# Financing Sustainable Water

FINANCING SUSTAINABLE WATER
Rates. Revenue. Resources.

Alliance for Water Efficiency

# Agenda

**8:45 am –** *Registration and Networking Breakfast*

**9:30 am –** Welcome and Opening Remarks

**9:45 am –** Strategies for Aligning Rates, Revenue and Resources

**10:30 am –** Weather-Related Risk Management Through Hedging

**10:45 am –** *Break*

**11:00 am –** More Effective Rate Modeling in an Uncertain World

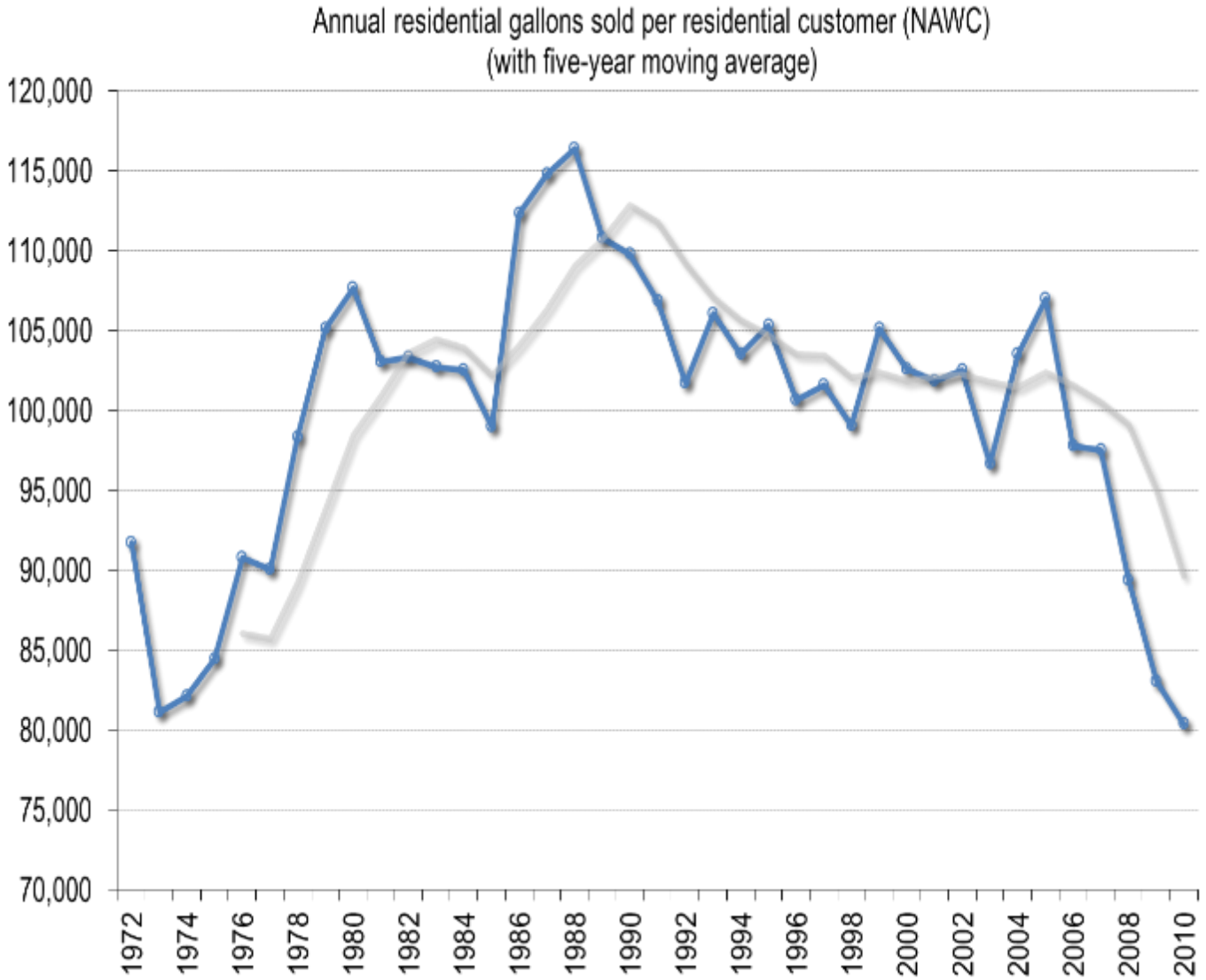
**12:15 pm –** *Lunch and Networking*

**1:00 pm –** Case Study

**1:45 pm –** Live Model Training (Optional)

# Utility Financial Management: Becoming Harder Than Ever?

# Residential Water Sales



# Isn't this a Success Story?

- *Yes, but with side effects*
- Lowered demand means reduced sales revenue
- Reduced sales revenue can mean not fully collecting fixed costs
  - Short-run variable costs (water, pumping energy, chemicals)
  - Long-run capacity costs (supply, transmission, storage, treatment)
- Revenue stability therefore becomes an issue – *and conservation is often blamed*
- Left untreated, long-term unstable revenue collection can affect bond ratings

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U.S. | THE TEXAS TRIBUNE

# *Texans Answer Call to Save Water, Only to Face Higher Rates*

By NEENA SATIJA FEB. 8, 2014

