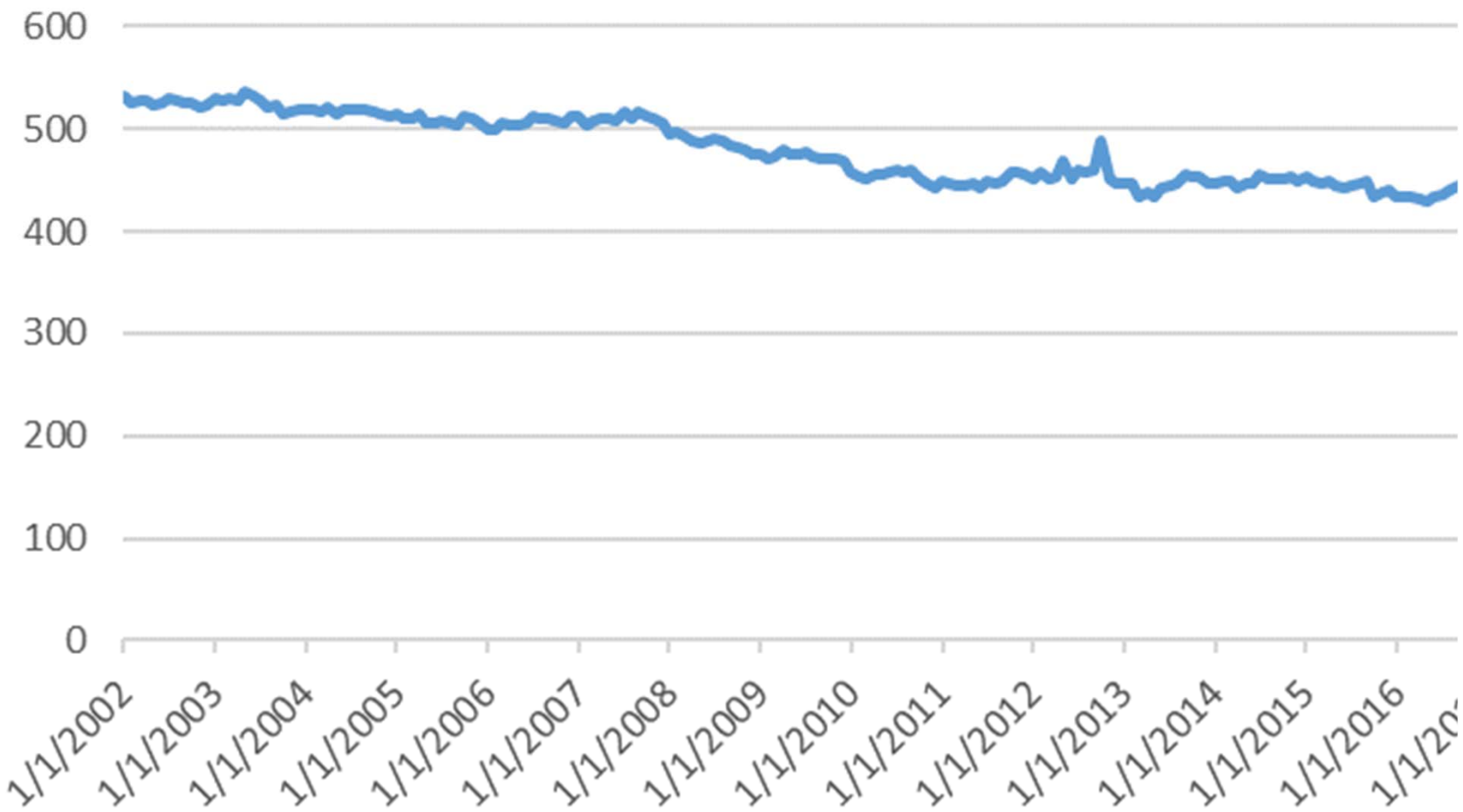

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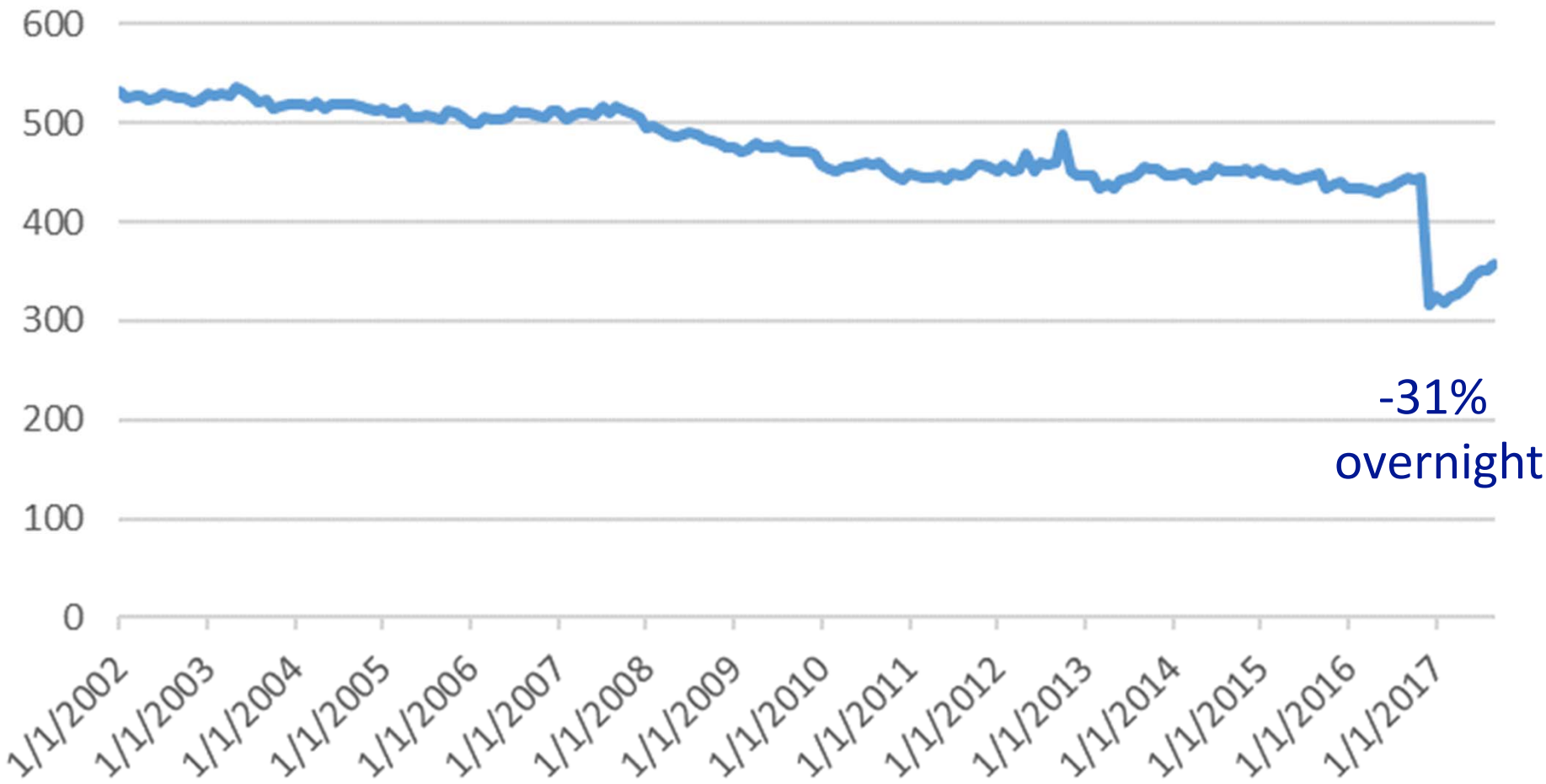


Average Water Use is Also on the Decline

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)

conservation

THOMAS D. ROCKAWAY, PAUL A. COOMES, JOSHUA RIVARD, AND BARRY KORNSTEIN

Residential water use trends in North America

FOR UTILITIES TO BOTH ENCOURAGE CONSERVATION AND HAVE SUFFICIENT FINANCIAL RESERVES FOR MAINTENANCE AND GROWTH, IT IS NECESSARY TO UNDERSTAND HOW WATER USE PATTERNS HAVE CHANGED DURING THE PAST 30 YEARS.

Water utilities across North America are experiencing declining water sales among their residential customers (single-family households). Typically, utility officials attribute the decline in water use to several possible factors, including wetter weather, new water-conserving appliances, changing demographics, and classification anomalies; however, there is no clear understanding of the ratio of use each of these factors contributes to the overall decline. Without a clear understanding of the driving forces behind changing water use patterns, it is difficult to develop appropriate pricing structures that will both recoup costs and provide resources for the future.

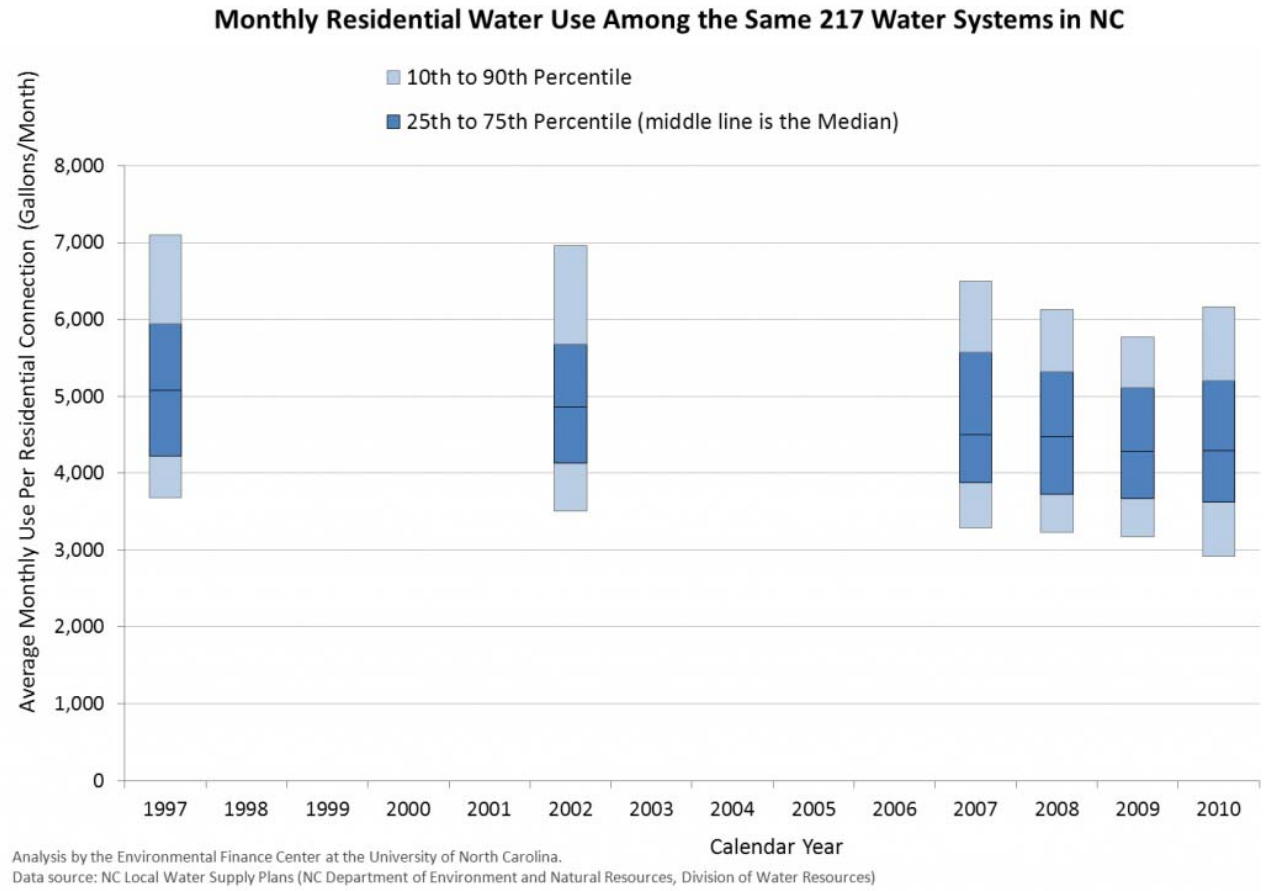
This study investigates trends in household water use in North America during the past 30 years and draws preliminary conclusions on the magnitude and causes of declining residential use. To assist utilities in adapting to changing use, the study focuses on (1) understanding residential water use patterns and trends; (2) assessing the effect of those patterns on water utility operations; and (3) providing data to be correlated with future trends for planning purposes. The study concludes that the decline in the number of individuals per household and the increased use of low-flow appliances are the primary contributors to the observed decline in water use among single-family households.

OLD WAYS OF ESTIMATING WATER USE DON'T WORK ANYMORE

Water utilities are finding it increasingly difficult to accurately manage their finances in the face of changing residential water use patterns. Many utilities have reported a gradual erosion of residential water sales on a per-household basis and are uncertain of the causes of the observed trends (Fig-

A full report of this project, *North American Water Usage Trends Since 1992* (4031), is available for free to Water Research Foundation subscribers by logging on to www.waterrf.org.

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

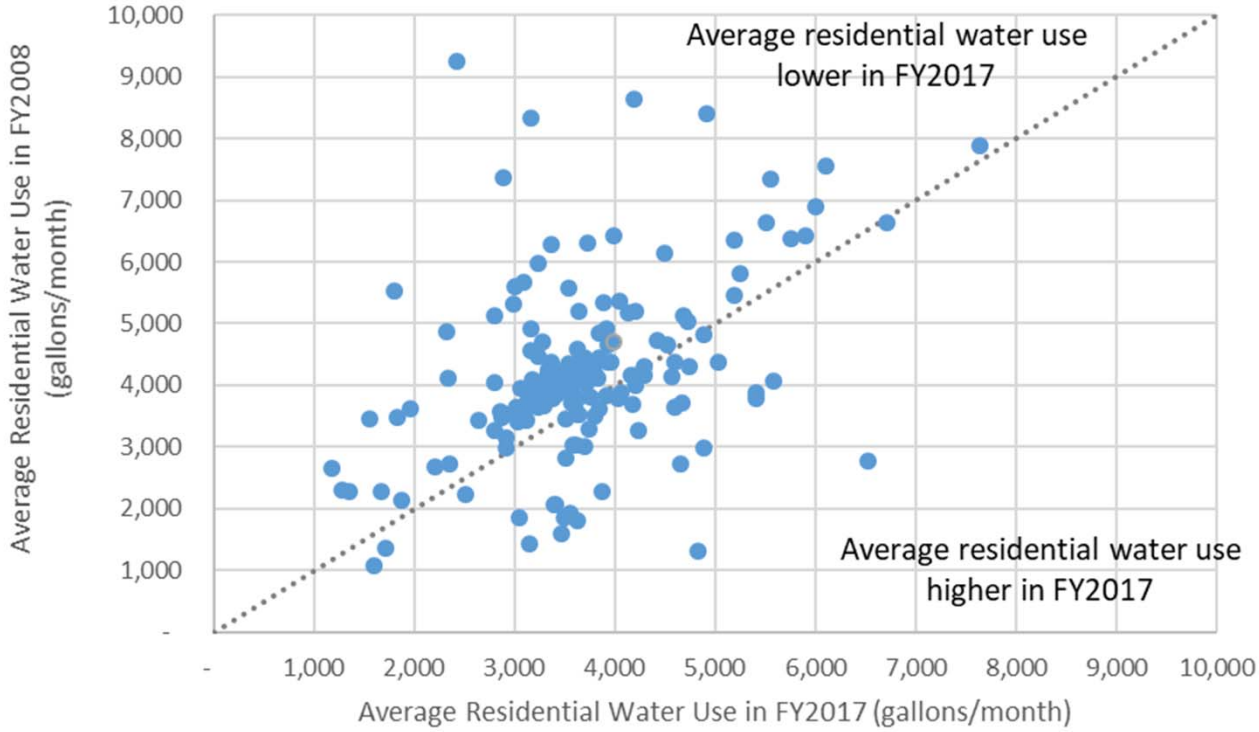


Source: Environmental Finance blog, “Declining Residential Water Use, Part One: North Carolina”, http://efc.web.unc.edu/2012/05/24/residential-water-use-is-declining-in-north-carolina/

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

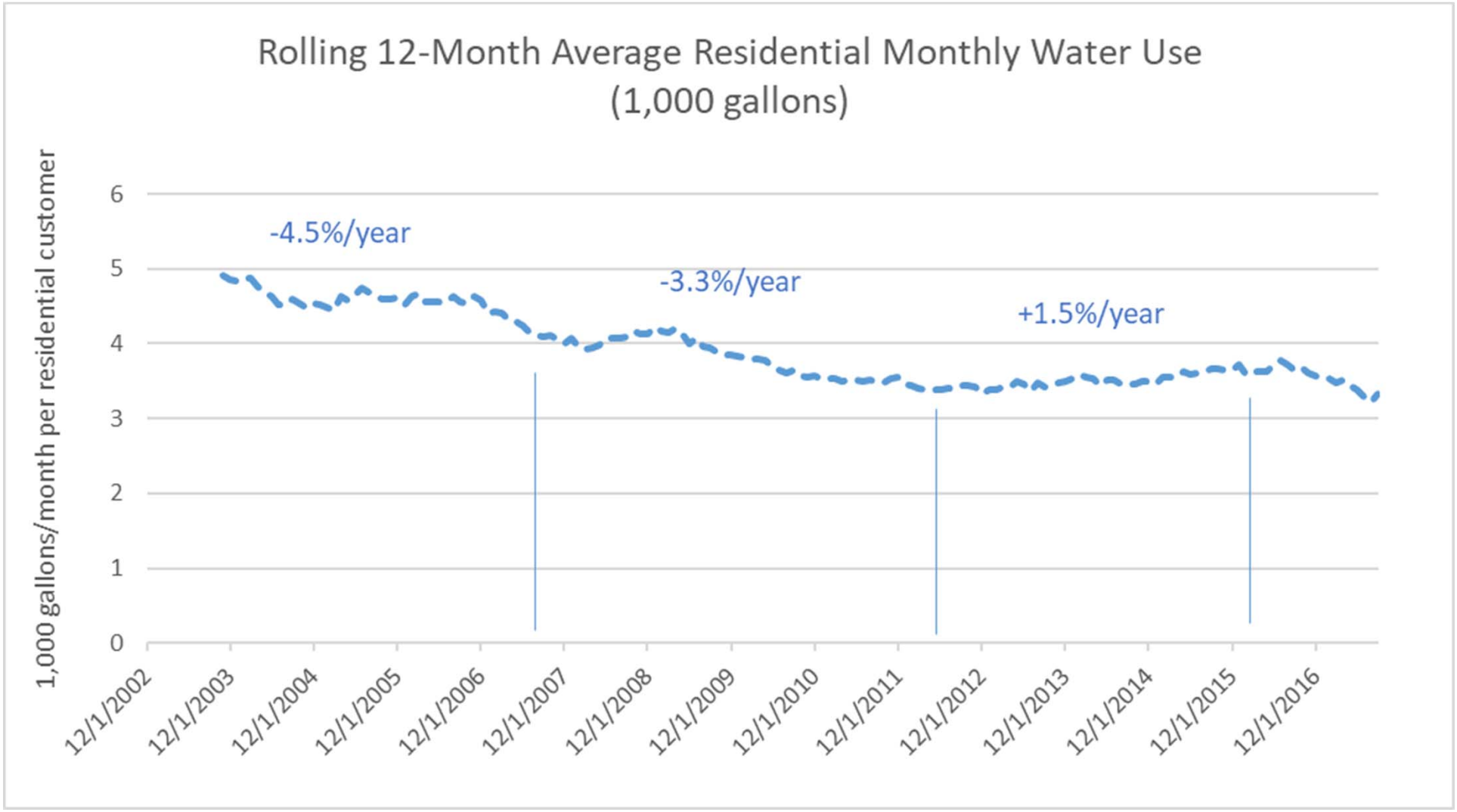
Average residential water use declined for 72% of 163 municipal water systems in North Carolina with water use data in FY2008 and FY017

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.

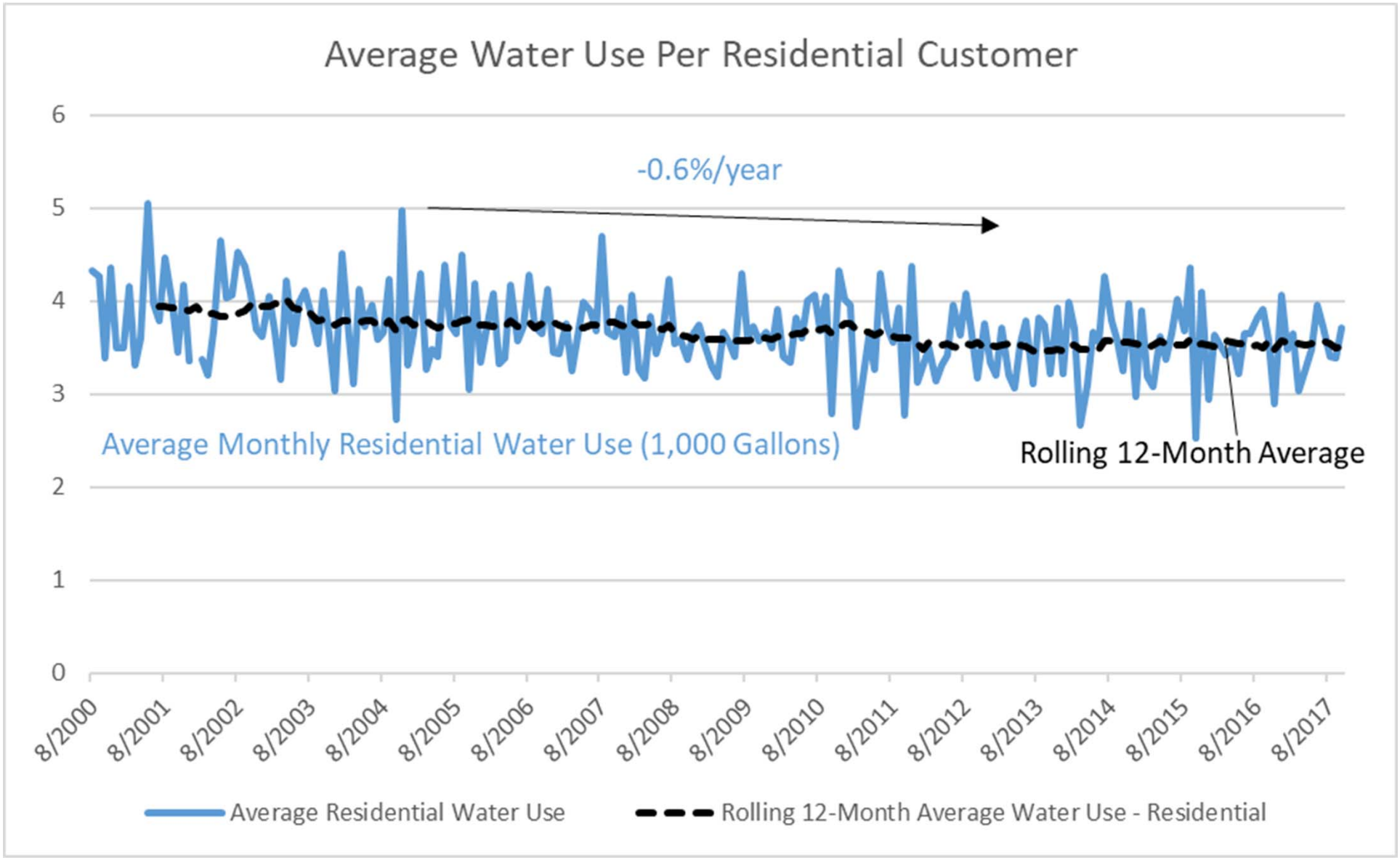


Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Source: Municipality-reported data in the FY2008 and FY2017 Annual Financial Information Reports to the NC Department of State Treasurer, Division of State and Local Government

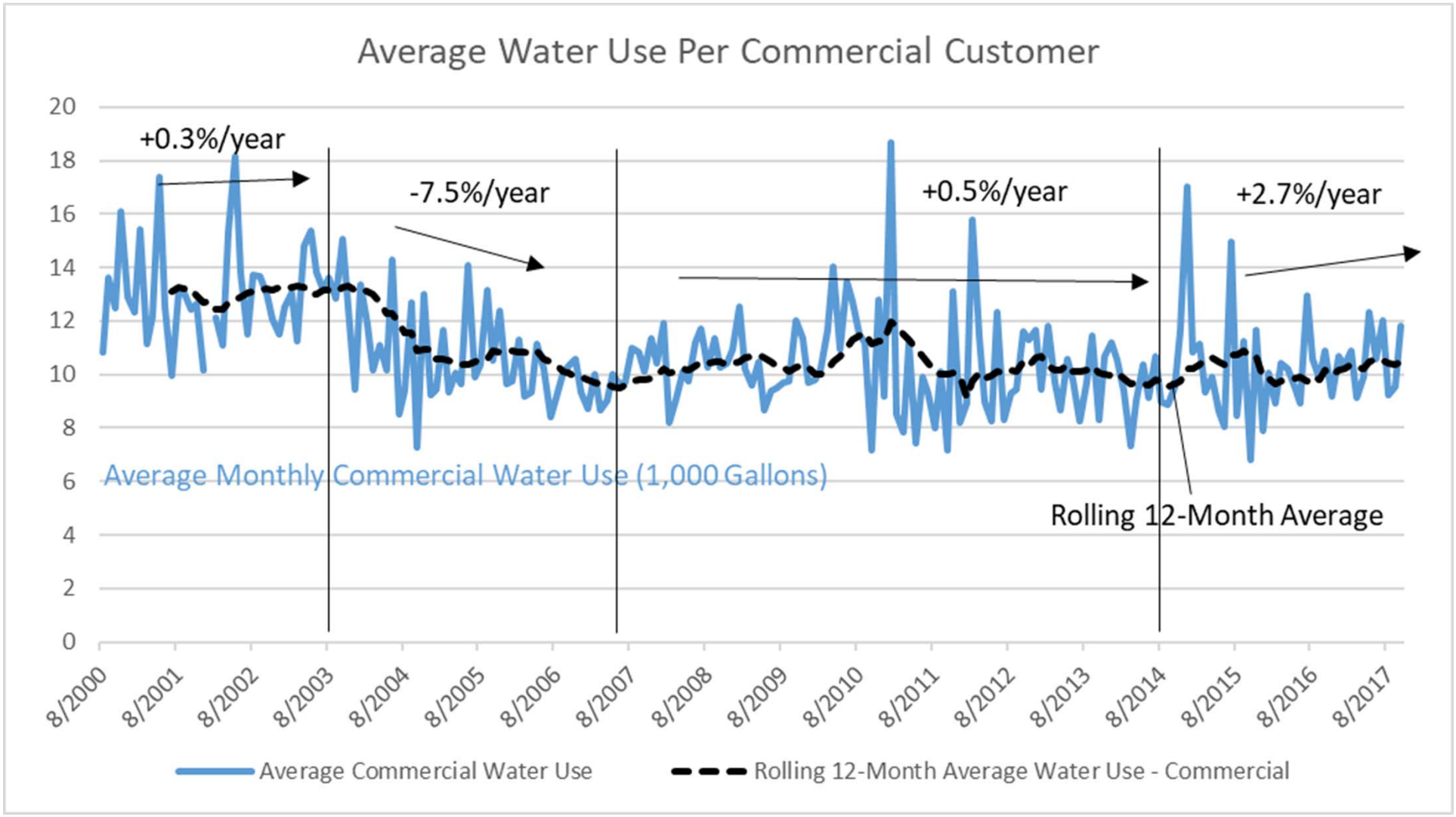
Average Residential Water Use in the Example Water System in North Carolina



