Smart Management for Small Water Systems

WEBINAR: Achieving Revenue Stability through Your Water Rate Structure

Thursday, January 19, 2017

2:00 – 3:00 PM EST

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

EFCN environmental finance center network

UNC ENVIRONMENTAL FINANCE CENTER

Environmental Finance Center Syracuse University

American Water Works Association

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 Project 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

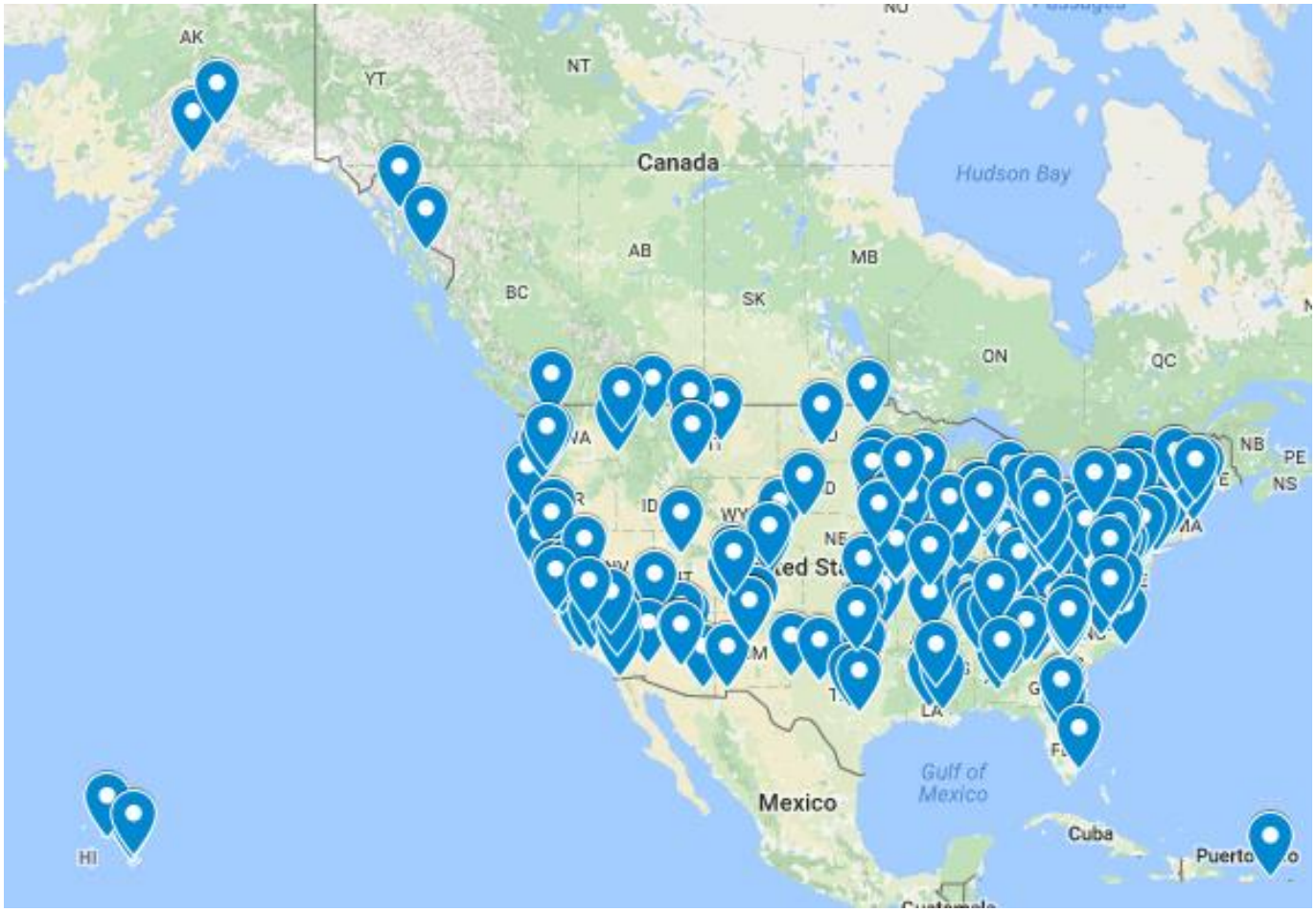
Individualized technical assistance, workshops, small group support, webinars, eLearning, online tools & resources.

- **Environmental Finance Center at University of North Carolina at Chapel Hill**
- Southwest Environmental Finance Center
- **Syracuse University Environmental Finance Center**
- Environmental Finance Center at Wichita State University
- Environmental Finance Center at University of Louisville
- EFC West
- Great Lakes Environmental Finance Center at Cleveland State University
- New England Environmental Finance Center at University of Southern Maine

Areas of Expertise

- Asset Management
- Energy Management Planning
- Financial Management
- Leadership Through Decision-making and Communication
- Managing Drought
- Water Loss Reduction
- Collaborating with Neighboring Communities
- Multi-funding
- Water Conservation
- Management and Finance 101
- Climate Resiliency
- Workforce Development

Registrants of this webinar



Achieving Revenue Stability through Your Water Rate Structure

Shadi Eskaf
Environmental Finance Center
The University of North Carolina at Chapel Hill
919-962-2785
Eskaf@sog.unc.edu

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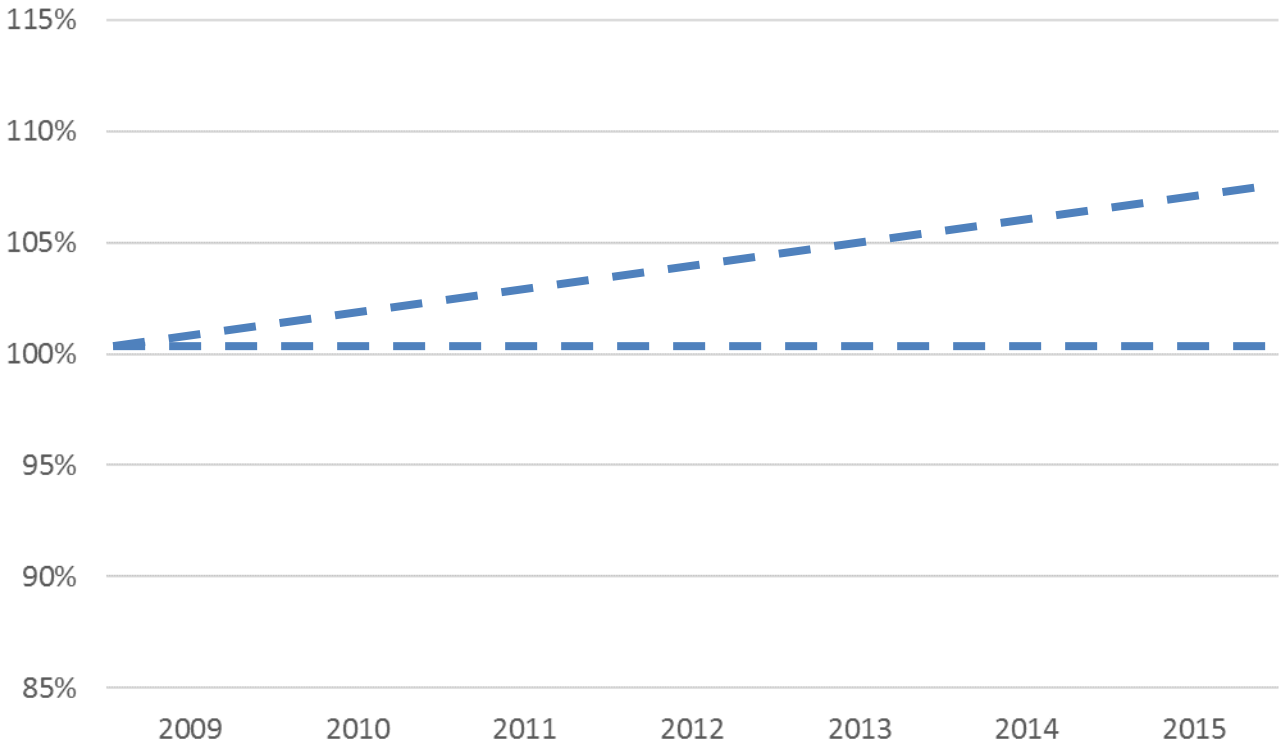
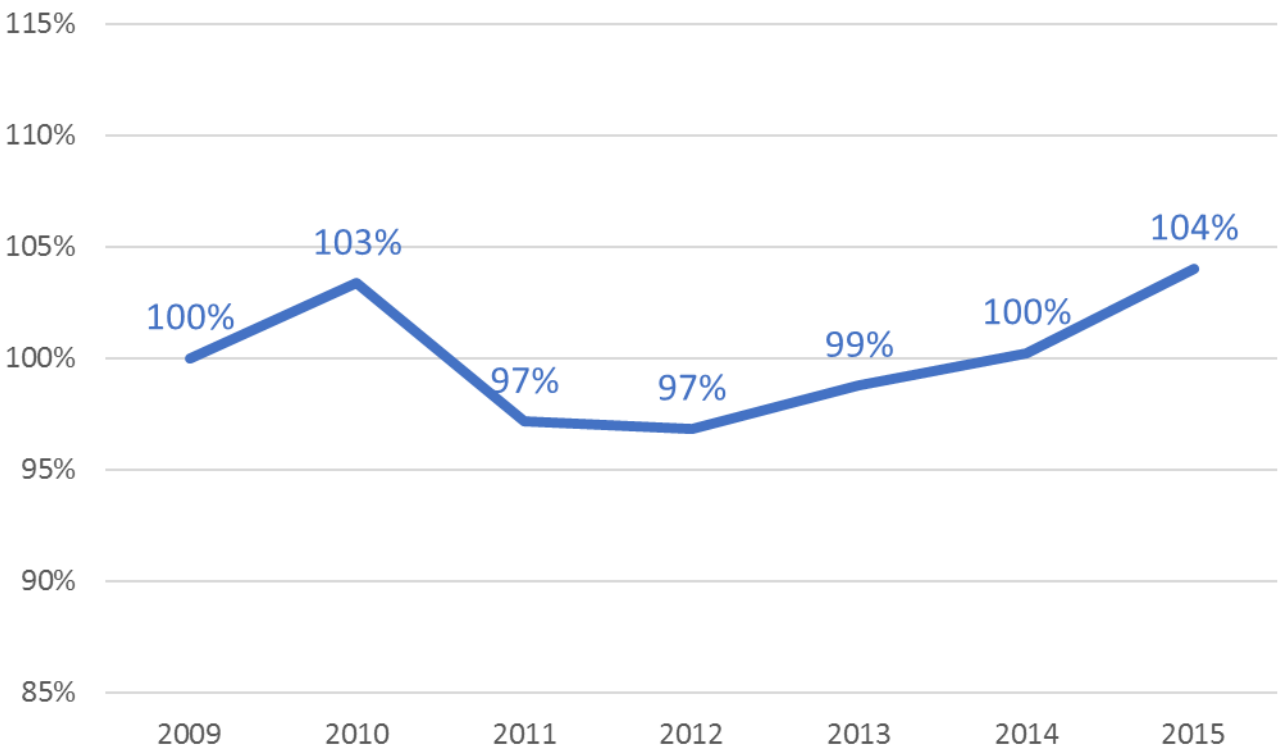
Consider the annual revenues of a small water and wastewater system that has not changed its rates in 7 years (real life example)



