Water Conservation: Strategies, Pricing, Revenues

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UNC ENVIRONMENTAL FINANCE CENTER

What does “water conservation” mean to you?

Does your utility encourage it? How?

Outline

- System-wide conservation by reducing “water loss”
- Strategies to promote customer conservation
- Protecting revenues when customers conserve

System-wide “water loss”

Fact

USGS estimated that only **60%**

of the total water withdrawals by Montana's public water systems (for domestic purposes) was eventually delivered to the customers in 2010.

Source: U.S. Geological Survey's National Water Use Information Program (NWUIP), available at http://water.usgs.gov/watuse/. In 2010, 138 MGD was withdrawn but only 83.2 MGD was delivered for domestic public supply use.

Water Produced − **Water Sold** = **“Water Loss”**

New term:
“Non-Revenue Water”

Non-Revenue Water

- Lost Water (e.g. Leaks)
- Water Use by Water Utility for flushing or other purposes
- Illegal Use
- "Free" Water Use for City, Town, Muni Purposes
- Inaccurate Meters
- Poor Data Handling

If we don't understand the nature of the problem, we will apply the wrong solution.

How can a water system assess the quantity and nature of its water loss problem?

Use AWWA's Water Audit Tool

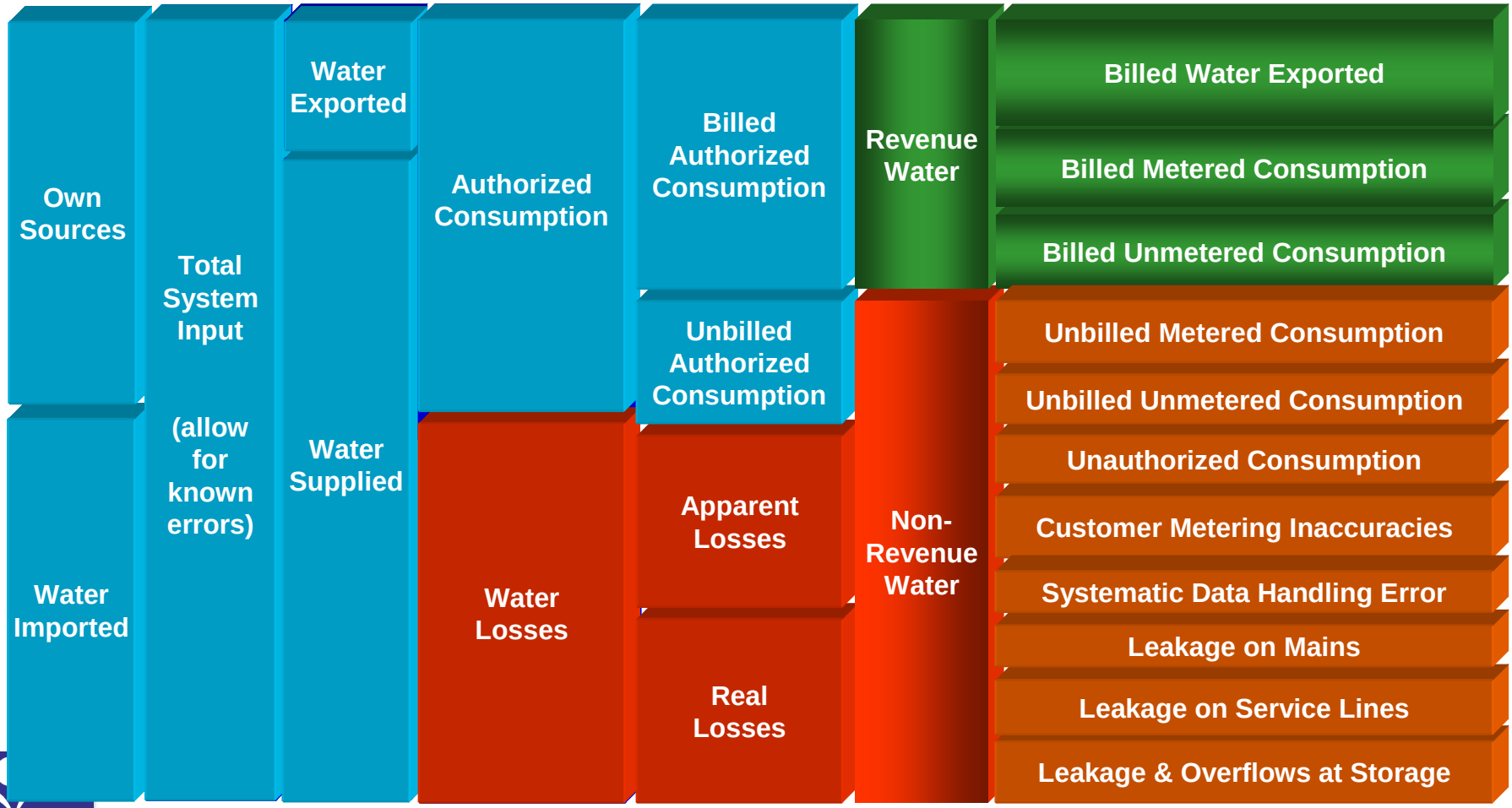
AWWA Free Water Audit Software v5.0

