

Innovative Water Financing

Shadi Eskaf

Senior Project Director

Environmental Finance Center at the University of North Carolina

WaterNow Alliance Summit

April 20, 2017

Boulder, CO



UNC
ENVIRONMENTAL FINANCE CENTER

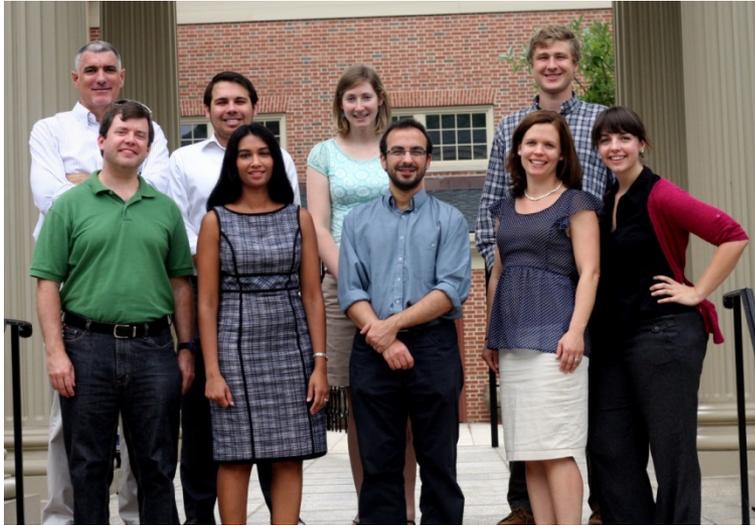
<http://efc.sog.unc.edu>

 @EFCatUNC



UNC

ENVIRONMENTAL FINANCE CENTER



UNC SCHOOL *of* GOVERNMENT

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

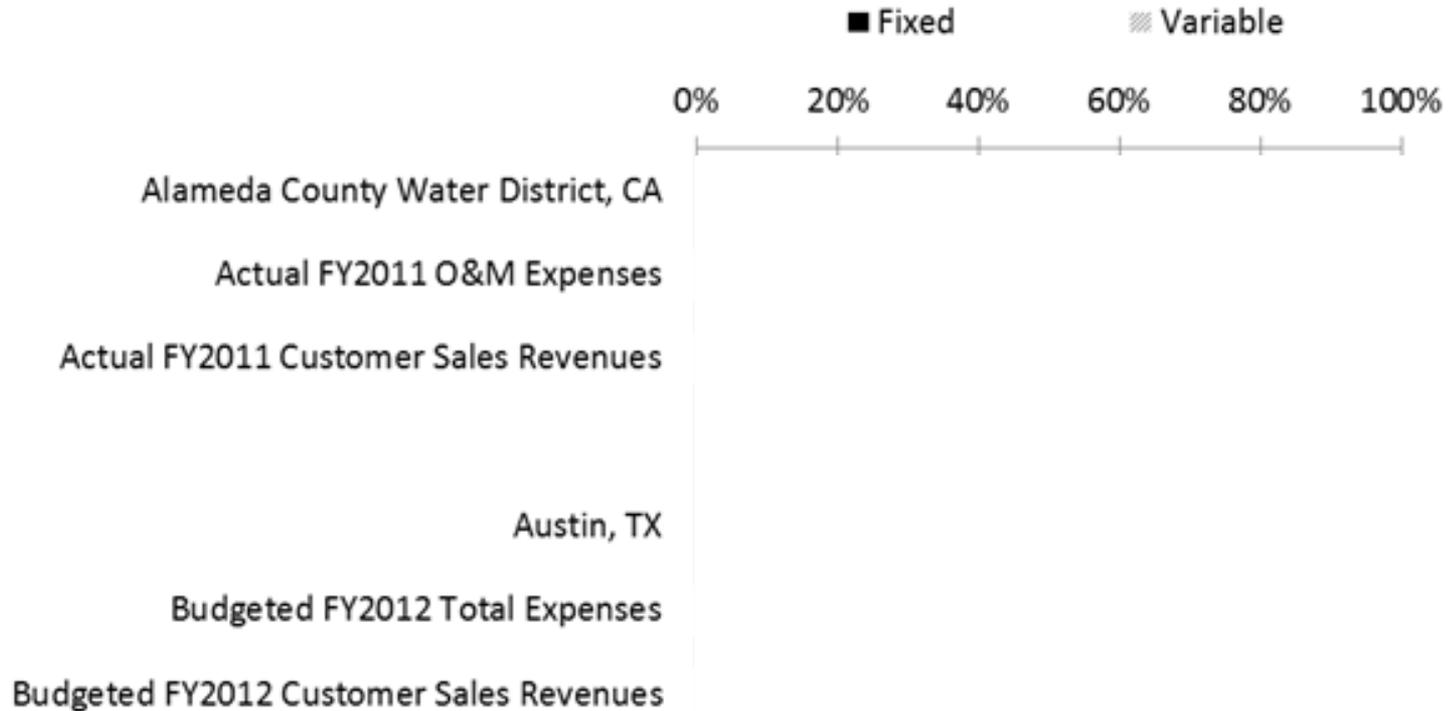
- Applied Research
- Teaching and Outreach
- Program Design and Direct Assistance
- Tool Development



How you pay for it matters



Fixed vs. 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.