Another Utility Example – Residential Water Use

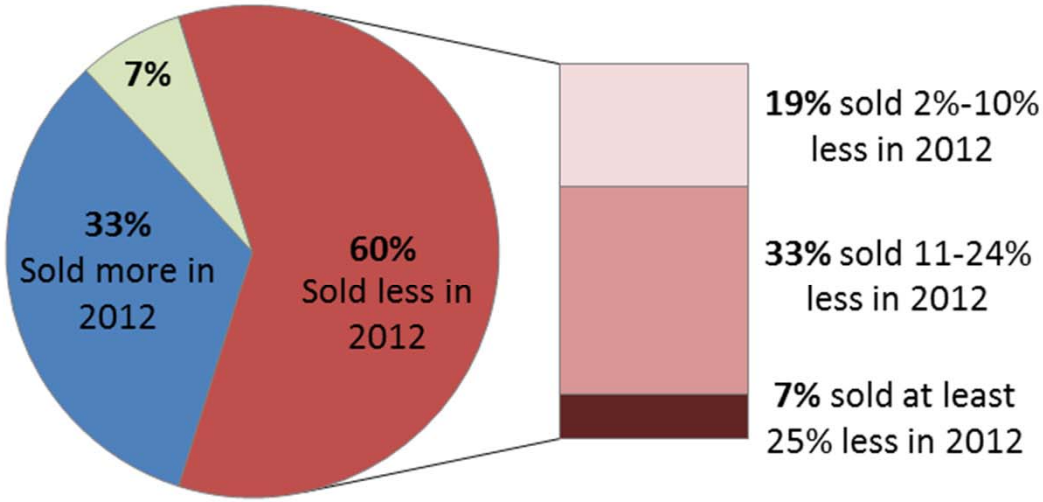


Nonresidential Water Use is Less Predictable



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

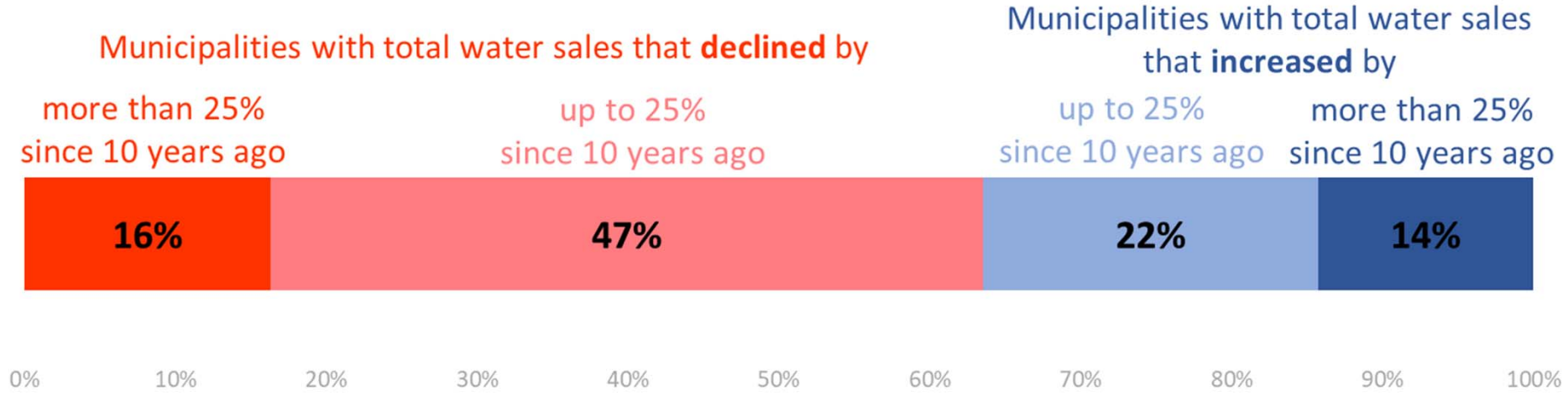


Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Source: Biennial, national AWWA-RFC Water and Wastewater Rate Surveys in 2006 and 2012. Water utilities that reported their total daily gallons sold (MGD) in 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

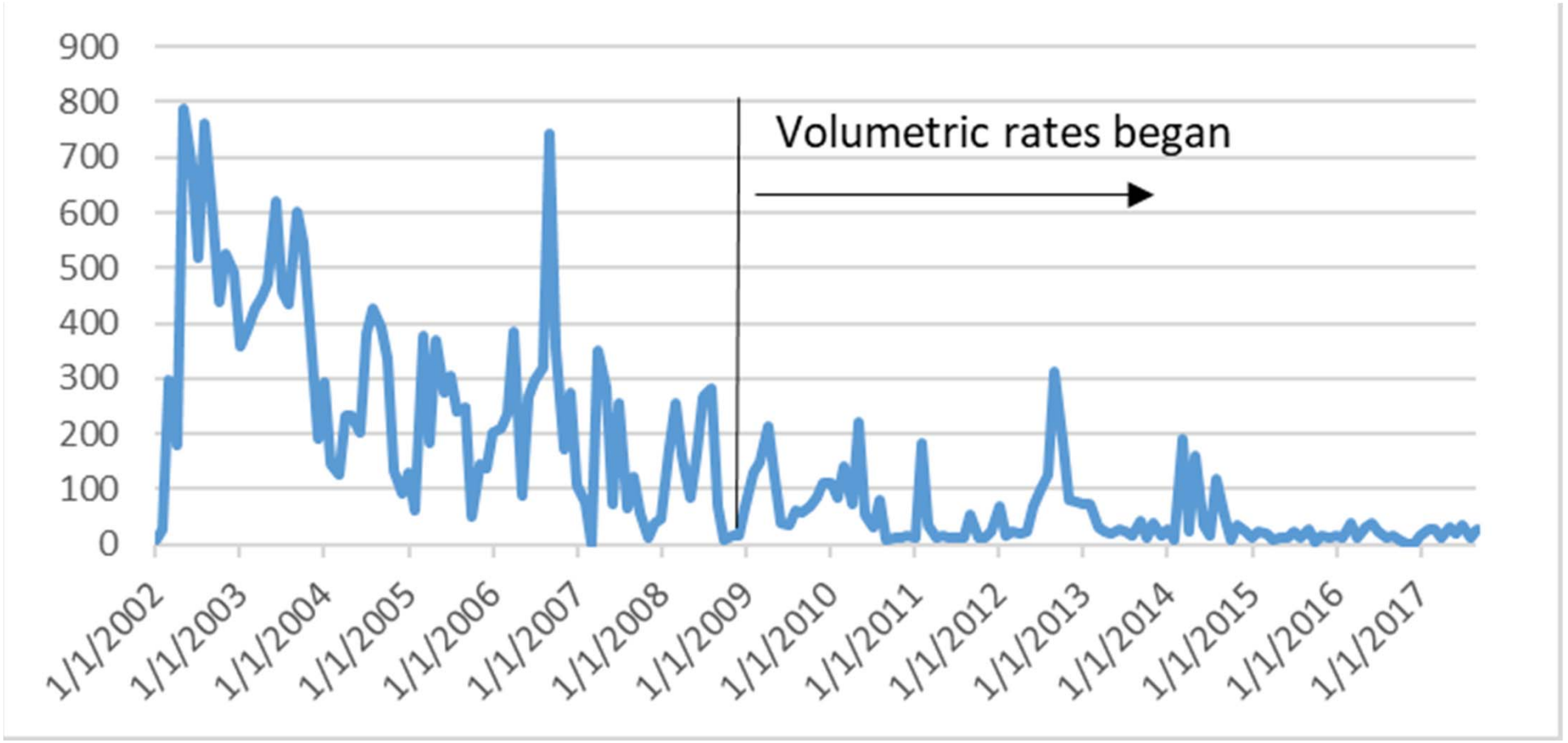


Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Source: North Carolina Department of State Treasurer, Division of State and Local Government's Annual Financial Information Reports for FY2008 and FY2017 for municipalities Municipalities with missing 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.



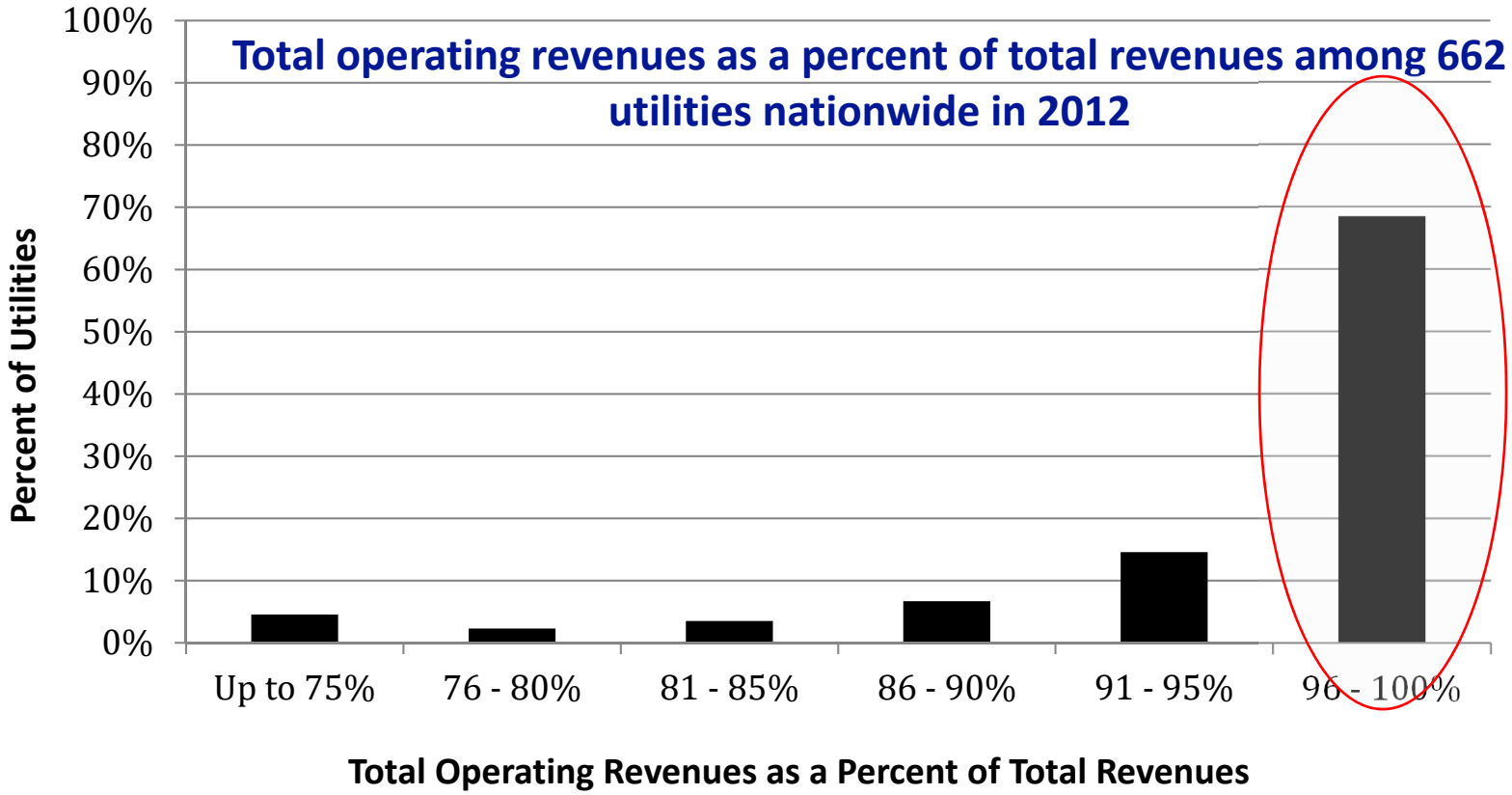
Session 2:

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

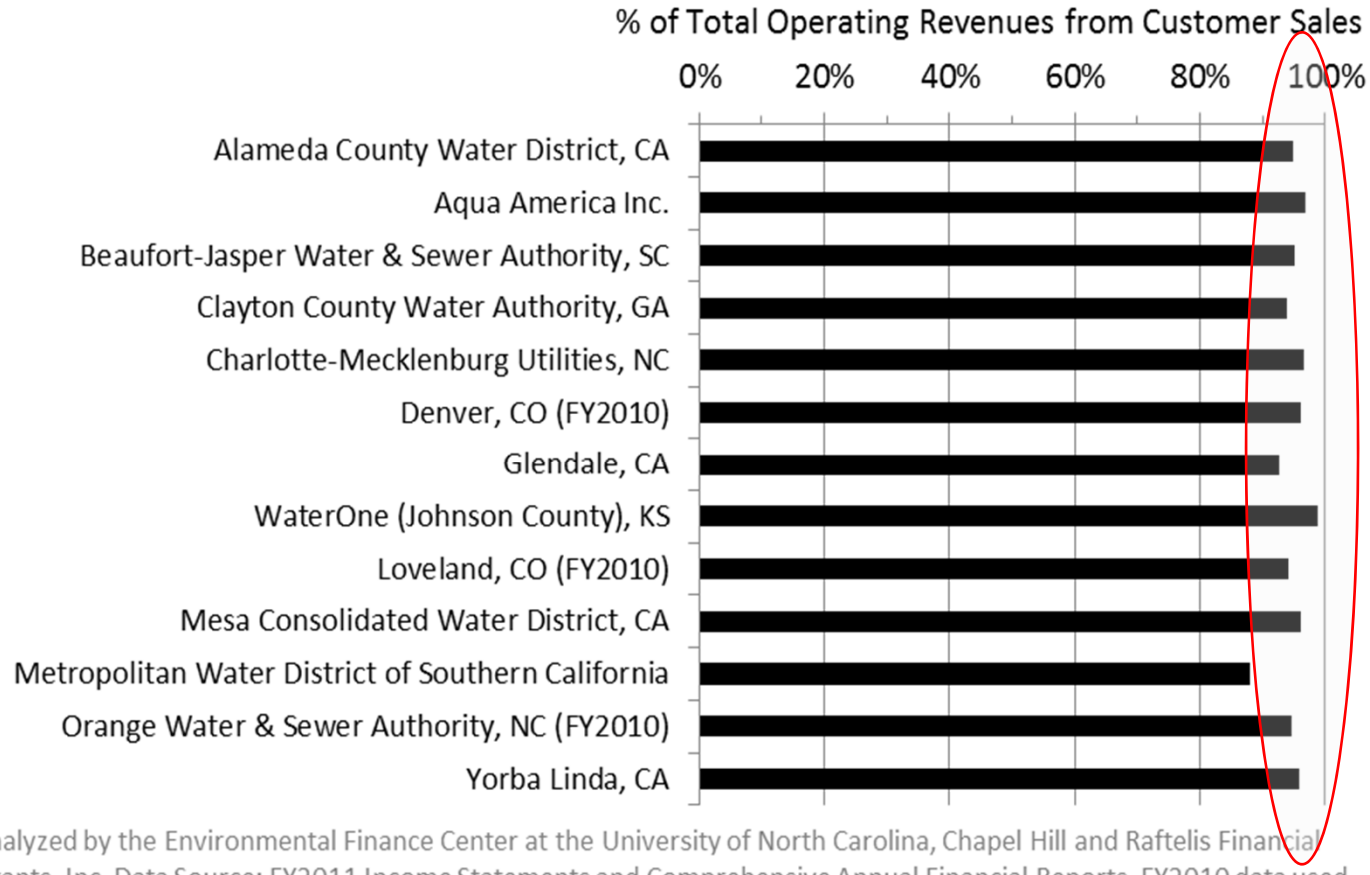
Operating Revenues are the Primary Source of Revenues for Water Utilities



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

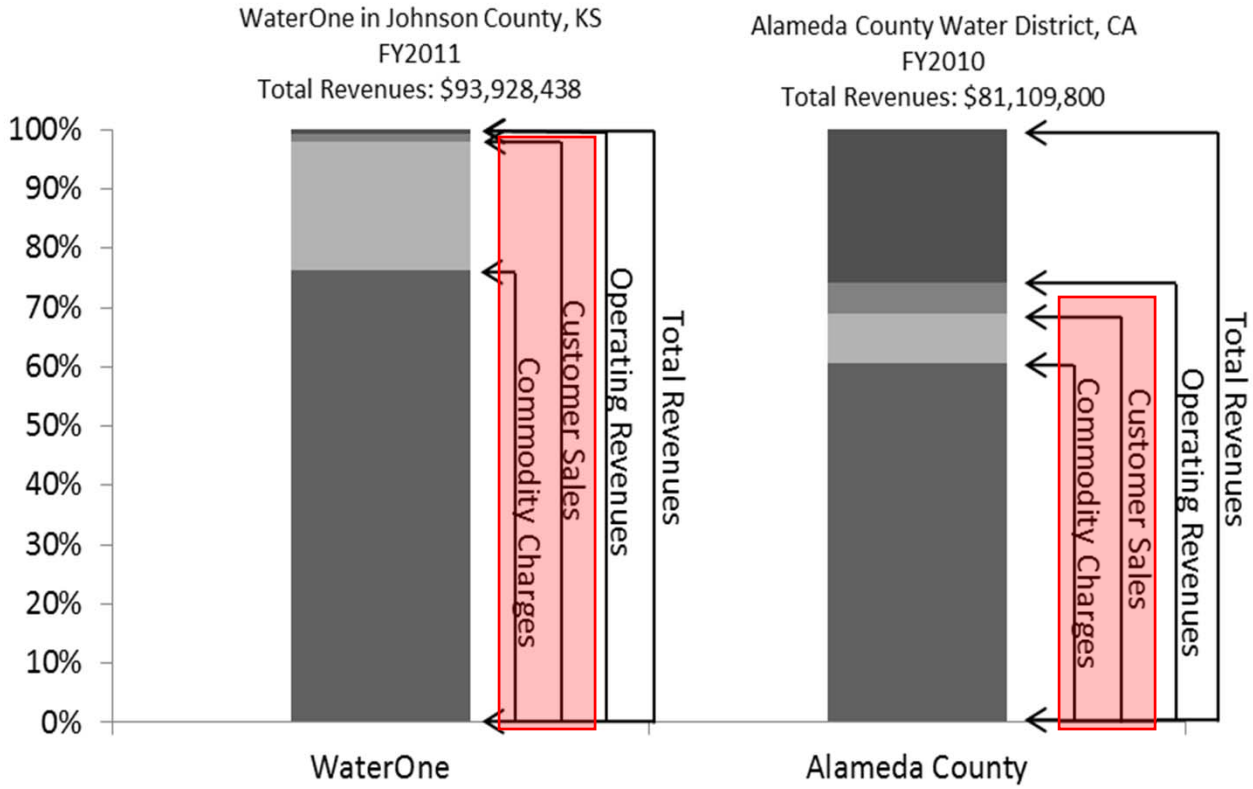
(e.g. $25.00/month minimum charge)

+

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”.

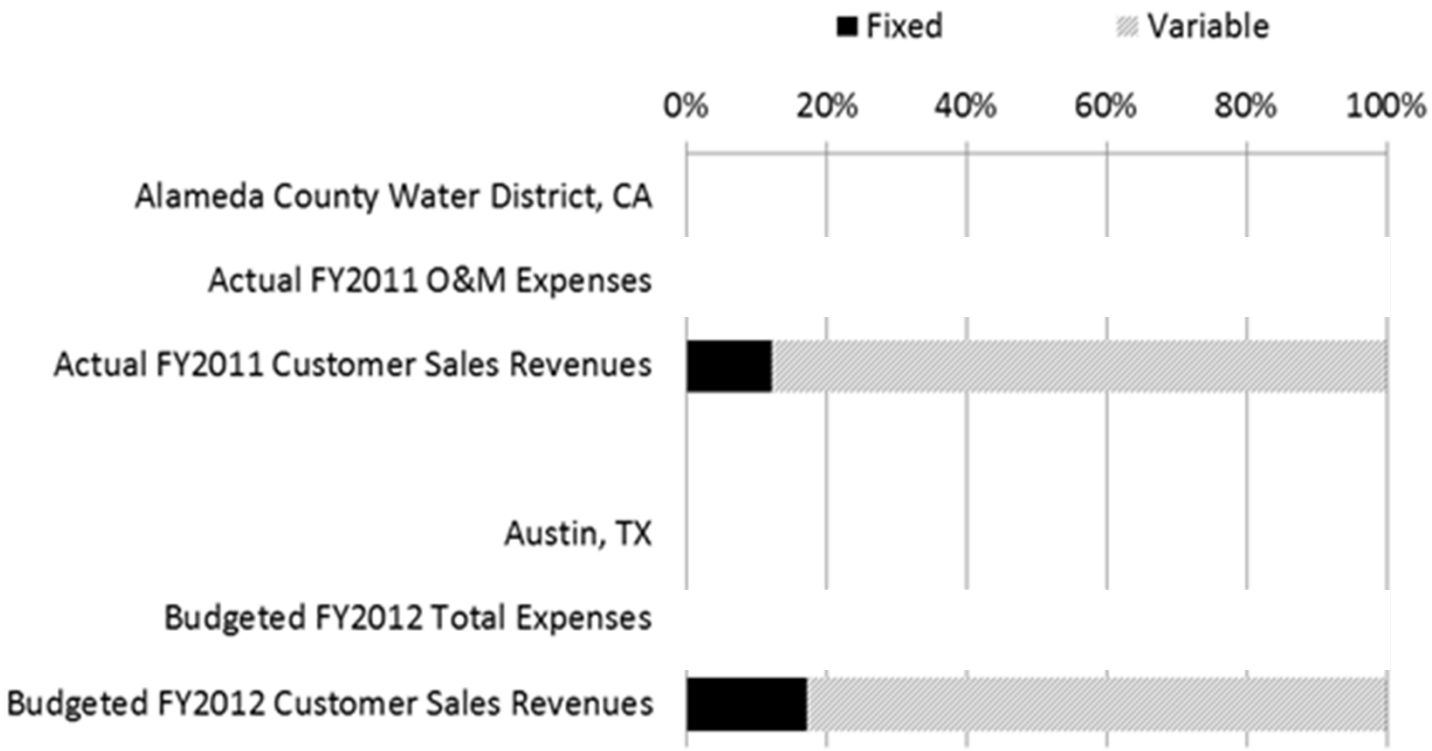
For many water systems, the majority of revenues are generated from the **volumetric charges**, which are dependent on water use.

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?

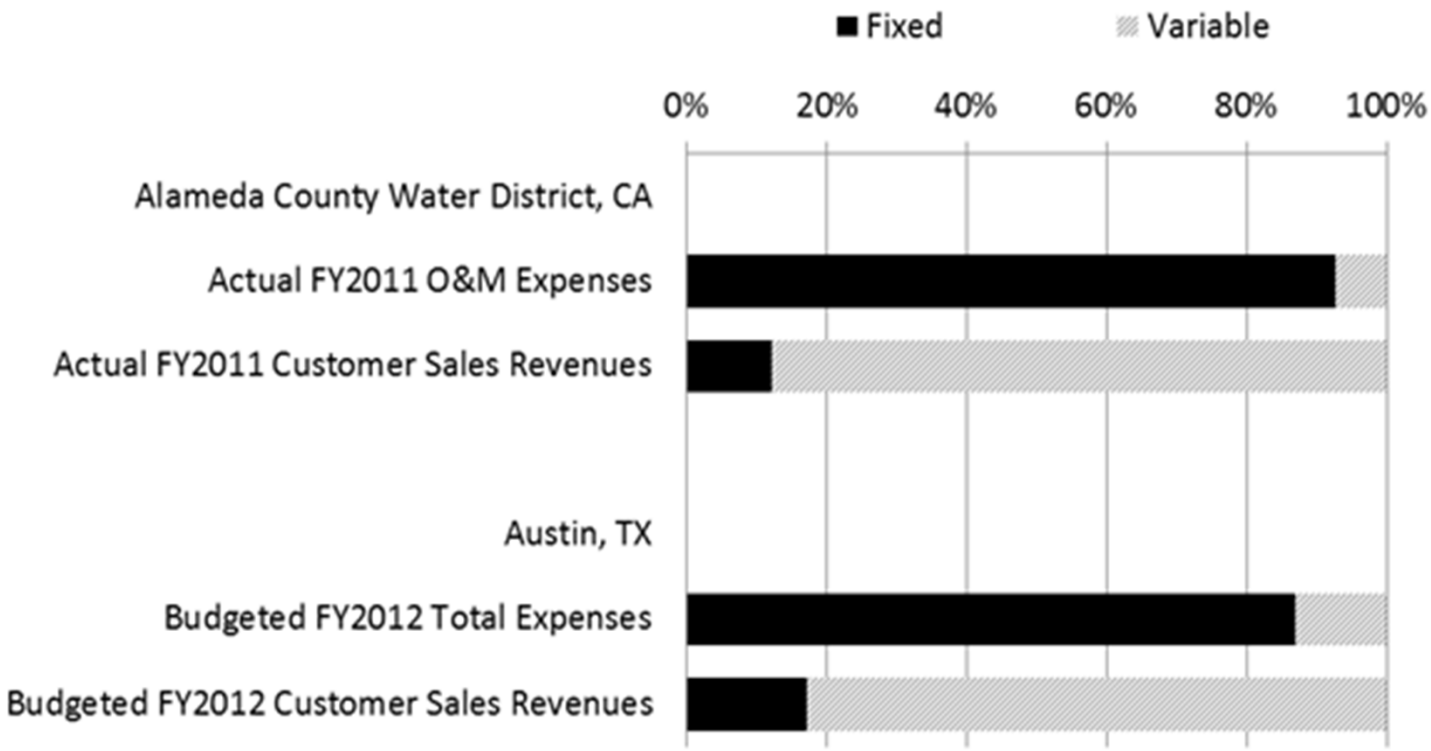
Fixed versus Variable Costs and Revenues



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



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

Expenses in the Short-Term

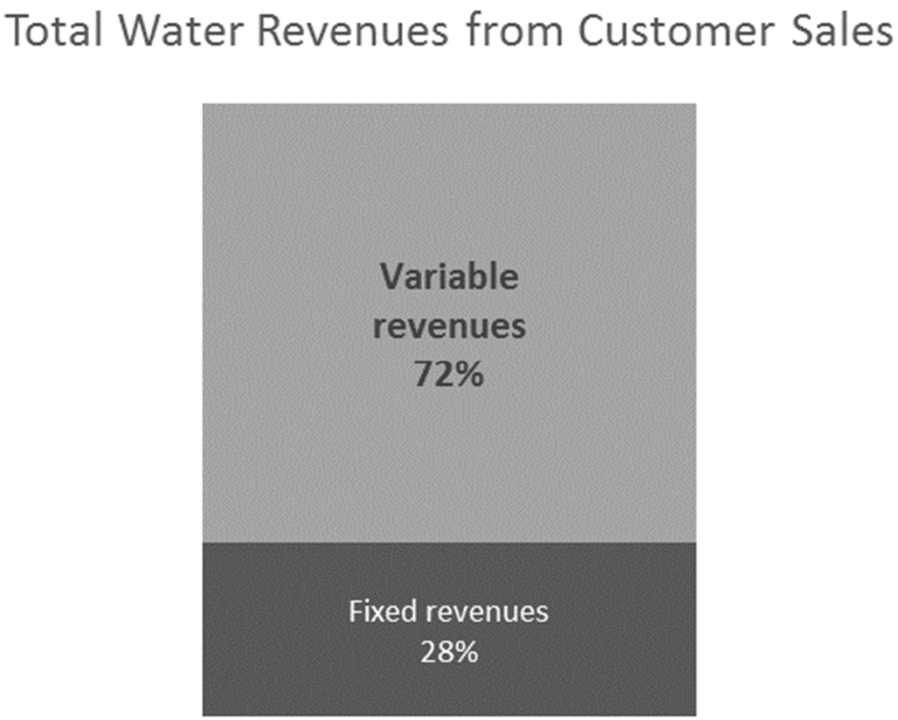
Variable (depends on volume of water)

- 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.