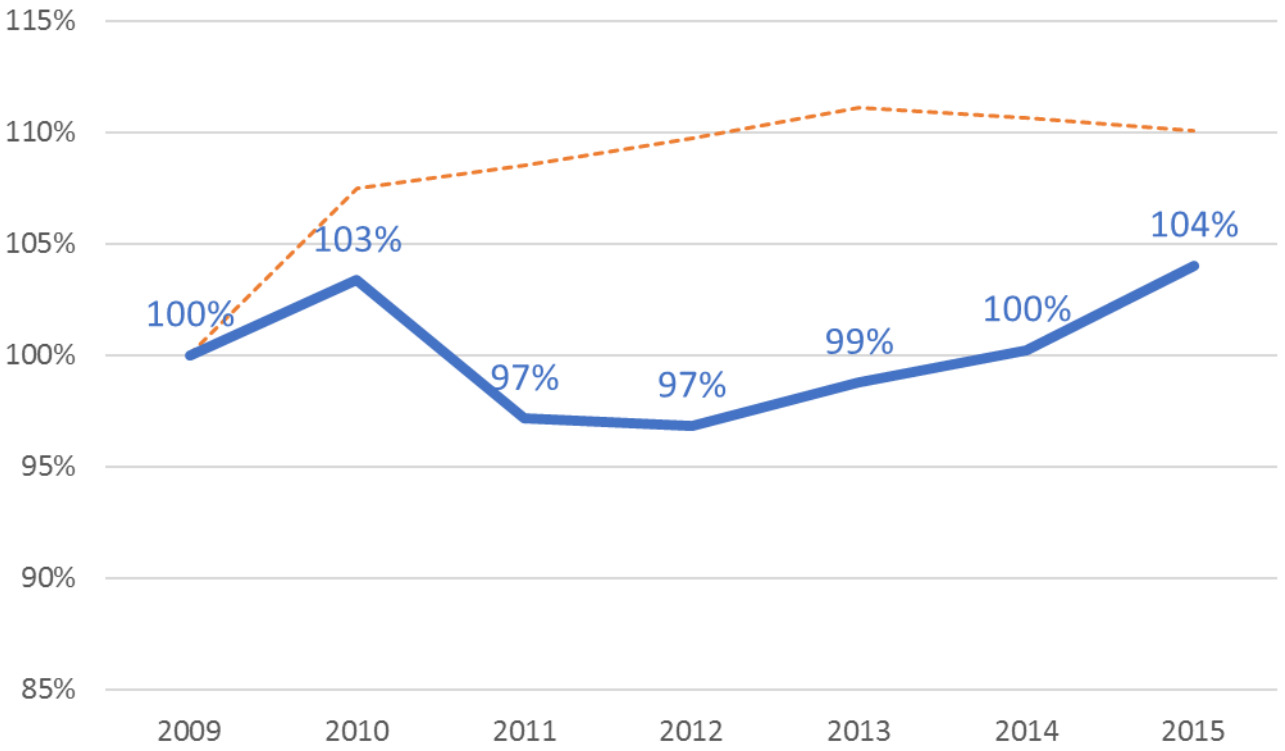
Operating revenues from a small municipal water and wastewater system fluctuated every year, despite water and wastewater rates not changing for those seven years



Total operating revenues of the water and wastewater enterprise fund in each fiscal year are compared to the FY2009 total. Certified municipal population estimate in each year is compared to the 2009 estimate.
Data sources: Annual audited financial statements of a municipality in North Carolina, compiled by the NC Local Government Commission; and certified municipal population estimates by the State Demographic branch of the NC Office of State Budget and Management. Data graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

Operating revenues from a small municipal water and wastewater system fluctuated every year, despite water and wastewater rates not changing for those seven years

And despite municipal population growing over time



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Data sources: Annual audited financial statements of a municipality in North Carolina, compiled by the NC Local Government Commission; and certified municipal population estimates by the State Demographic branch of the NC Office of State Budget and Management. Data graphed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.

Learning objectives

1. Explain how sensitive revenues are to demand fluctuations
2. Demonstrate the importance for water systems to study and plan for potential revenue shortfalls
3. Identify rate structure design options and resources to help the water system improve its revenue stability

Revenues and water use

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

Typical water rate structure

Fixed Base Charge (Minimum Charge)

with or without a consumption allowance

+

Variable Volumetric Charge (determined by the water volume billed)

Can be structured in many ways

Example water rate structure

$20.00/month

Including the first 2,000 gallons/month

+

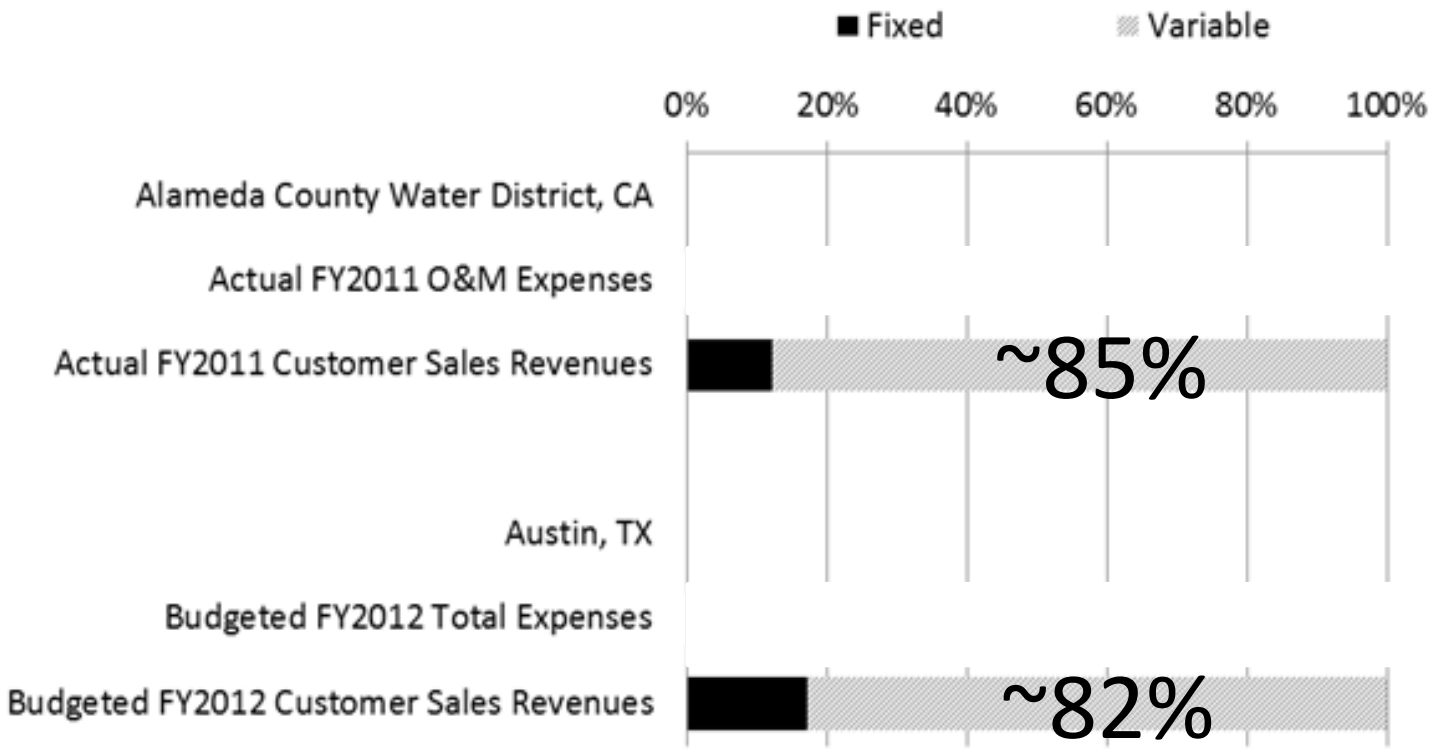
$5.00 / 1,000 gallons (above 2,000 gallons)

% water sales revenues coming from the variable charges

	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

More examples



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.