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions The current sheet. Enter contact information and basic audit details (year, units etc)	***Reporting Worksheet*** Enter the required data on this worksheet to calculate the water balance and data grading	***Comments*** Enter comments to explain how values were calculated or to document data sources	***Performance Indicators*** Review the performance indicators to evaluate the results of the audit	***Water Balance*** The values entered in the Reporting Worksheet are used to populate the Water Balance	***Dashboard*** A graphical summary of the water balance and Non-Revenue Water components
Grading Matrix Presents the possible grading options for each input component of the audit	***Service Connection Diagram*** Diagrams depicting possible customer service connection line configurations	***Definitions*** Use this sheet to understand the terms used in the audit process	***Loss Control Planning*** Use this sheet to interpret the results of the audit validity score and performance indicators	***Example Audits*** Reporting Worksheet and Performance Indicators examples are shown for two validated audits	***Acknowledgements*** Acknowledgements for the AWWA Free Water Audit Software v5.0

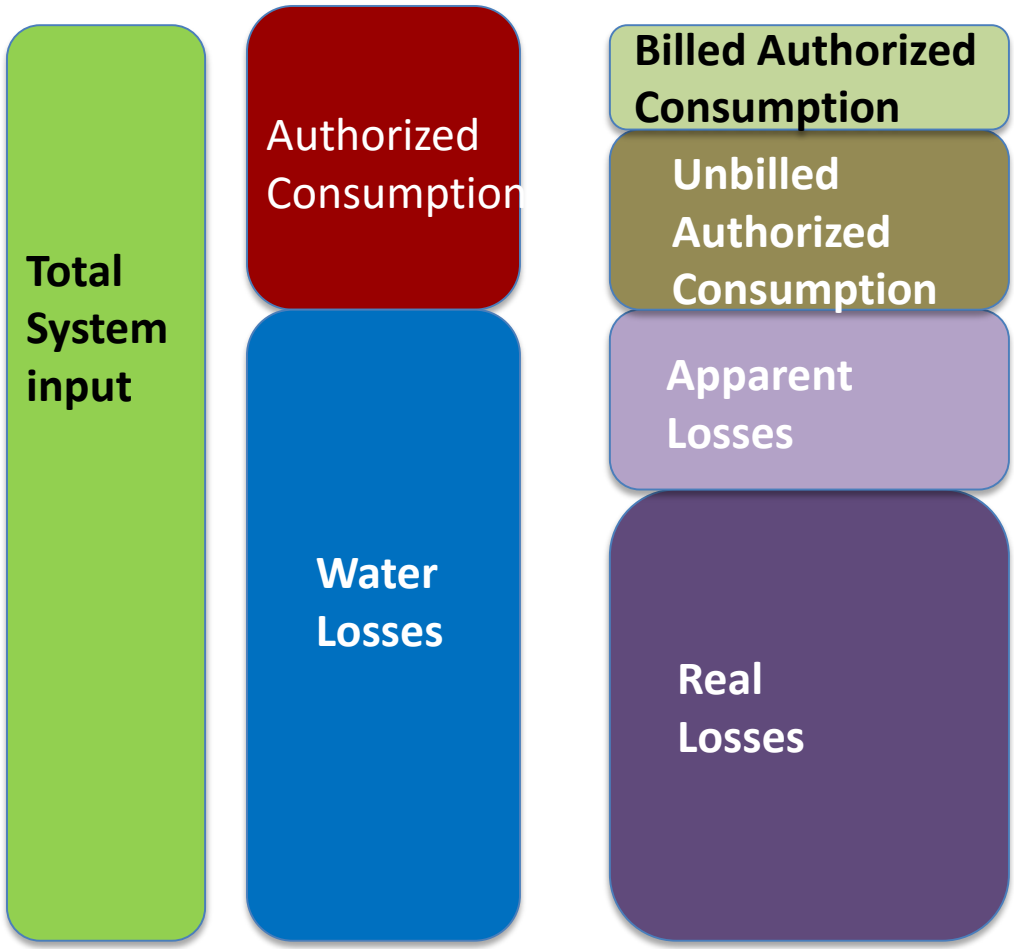
If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

The Water Audit or Water Balance: The Big Picture



After you fill it out, you will find that the magnitude of the Water Balance components can have a big impact on how you proceed

What is this system's biggest problem?