Water Utility Revenue Risk Assessment Tool

- Excel tool (simplified)
- Focus on residential revenues
- Utility inputs own:
 - Rate structure details (can compare 2)
 - 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

How Much Revenue Might Be Lost When Residential Customers Reduce Consumption?



Version 1.0

Version date: November 15, 2013

Developed by: The Environmental Finance Center at the University of North Carolina, Chapel Hill
Developed for: Water Research Foundation

[Click here to access a video tutorial on using the tool.](#)

This tool allows utilities and technical assistance providers to quickly determine the proportion of residential revenues from water sales that may be at risk of loss when residential customers change demand patterns. When residential customers reduce demand, whether due to price elasticity effects, or normal weather fluctuations that affect their water demands, or in reaction to shocks (such as new water conservation programs, water shortage periods, change in economic conditions, etc.), utilities collect less revenue from customer sales than anticipated. Utilities often ask how much of their revenues are really and realistically at risk of loss if their customers lower their consumption. This tool allows utilities and their technical assistance providers to quickly determine these estimates based on the utility's own rate structure, customer demand profile and weather conditions.

The tool requires only minimal data input and uses simplifying assumptions as well as detailed models developed after analyzing hundreds of thousands of real customer water records to understand how water customers change demand patterns.

This simplified tool is focused solely on revenue projections and assessment. Costs and revenue requirements based on customer classifications are not incorporated into this model. The tool allows the user to compare two different residential rate structures and determine which rate structure offers greater revenue resiliency.

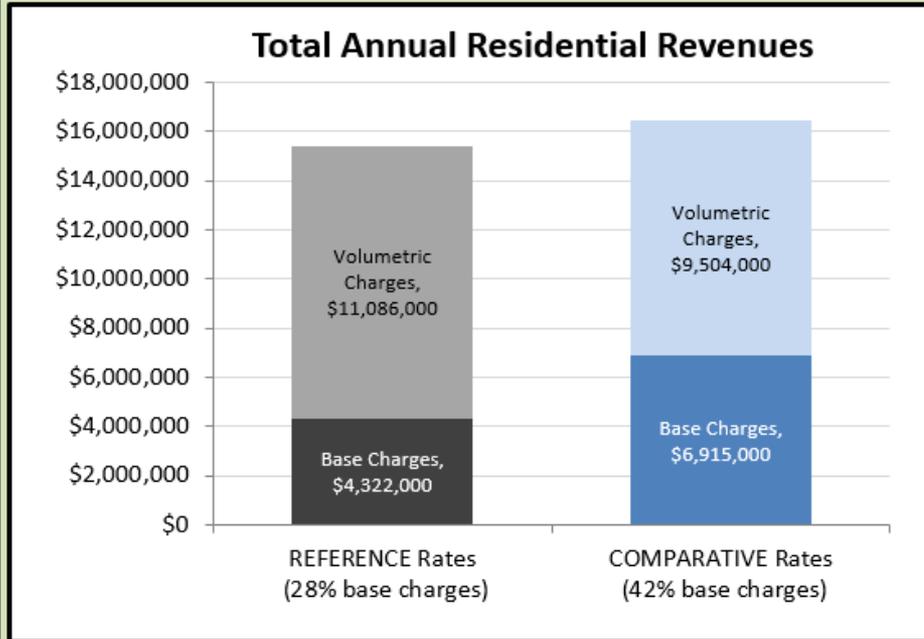
Free to download and use at

www.waterrf.org

www.efc.sog.unc.edu

Comparing Revenues from Reference and Comparative Rates

How do the total revenues compare under both rate structures?