"The losses have prompted credit ratings agencies to look closer at the finances of public utilities in Texas. One agency, Fitch, downgraded some of Fort Worth's water and sewer debt last year, and last week the firm downgraded the debt of the city's wholesale water supplier. Fort Worth lost $11 million last year because of water conservation."

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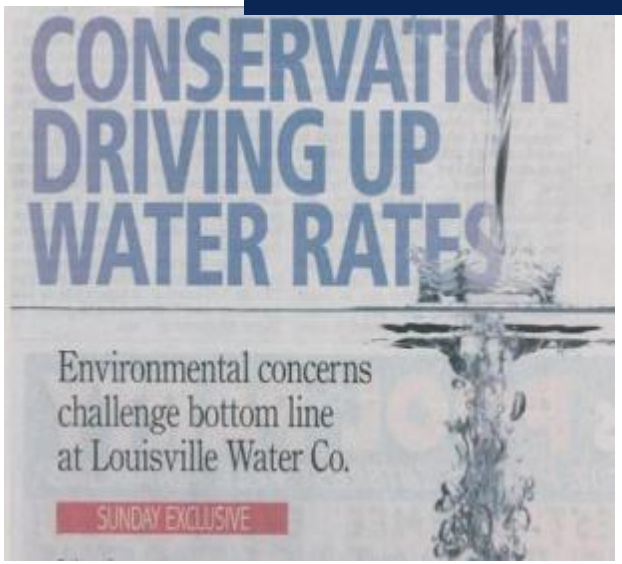
# The Political Reality

- We don't like to revise our rates
- It is politically unpopular, so rates are changed as little as possible
- The inevitable inflationary increase is postponed until it is a crisis, much less increases in other costs
- Conservation is often blamed for financial challenges – even when there are no active conservation programs in place
- This sends the wrong message to consumers

courier-journal.com
A GANNETT COMPANY




THE GLOBE AND MAIL

Reduced water use drains Toronto's funds for infrastructure upgrades

Raleigh Public Record

Raleigh's Water Conundrum: Conservation v. Rates

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# What Really Affects Revenue Stability?

- Reduced demand from:
  - efficient fixture replacement  under the plumbing and appliance codes
  - active conservation programs
  - the recession:  industrial shift layoffs, home foreclosures
- Reduced peak demand in wet years
- Increased infrastructure costs
- Rise in other fixed costs
- Continuing Inflation