Example from two small towns

Maysville NC	Readsboro VT
72% variable	24% variable
28% fixed	76% fixed

Example from two small towns

Maysville NC

$7.50/month
includes 0 gallons

+ $4.75/1000 gallons
between 0 – 10k

+ 5.25/1000 gallons
between 11k – 25k

+ 2 more blocks

Readsboro VT

$38.00/month
includes 4,000 gallons

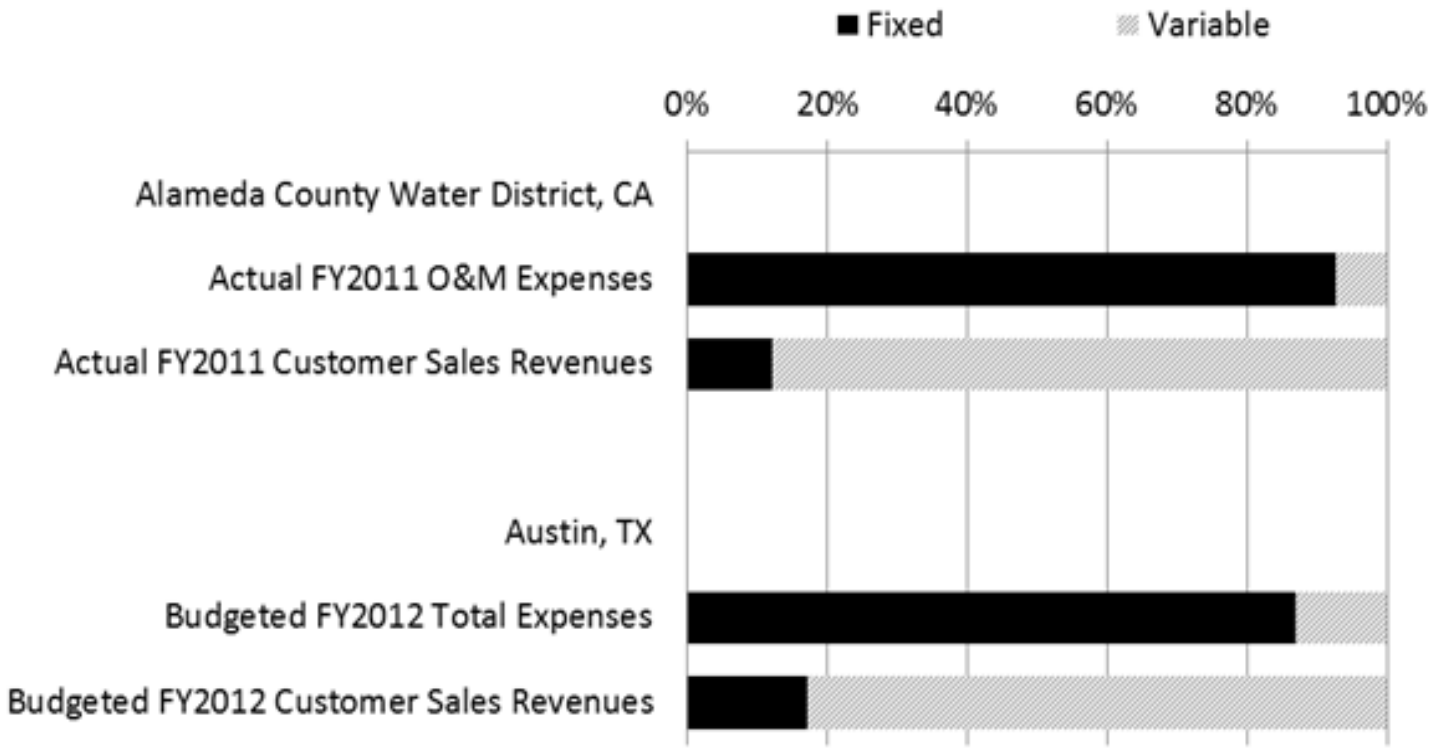
+ $9.50/1000 gallons
above 4,000

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

Expenses

Variable	Fixed
Chemicals	Debt service
Power	Capital projects
Water purchase	Payroll
Perhaps small portion of maintenance costs	Billing
	Supplies
	Lab
	Contracts, etc.

Expenses vs. Revenues



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Even small systems

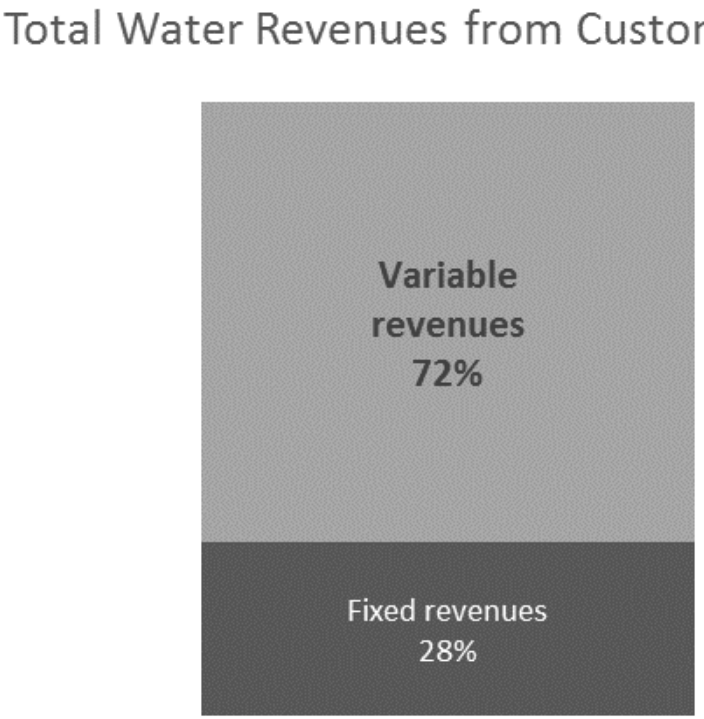
Readsboro VT

Actual FY2015

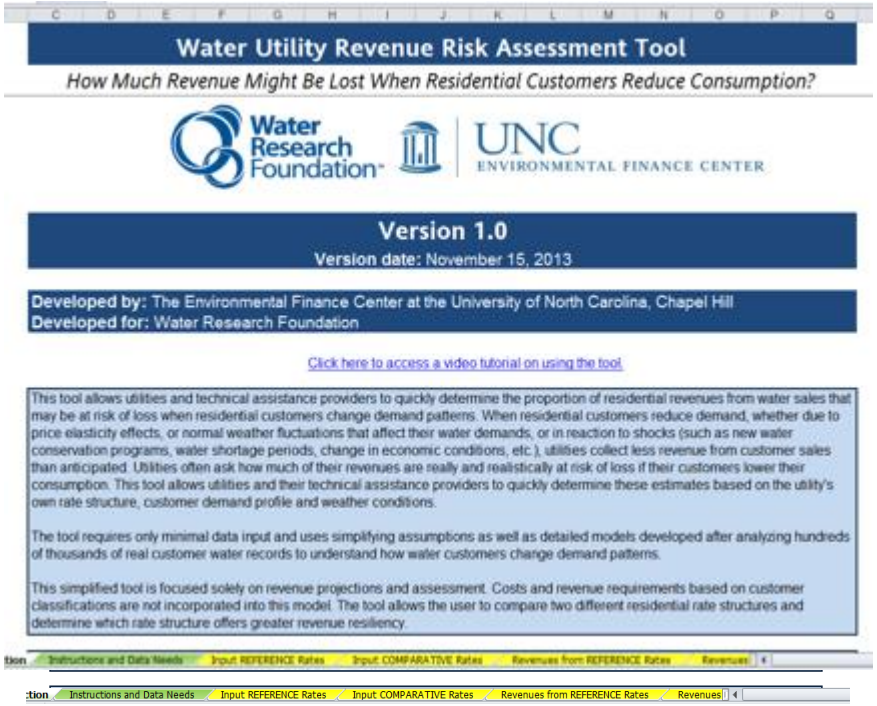
Expenses	Revenues
9% variable	24% variable
91% fixed	76% fixed

In most costs, as water use decreases, revenues will go down faster than costs in the short term

How much of the revenues are *truly* vulnerable?