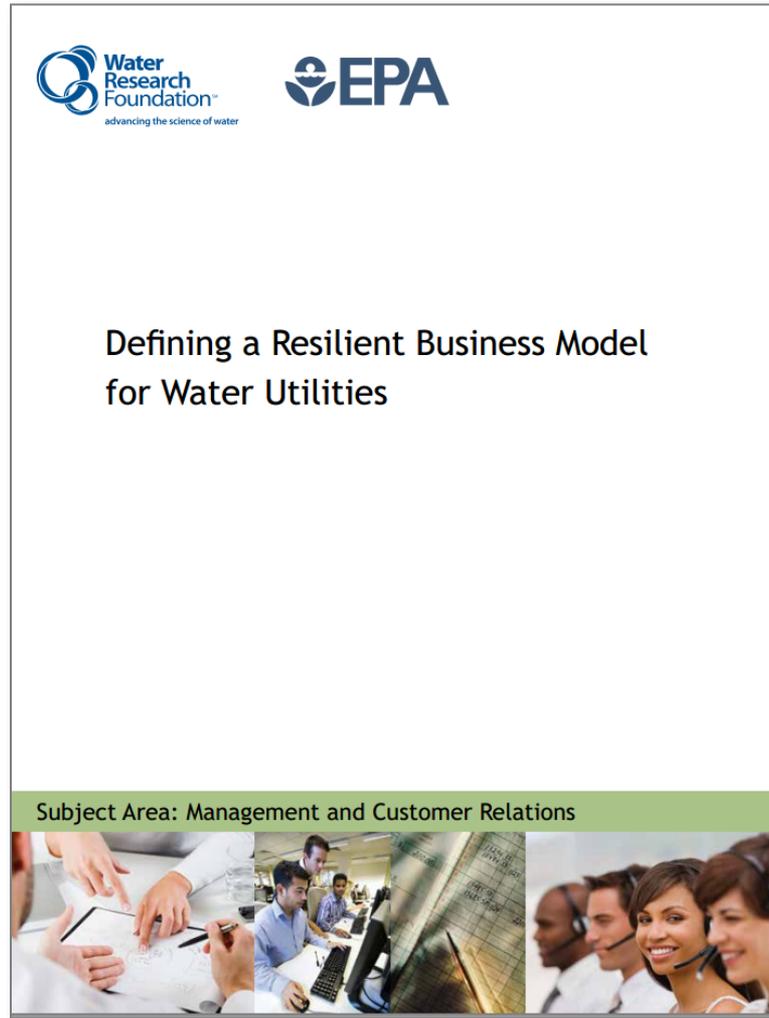


	REFERENCE Rates	COMPARATIVE Rates	Change
Total Annual Revenues	\$15,408,000	\$16,419,000	\$1,011,000
From Base Charges	\$4,322,000	\$6,915,000	\$2,593,000
From Volumetric Charges	\$11,086,000	\$9,504,000	-\$1,582,000

The comparative rate structure is projected to generate \$1,011,000 (6.6%) GREATER revenues than the reference rate structure. This assumes that no change in demand occurs besides residential customers reacting to the rate changes through price elasticity. Thus, no conservation, significant demand fluctuations or weather-related demand changes are modeled in this scenario.

MORE of the revenues would come out of the base charges in the comparative rate structure, increasing revenue resiliency against demand fluctuations.

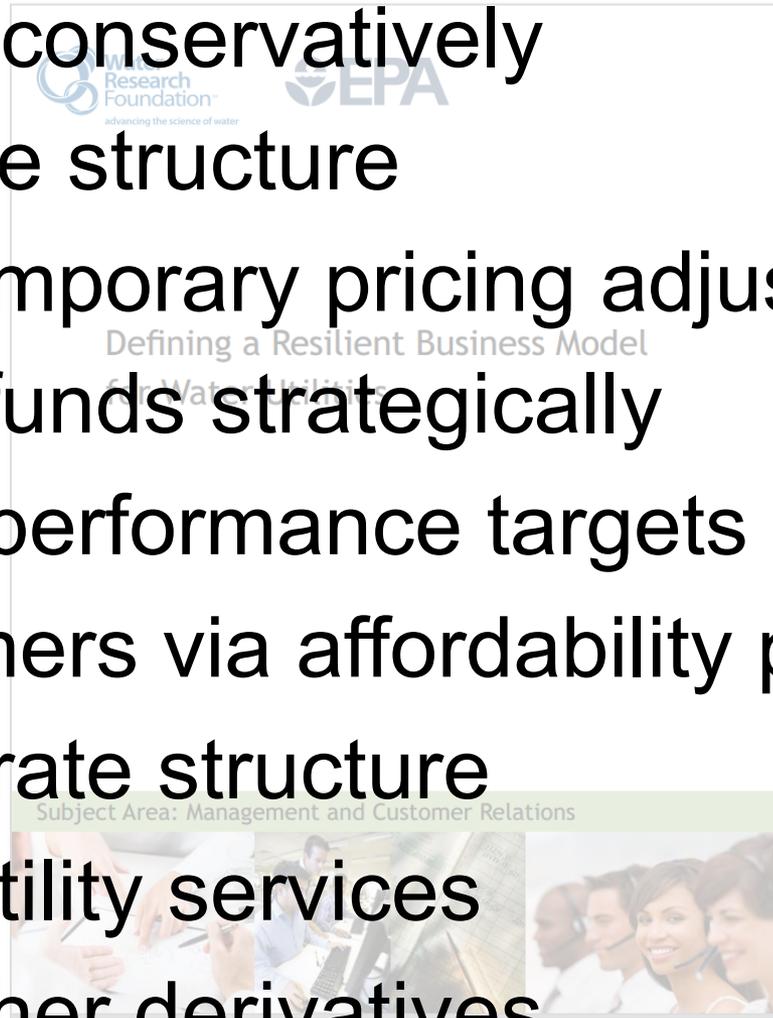
Strategies for Addressing Revenue Vulnerability