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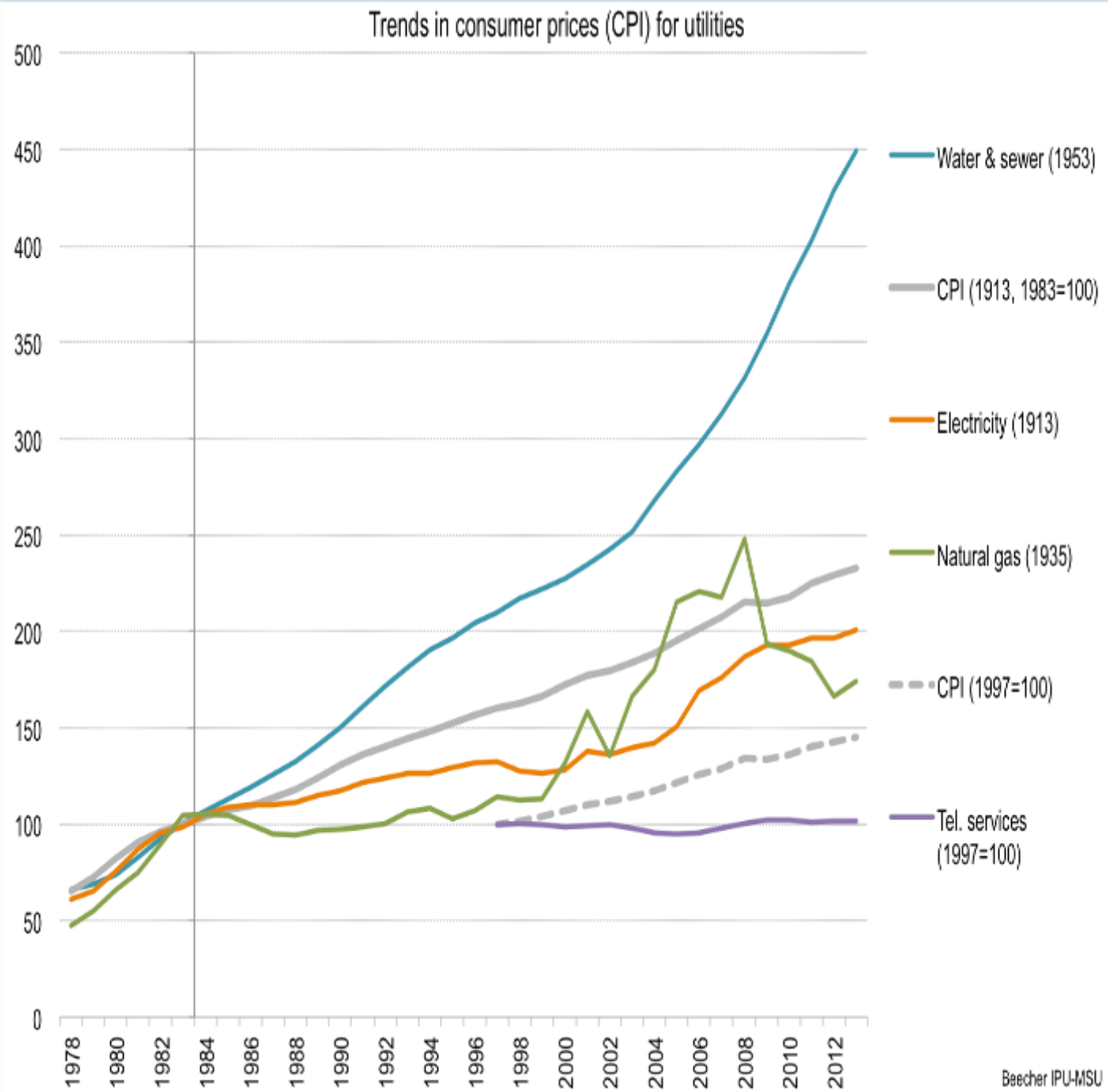
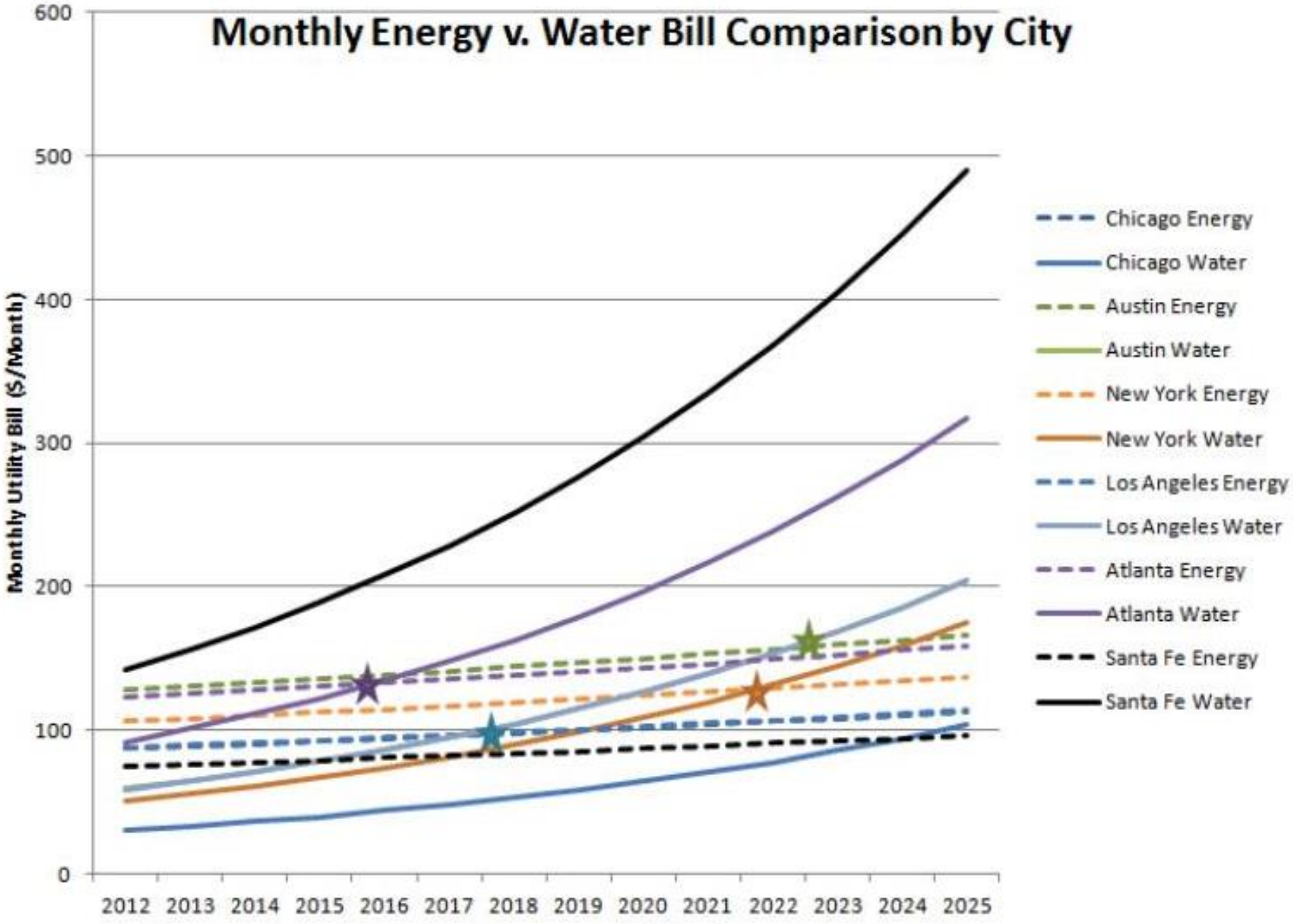