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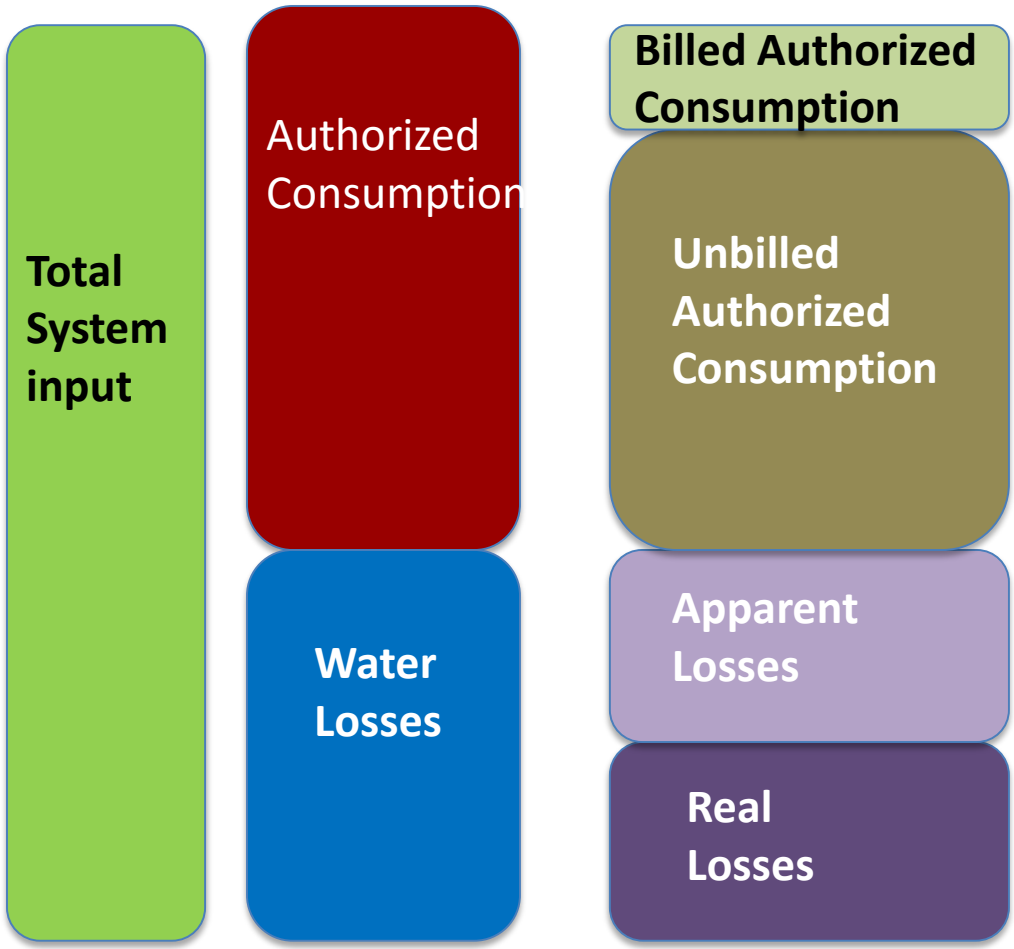