Water Utility Revenue Risk Assessment Tool



Free to download and use at

www.waterrf.org

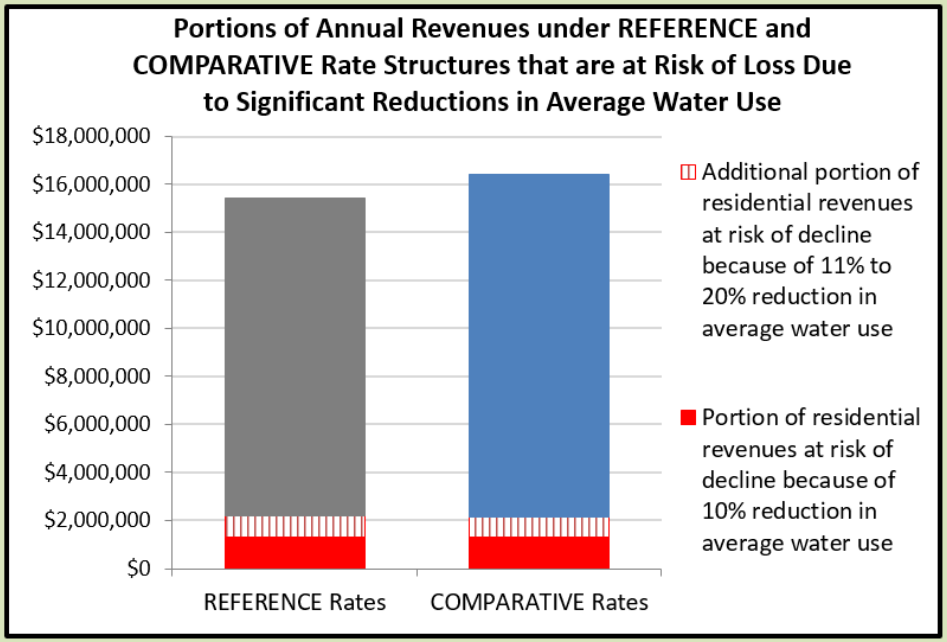
www.efc.sog.unc.edu

- 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?

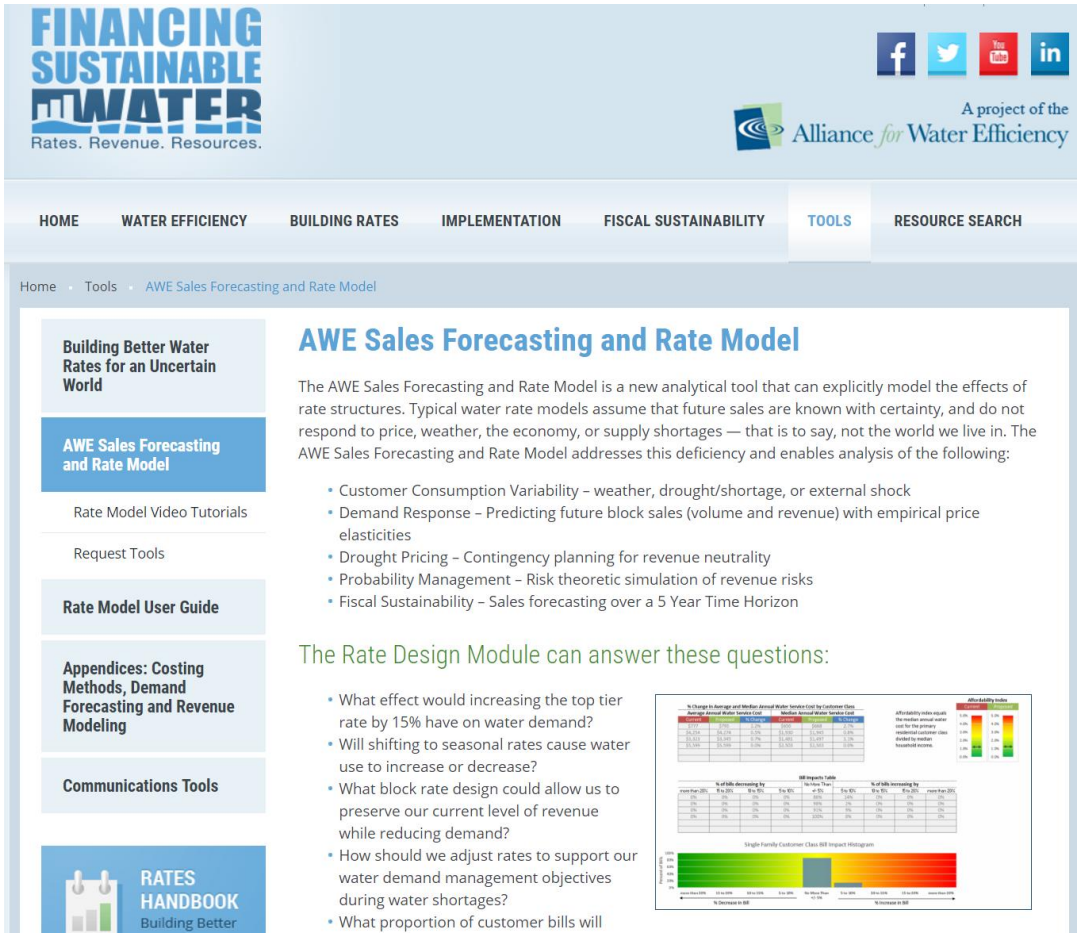


Decline in Total Annual Revenues for a:	REFERENCE Rates	COMPARATIVE Rates
10% reduction in avg use	$1,311,000	$1,319,000
20% reduction in avg use	$2,181,000	$2,167,000
10% reduction in avg use	8.5%	8.0%
20% reduction in avg use	14.2%	13.2%

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

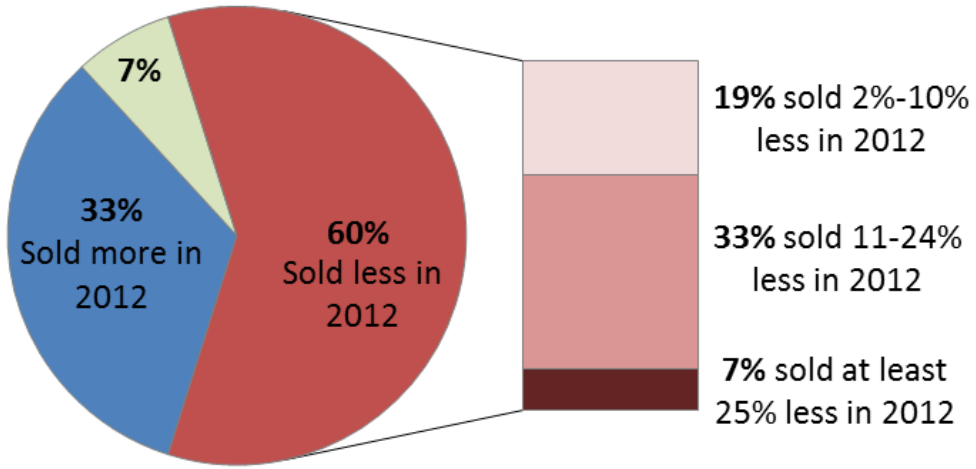
Available for
Alliance for Water Efficiency members
http://www.financingsustainablewater.org/



There are tools available to help you roughly assess how much of your revenues may be vulnerable to your customer demand changes

Water use is declining for many systems

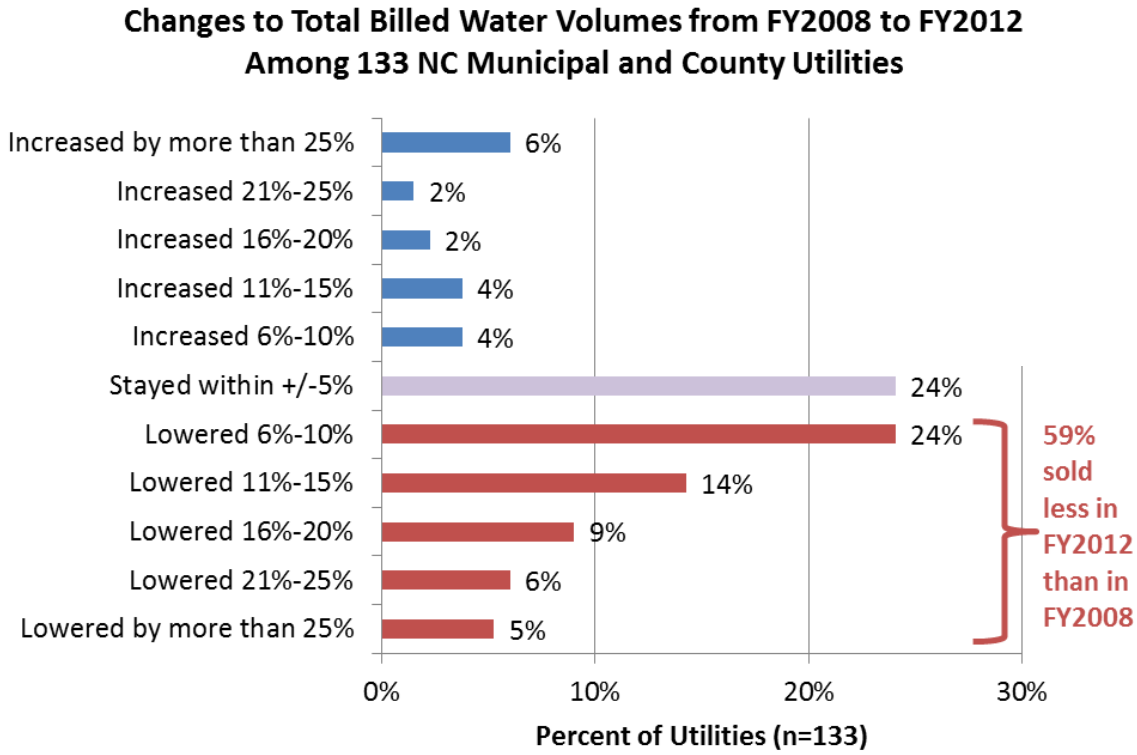
Total Water Volume Sales in 2012 Compared to 2006 in 129 Utilities Nationwide