Trends in consumer prices (CPI) for utilities
500
450
400
350
300
250
200
150
100
50
0
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
Water & sewer (1953)
CPI (1913, 1983=100)
Electricity (1913)
Natural gas (1935)
CPI (1997=100)
Tel. services (1997=100)
Beecher IPU-MSU


Monthly Energy v. Water Bill Comparison by City
Monthly Utility Bill ($/Month)
600
500
400
300
200
100
0
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
2025
Chicago Energy
Chicago Water
Austin Energy
Austin Water
New York Energy
New York Water
Los Angeles Energy
Los Angeles Water
Atlanta Energy
Atlanta Water
Santa Fe Energy
Santa Fe Water

# Cost-Effective Efficiency and the Real Impact on Rates

# Conservation is Part of the Solution

- It is a long-term cost reducer to the utility
- Revenue loss is often due to other drivers
- Every gallon saved is water that does not have to be pumped, treated and delivered
- Conservation is an investment and short-term effects must be planned for
- Reduced utility costs generally mean reduced customer rates in the long-term due to avoided infrastructure capacity increases

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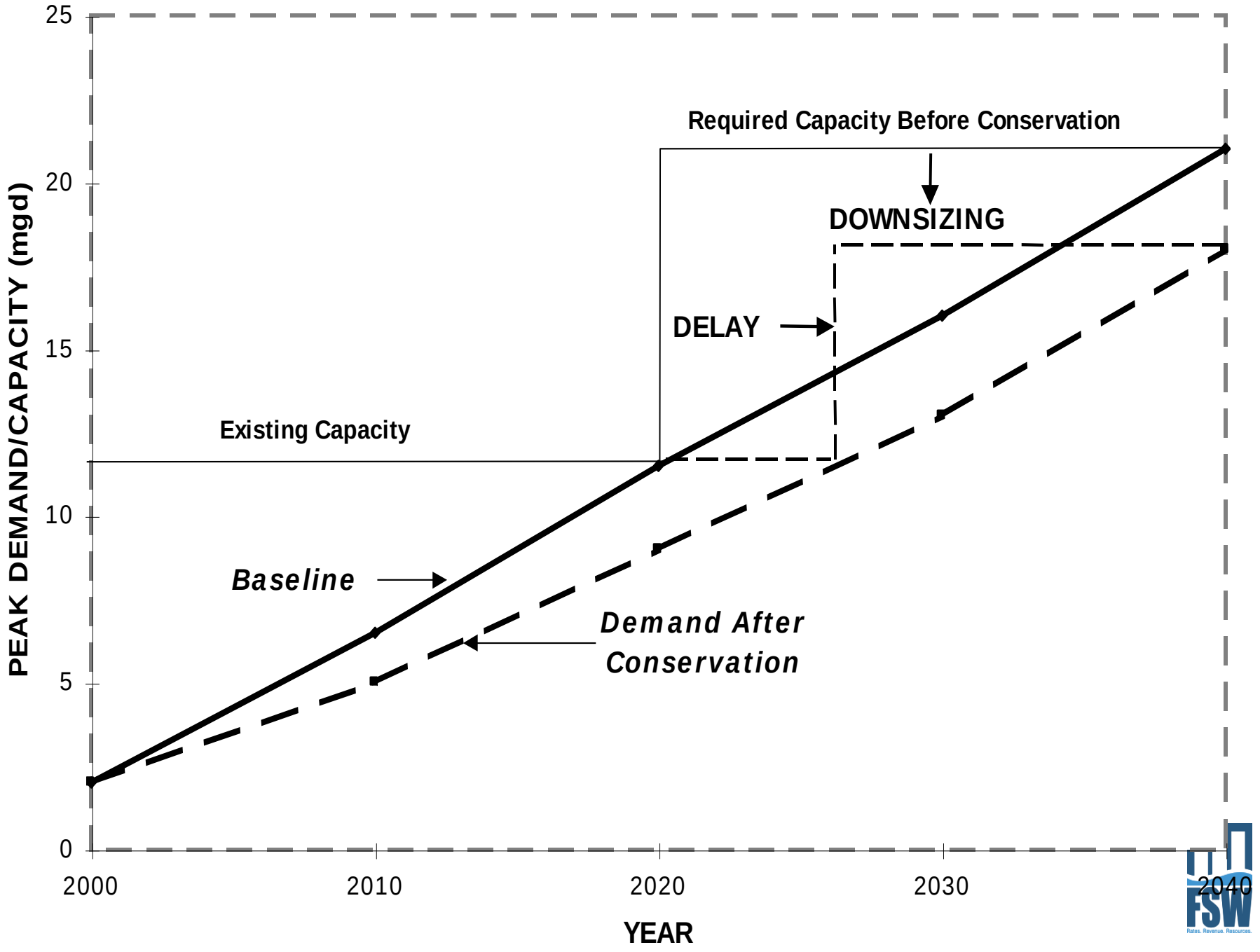
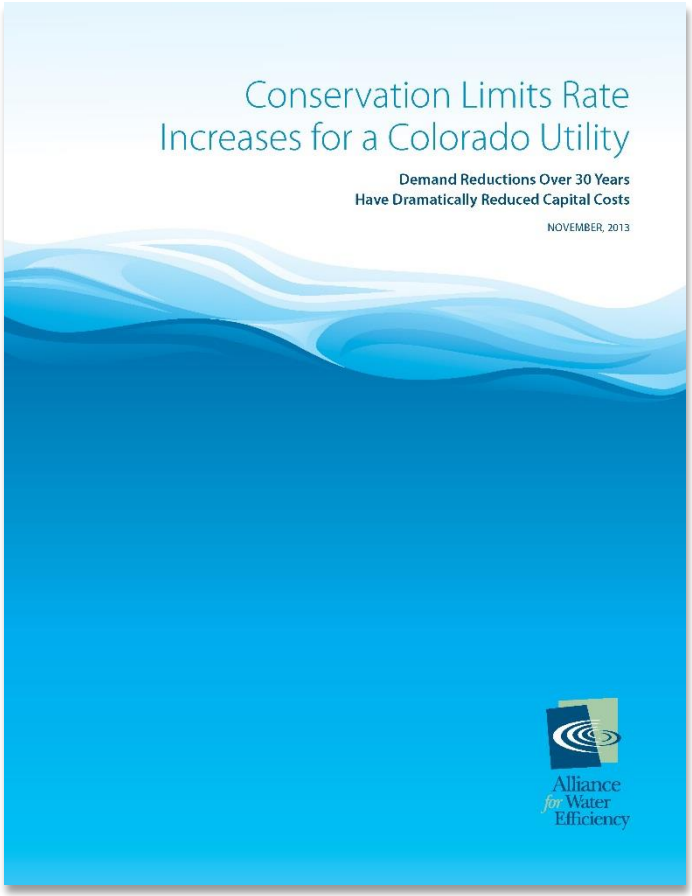