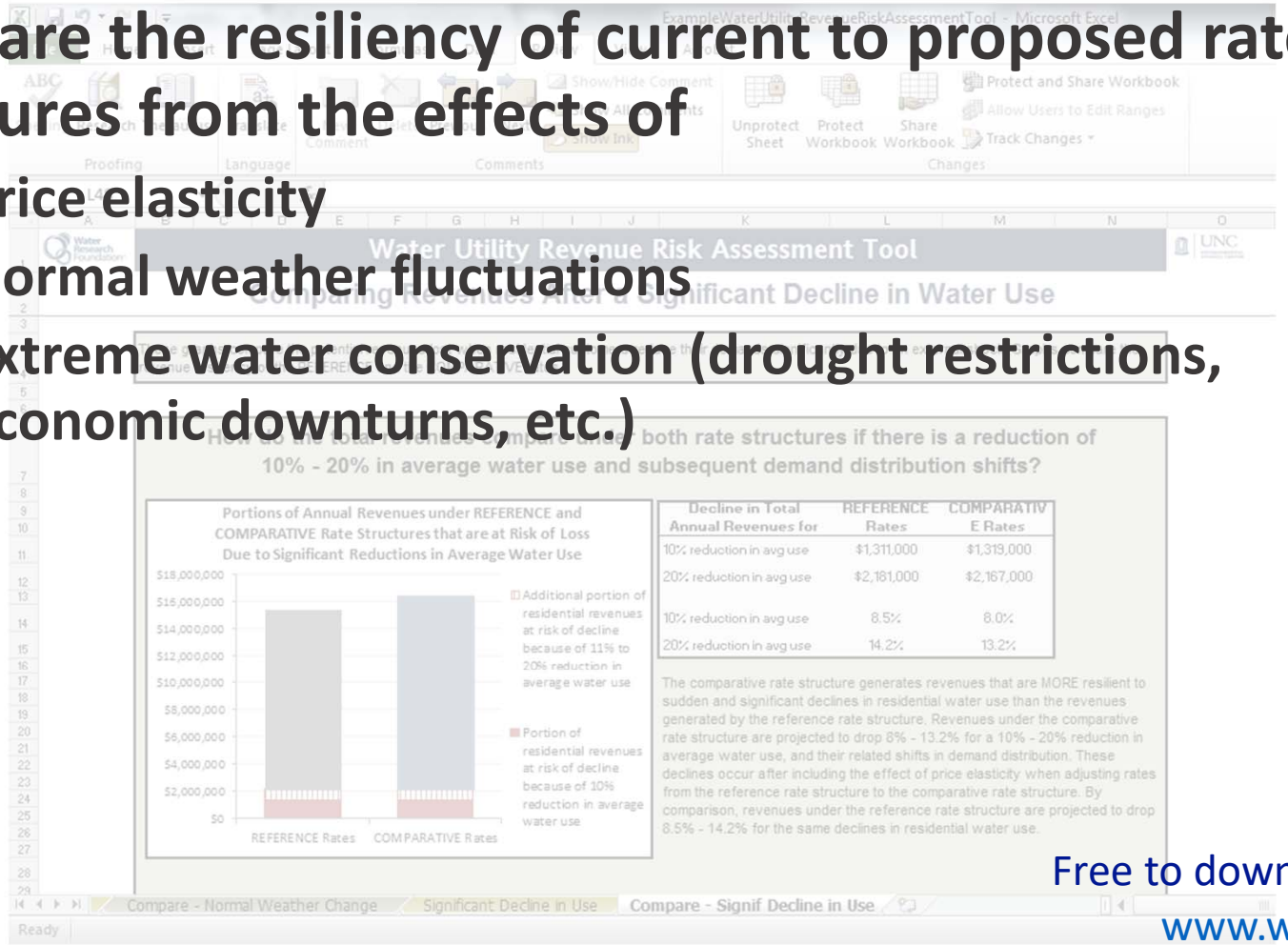
How Much of the Revenues are *Truly* Vulnerable to Declining Demands?



Water Utility Revenue Risk Assessment Tool

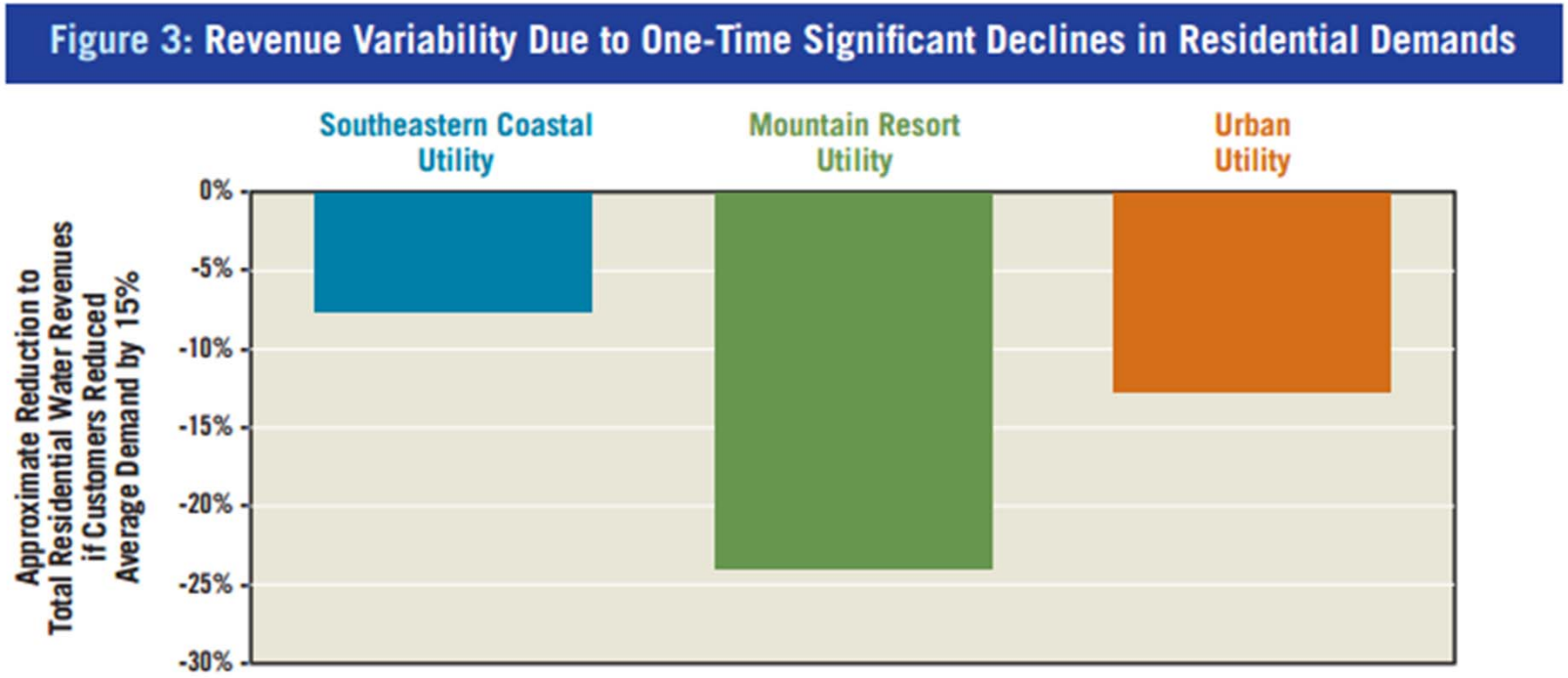
Compare the resiliency of current to proposed rate structures from the effects of

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



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

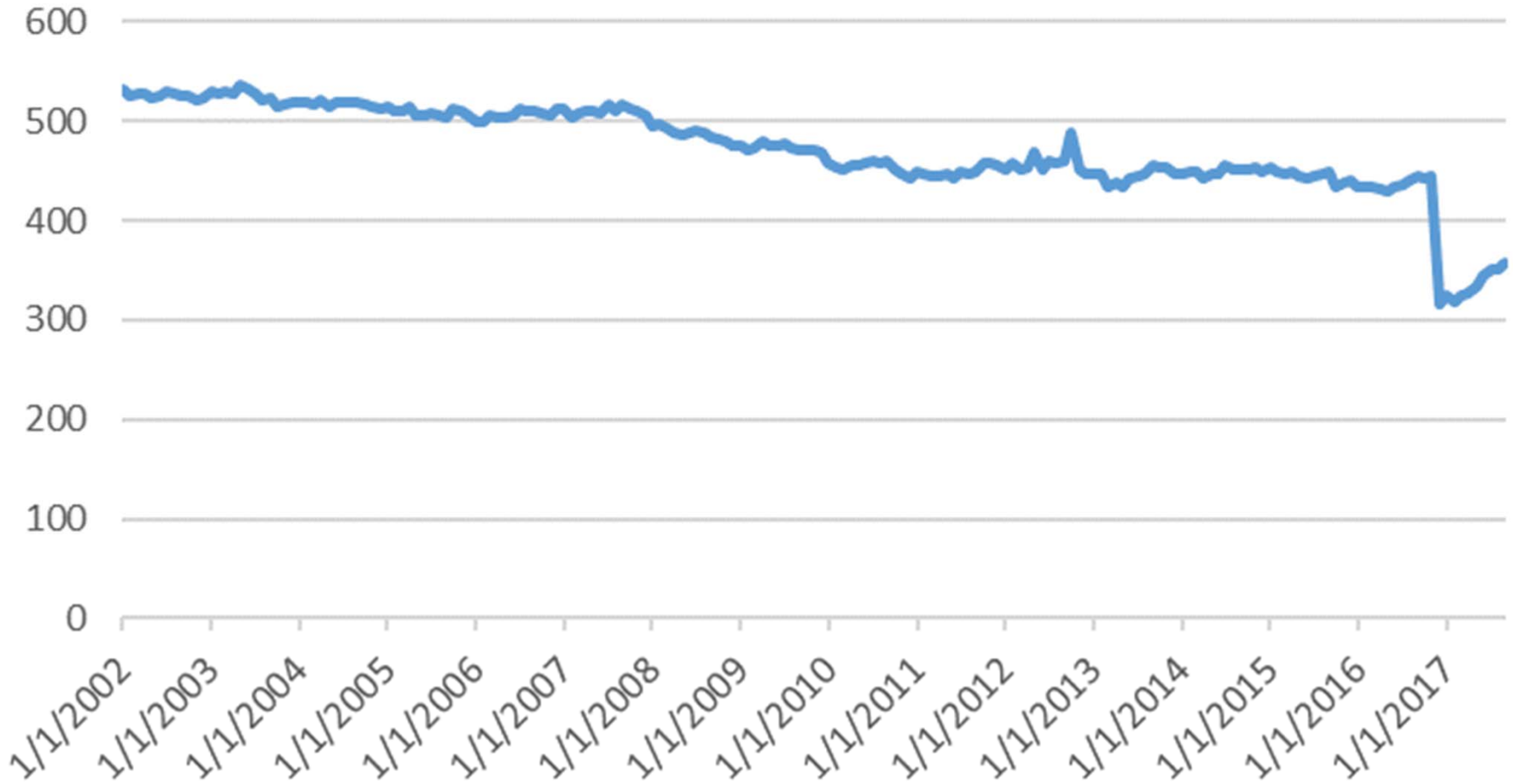
Effect of Reducing Average Demand by 15% on Three Utilities' Revenues



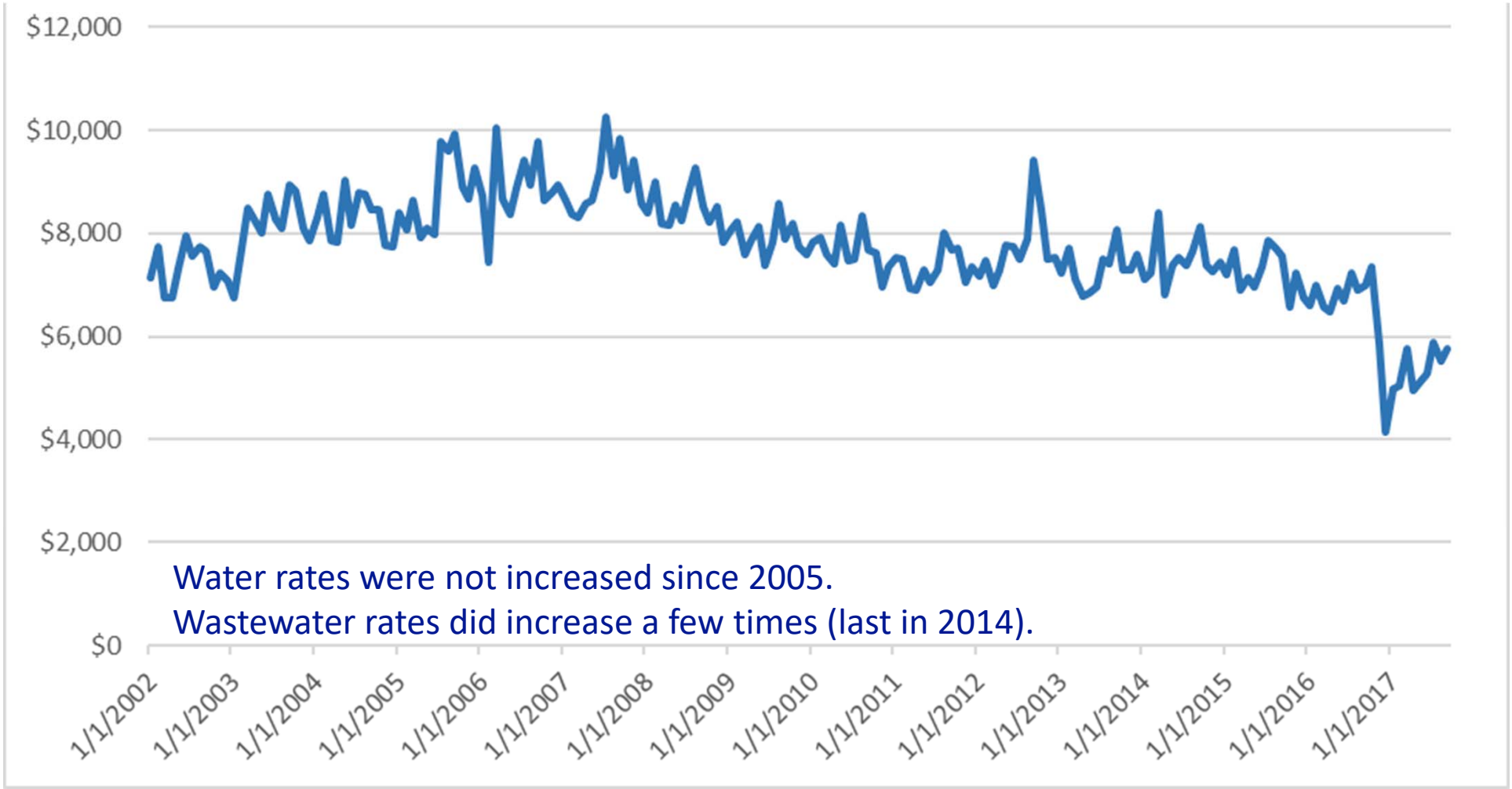
Source: Eskaf, S. et al. (2014). *Measuring & Mitigating Water Revenue Variability: Understanding How Pricing Can Advance Conservation without Undermining Utilities' Revenues Goals*. Ceres report. www.ceres.org or www.efc.sog.unc.edu

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

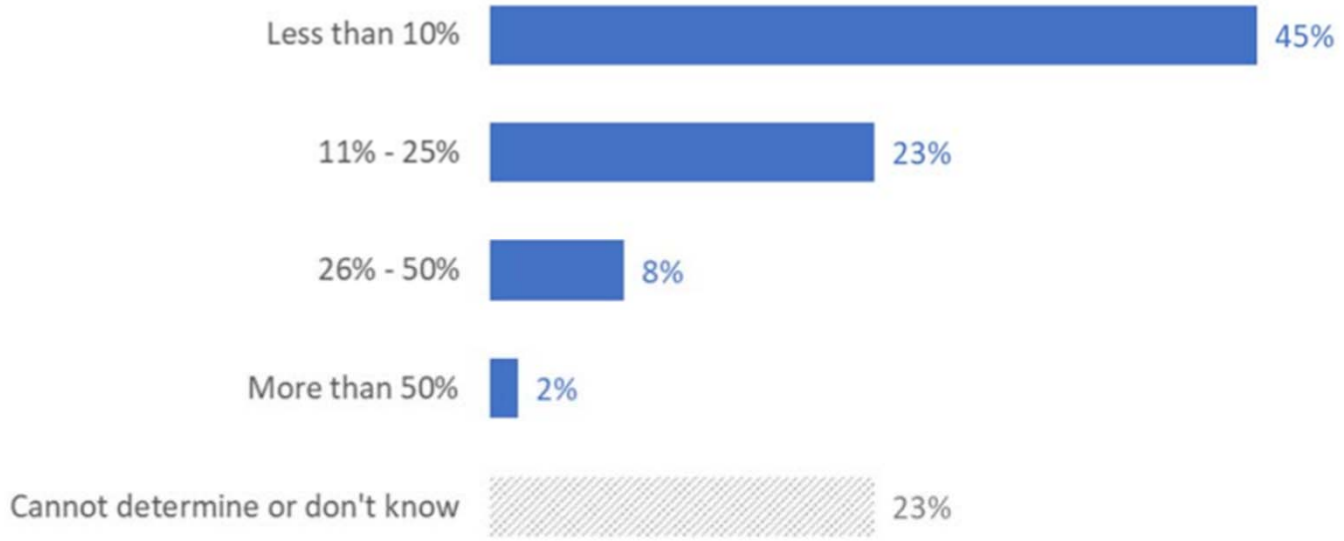


How Vulnerable are Revenues to Loss of Large Customers?

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)

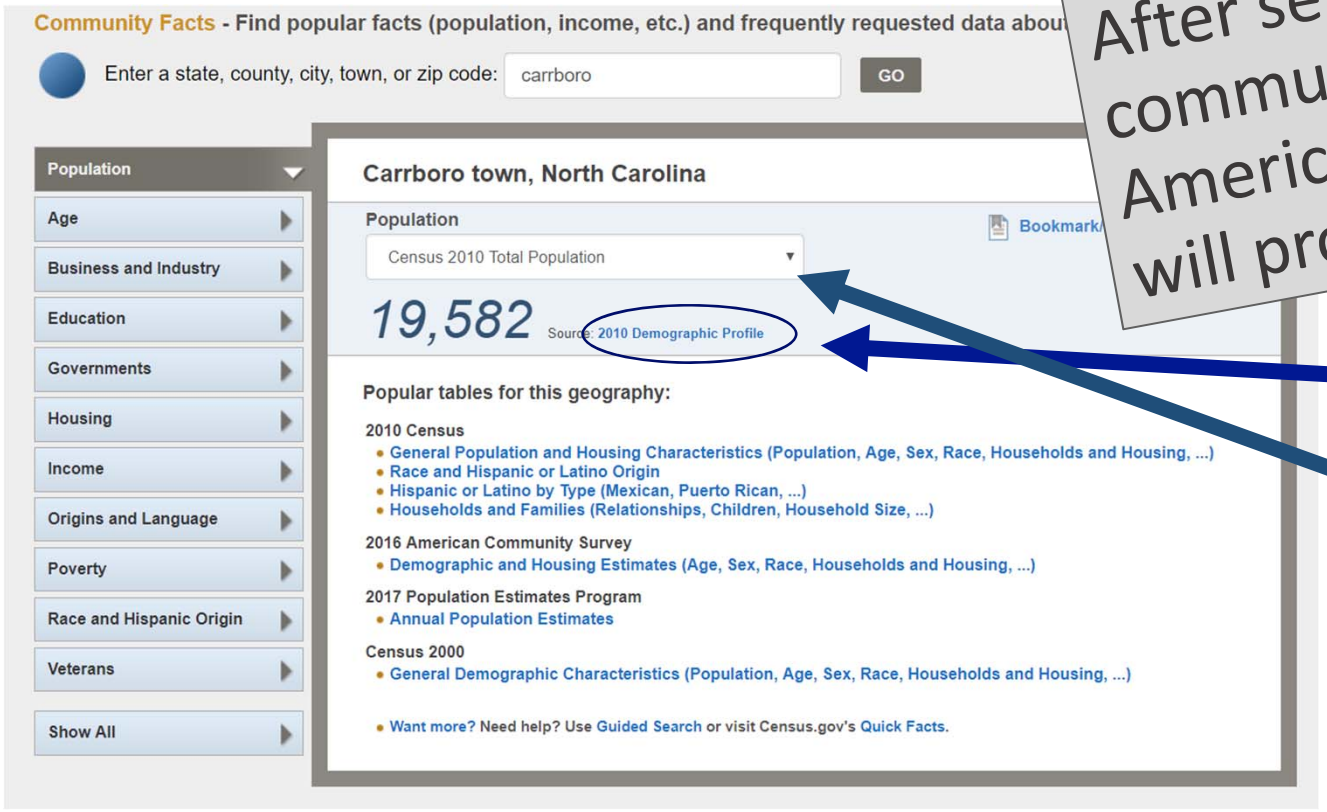
Using US Census Bureau's American Community Survey (ACS) Data

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."

https://factfinder.census.gov/

"Community Facts" Finding Useful Information

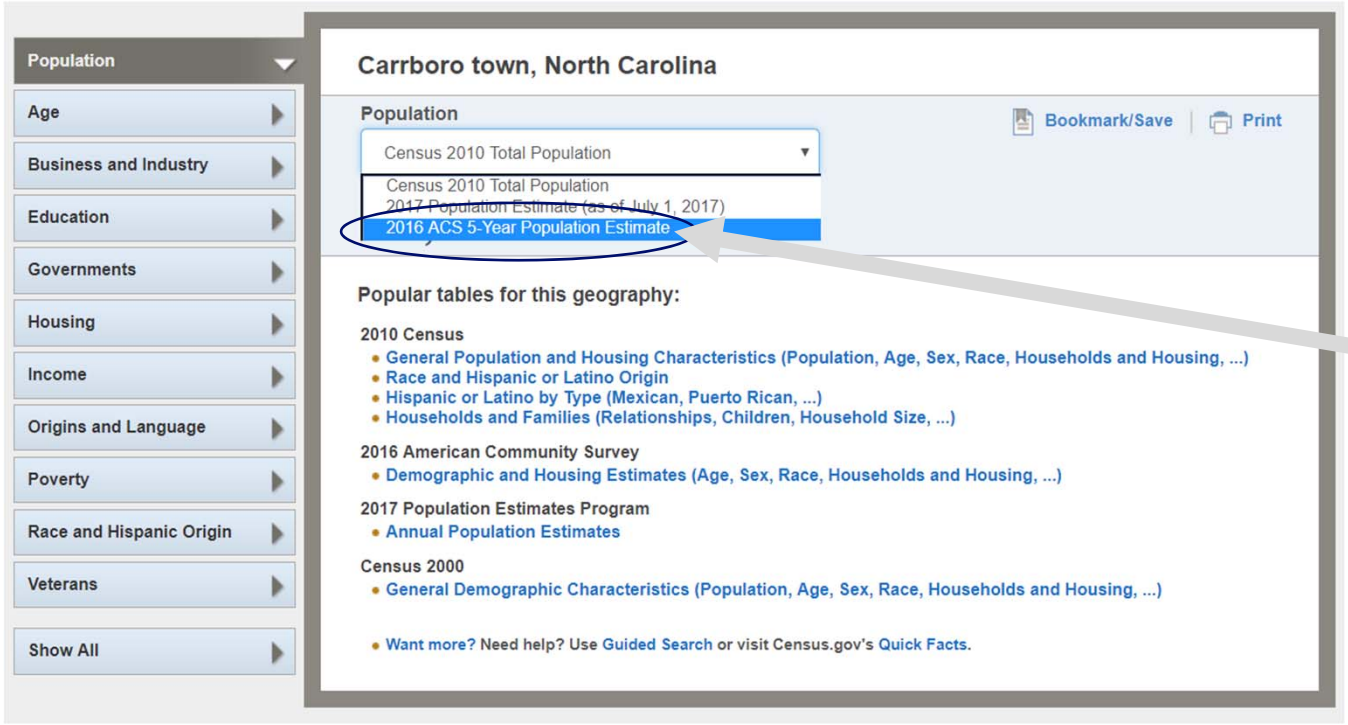


After searching for a community, the American FactFinder will produce this table.