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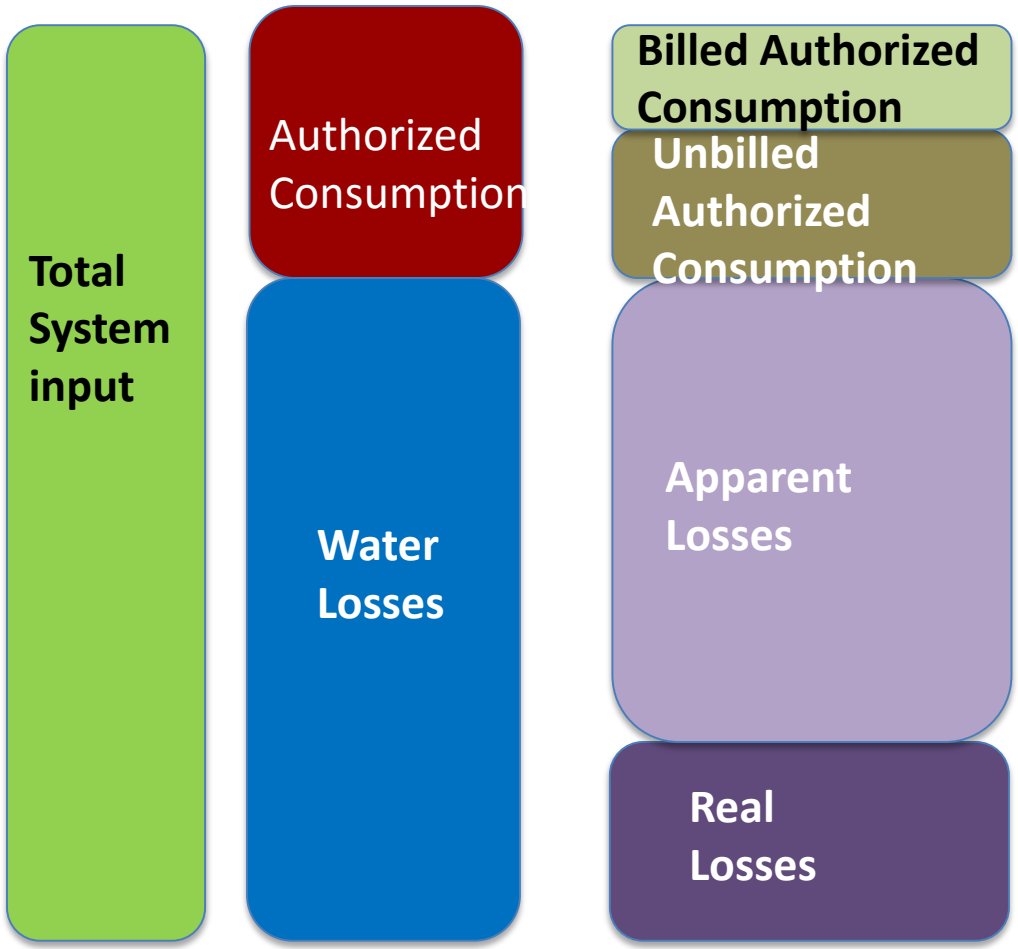
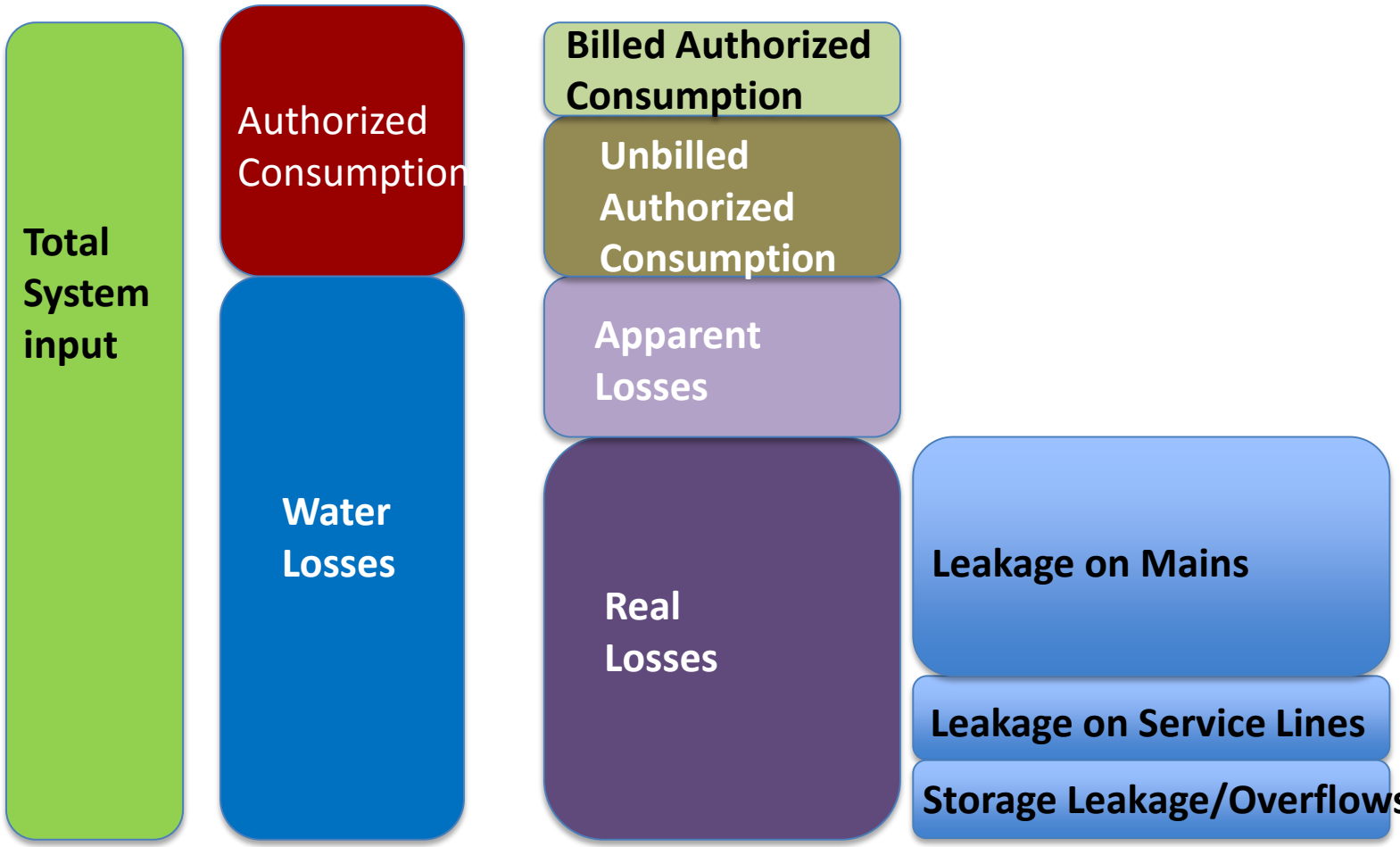


What should you address?



What should you address?

Total System input

Authorized Consumption

Billed Authorized Consumption

Unbilled Authorized Consumption

Water Losses

Apparent Losses

Real Losses

Leakage on Mains

Leakage on Service Lines

Storage Leakage/Overflows

Tips for completing the Water Audit

- Start with what you know and can readily obtain
  - Compare water leaving the treatment facility with what you bill
  - Estimate consumption that you authorize but don't bill for and sources of apparent loss
  - Leakage = Revenue Sales Volume - Apparent loss volumes - Authorized Unbilled Water volume
- Look at data that is missing, poor or questionable quality
  - Work to improve weak or missing data
  - Verify critical data (like master meters)
  - Worry about the big stuff

Promoting customer conservation

A few common strategies

Non-Pricing

- More efficient appliances/ fixtures exchanges or rebate programs
- Restrictions
- Public education

Pricing

- Specific rate structures designs
- High rates for discretionary use
- Drought surcharges

Where can you learn about conservation programs?