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: EFC *Environmental Finance* blog post "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/

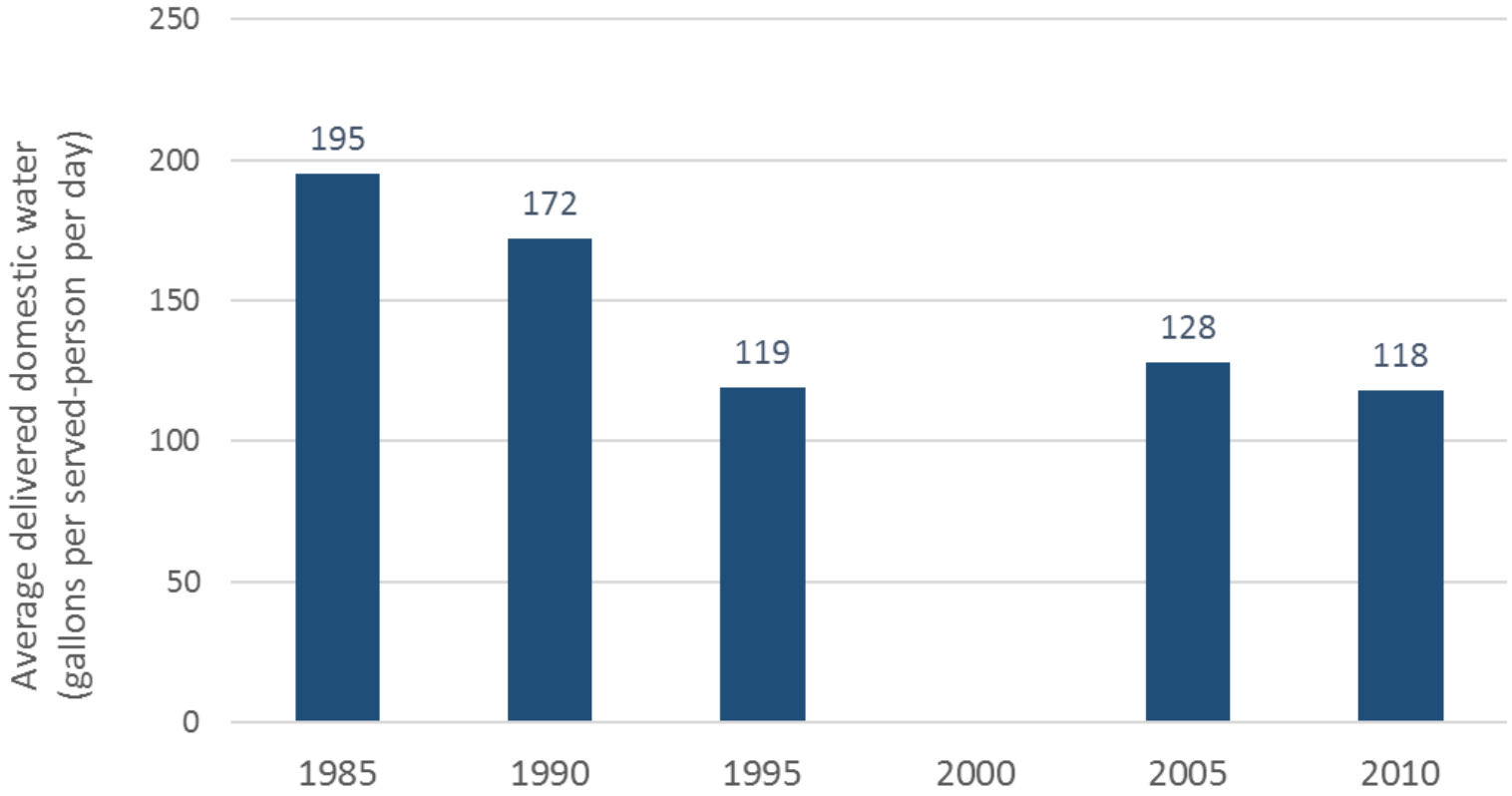
Water use is declining for many systems



Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill.
Data Source: NC Local Government Commission's Annual Financial Information Reports (AFIR) in FY2008-FY2012. Total billed water volumes are self-reported by the utilities in million gallons or cubic feet sold to all customers. Fiscal years are July through June for all utilities. 57% of the sampled utilities increased total number of accounts from FY2008 to FY2012.

Source: EFC *Environmental Finance* blog post "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/

Average water use for public water system customers has declined in Montana



Source: U.S. Geological Survey's National Water Use Information Program (NWUIP), available at http://water.usgs.gov/watuse/. Calculated as the total water deliveries by public water systems for domestic uses divided by the population served by public water systems. http://water.usgs.gov/watuse/

At least average residential demand is decreasing

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

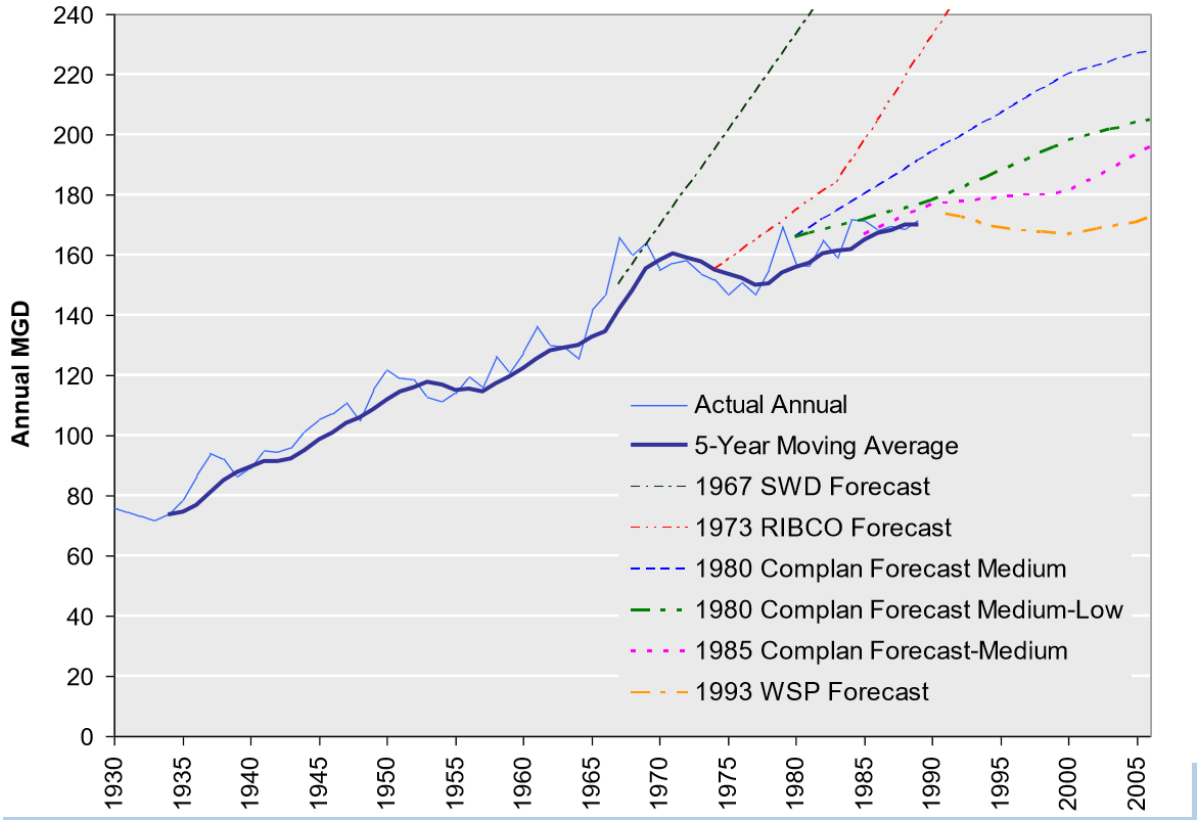
Water utilities are finding it increasingly difficult to accurately manage their finances in the face of changing residential water use patterns. Many utilities have reported a gradual erosion of residential water sales on a per-household basis and are uncertain of the causes of the observed trends (Fig-

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.