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

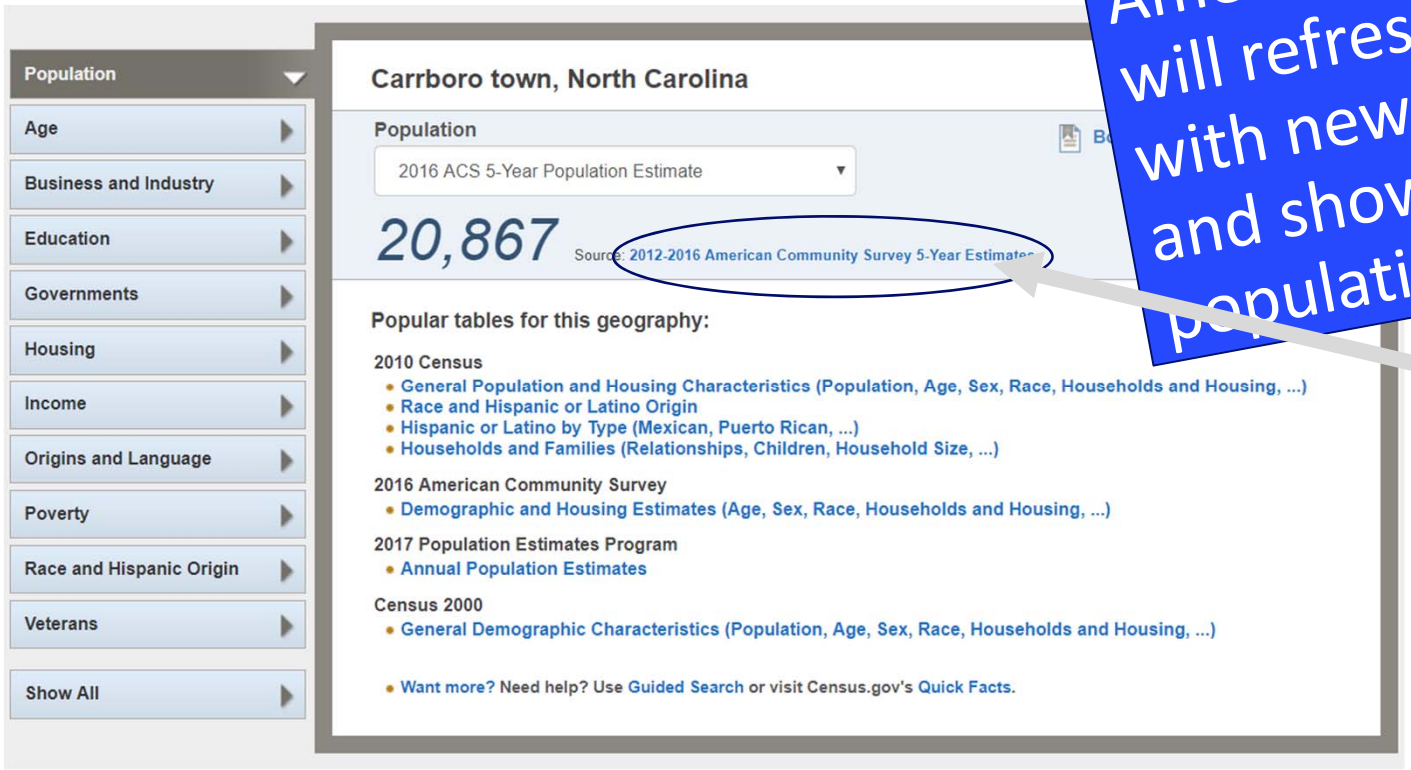
Click the arrow to produce a drop-down list.

“Community Facts” Finding Useful Information



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

“Community Facts” Finding Useful Information



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

1 - 84 of 84

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	[illegible]	[illegible]	47.2%	+/-2.0
Female	11,028	+/-428	[illegible]	+/-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%	[illegible]
[illegible] 24 years	2,324	+/-370	11.1%	[illegible]
25 to [illegible]	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 Carol			
	Estimate	Margin of Error	Percent	Perce
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
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85 years and over	118	+/-72	0.6%	+/-0.3
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

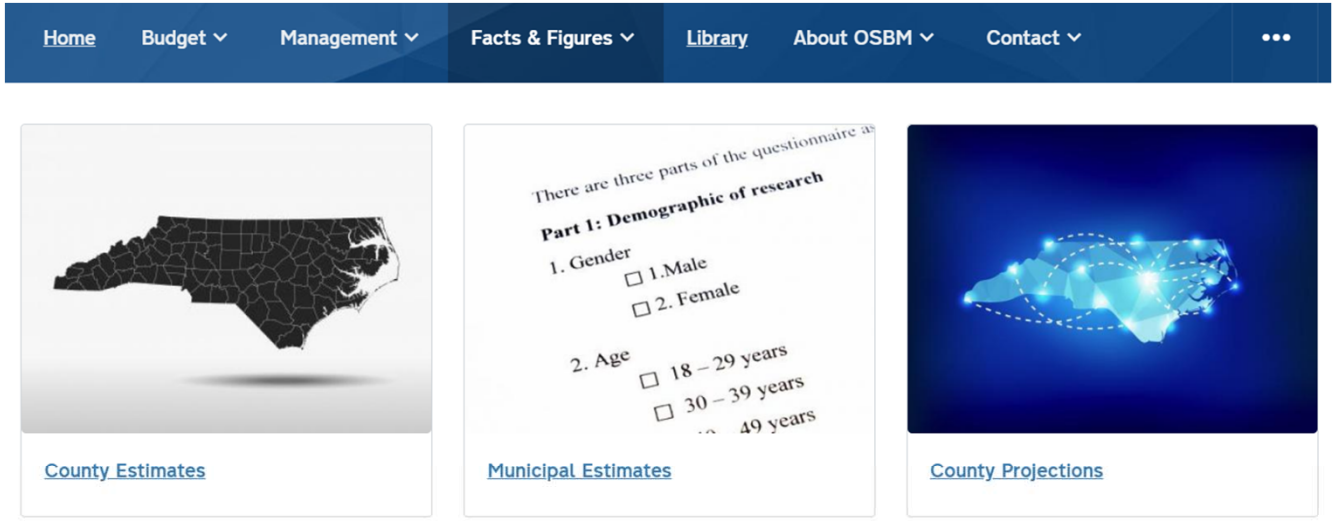
1) Go to http://factfinder.census.gov

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



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

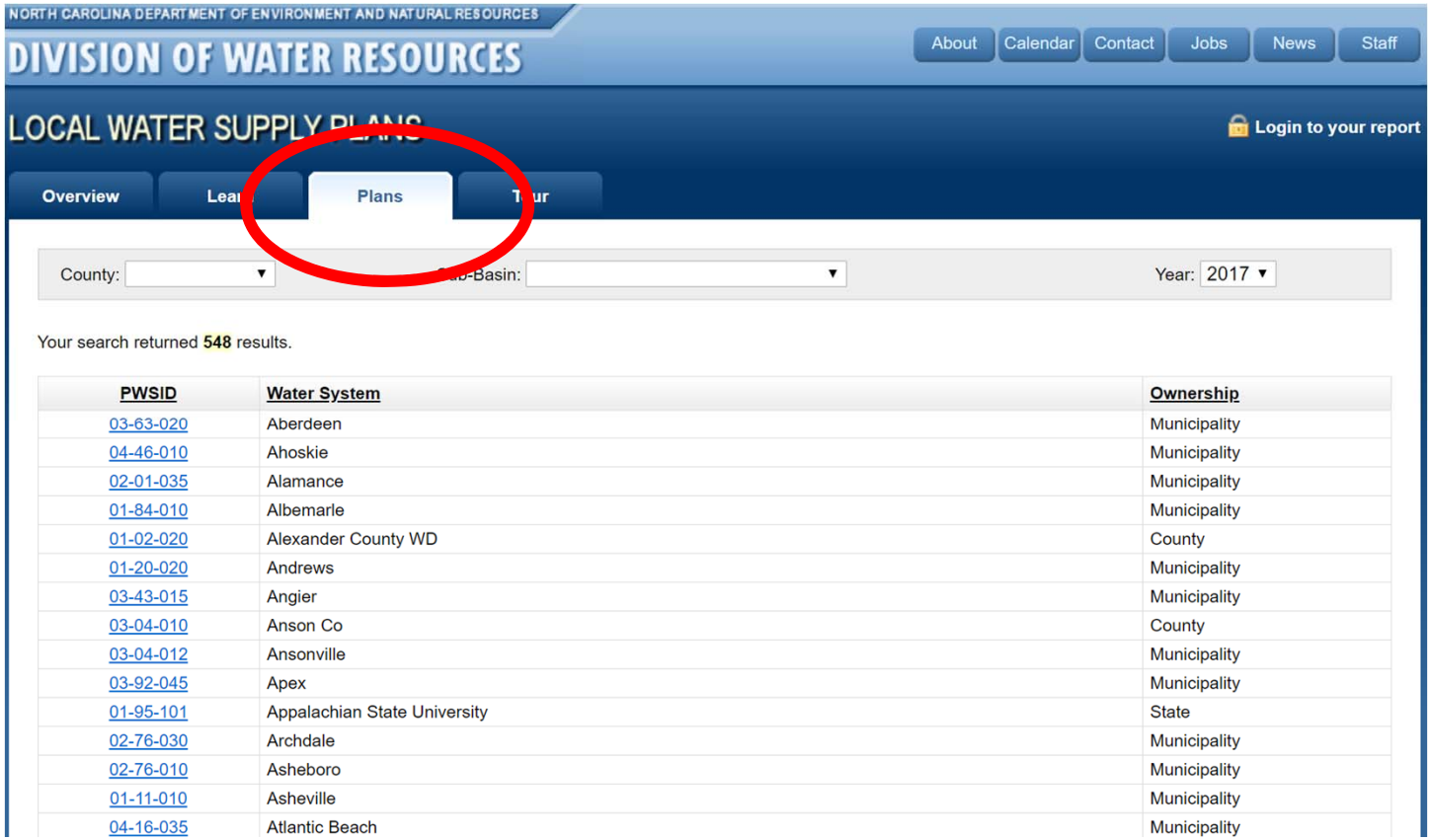
Water Billing Data

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/

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



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

Click on
"AFIR Reports – 2012-Current"

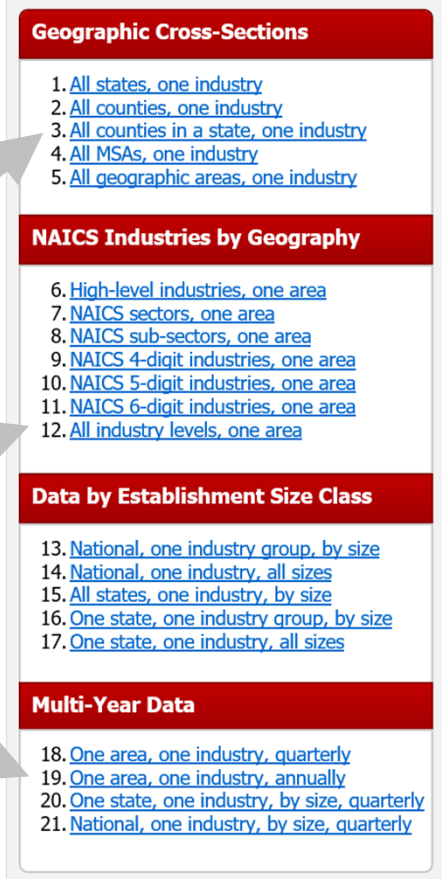
Figuring Out How Nonresidential Use Might Change

- 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:*

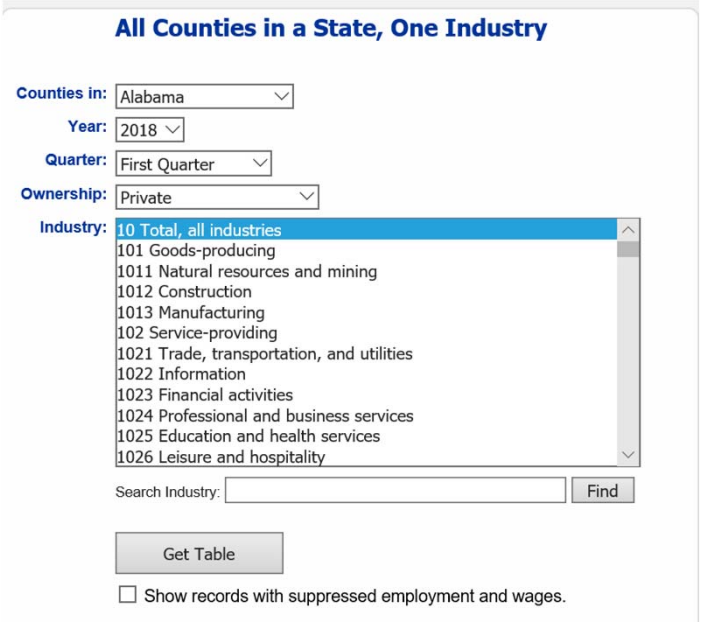
- Industry for each county
- County, State for each industry
- County for *all industries,* over time (2014-2017)



https://data.bls.gov/cew/apps/data_views/data_views.htm

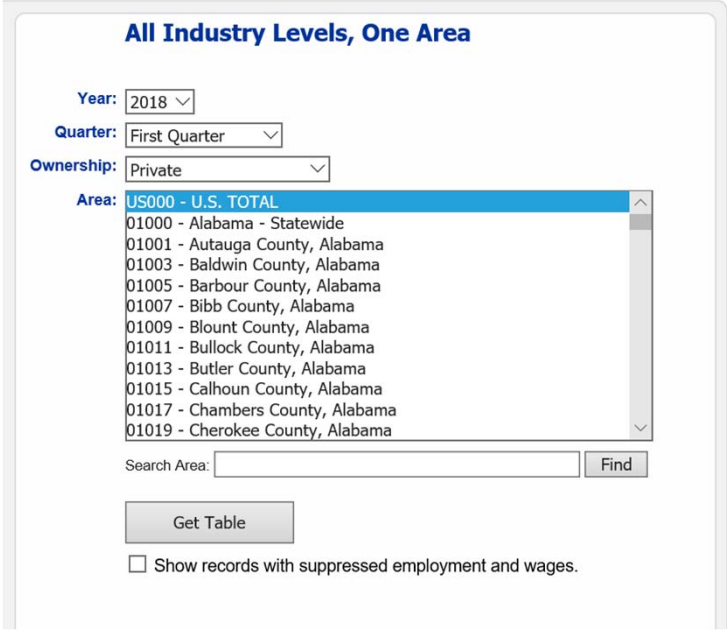
Creating a Table: *All Counties in a State, One Industry*

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"



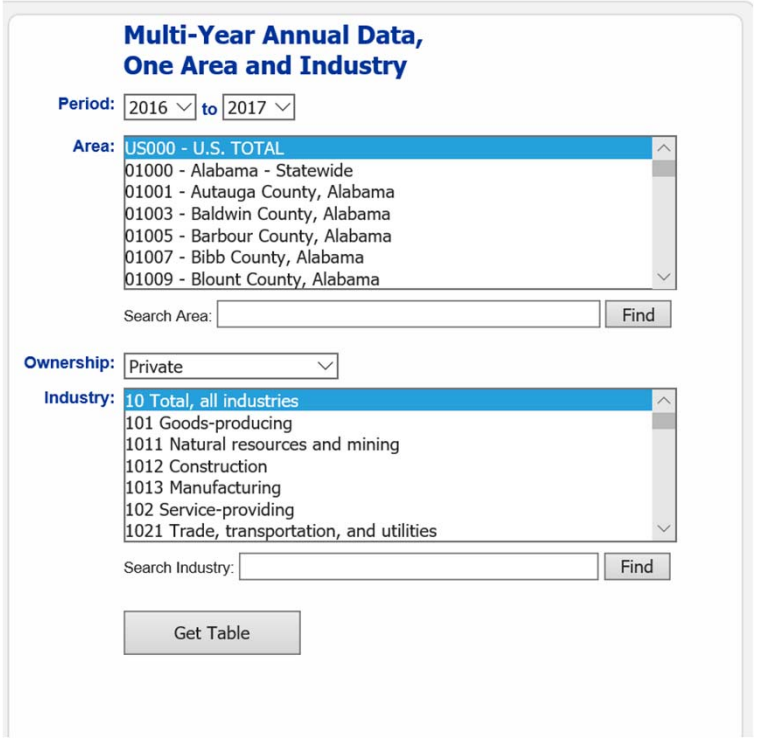
Creating a Table: *All Industry Levels, One Area*

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"



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"



“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 < >

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
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								

We selected this information

This is our quantity of output

“Get Table”…What does the output mean?

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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

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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?

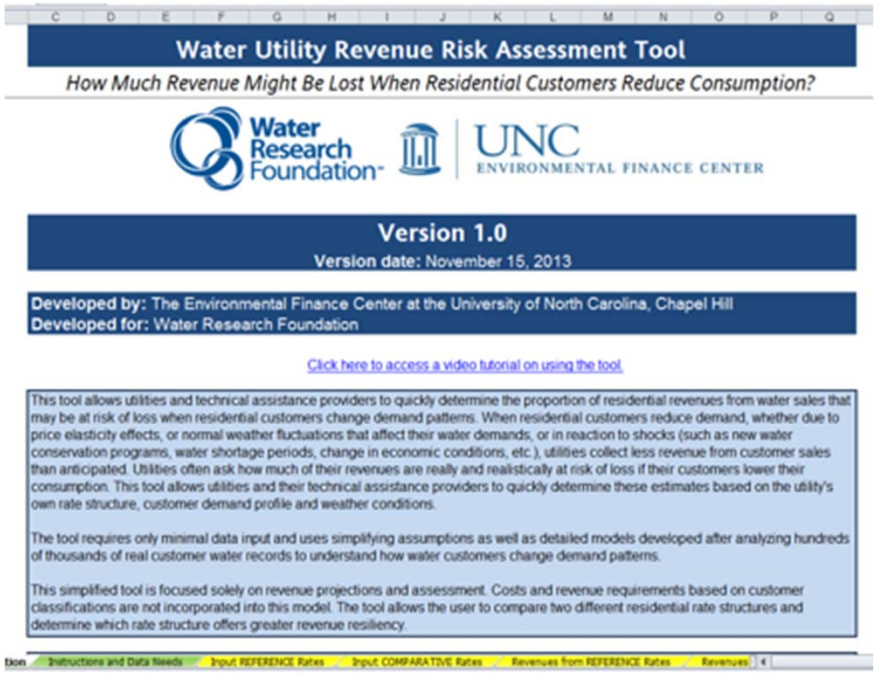
How important is a single industry to the entire state?

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



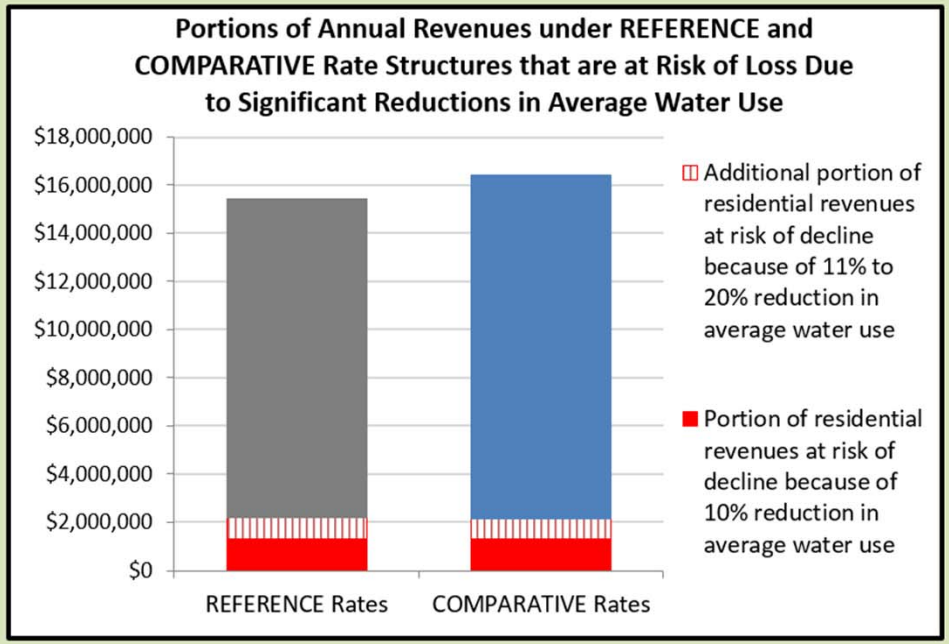
Free to download and use at
www.waterrf.org
www.efc.sog.unc.edu

- 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?

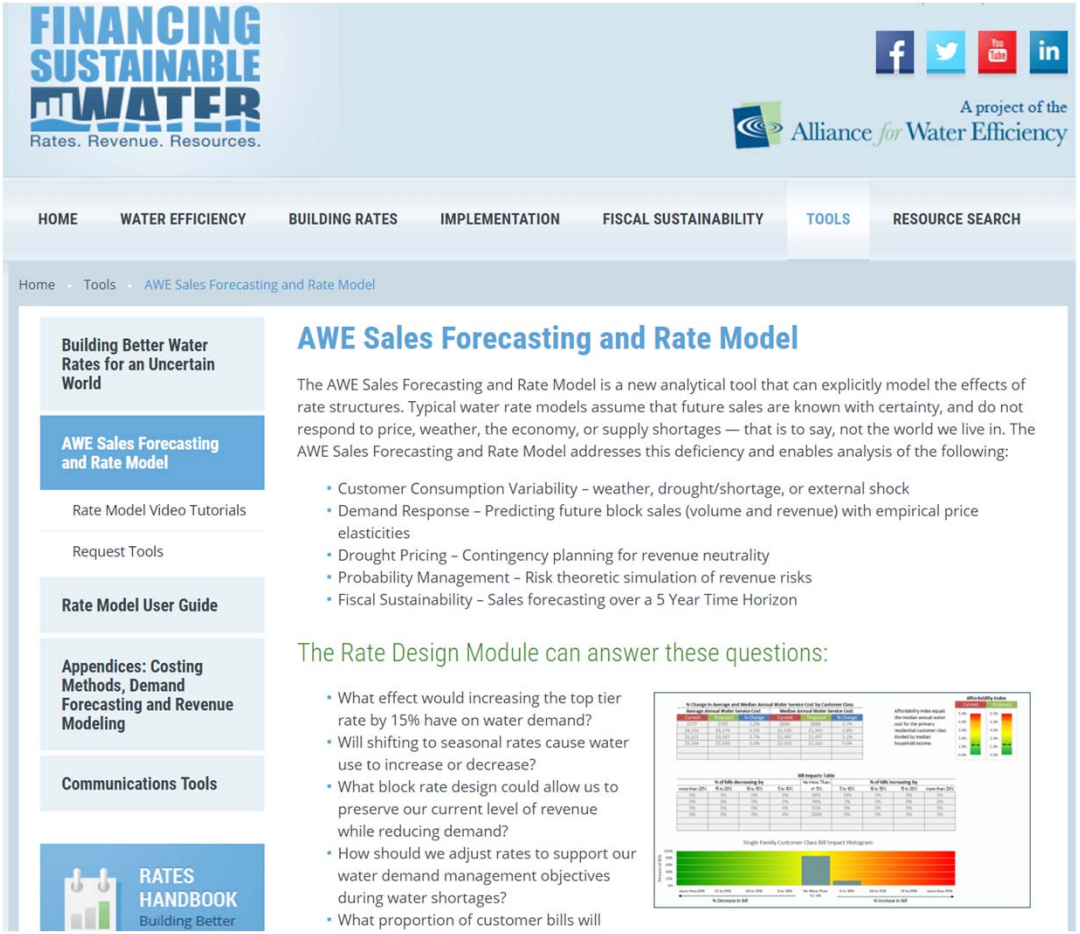


Decline in Total Annual Revenues for a:	REFERENCE Rates	COMPARATIVE Rates
10% reduction in avg use	$1,311,000	$1,319,000
20% reduction in avg use	$2,181,000	$2,167,000
10% reduction in avg use	8.5%	8.0%
20% reduction in avg use	14.2%	13.2%

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/



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.

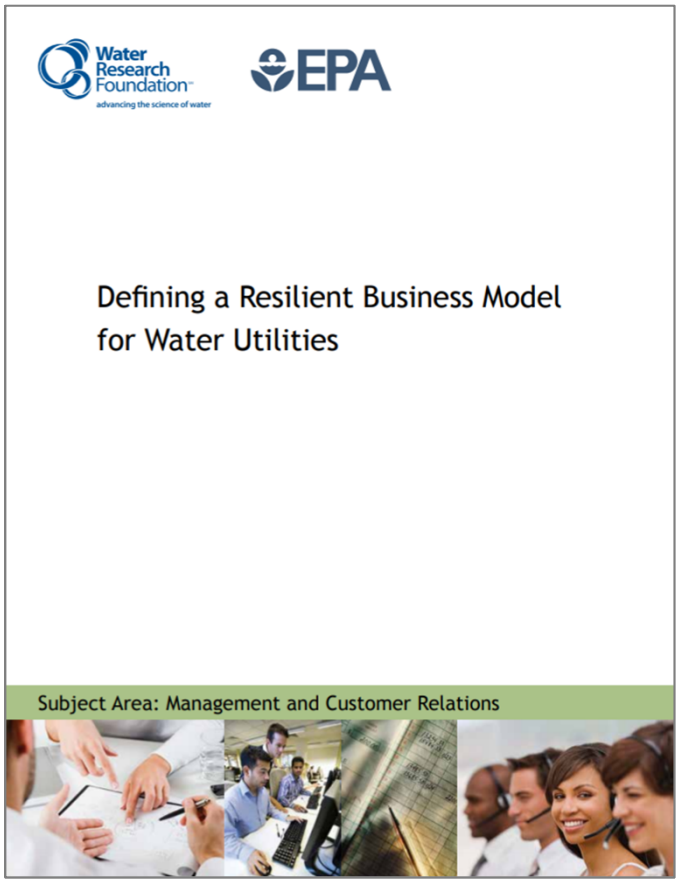
Group Exercise – Report Out:

- 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

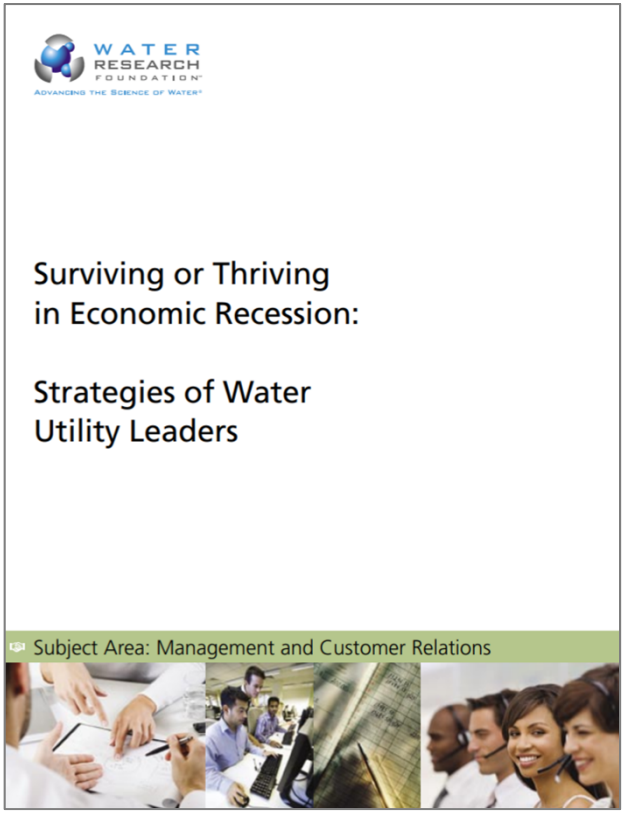
1. Background and Methods
2. Assessing the Revenue Resilience of the Industry's Business Model
3. Factors Influencing Revenue Resiliency
4. **Strategies and Practices for Revenue Resiliency**
5. Conclusions and Recommendations



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.