- Alliance for Water Efficiency's resource library
- AWWA's Water Conservation Resource Community
- EPA's Water Conservation Plan Guidelines (WaterSense)
- California Urban Water Conservation Council Best Management Practices
- Guidebooks and manuals, like Amy Vickers' "Handbook of Water Use and Conservation"
- From other utilities

WaterSense technologies

Fixture	Maximum Water Use Allowed (effective January 1994)	Water Sense
Toilets (water closets)		
Gravity-tank	1.6 gallons per flush (gpf)	1.28 gpf
Gravity-tank, white, two-piece, labeled "Commercial Use Only"	3.5 gpf	1.28 gpf
Flushometer-tank	1.6 gpf	1.28 gpf
Flushometer-valve (except blowout valve)	1.6 gpf	1.28 gpf
Blowout-valve	3.5 gpf	1.28 gpf
Electromechanical hydraulic	1.6 gpf	1.28 gpf
Urinals		
Any type	1.0 gpf	0.5 gpf
Showerheads		
Any type (except those used for safety reasons)	2.5 gallons per minute (at 80 psi) or 2.2 gpm (at 60 psi)	2.0 gpm (at 20, 45 and 80 psi)
Faucets and Replacement Aerators		
Lavatory faucets	2.5 gallons per minute (at 80 psi) or 2.2 gpm (at 60 psi)	1.5 gpm (at 60 psi)
Lavatory replacement aerators		
Kitchen faucets		
Kitchen replacement aerators		
Metering faucets	0.25 gallons per cycle	

Pricing strategies

Designing Water Rate Structures for Conservation & Revenue Stability

See this guidebook, available at
http://efc.sog.unc.edu

(Look for it under Resources / Publications)

Approaches to Ensure a Pricing Signal is ~~Being Sent~~ Being Received

- Use monthly billing period
- Provide price and use information on customers' bills
- Encourage sub-metering
- Incorporate the costs of water into price setting
- Understand the relative price signal

Evaluation of the Pricing Signal at Various Consumption Points and Targeting Specific Types of Water Use

- Consider the average as well as high levels of consumption when setting rates
- Marginal price consideration
- Increasing block rate structures design
- Can use a higher uniform rate structure or a seasonal rate structure

Evaluation of the Pricing Signal at Various Consumption Points and Targeting Specific Types of Water Use

- Set irrigation rates
- Consider drought surcharges
- Don't use a declining rate structure for residential customers

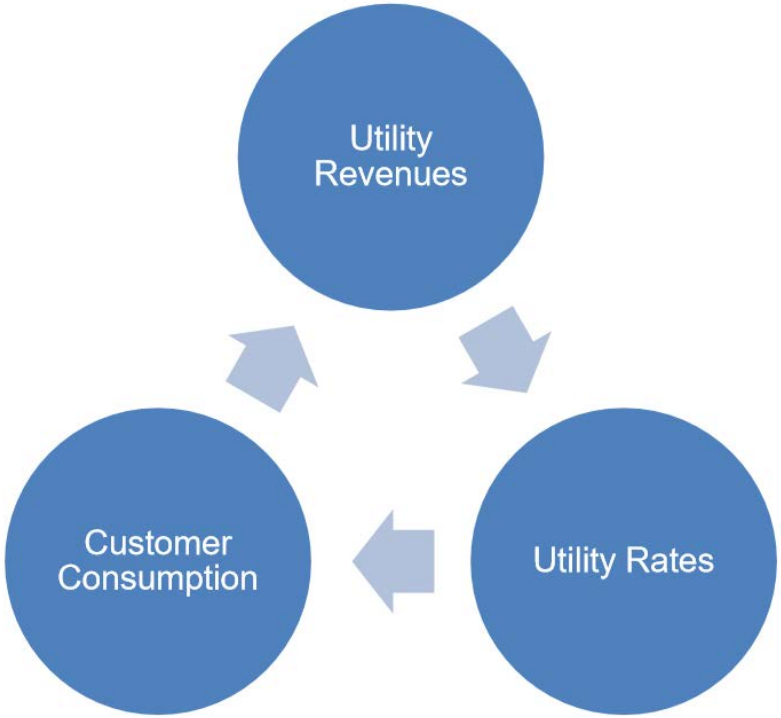
Choosing the right conservation measures for your water system

Matching utility and customer characteristics to conservation measures and programs

Utility Issue	Conservation Measure Example
Large rental community	Sub-metering
Affordability concerns/Customer service	Residential water audits
Seasonal population	Seasonal rates
High summer peak	Reuse program, irrigation policies