Source: Water Research Foundation study conducted by the EFC (2014). *Defining a Resilient Business Model for Water Utilities*. Download the report at <http://www.waterrf.org/Pages/Projects.aspx?PID=4366> or <https://efc.sog.unc.edu/project/defining-resilient-business-model-water-utilities>

Strategies for Addressing Revenue Vulnerability

- Project more conservatively
- Adjust the rate structure
- Implement temporary pricing adjustments
- Use reserve funds strategically
- Set financial performance targets
- Assist customers via affordability programs
- Innovate the rate structure
- Rethink the utility services
- Explore weather derivatives



Source: Water Research Foundation study conducted by the EFC (2014). *Defining a Resilient Business Model for Water Utilities*. Download the report at <http://www.waterrf.org/Pages/Projects.aspx?PID=4366> or <https://efc.sog.unc.edu/project/defining-resilient-business-model-water-utilities>

Alternative Rate Models for Water Utilities

Concept: **individualize the base charges** to each customer, generate **more revenue from base charges**, but structure it to **incentivize efficiency**

1. PeakSet Base Model
2. Customer*Select* Model
3. Dividend Models



<https://efc.sog.unc.edu/project/alternative-water-pricing-models>

PeakSet Base Model

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

Residential Customer with Low Seasonal Water Use



Residential Customer with High Seasonal Water Use



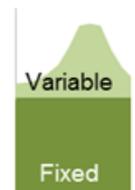
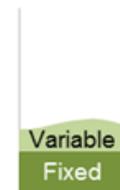
Monthly Water Use