Session 4:

Financial Strategies to Mitigate Losses from Declining Demands

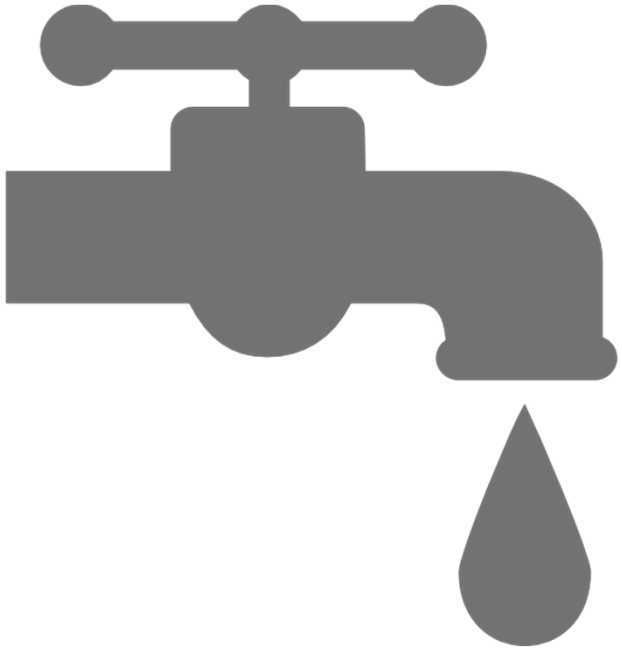
Financial Strategies

- 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.

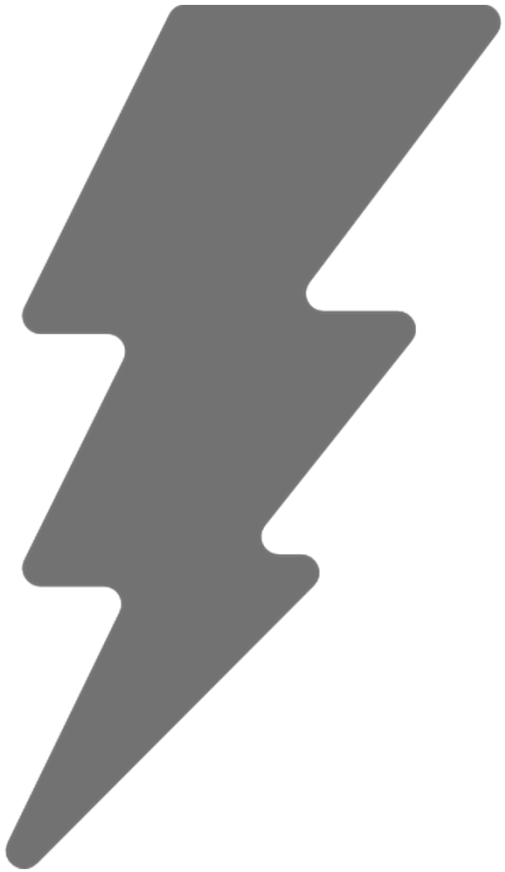
Asset Management

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.

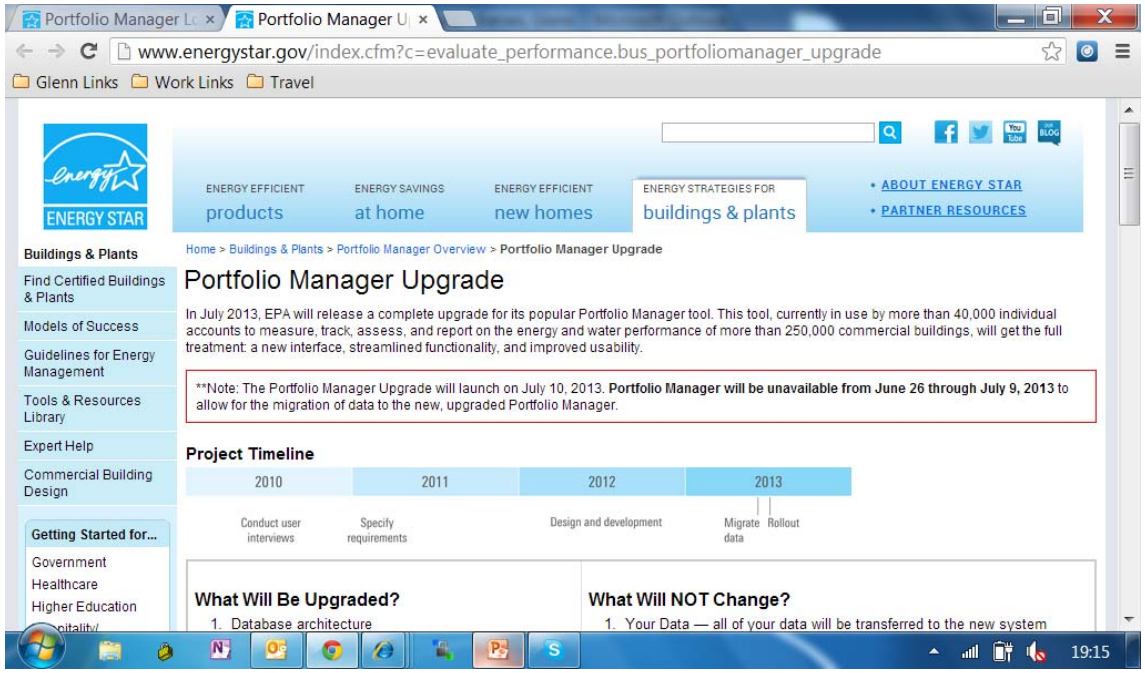
Energy Management Techniques

- 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.



Other Strategies to Reduce O&M Costs

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

Management of Capital Expenditures

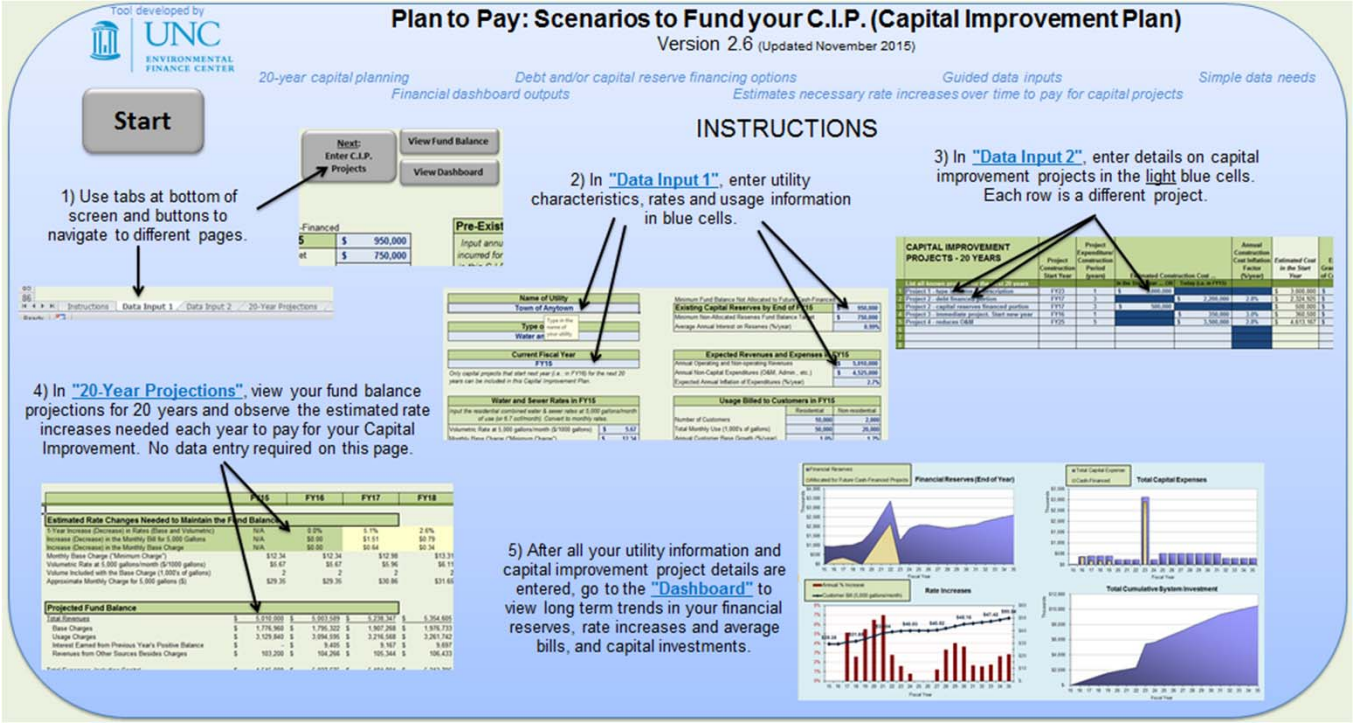
- Have a capital plan
- Have a plan on how to fund capital (debt or cash?)
- Explore and test funding scenarios
- Look into debt refinancing if applicable
- Get a (higher) credit rating
- Partner with other utilities on regional capital projects to reduce costs and achieve higher priority points

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



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?

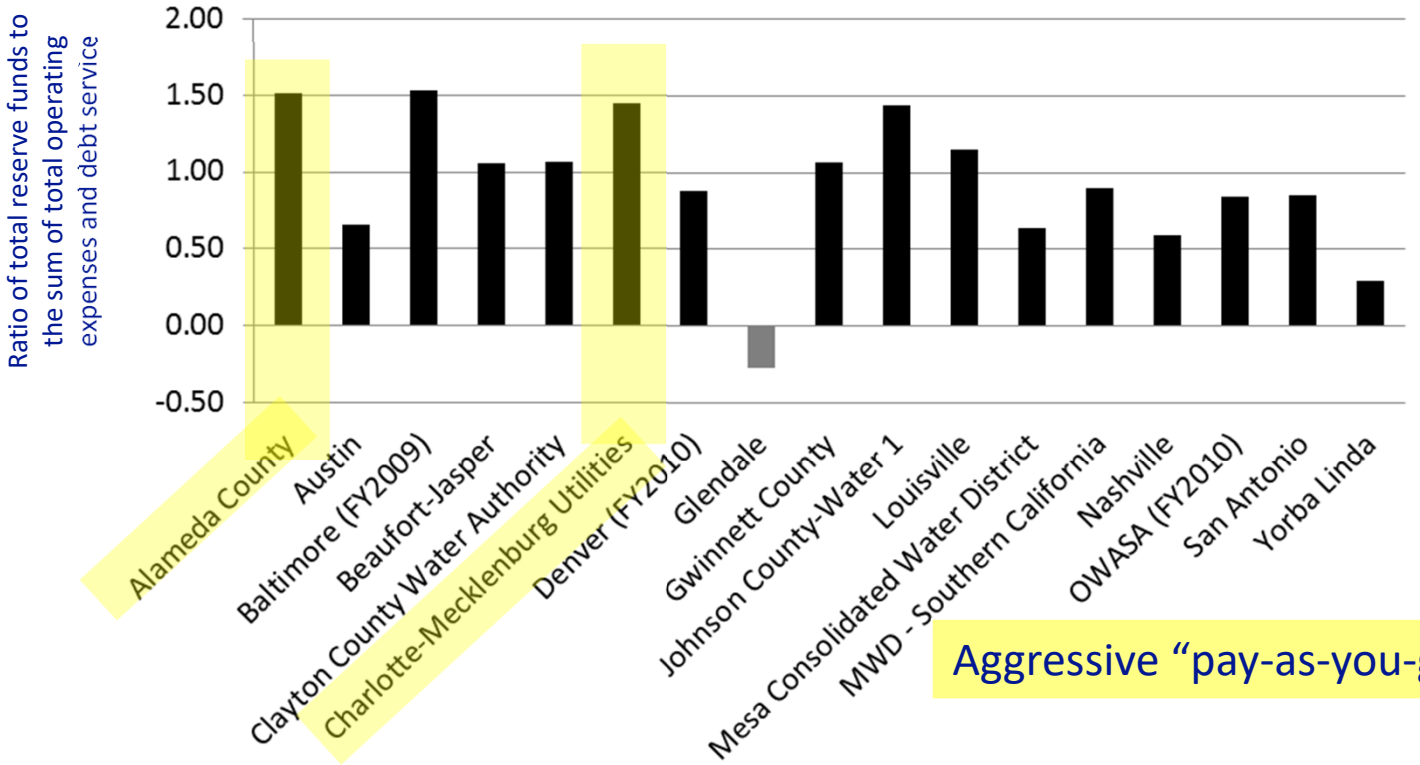
Look into setting a minimum target for a reserve fund to cover a reasonable decline in revenues so that you can continue to operate the water system and buy yourself enough time to make additional adjustments to mitigate the loss.

Examples of Targets for Rate Stabilization Reserves

Utility	Reserve Fund Targets
City of Minneapolis[1]	15% of revenue budget for the next year
Orange Water and Sewer Authority[2]	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[3]	Minimum of 90 days cash on hand
Alameda County Water District[4]	Sufficient to meet operating, capital, and debt service obligations
Charlotte-Mecklenburg Utilities[5]	100% of operating expenses for the current budget
Water District No.1 of Johnson County[6]	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



Aggressive "pay-as-you-go" policy

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.

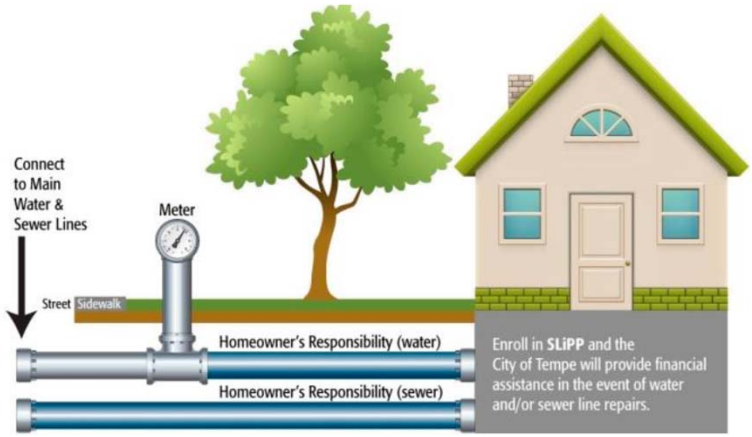
Being a coastal community, we realize that a hurricane could do significant damage."

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

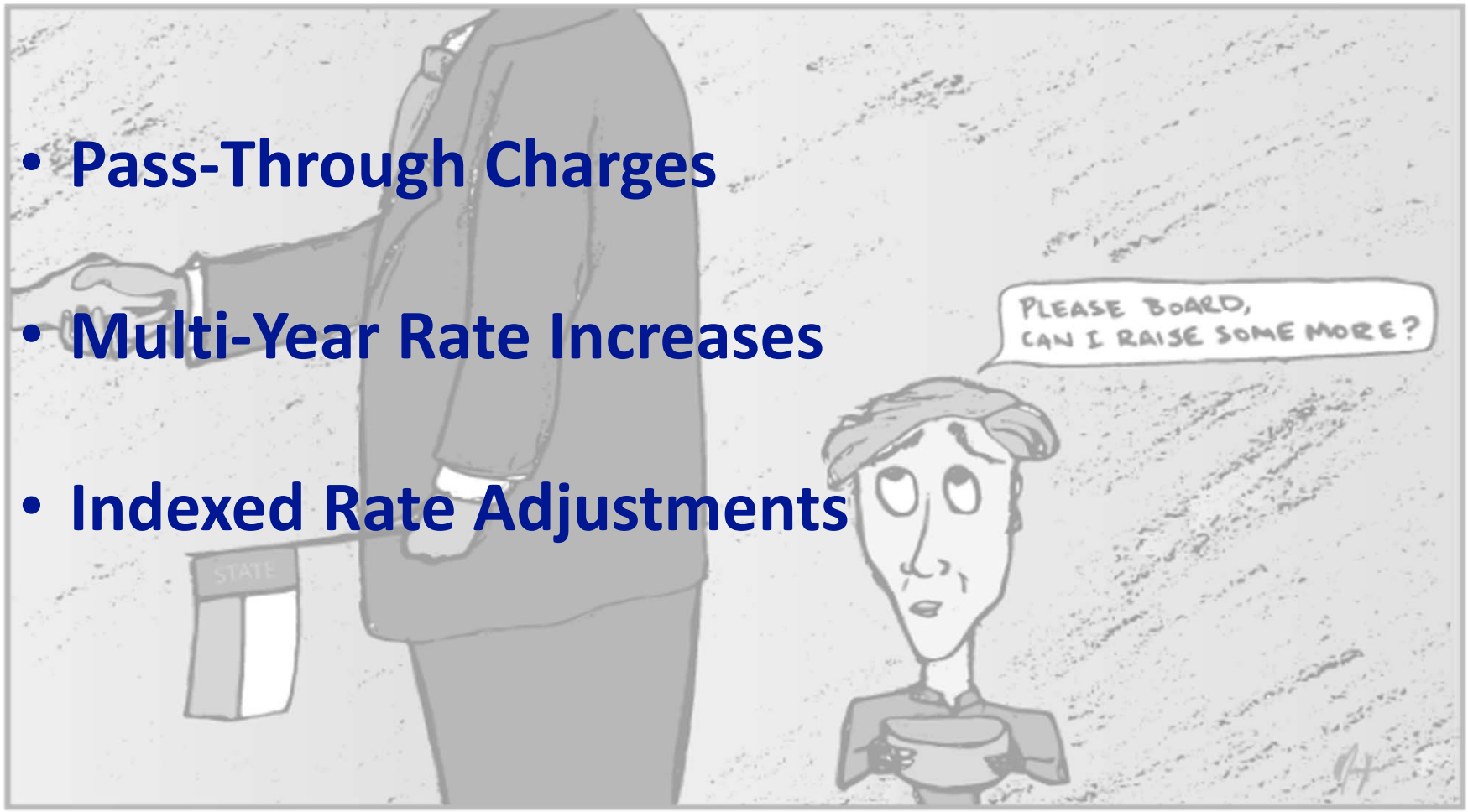
Automatic Rate Increases

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

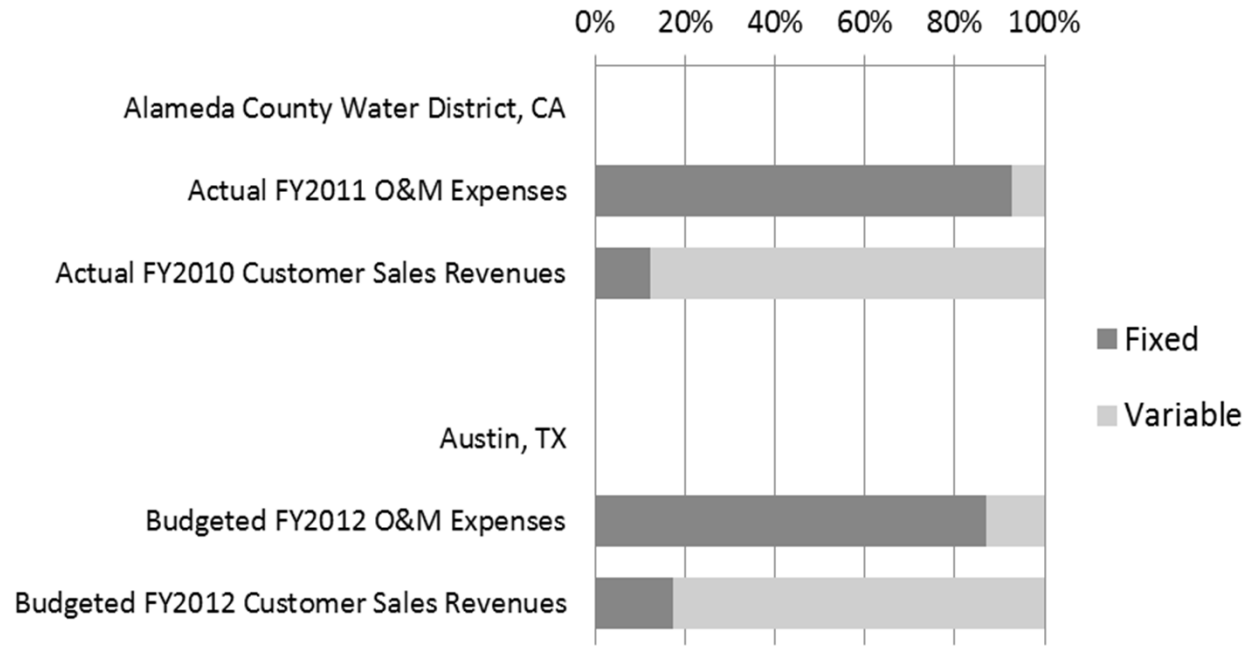
- Pass-Through Charges
- Multi-Year Rate Increases
- Indexed Rate Adjustments



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

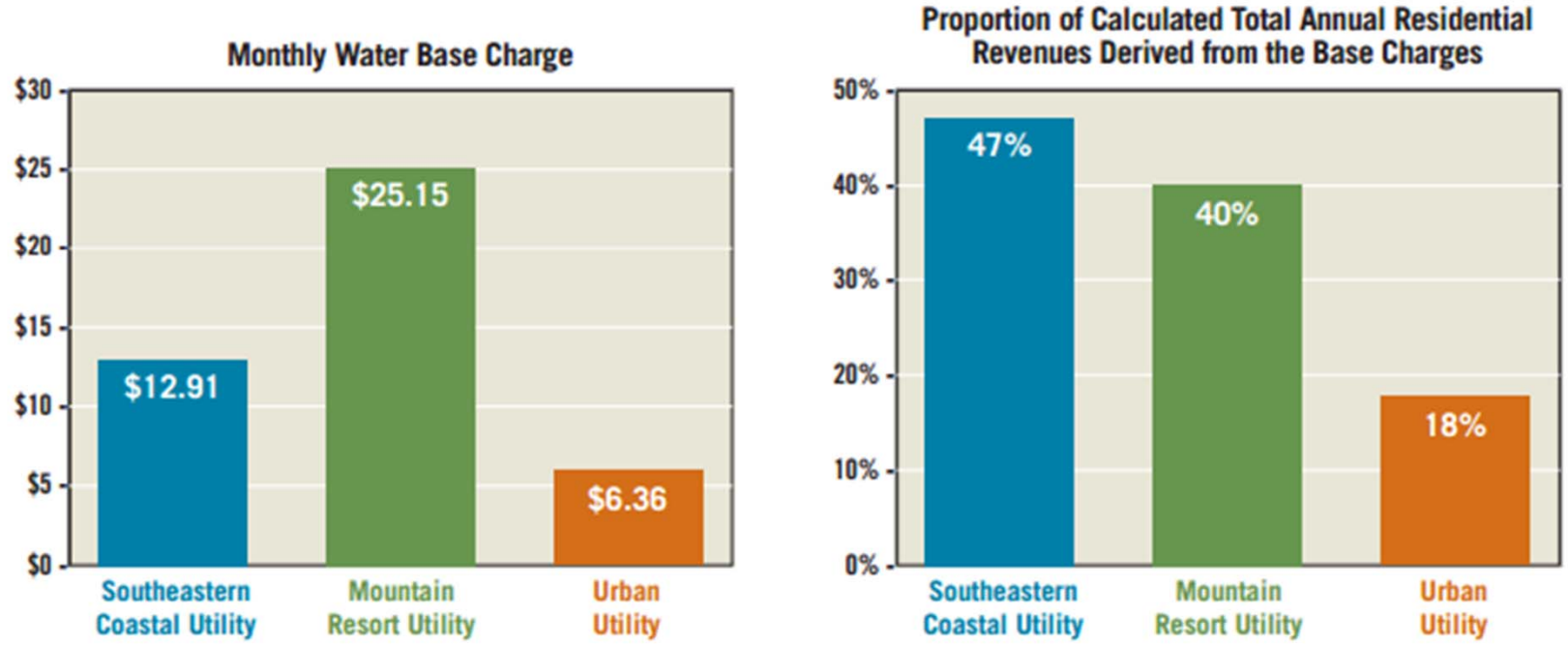
Readsboro, VT

$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 or 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.