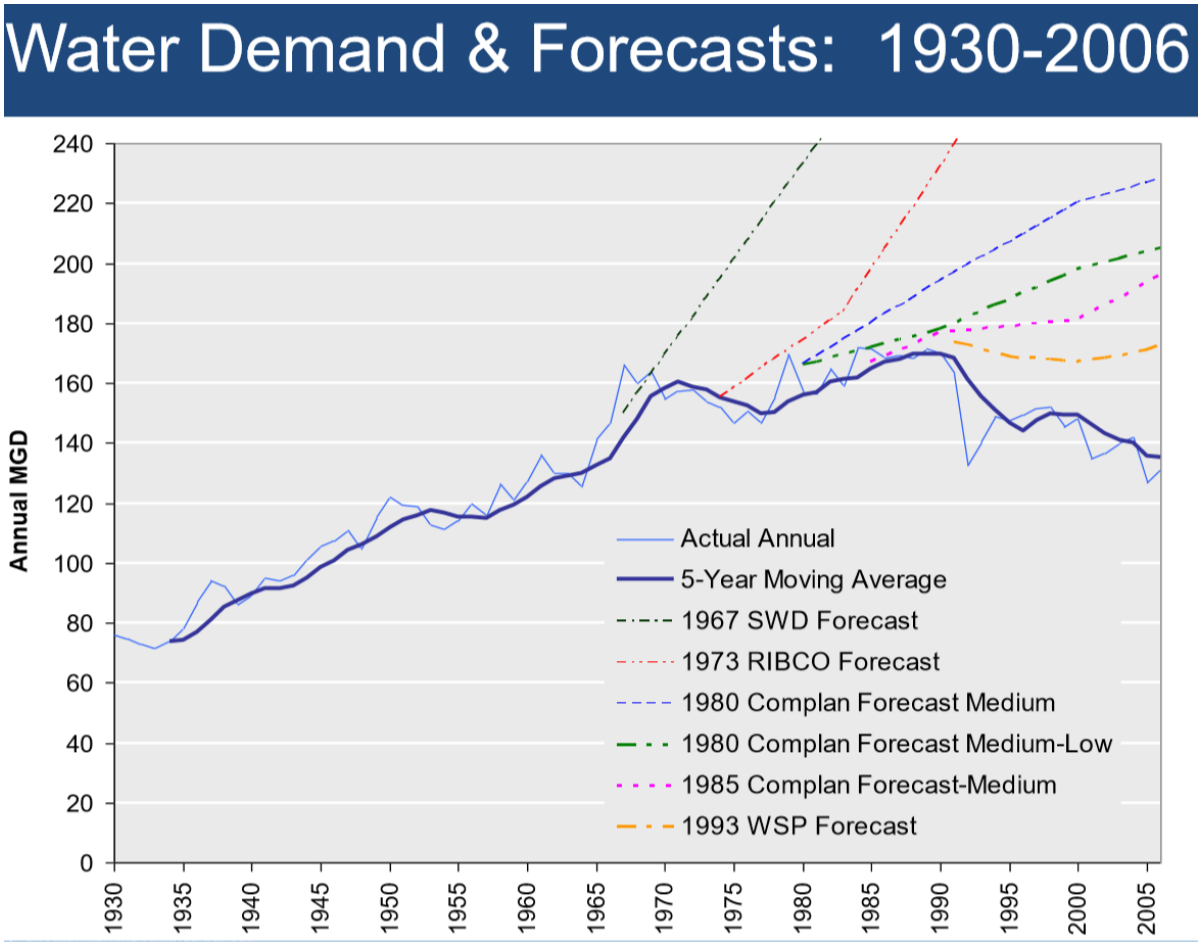
Water use is declining for many water systems (but not all)

Seattle's demand forecasts

Water Demand & Forecasts: 1930-1990



Seattle's demand forecasts



Strategy #1

Analyze your customers' (total and average) water use patterns to identify long-term trends and adjust your water use projections when setting budgets and rates

Strategies for revenue stability

1. Improve your financial models
2. Review rates each year
3. Rethink your rate structure design
4. Consider drought surcharges
5. Consumption-based rate adjustments
6. Rate stabilization fund / reserves
7. Reduce your non-revenue water
8. Consider a fixed charge based on consumption (alternative rate structures)

Rate structure design strategies

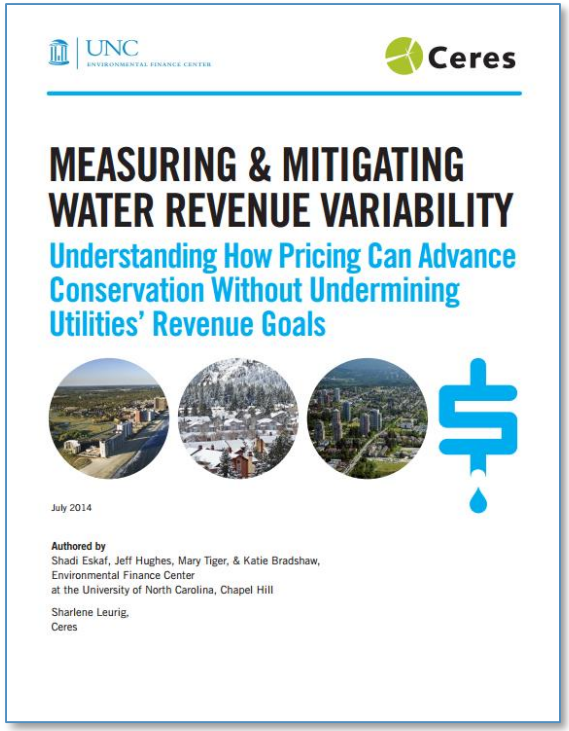
- Increase the fixed base charge
- Increasing block rates can exacerbate revenue risk depending on demand profile (might consider uniform rates, or carefully adjusting block rate structure)
- Use large blocks, full-cost pricing in the lower blocks

Examples of affecting revenue stability at 3 utilities by tweaking rate structures

Assessed and compared revenue risk of 3 utilities with different rate structures, climates, customer water use patterns, customer types.

Applied each other's rates on own customer base to identify relationships between revenue risk, rates and use.

Listed mitigation strategies.



www.ceres.org

www.efc.sog.unc.edu

Alternative rate structure designs

Individualized rate structures, customizing the fixed (base) charge based on individual's water demands.

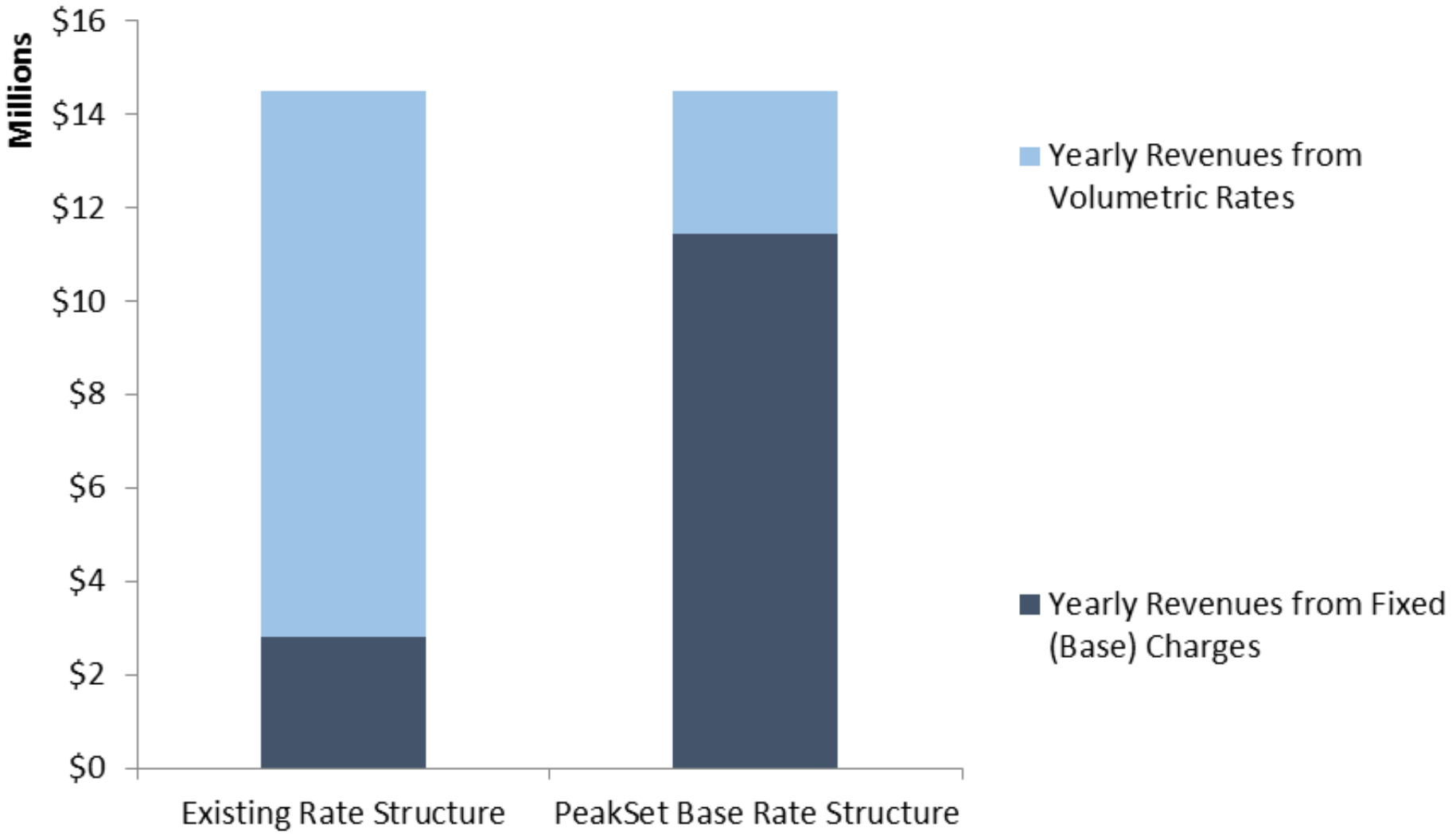
Described in a whiteboard video
http://www.waterrf.org/Pages/Projects.aspx?PID=4366