Monthly water bills under a typical uniform rate structure



Monthly water bills under a PeakSet Base rate structure

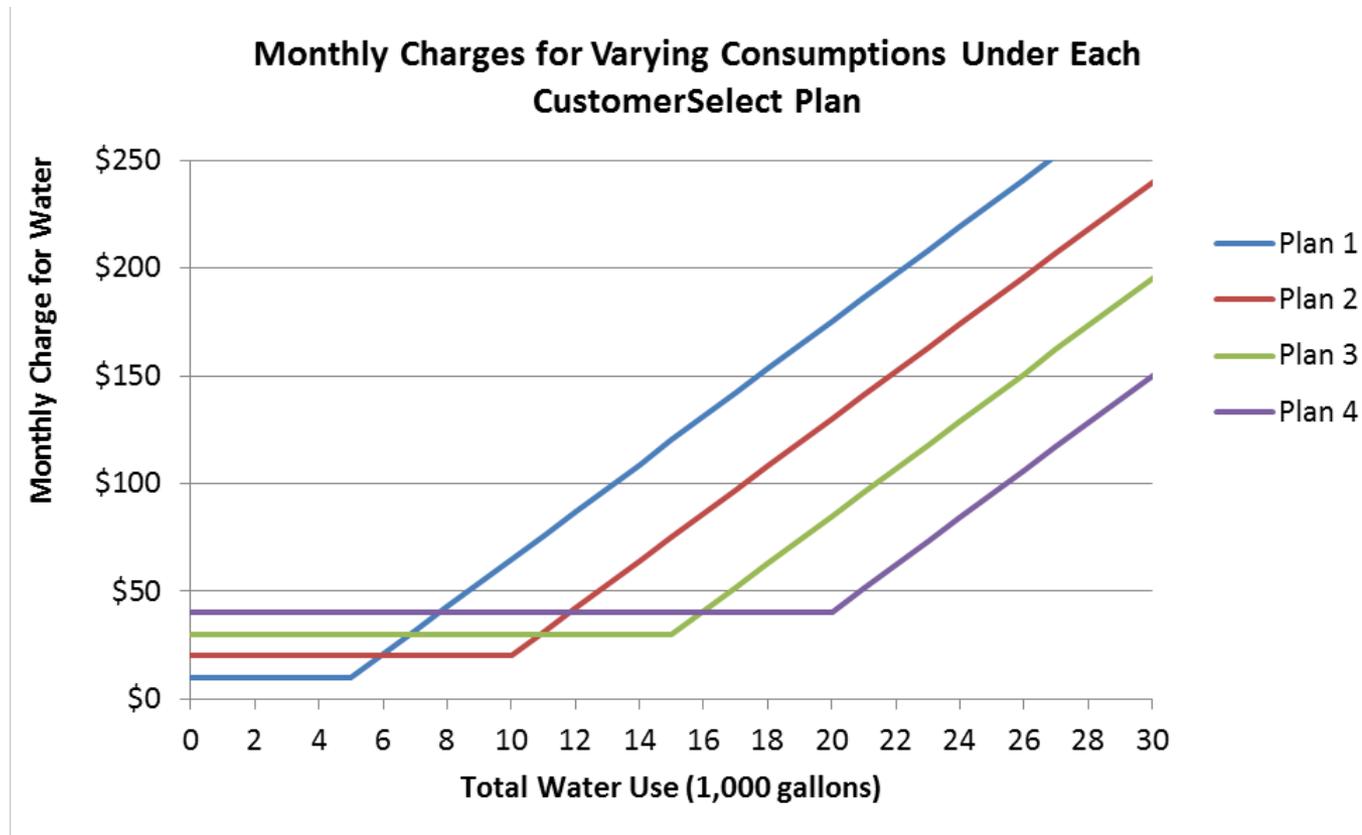


Fixed charge = customer's historic peak volume (X) times a PeakSet Base rate

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

CustomerSelect 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

Calculating the Dividend

Simple Dividend:

- Equally among customers (per month/service)