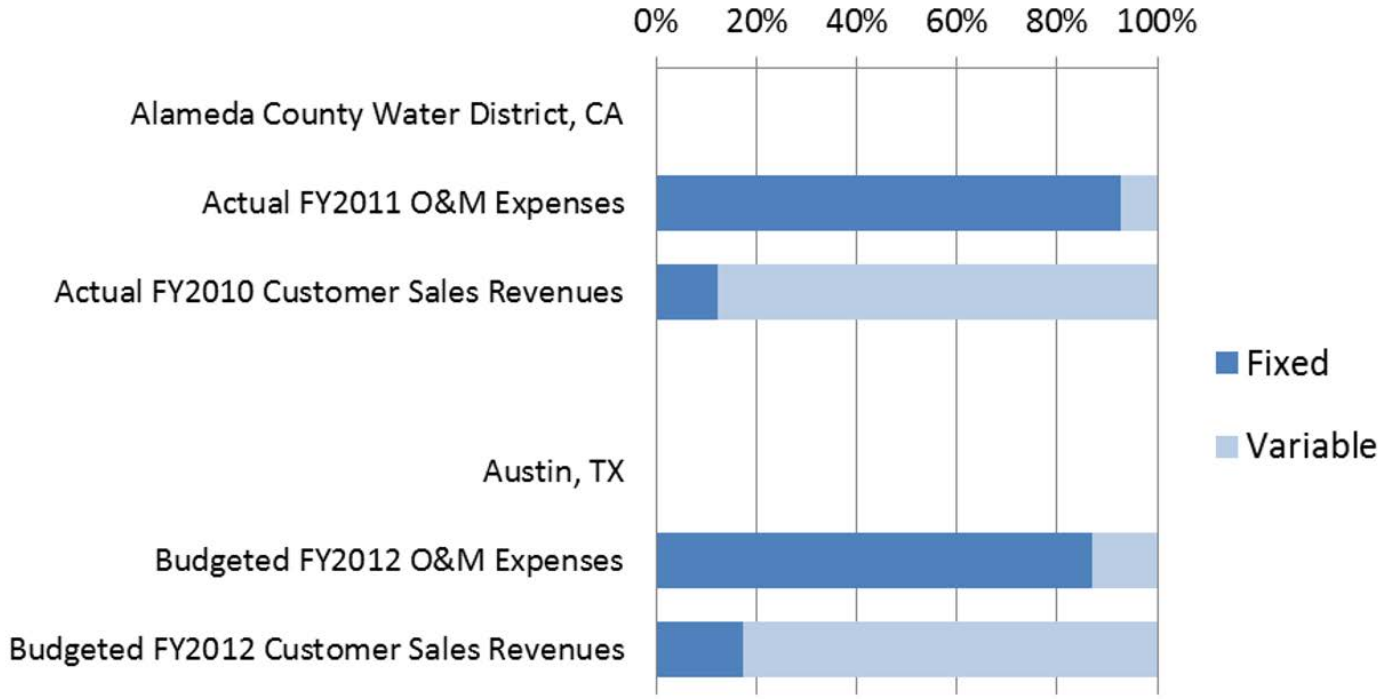
Protecting revenues

Utility Business Model



Source: Fayetteville Observer 2/6/04

Fixed versus Variable O&M Expenses and Customer Sales Revenues



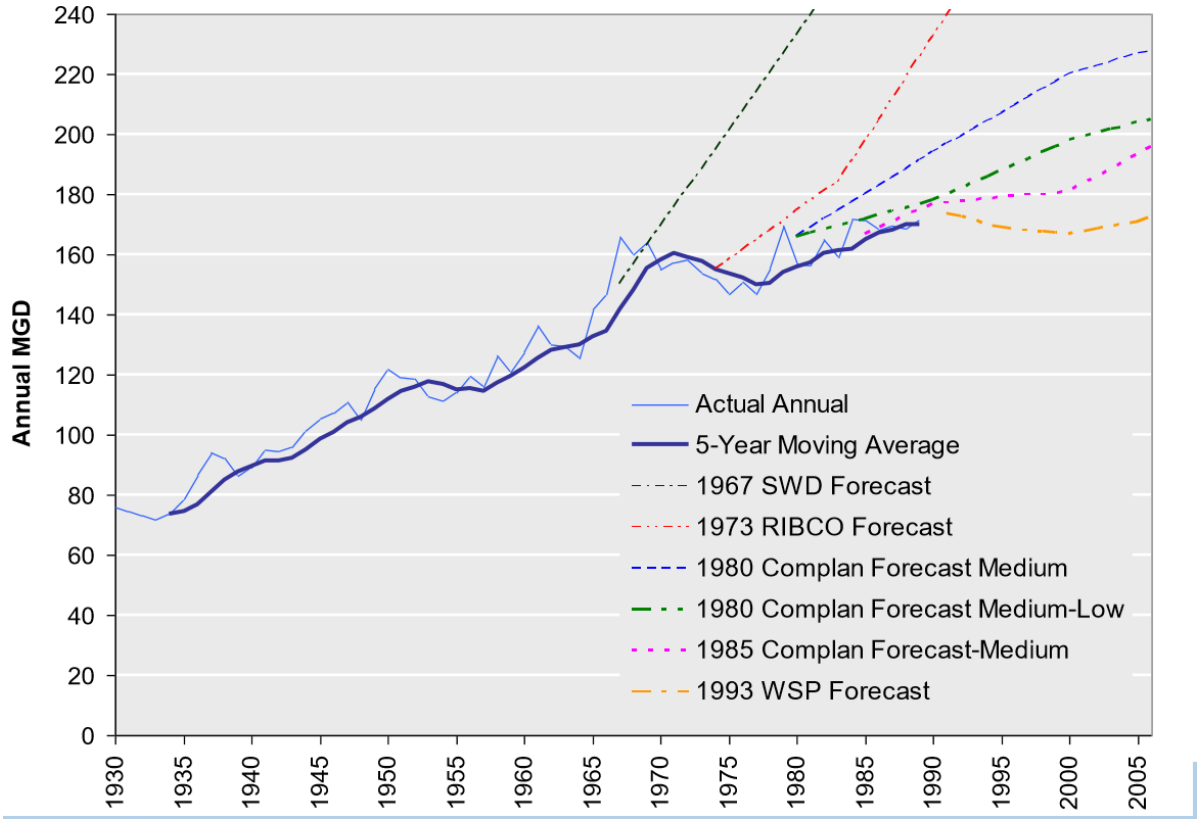
Data analyzed by the Environmental Finance Center at the University of North Carolina, Chapel Hill and Raftelis Financial Consultants, Inc. Data Sources: Alameda County Water District's Financial Plan model and Austin Water's FY2012 budget estimations in the Reference Material to the Joint Subcommittee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