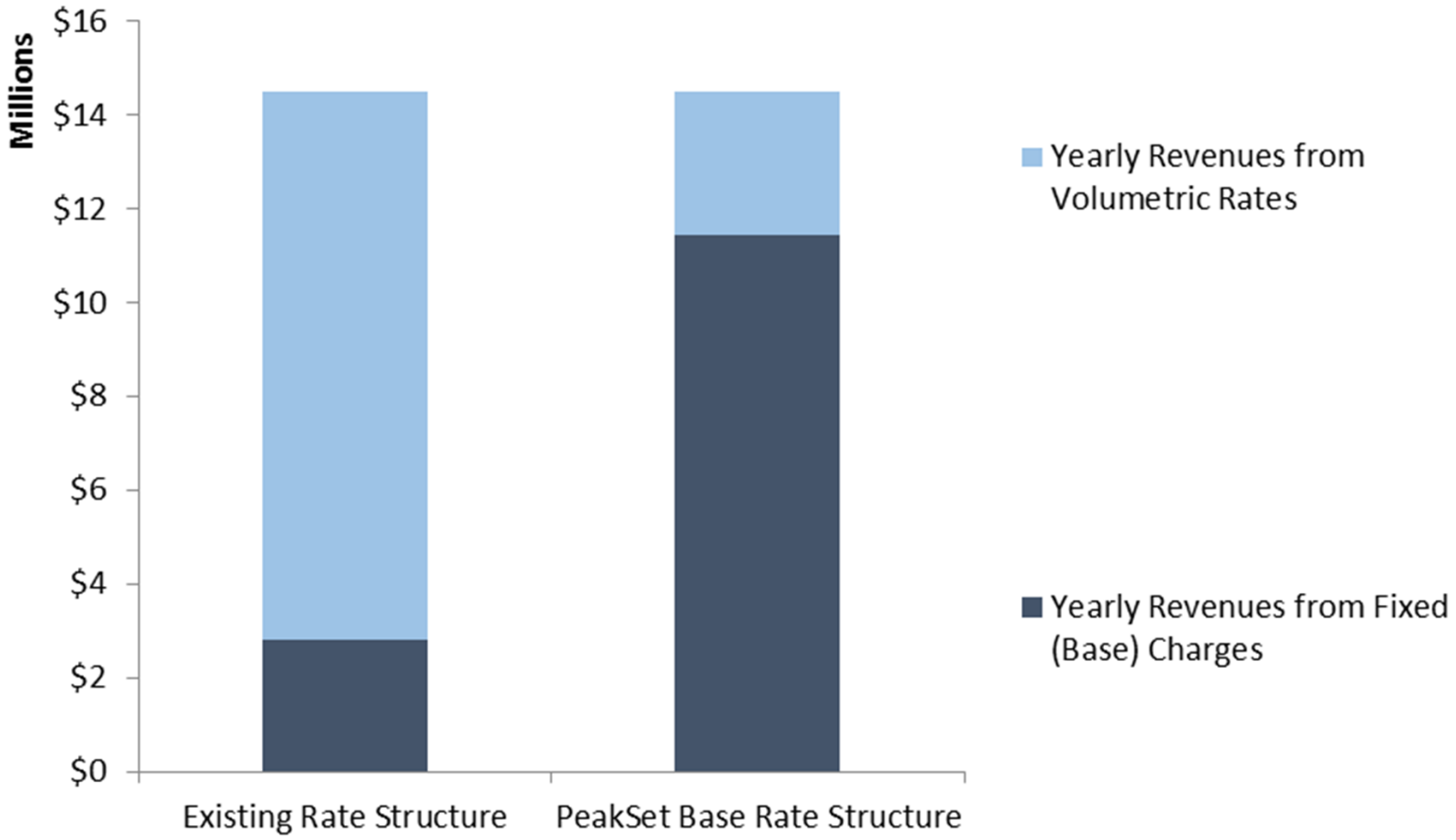
Three alternative rate models described in a whiteboard video: http://www.waterrf.org/Pages/Projects.aspx?PID=4366

waterflips

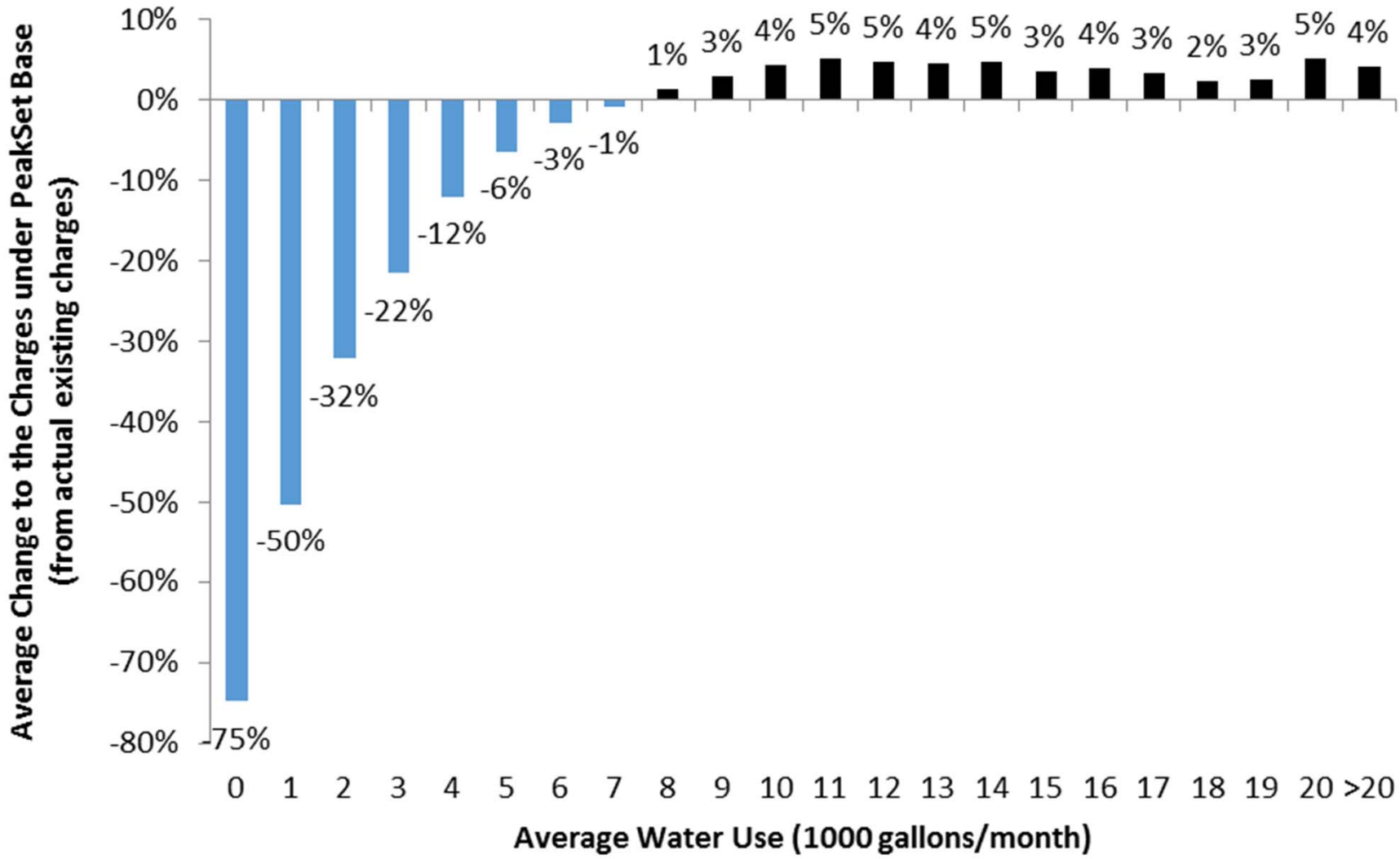
Water Research Foundation

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

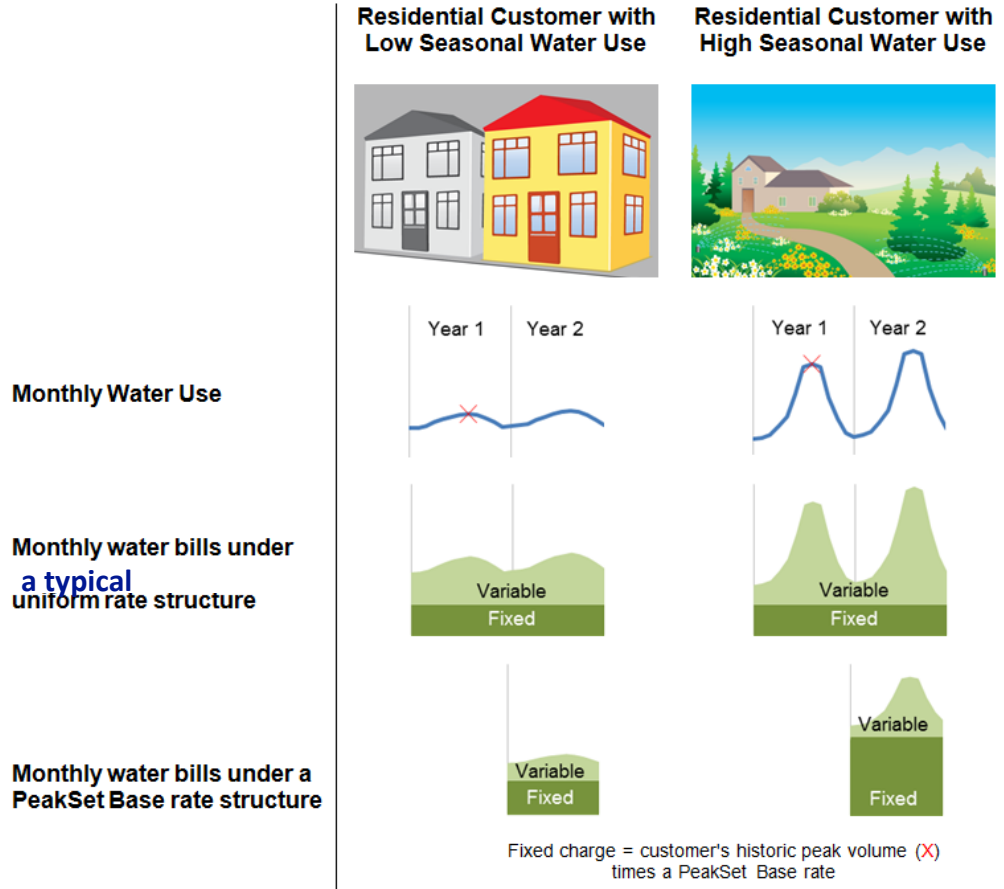


Low water use customers would pay much less under PeakSet Base than under the current rate structure



PeakSet Base Model

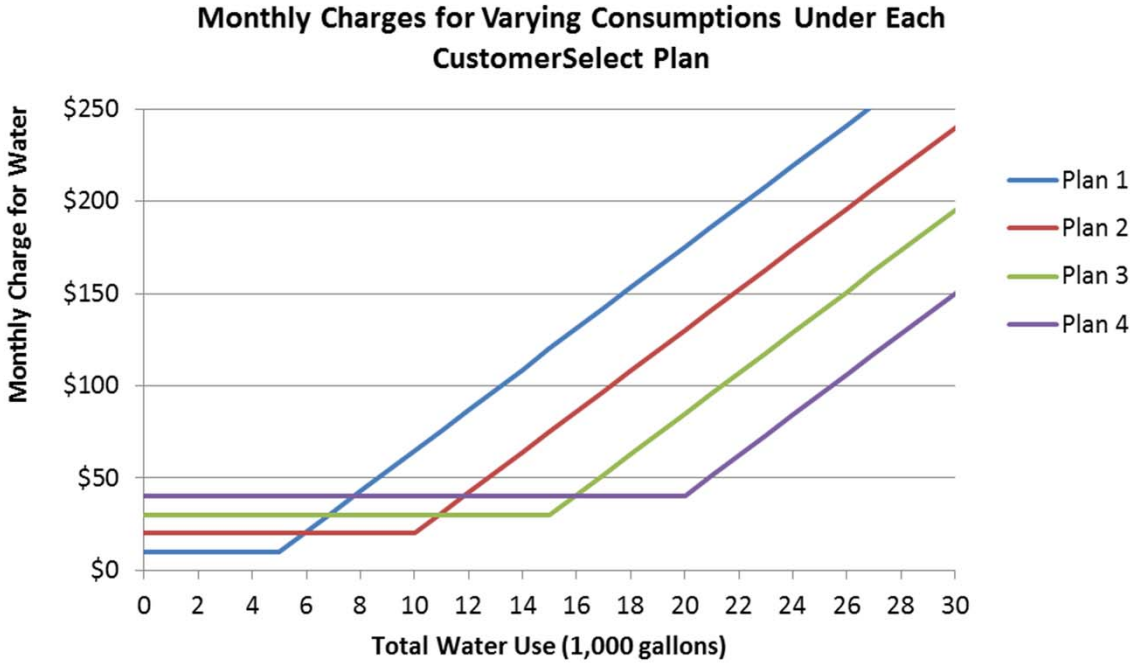
A customer's base charge for next 12 months would be individually set based on their individual historic peak demand



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 or 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

UNC ENVIRONMENTAL FINANCE CENTER

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...

1 2 3 next › last »

Project Presentations

Simulating Alternative Water Rate Structures

Shadi Eskaf

CFO Connect Meeting 2015 - Denver, CO

Ceres, 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

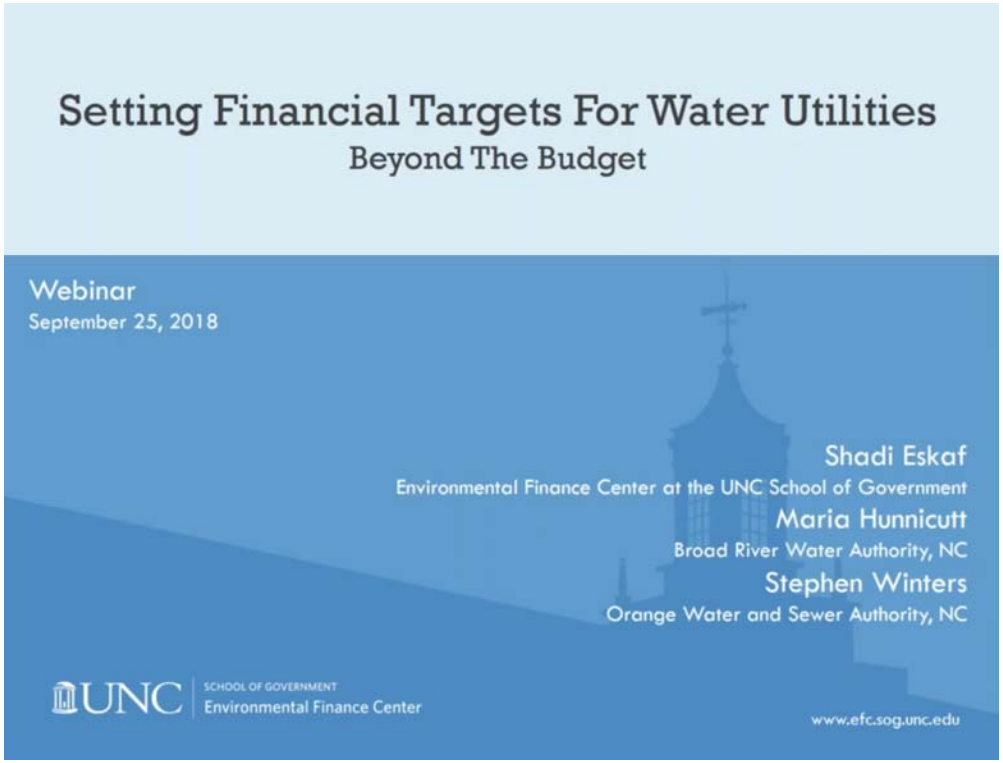
- New Business Models for the Water Industry (Video) - This whiteboard video introduces three potential business models that can help a utility meet its operational needs while also sending a clear signal to its customers about the value of water service.

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



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	• Parity coverage of 1.5x • Total coverage of 1.2x
Debt Load	• Debt service less than 40% of total revenue requirements
Capital Funding	• Minimum of 25% of annual capital expenses funded through rate-funded capital (PAYGO)
Days Cash on Hand	• 180 days
O&M Budget Escalation	• Maximum annual O&M budget escalation of 5%
Operating Reserve Fund	• Minimum fund balance of 90 days of annual O&M expenses
Capital Reserve Fund	• Minimum fund balance of 25% of annual Capital expenses
Rate/Revenue Stabilization Fund	• Minimum fund balance target of 5% of projected annual revenues
Rate Revenue Composition	• Minimum of 25% of annual revenue from fixed charges
Rate Increases	• Minimum of automatic rate increases indexed to CPI
Service Affordability	• Maximum annual bill of an average customer of 2% of median household for each water and wastewater

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

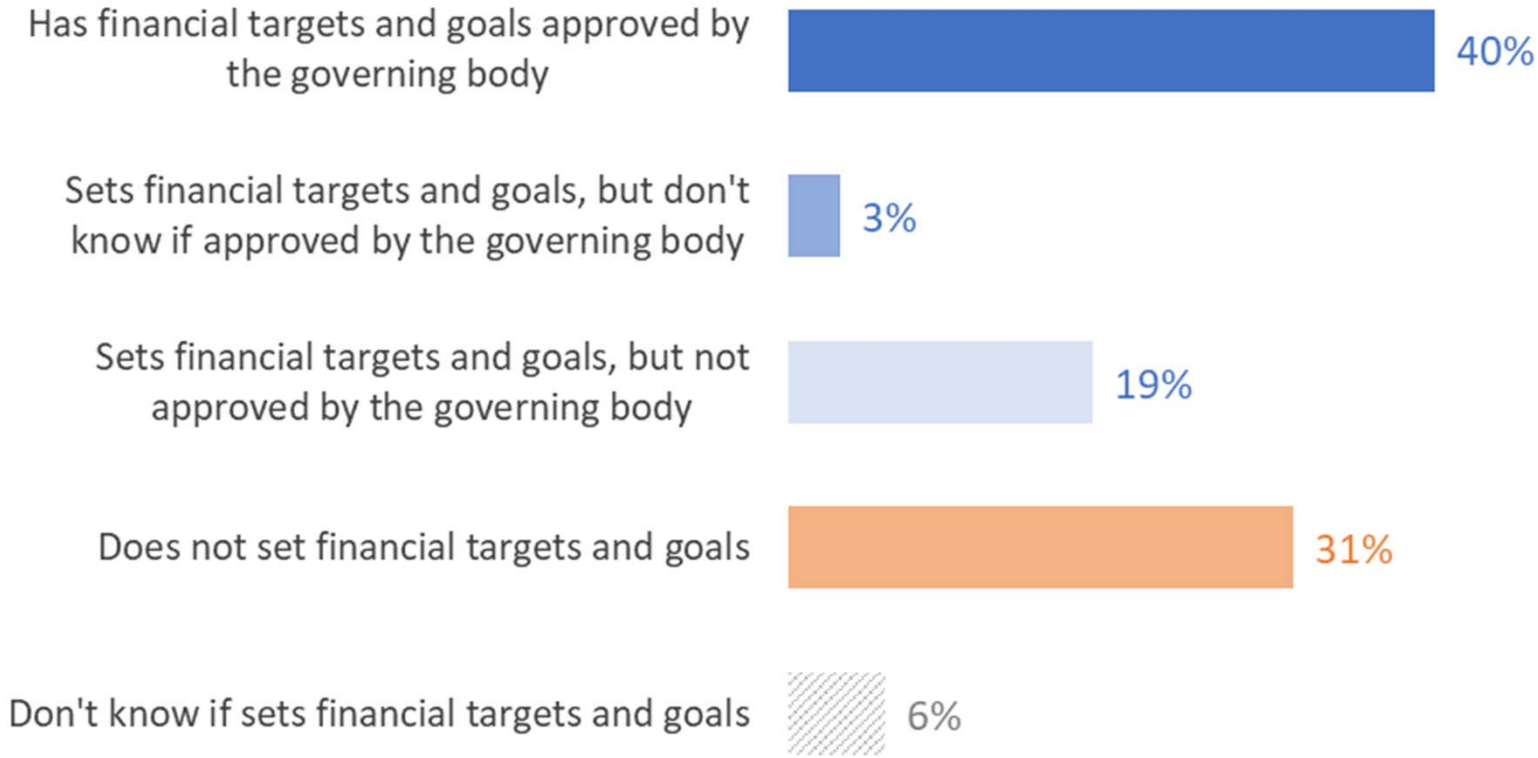
Source: Water Research Foundation report, 2014, *Defining a Resilient Business Model for Water Utilities.*

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

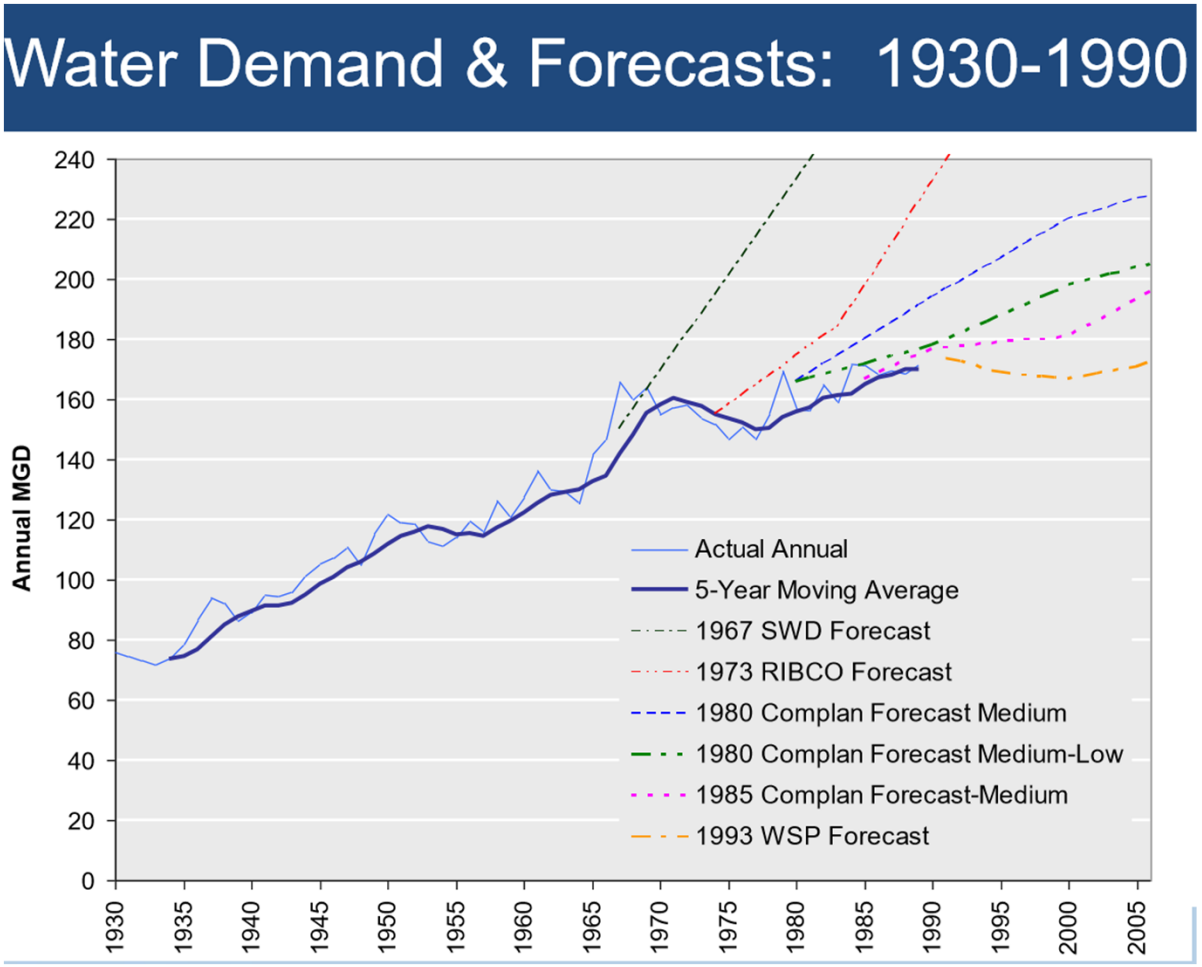
Structural and Managerial Strategies

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

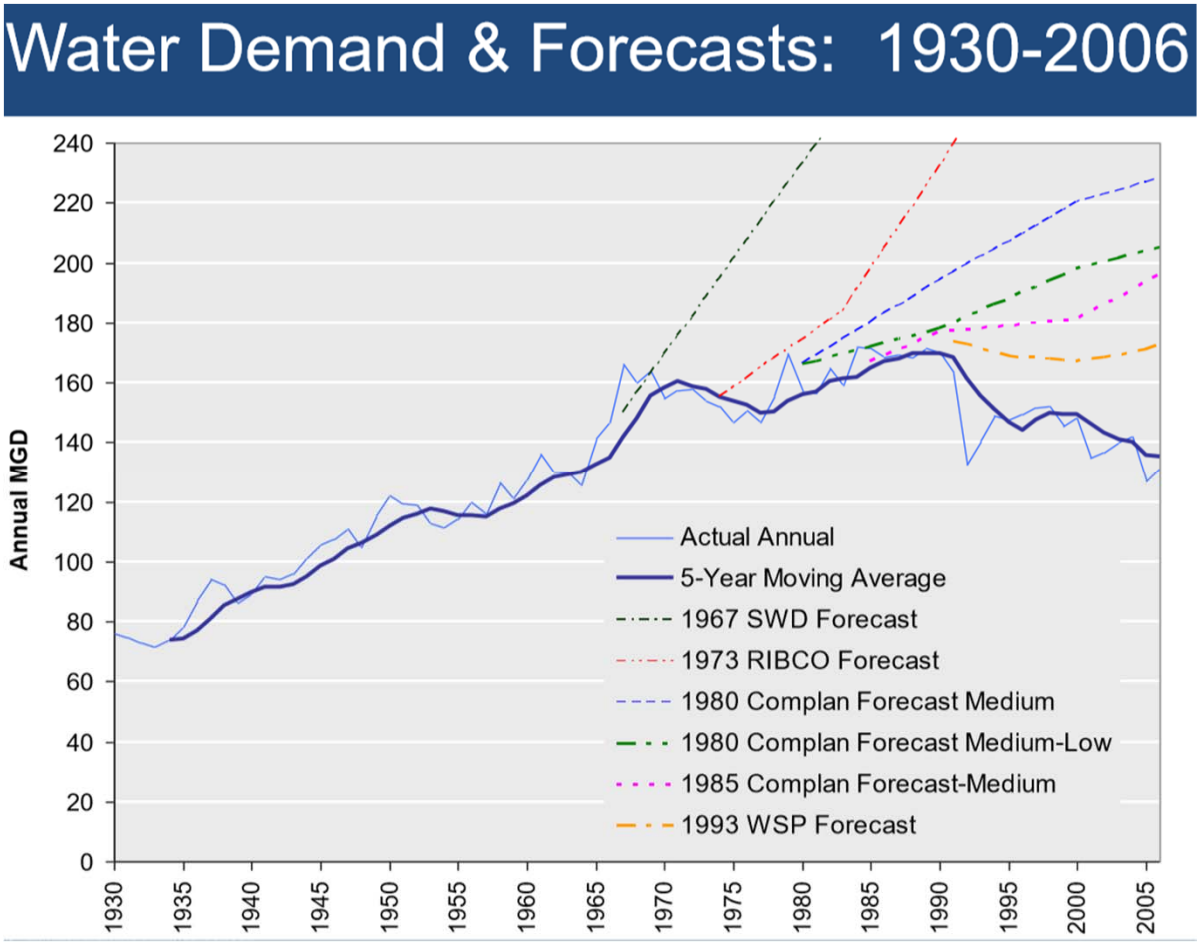
Planning and Adjusting Demand Forecasts

- 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



Seattle's Demand Forecasts



Demand Projections – Financial Repercussions of Being Wrong

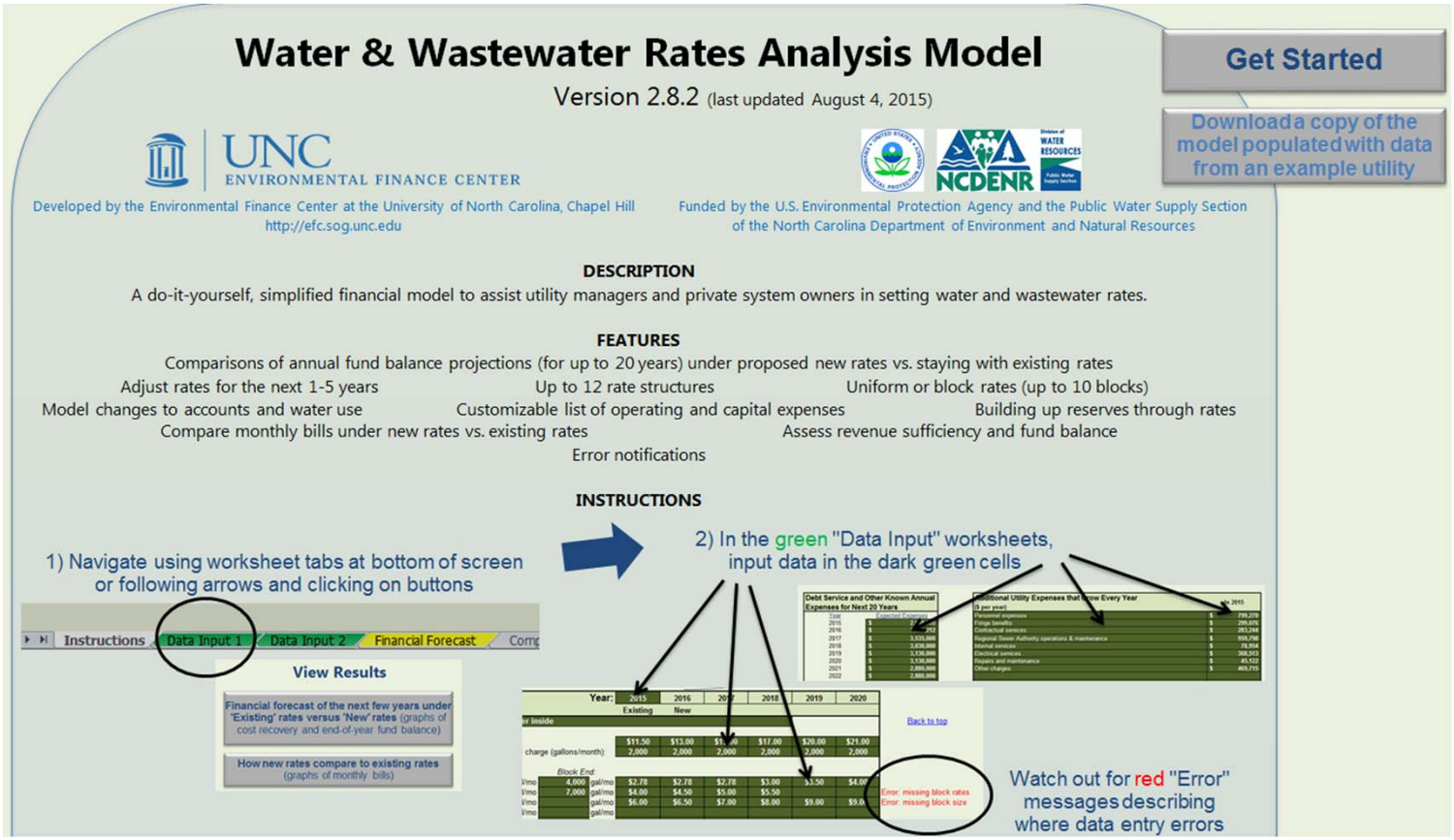
	Actual demand decreases	Actual demand increases
Projected decrease in demand	Balanced budget; delayed capital investment delayed	Revenue surplus; potential capacity constraint
Projected increase in demand	Revenue deficit; underutilized capacity	Balanced budget; utilized capital