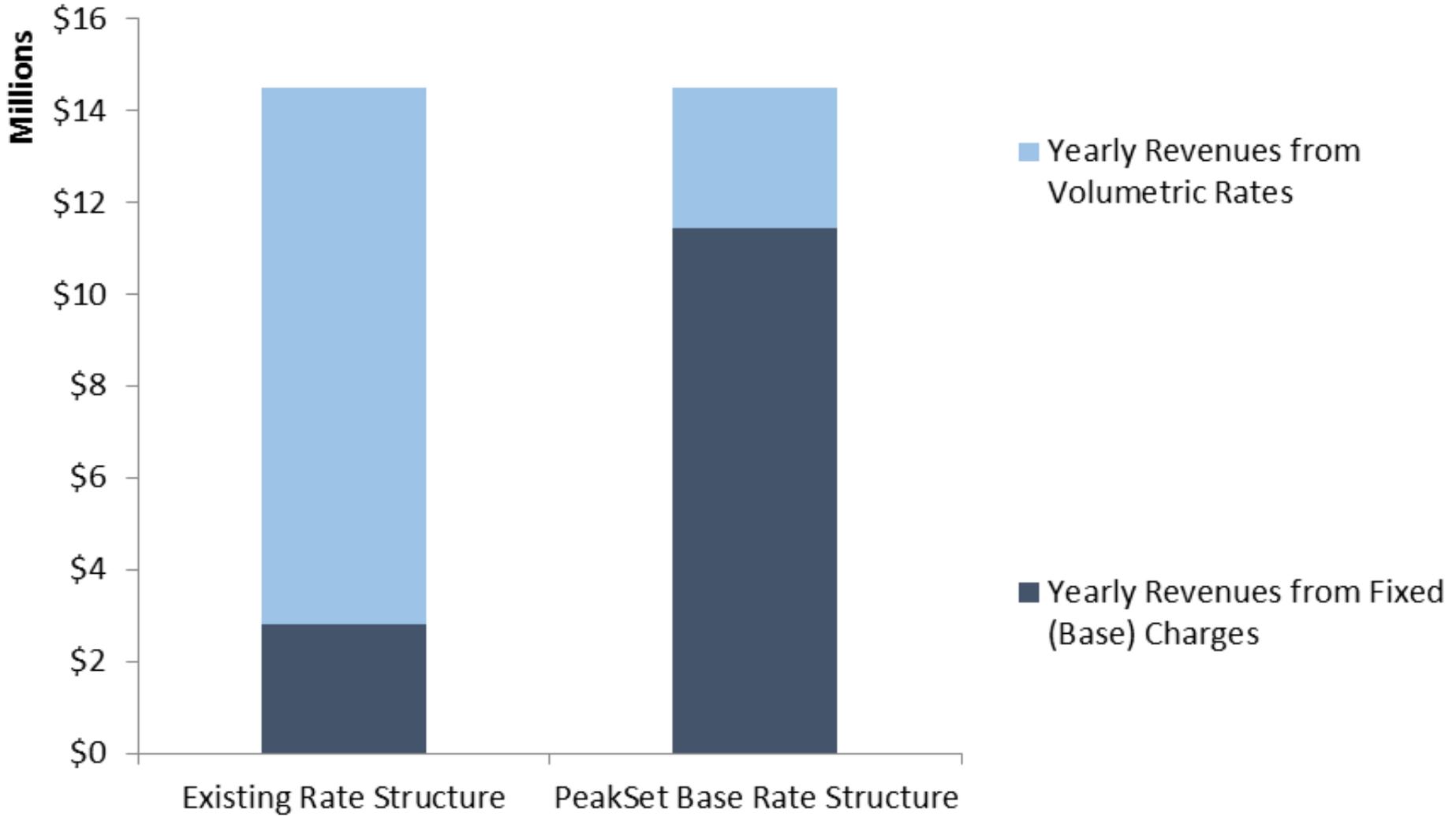


or

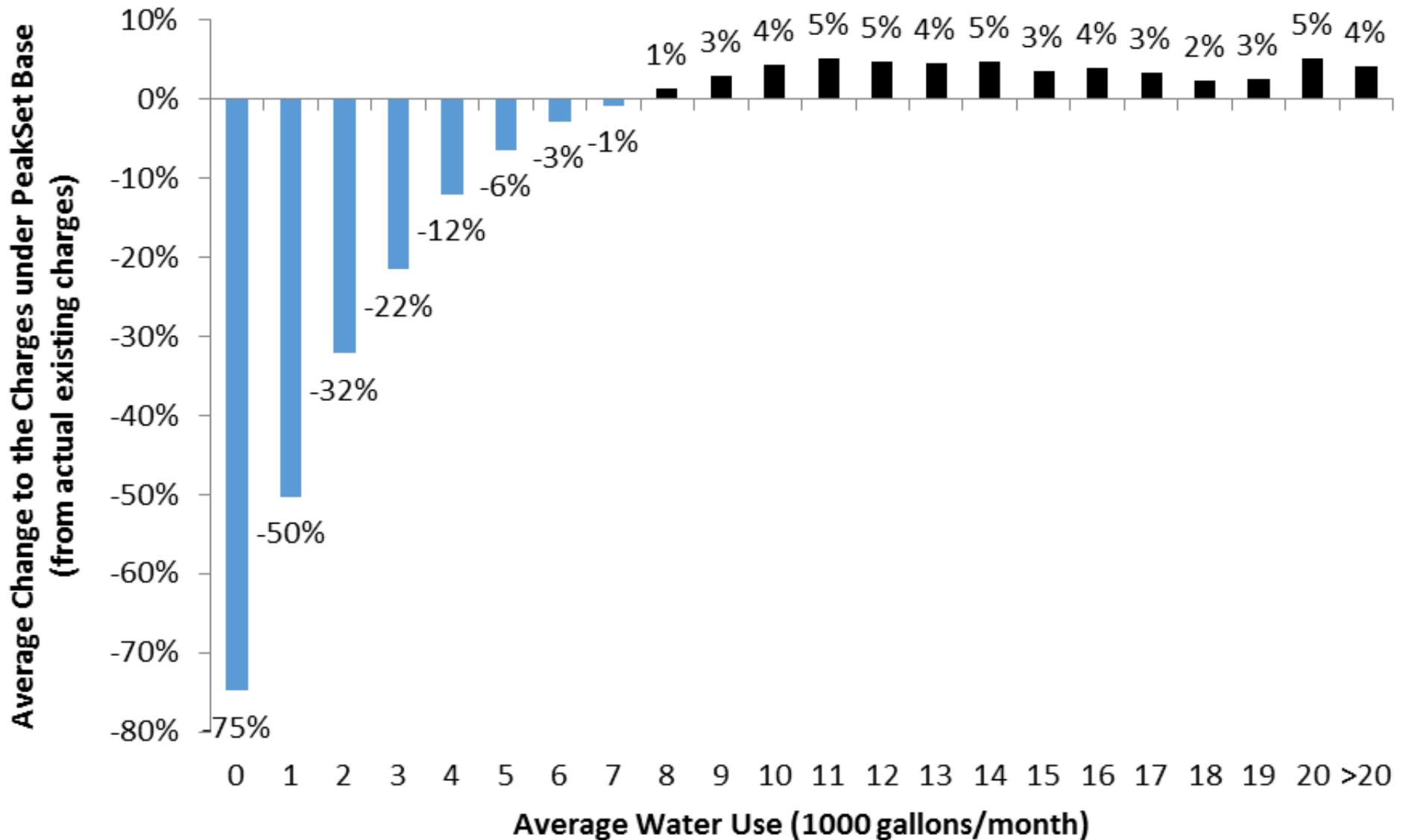
Return more to WaterWise customers:

- Proportional to reduction in demand from last year
- Customers who meet a water budget target