Practices for Revenue Stability

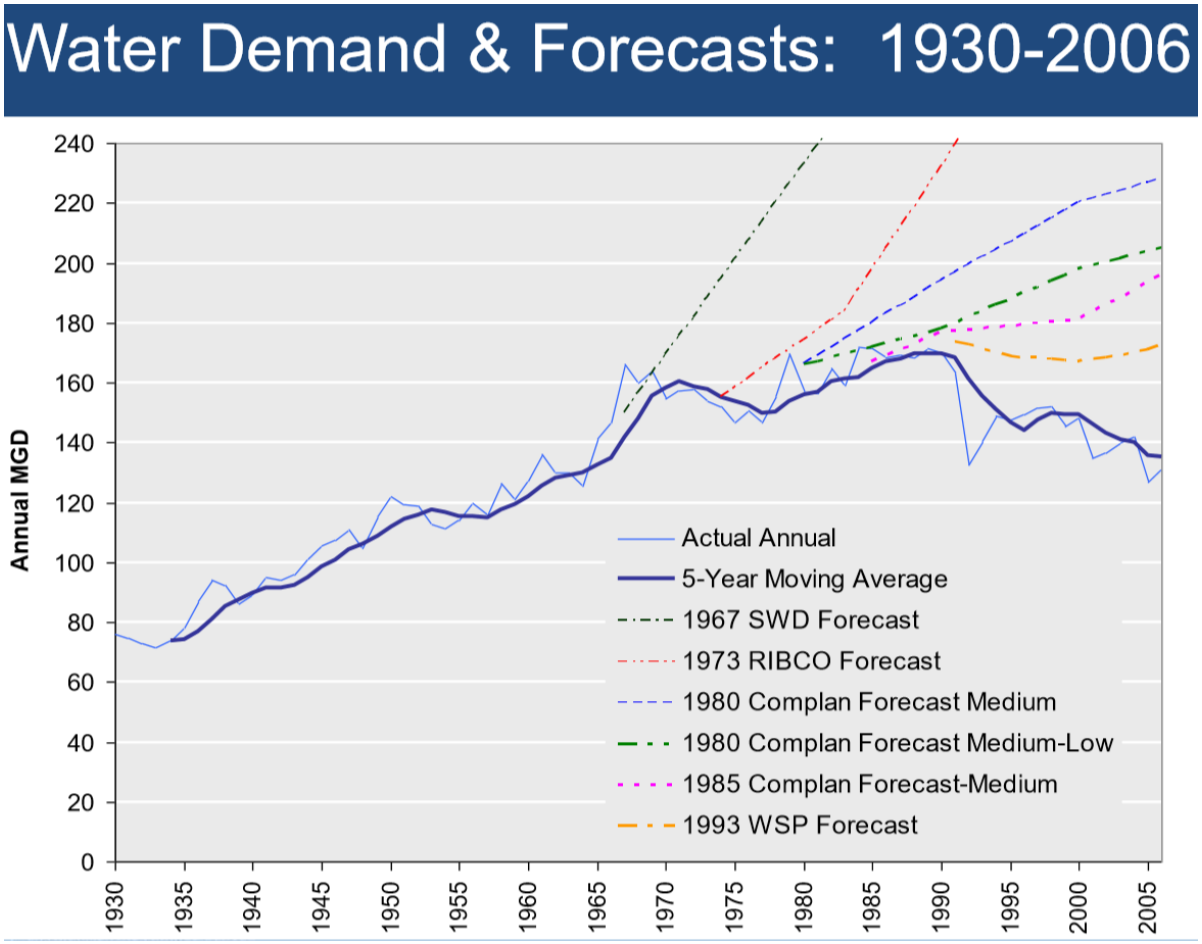
- Review rates each year
- Improve accuracy of demand projections
- Remember that revenue from high consumption is more vulnerable
- Consider drought surcharges
- Rate stabilization fund
- Consider a fixed charge based on consumption