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

Water and Wastewater Rates Analysis Model

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

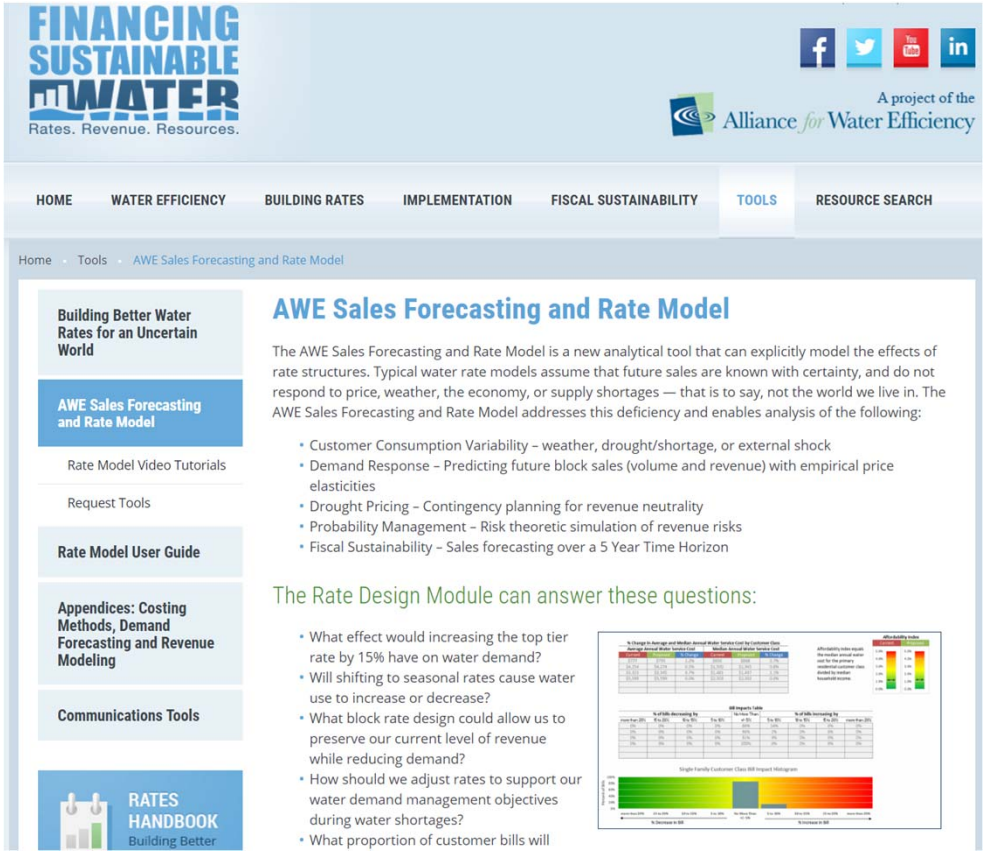
Find the most up-to-date version in Resources / Tools



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/



Know Your (Biggest) Customers

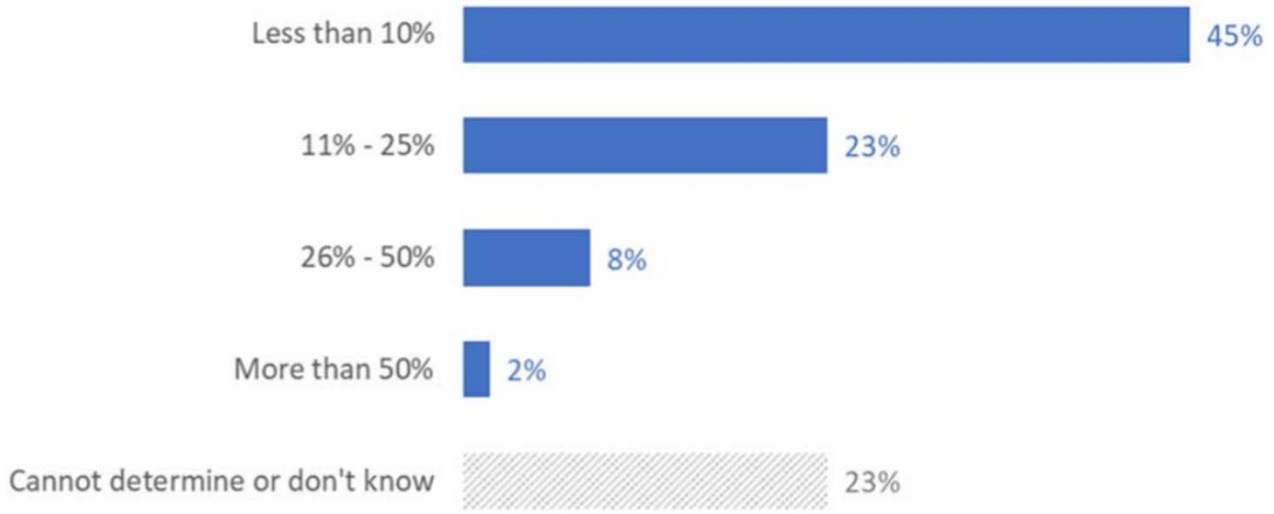
- Find them out from billing records.
- Determine the potential revenue risk if your largest customer(s) leave.
- Meet with the largest non-residential customers. Tour their facilities. Find out how they use water and ask about any potential changes to their demands in the future.
- Use BLS data to find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

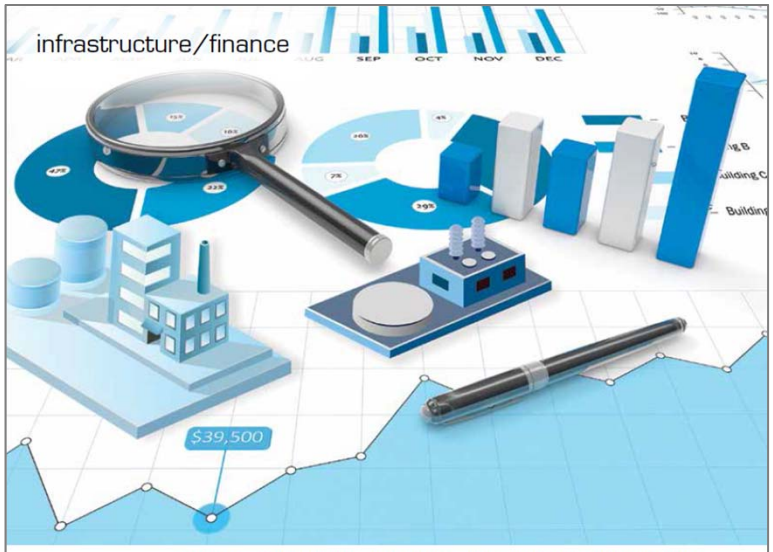
34) What percentage of your utility's total annual revenue is normally billed to your 5 largest non-wholesale customers (i.e. the five largest industrial or commercial customers, but NOT sales to other utilities)?

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



MARY TIGER, CHRISTINE BOYLE, SHADI ESKAF, JEFFREY HUGHES, AND RENÉE JUTRAS

A Better Understanding of Nonresidential Water Customers Through Analysis

BY ANALYZING AND TRACKING WATER USE AMONG NONRESIDENTIAL CUSTOMERS, UTILITIES CAN PROJECT FLUCTUATIONS IN USE OVER TIME AND IMPROVE PRICING SCHEMES AND BUSINESS PRACTICES.

Nonresidential customers contribute significantly to water utilities' financial resources and water resource demand profiles, yet they are not studied or benchmarked nearly as often as residential customers. Conducting business intelligence on a utility's largest customers can improve the way the utility does business: the finance director can better project revenue, the billing staff can correct erroneous (and potentially costly) miscategorizations, customer service representatives can build relationships, and water resource planners can better understand how different nonresidential customers respond to price and nonprice signals. This article describes an analysis of four urban water utilities in North Carolina to demonstrate the significance of nonresidential customers. Further, this article proposes methods of analysis that can be used to understand and project nonresidential customer water use, including key account programs, water use plateaus, and meter rightsizing. This study uses customer-level billing analysis and in-depth water utility staff consultations to assess better ways to measure the impacts of nonresidential customers' water use and engage more effectively with this important customer class.

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

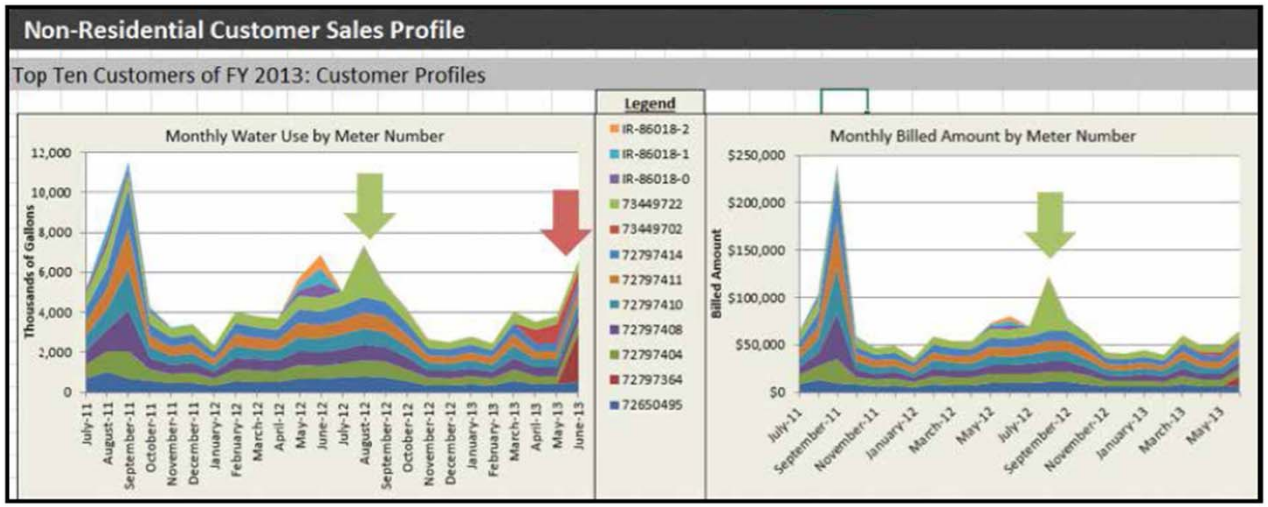
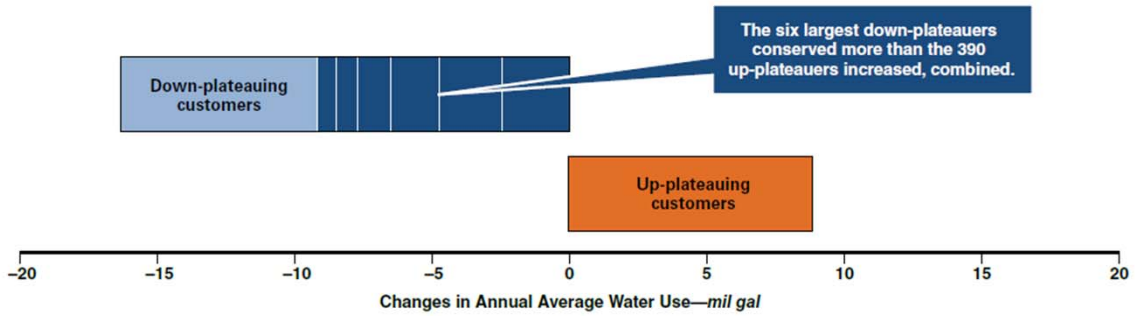


FIGURE 7 Cumulative water use changes of plateauing customers



Customers who down-plateaued did so to a much greater degree than those who up-plateaued.

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 appro… waiver for new b…

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

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

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

The action, approved in a 6-1 vote wi… allow City Administrator Londi Lindell t… Facilities Charges (GFCs) for specific target b… 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.

Hannibal, MO

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

Residential Rates	Current Rates
0 - 2,000 (Minimum)	$19.67
2,001 - 6,000	$5.79 / 1,000 gals.
6,001 - 10,000	$6.14 / 1,000 gals.
10,001 - 20,000	$9.22 / 1,000 gals.
All Over 20,000	$10.75 / 1,000 gals

Commercial Rates	
0 - 2,000 (Minimum)	$29.49
2,001 - 48,000	$3.51 / 1,000 gals.
All Over 48,000	$4.10 / 1,000 gals.

Agricultural Rates	
0 - 2,000 (Minimum)	$21.45
2,001 - 48,000	$2.57 / 1,000 gals.
All Over 48,000	$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
Examples: • Sharing equipment • Sharing bulk supply purchases • Mutual aid arrangements	**Examples:** • O&M • Engineering • Purchasing water	**Examples:** • Shared system management • Shared operators • Shared source water	**Examples:** • Acquisition and physical interconnection • Acquisition and satellite management • Transfer of privately-owned system to new or existing public entity

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

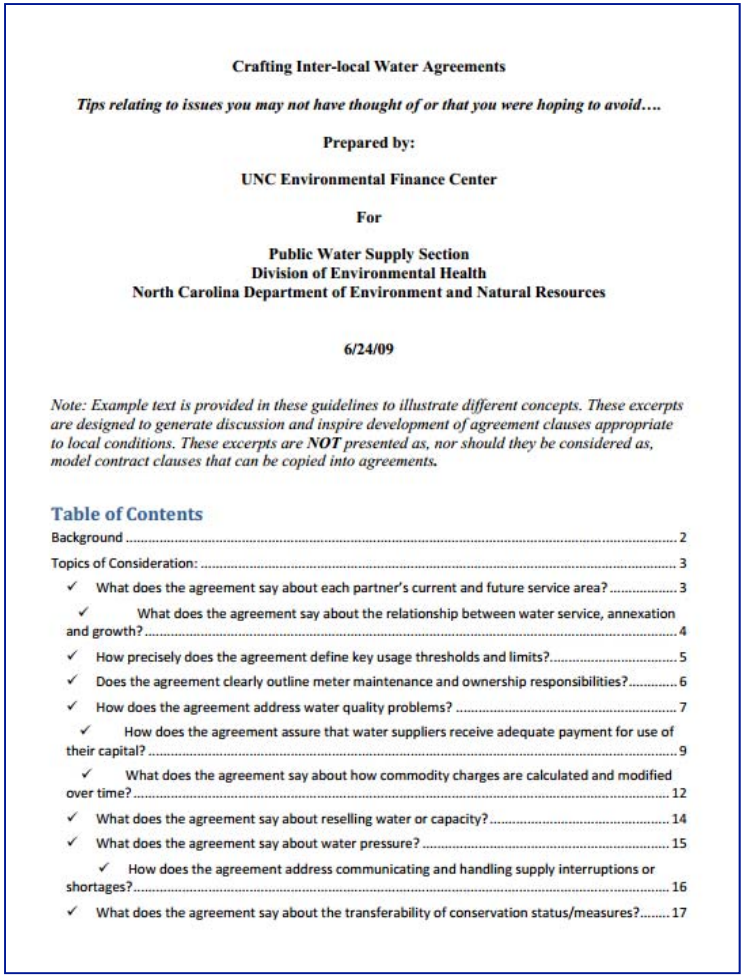
Crafting Inter-local Water Agreements

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

Tips relating to issues you may not have thought of or that you were hoping to avoid….

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

*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 **NOT** presented as, nor should they be considered as, model contract clauses that can be copied into agreements.*

Table of Contents

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

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

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

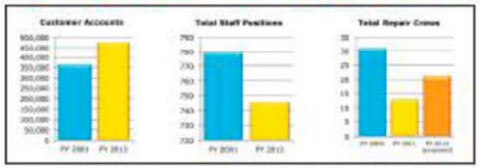
Paying for capital and infrastructure projects accounts for 62 cents of every dollar spent by the utility, and is in many ways like a mortgage that has to be paid back over time. Utilities works hard to maintain a AAA-credit rating. This allows the utility to build new projects at the lowest possible 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 $8.99 per month, with most seeing increases between $4 and $4.59 per month.

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

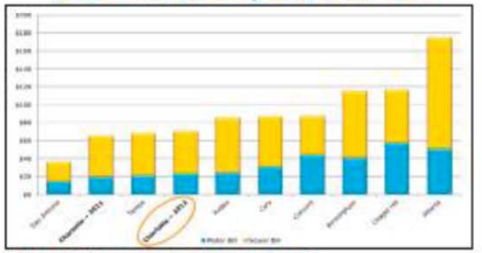
For the typical customer who uses 8 Ccf of water each month, the total monthly bill increase will be $4.59. Of this $4.59, $2.85 will pay back construction loans. The remaining $1.74 pays for increases for personnel, chemicals, maintenance and 311/customer service.

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

Water and Sewer Rates 2011-2012

	2011 (current)	2012 (proposed)
Tier 1 (1-4 Ccf)	$1.45	$.98
Tier 2 (5-8 Ccf)	$1.64	$1.96
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.

Source: Charlotte Water

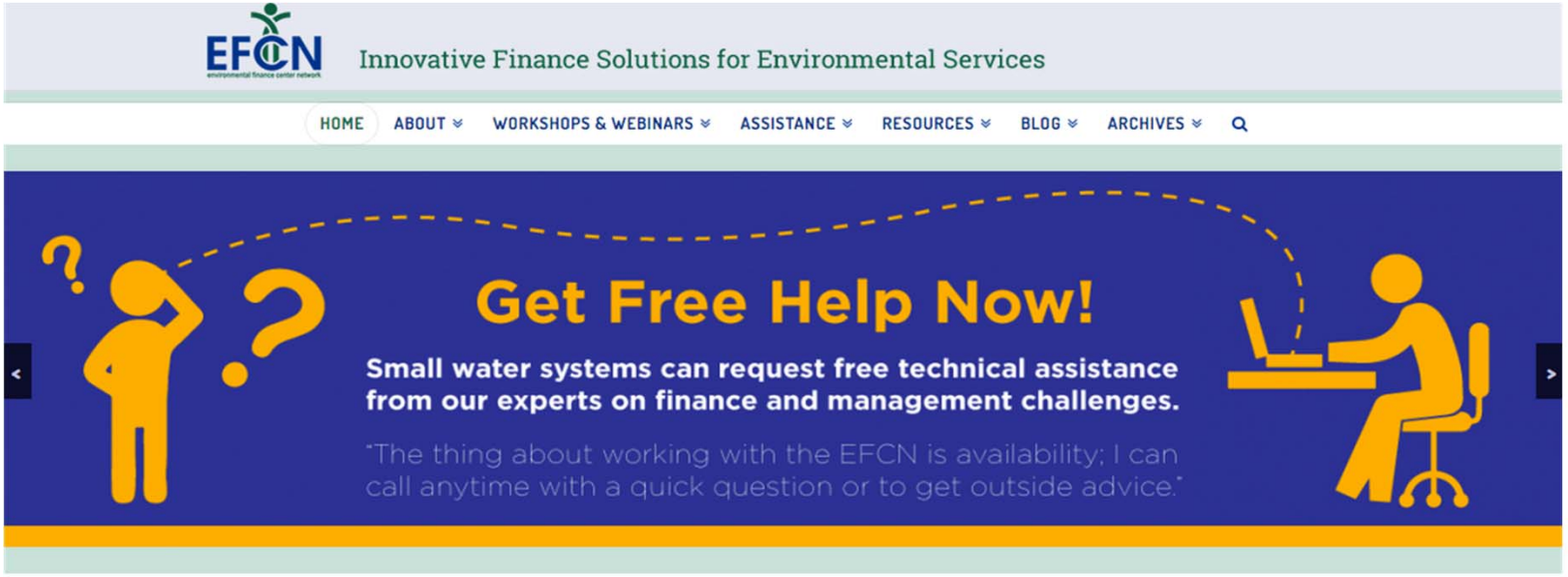
Summary of Structural and Managerial Strategies

- 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

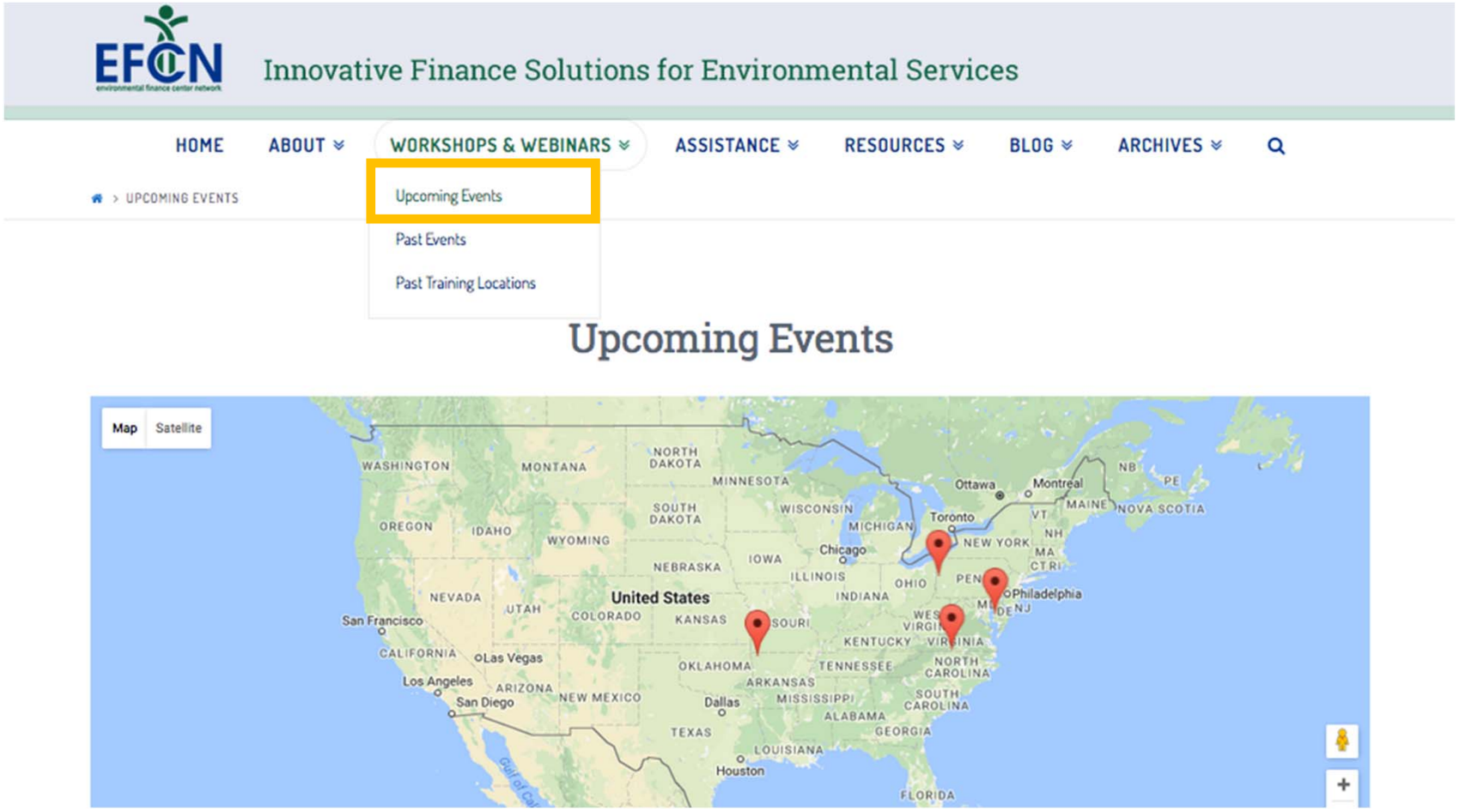
Visit the EFCN Website – *www.efcnetwork.org*

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



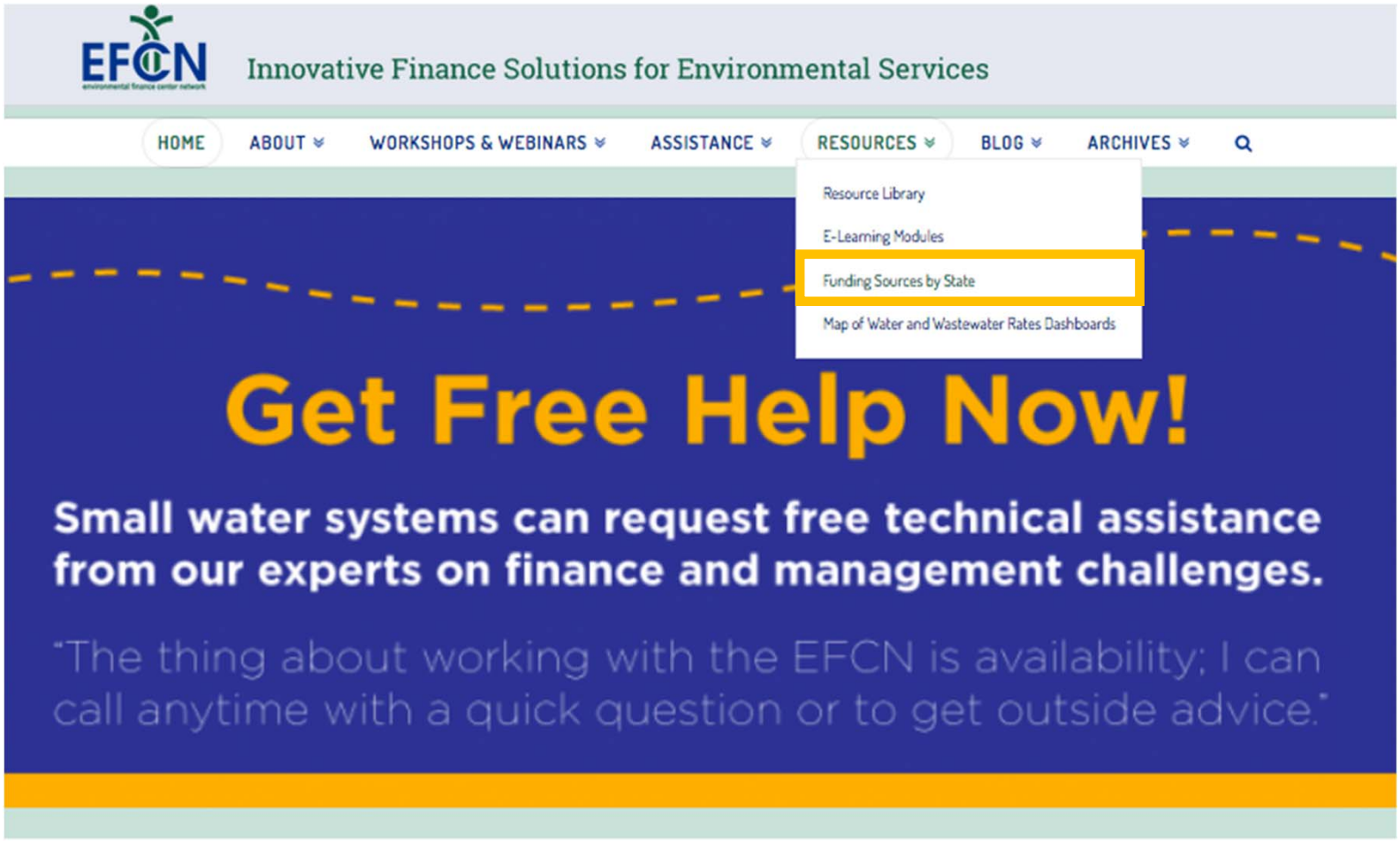
Upcoming Events Calendar

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



Funding Tables By State

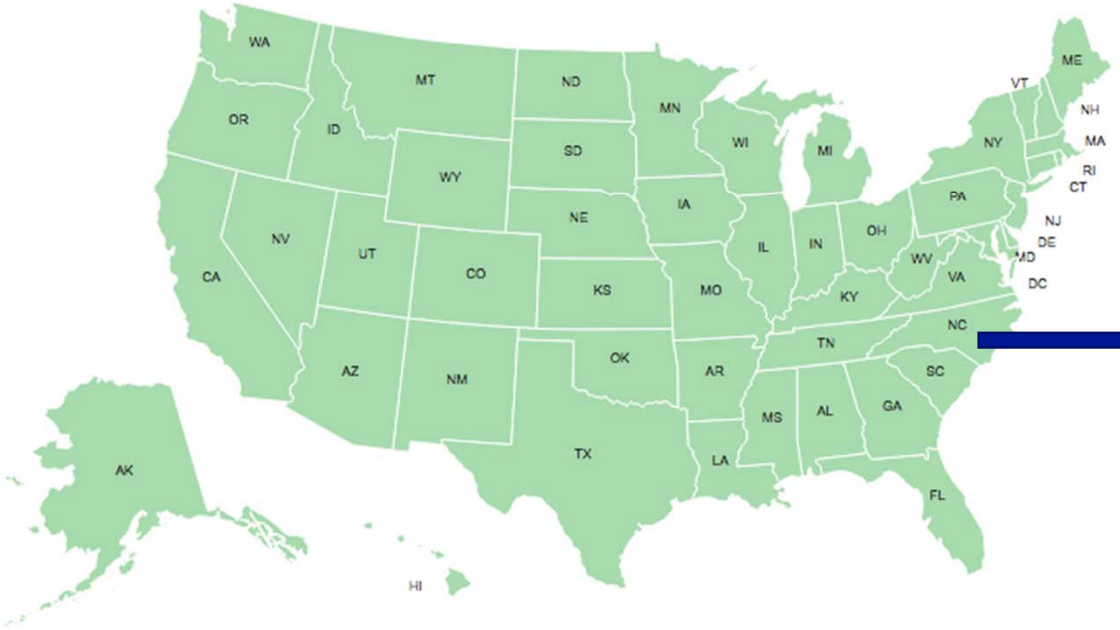
Select “Funding Sources by State” under the Resources Tab.