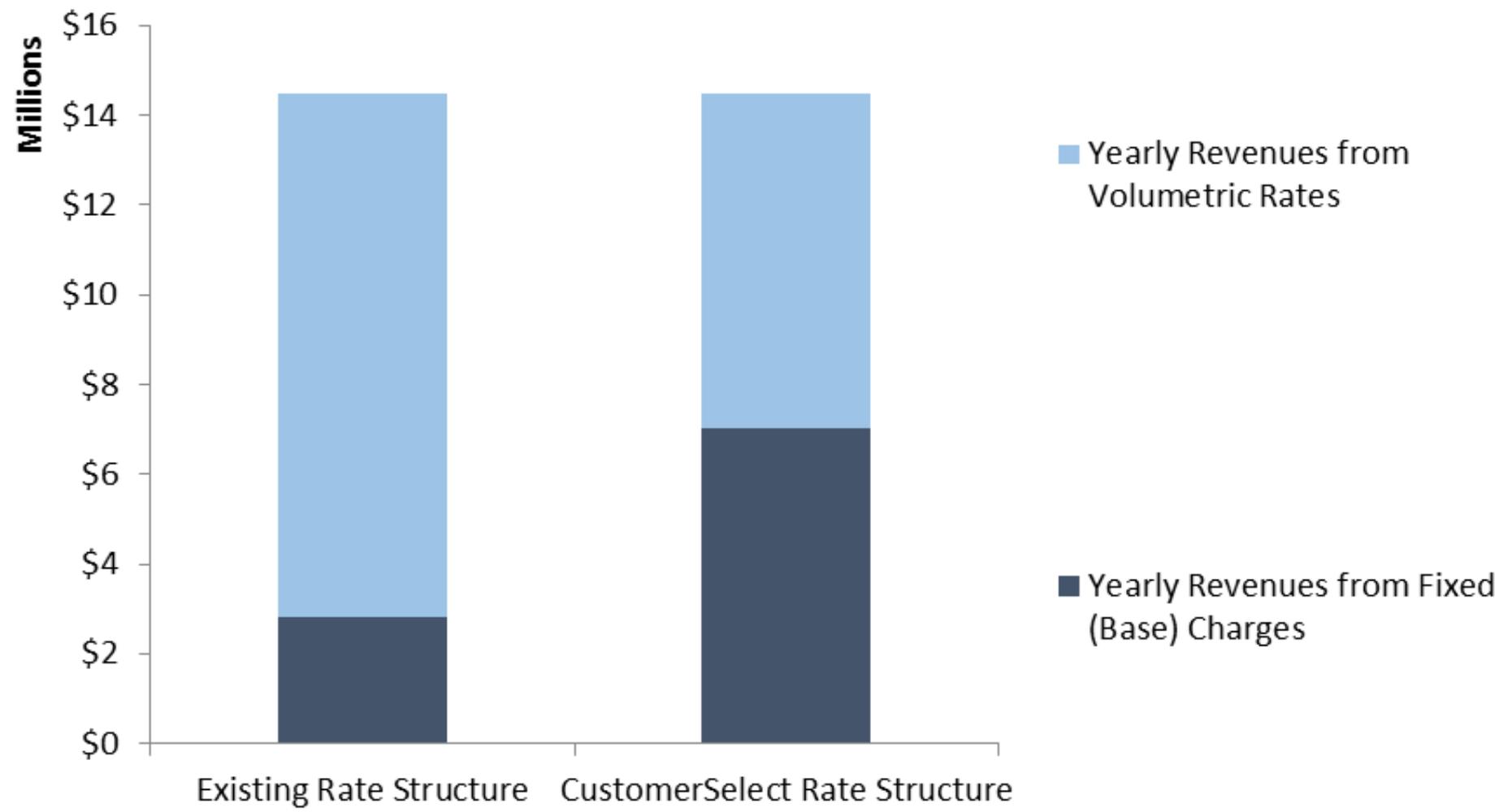
In this revenue-neutral scenario, the PeakSet Base rate structure would generate much greater fixed charges than the existing rate structure