Seattle's demand forecasts

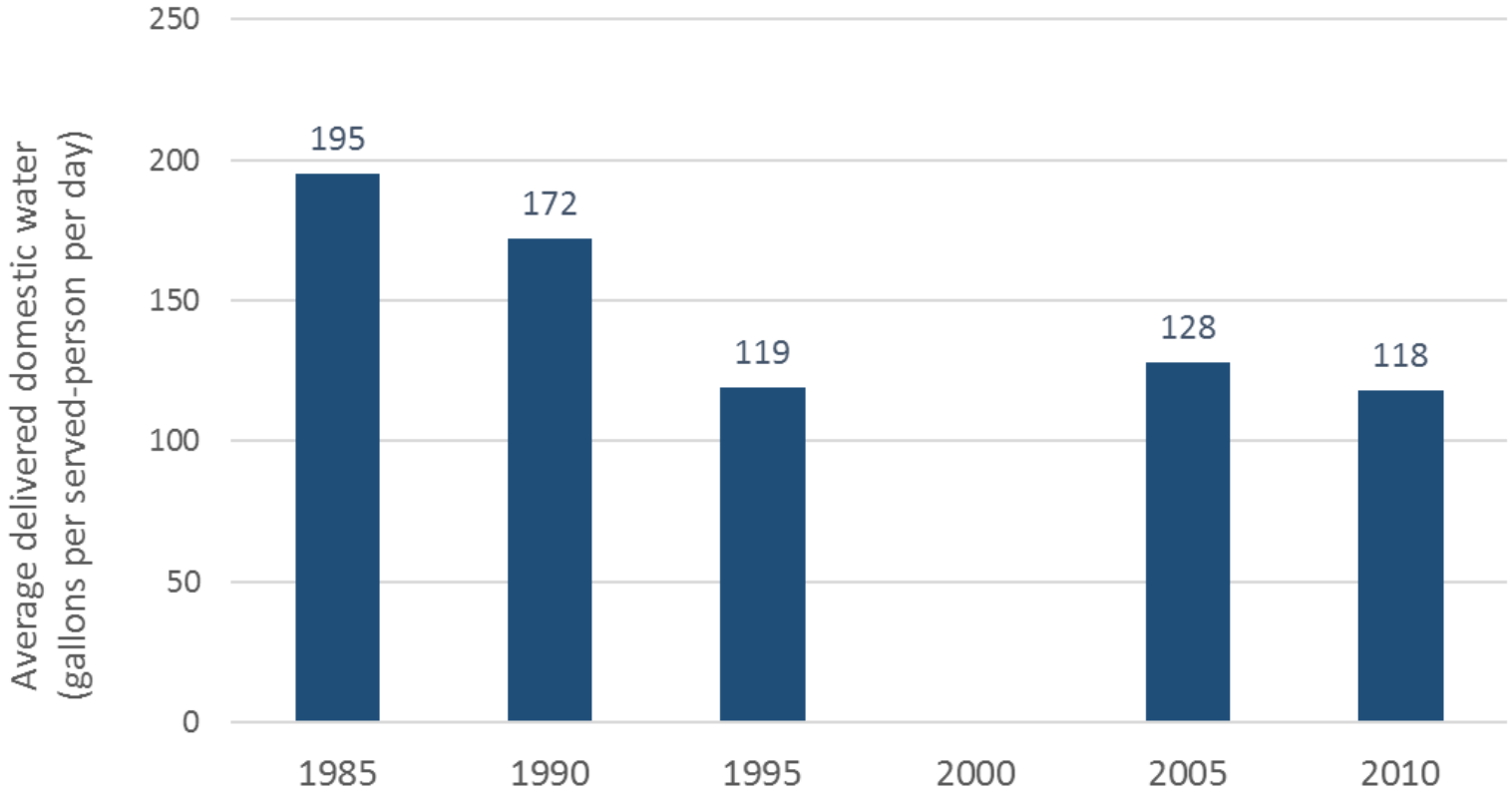
Water Demand & Forecasts: 1930-1990



Seattle's demand forecasts



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/

Smart Management for Small Water Systems

*under a Cooperative Agreement with the US EPA

- The EFCN will provide **training** and **free direct assistance** to small public water systems (<10,000 people) in all fifty states and five territories to help local water systems achieve and maintain compliance with the Safe Drinking Water Act.
- Trainings and direct assistance available on:
  - Asset Management/Capital Planning
  - Financial Planning and Rate Setting
  - Water Loss Reduction
  - Water System Collaboration
  - Energy Management
  - Funding Coordination/Availability, and
  - Managerial and Financial Leadership

We Can Help

Direct assistance available from Environmental Finance Centers, *free*!

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

Thank you! Please fill out the evaluation form.

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