waterClips

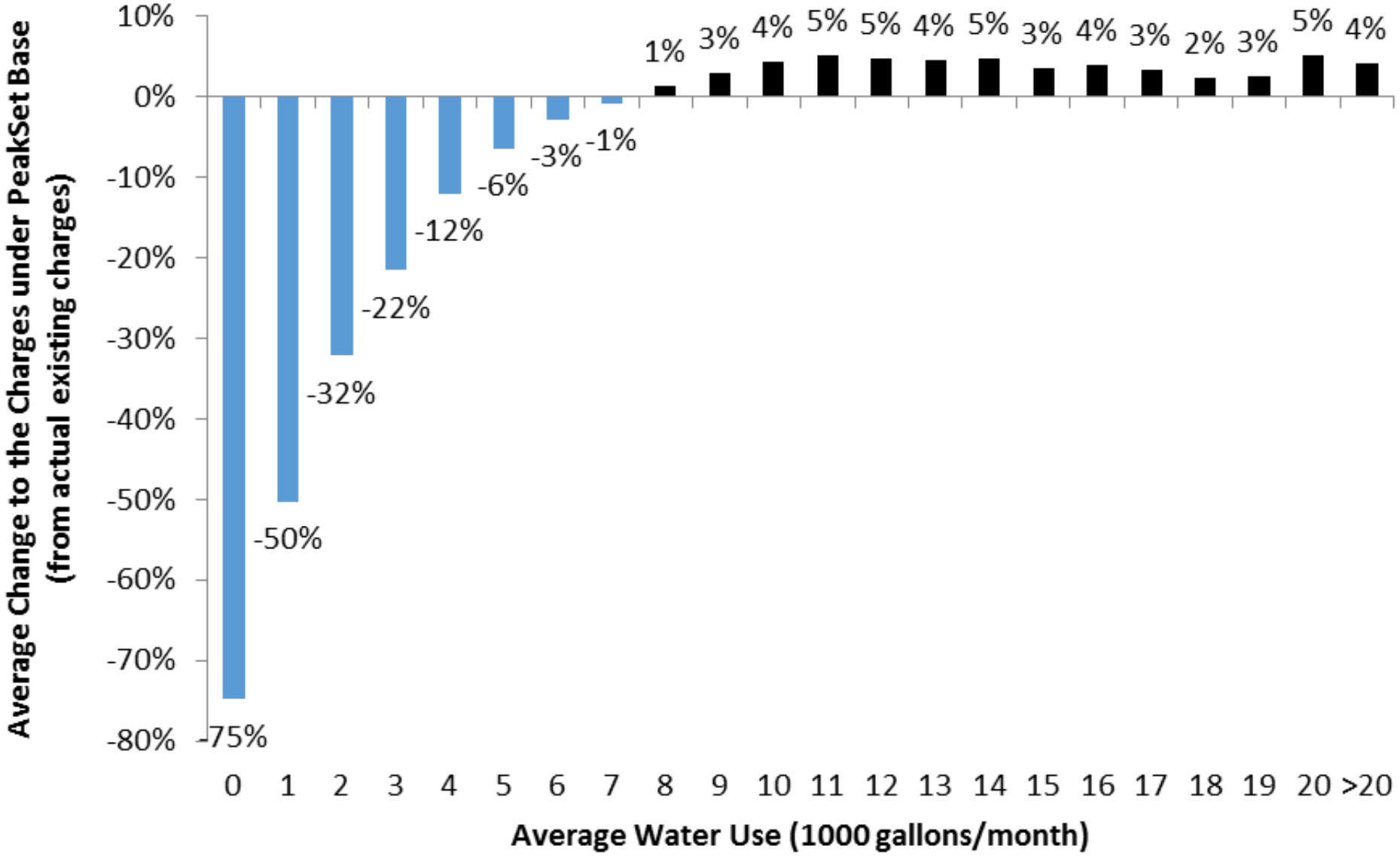
Water Research Foundation

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

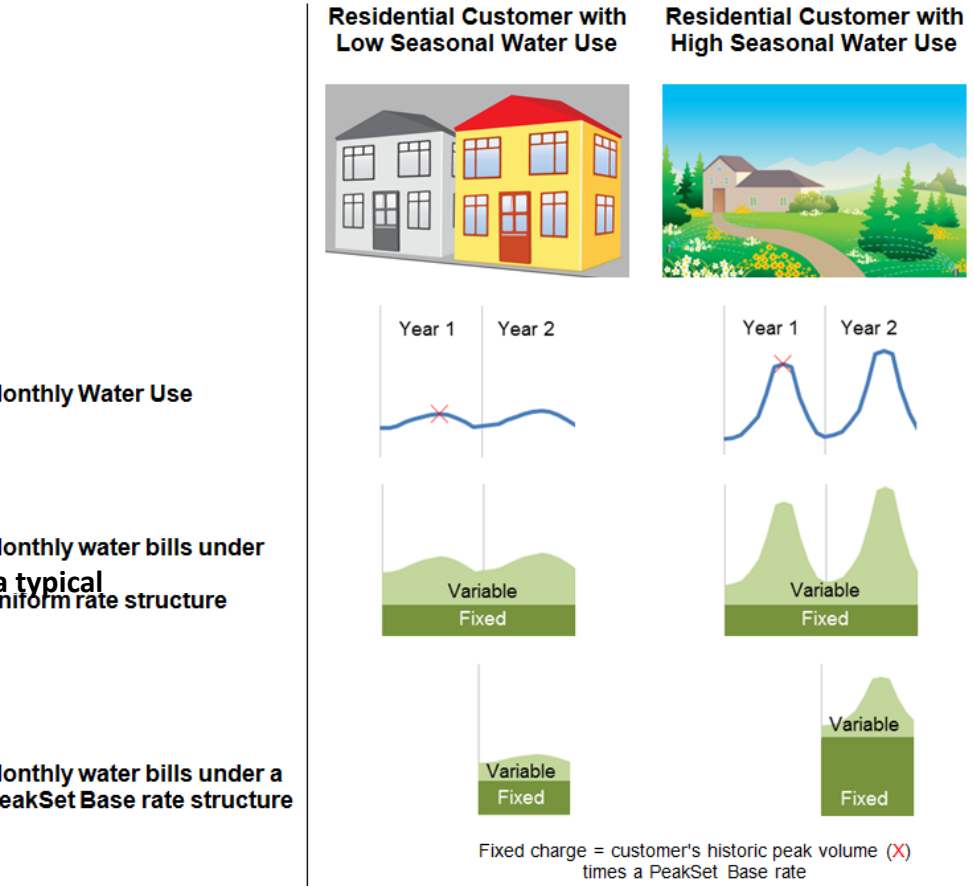


Low water use customers would pay much less under PeakSet Base than under the current rate structure