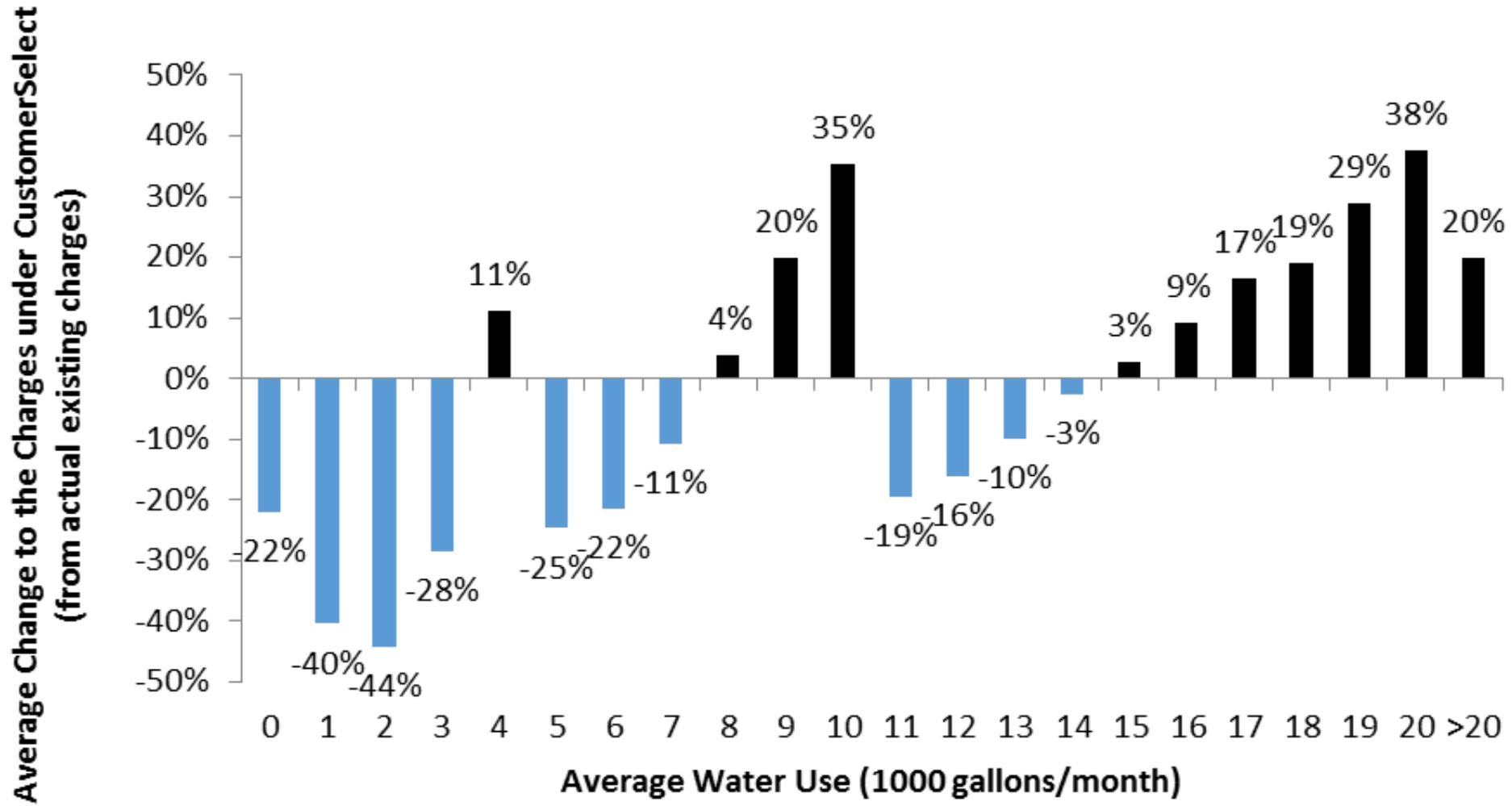
Low water use customers would pay much less under PeakSet Base than under the current rate structure



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



The CustomerSelect rate structure increases the charges for customers that average near the plans' allowances because of occasional exceedances of the plans' allowances



Individualizing base charges based on the customer's demands:

1. Increases revenue stability
2. Lowers charges to low-use or low-peaking customers
3. Increases charges for high-peakers
4. Treats each individual customer as its own class in allocating revenue requirements (including capacity costs)

Various Decision-Making Tools

<http://www.efc.sog.unc.edu/project/utility-financial-tools>

or <http://efcnetwork.org/resources/tools/>



The EFC has created several free tools to assist water utilities in addressing the challenges and questions we commonly see in our teaching and advising. These tools cover a broad range of finance and management topics, including rates and revenue, financial benchmarking, affordability, capital finance, communicating with the board, and evaluating loans and grants.

Rates and Revenue



Water and Wastewater Rates Analysis Model

Use this tool to review your rates to ensure projected revenues cover projected expenses. This tool will help you determine whether proposed rates will keep the utility financially self-sufficient for the next few years.



Water Utility Revenue Risk Assessment Tool

Use this tool to assess how much revenues might be affected by changing demand patterns. The tool will help you compare effects on existing rates and on alternative rate structures.

Benchmarking



Financial Sustainability and Rates Dashboards

Our flagship tools for water utilities, these interactive dashboards allow you to benchmark your utility's rates against other utilities with similar characteristics. The dashboards also help you evaluate rates, cost recovery, affordability, pricing signal, and other financial benchmarks. Use the dashboards to communicate important information about your rates with your board, the media, and the public.

Shadi Eskaf
Senior Project Director
Eskaf@sog.unc.edu
919-962-2785

Environmental Finance Center at the University of North Carolina
School of Government, Knapp-Sanders Building
CB #3330
Chapel Hill, NC 27599-3330
USA