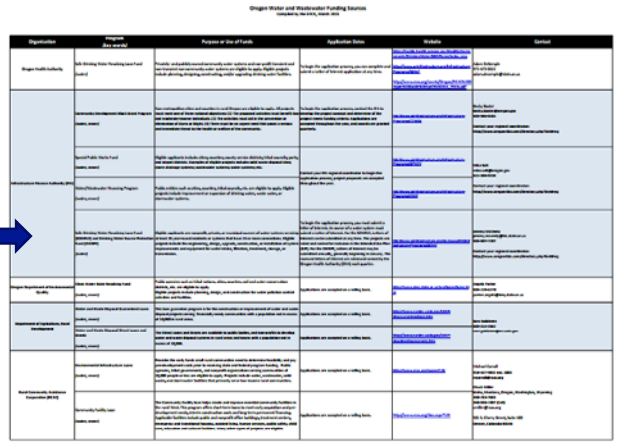
Funding Sources by State

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

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

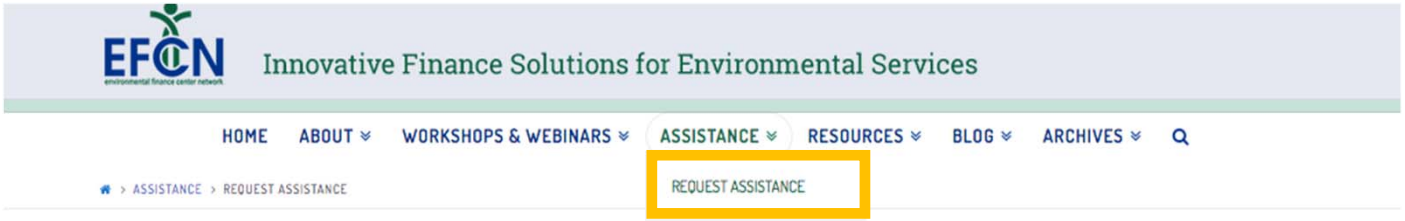


Click on an individual state to view funding table.



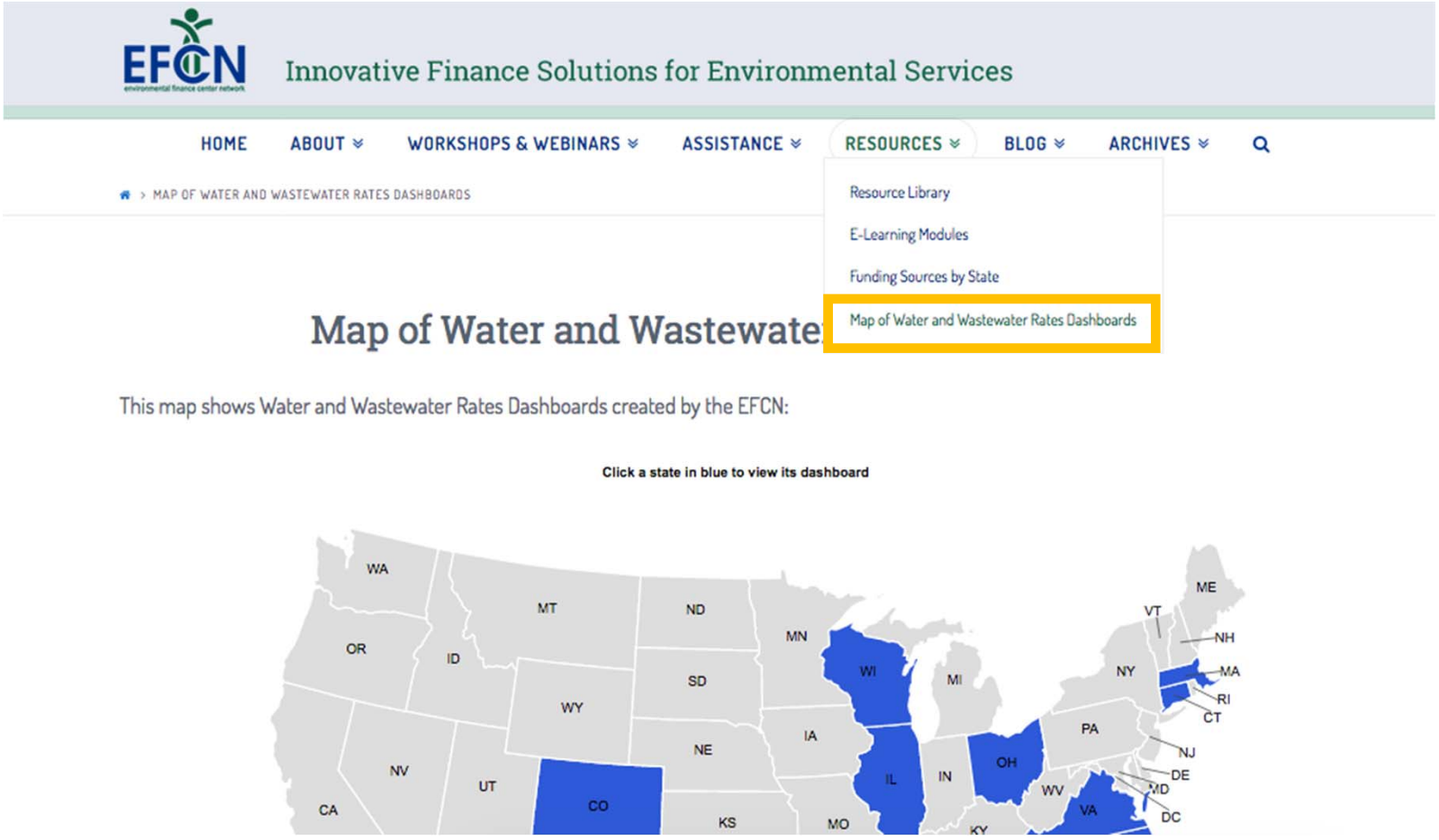
Request Technical Assistance

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



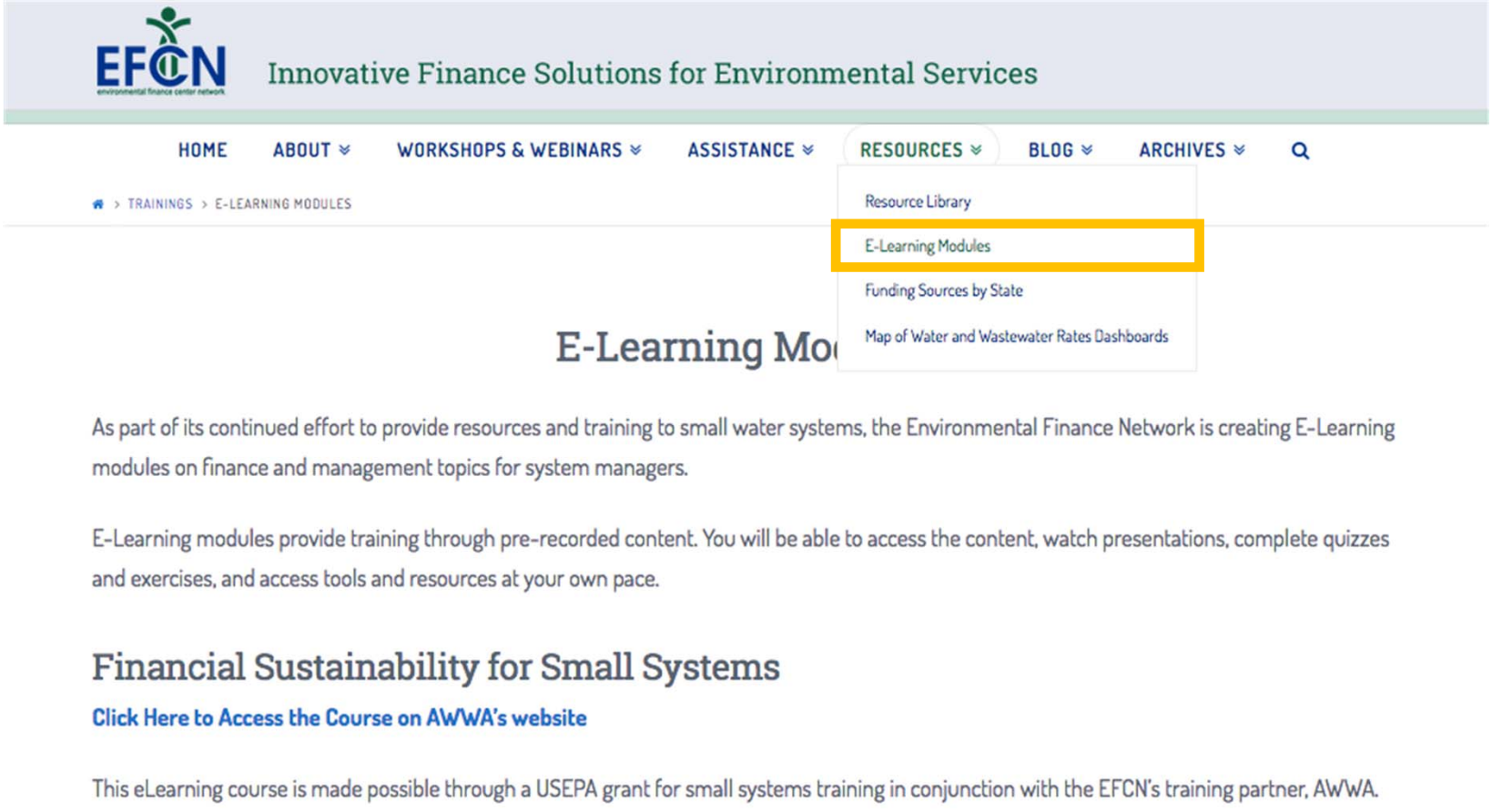
Rates Dashboards

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



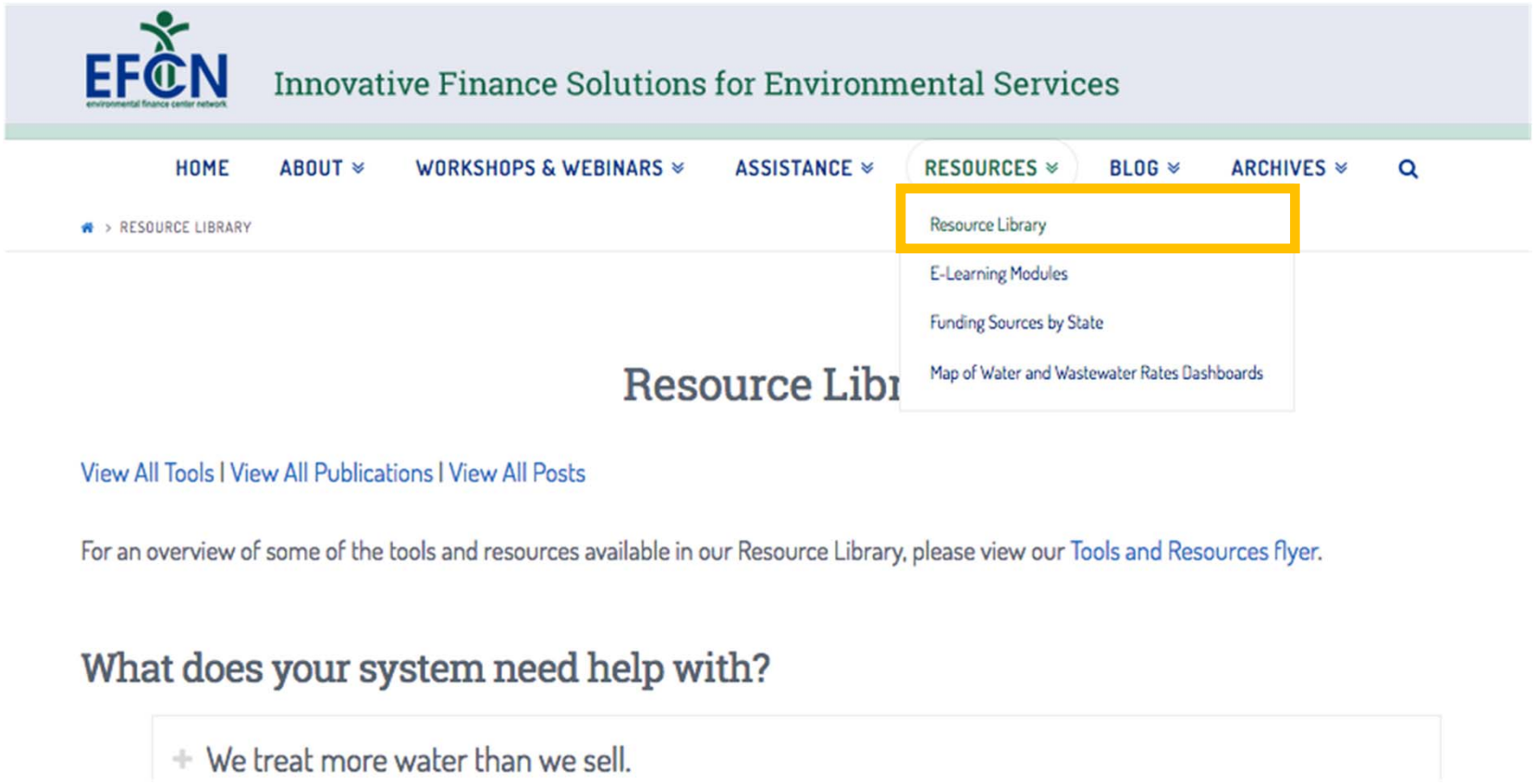
E-Learning Modules

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



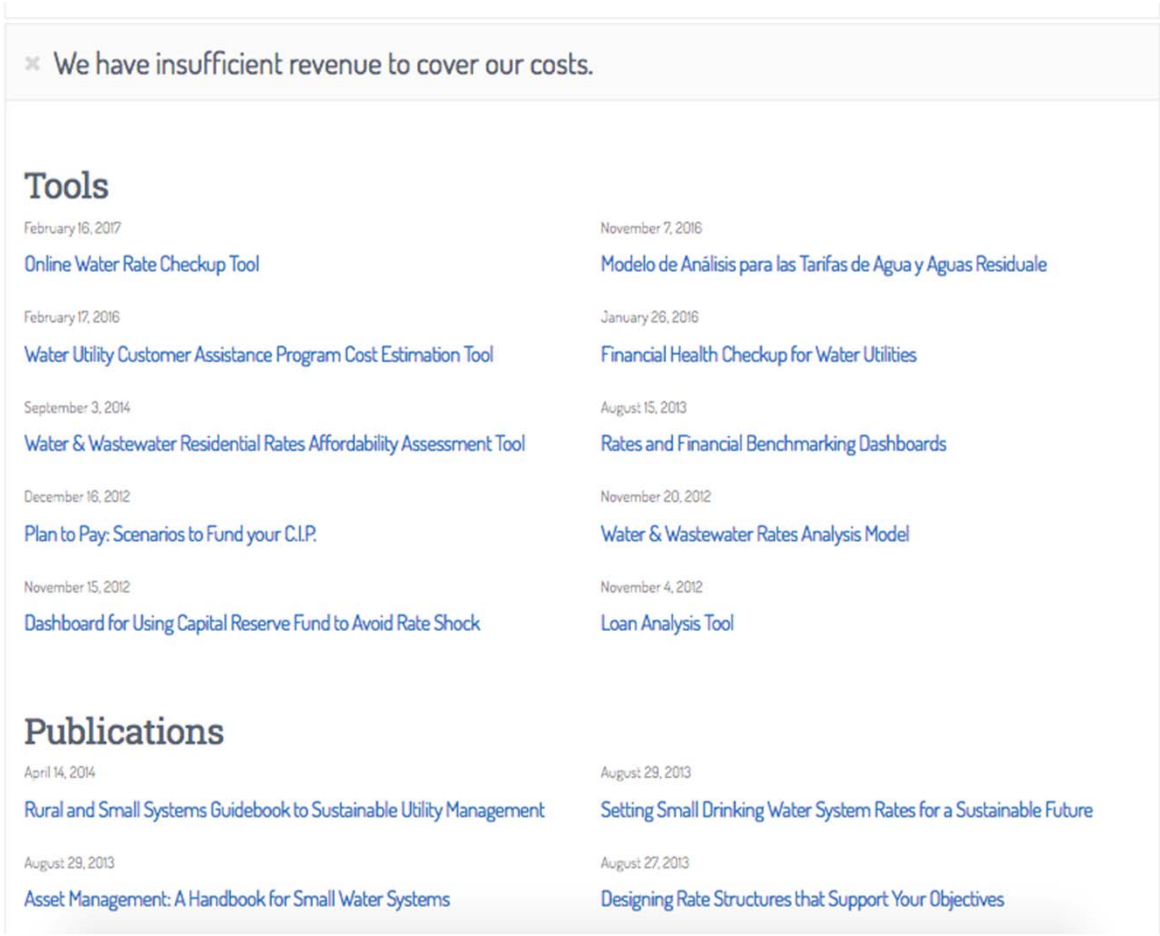
Resource Library

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



Resource Library Continued…

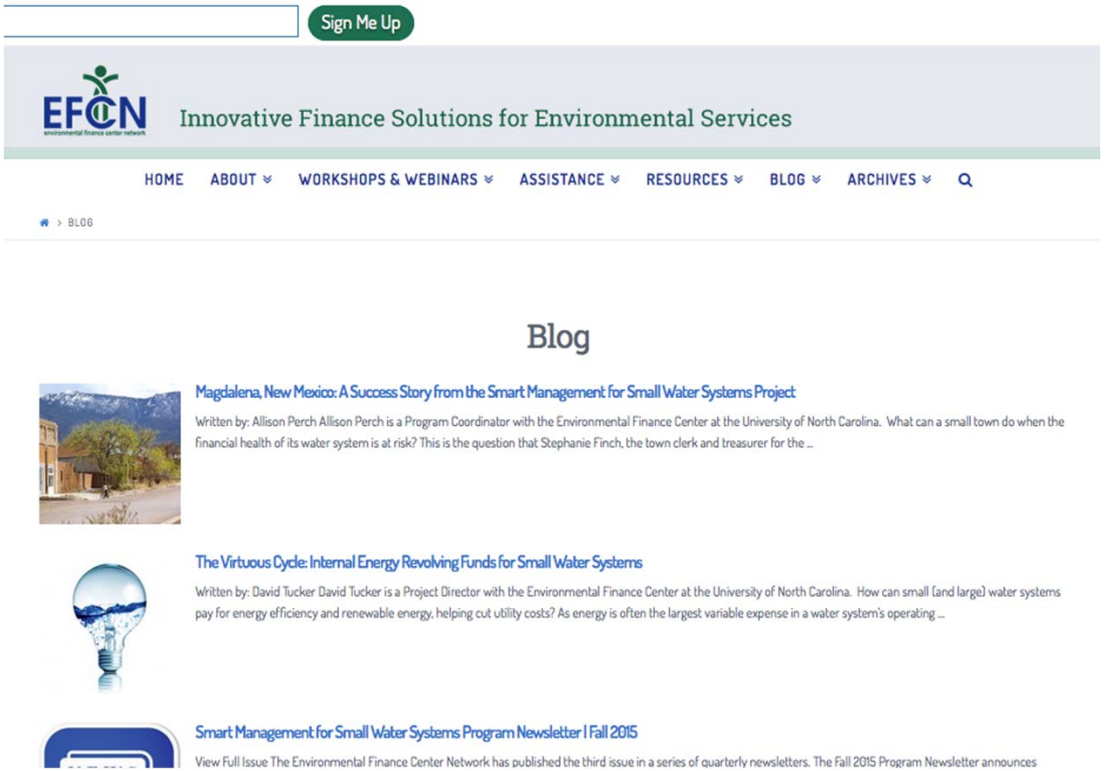
Click on a what your system needs help with to reveal tools and publications related to that topic.

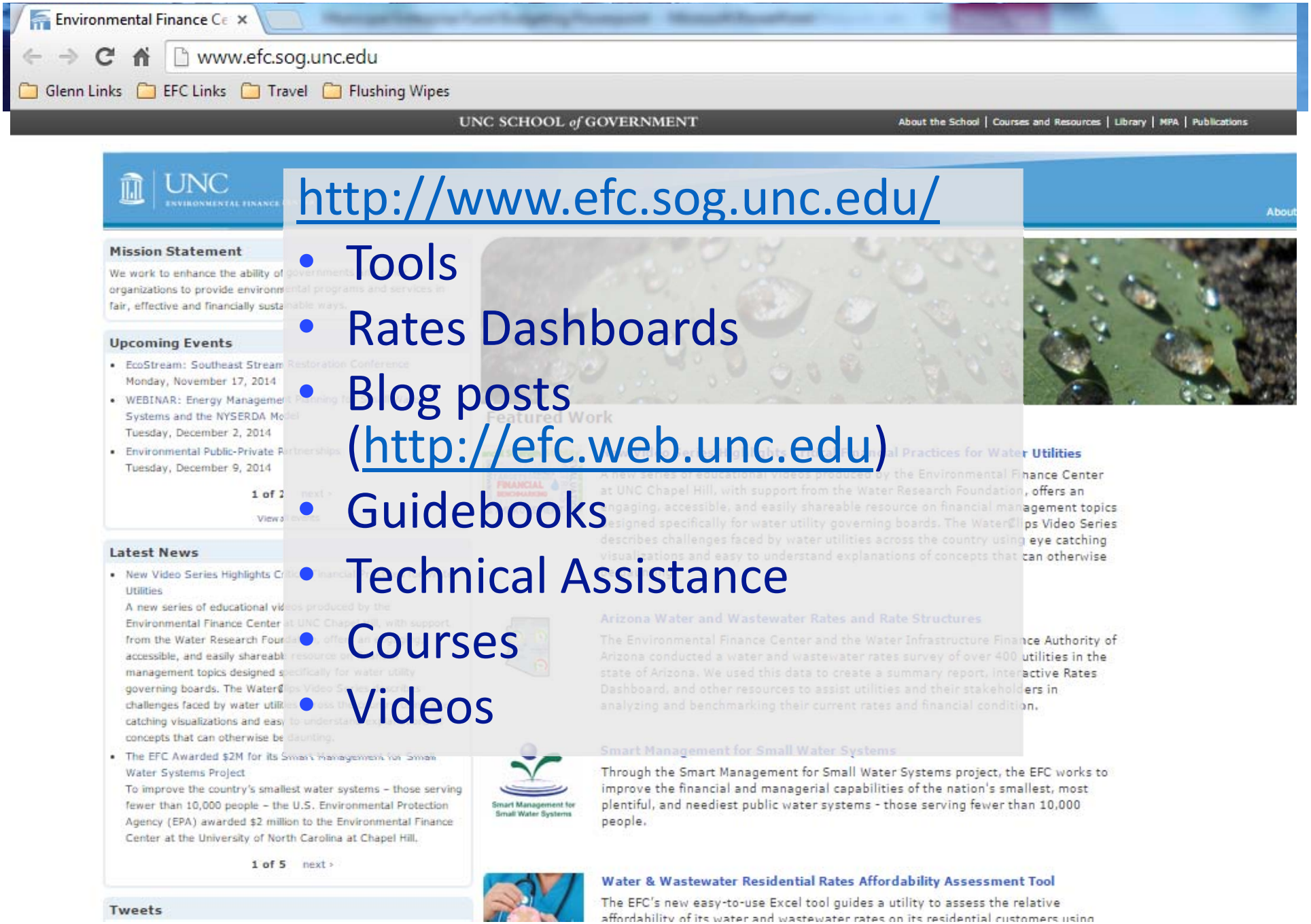


Small Systems Blog

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://www.efc.sog.unc.edu/

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

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
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

EFCN environmental finance center network

NADO National Association of Development Organizations Research Foundation

GFOA Government Finance Officers Association