PeakSet Base Model

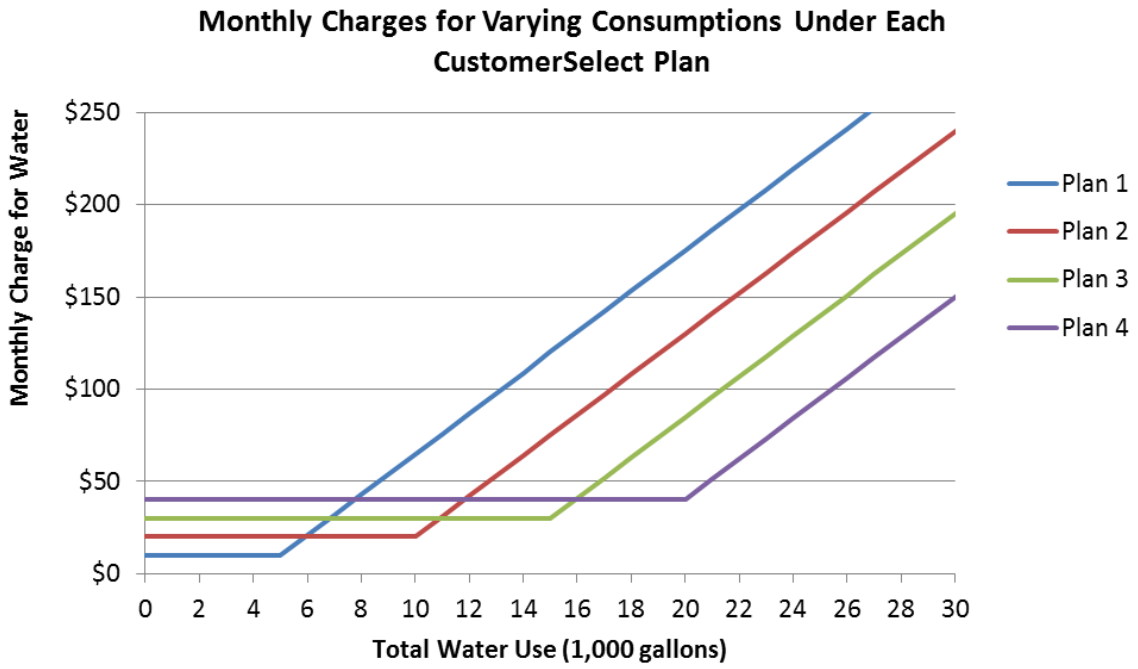
A customer's base charge for next 12 months would be individually set based on their individual historic peak demand



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

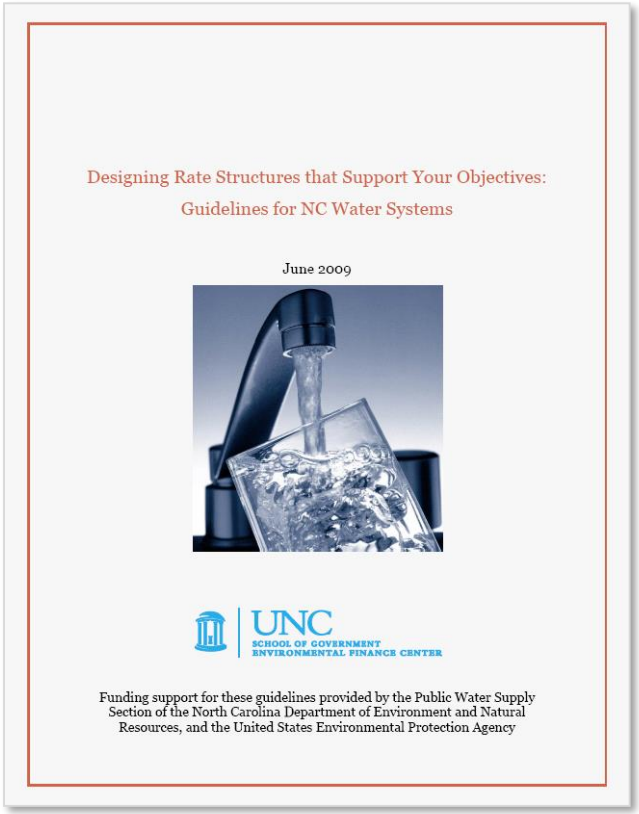
- Utility clearly defines its total revenue needs (including O&M, debt service, capital reserves, etc.)
- Charge full cost prices, plus refundable "revenue stabilization" rates to guarantee revenues (add to base charge)
- At end of the year, keep the revenues that are needed and then return any excess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

Additional resources

Designing rate structures that support your objectives

Guide written for system managers

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



Designing Water Rate Structures for Conservation & Revenue Stability

www.efc.sog.unc.edu

Mary Tiger
Jeff Hughes
Shadi Eskaf
February 2014

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More on alternative rates

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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.

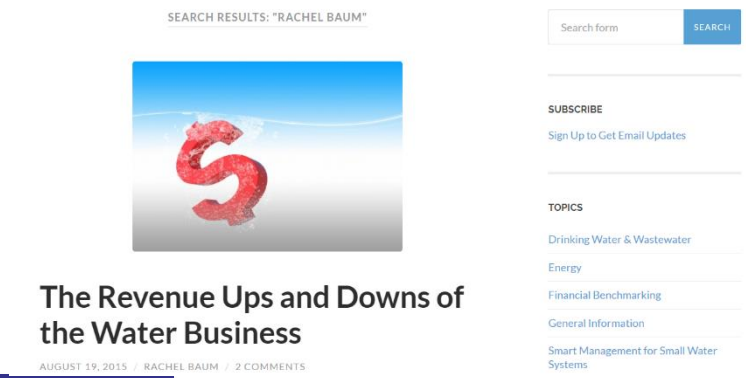
Learn More

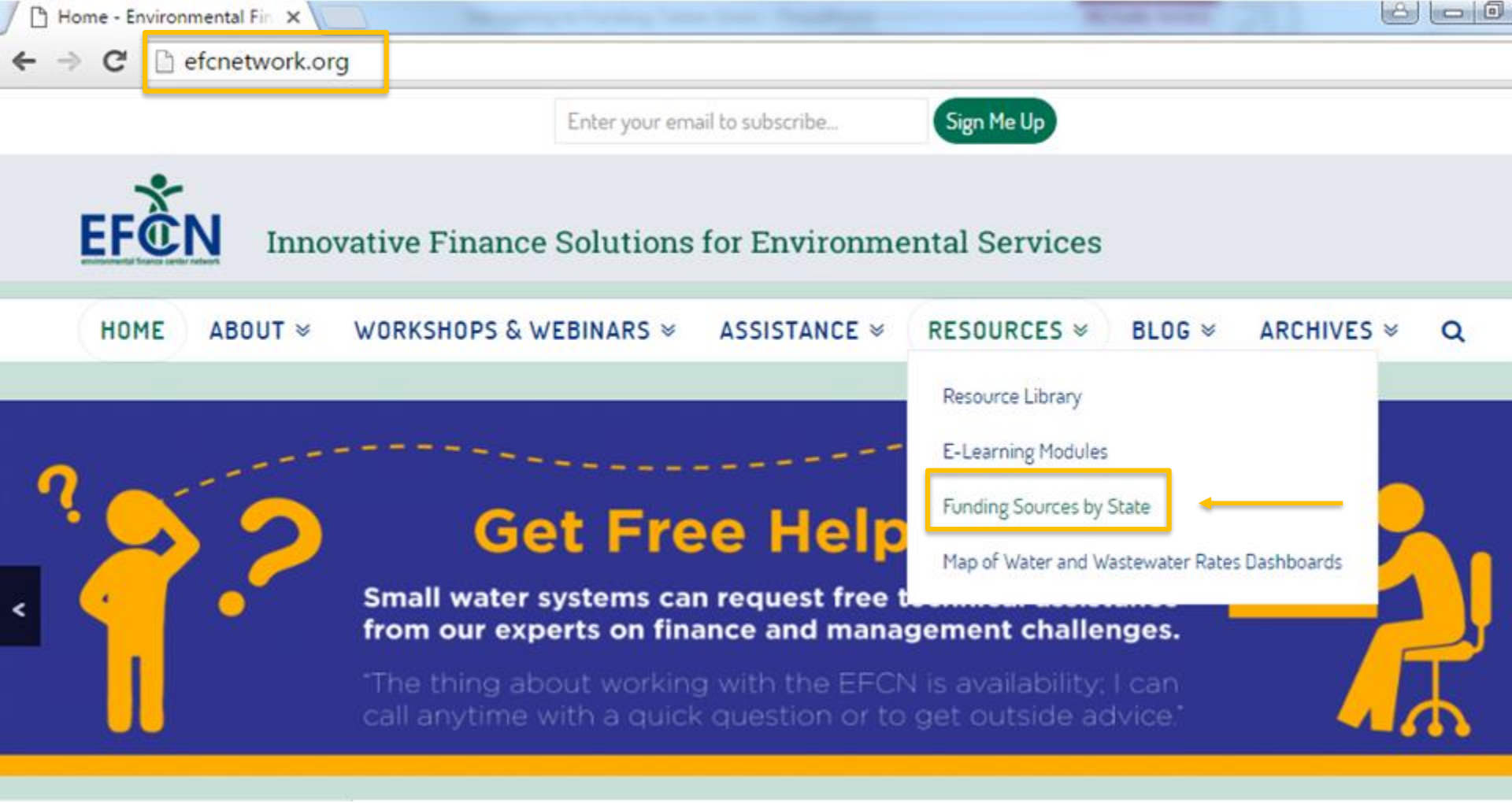
- New Business Models for the Water Industry (Video) - This whiteboard video introduces three potential business models that can help a utility meet its operational needs while also sending a clear signal to its customers about the value of water service.
- PeakSet Pass: A Pricing Model for Utility Revenue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

Environmental Finance blog

http://efc.web.unc.edu/

or http://efcnetwork.org/small_systems_blog/





Navigating to Funding Tables

Step 1: efcnetwork.org
Step 2: Select “Funding Sources by State” under the Resources Tab

Free direct assistance to small water systems

http://efcnetwork.org/ (Click on Assistance)

Thank you!

Shadi Eskaf

Eskaf@sog.unc.edu

919-962-2785