25
20
15
10
5
0
PEAK DEMAND/CAPACITY (mgd)
Required Capacity Before Conservation
DOWNSIZING
DELAY
Existing Capacity
Baseline
Demand After Conservation
2000
2010
2020
2030
2040
YEAR

# Westminster's Story

- Citizens complained about being asked to conserve when rates would just go up anyway
- Westminster reviewed marginal costs for future infrastructure if conservation had not been done
- Since 1980 conservation has saved residents and businesses 80% in tap fees and 91% in rates compared to what they would have been without conservation

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# How Did They Do It?

1. Compared 1980 per capita water use with 2010 per capita
2. Estimated current water use if there were no change in gpcd from 1980 to 2010
3. Estimated build out demand under current gpcd
4. Estimated build out demand with 1980 gpcd
5. Estimated build out Peak Capacity under 1980 and current gpcd
6. Estimated cost of water infrastructure expansion
7. Estimated cost to acquire water
8. Estimated cost of wastewater infrastructure expansion
9. Estimated impact to rates
10. Estimated impact to tap fees

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# What Will Your Story Be?

- Every story will be different!
- Key questions to determine the case for efficiency
- Where do costs come from and what are your future cost risks?
  - Wholesale water costs
  - Costs of capital improvements for capacity increases
  - Short run variable costs (treatment, energy, etc.)
- What's your return on the investment in efficiency?
- How do you quantify it?
- AWE Water  Conservation Tracking Tool provides forward-looking analysis

# New Resources and Tools for Utility Managers

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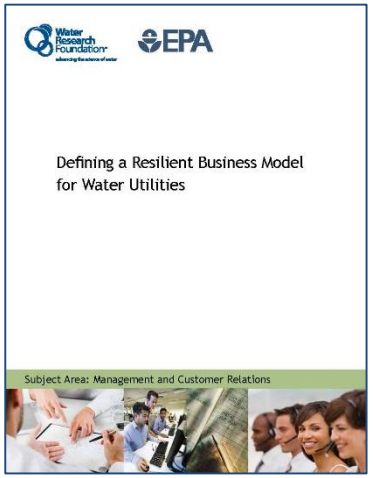
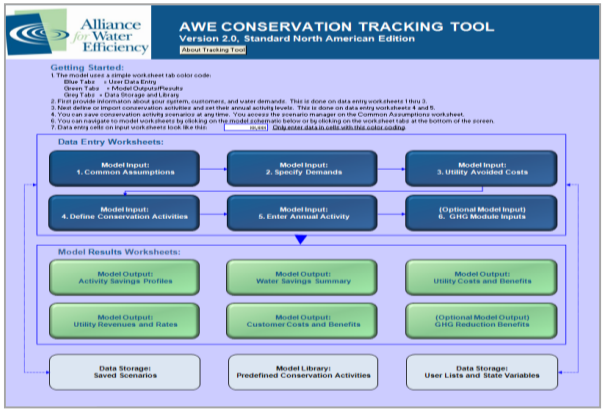
# Tools for Every Step

- New guidance available from many sources, on many topics:
  - Assessing Your Revenue Model
  - Rate Design and Evaluation
  - Communicating with Stakeholders
  - Financial Planning and Management
- See Resource List in packet for links

# Assessing Your Revenue Model

- EPA/WaterRF: 2013 Defining a Resilient Business Model for Water Utilities
- AWE Water Conservation Tracking Tool
- UNC Rates Dashboards
- AWE Self Assessment Flowchart

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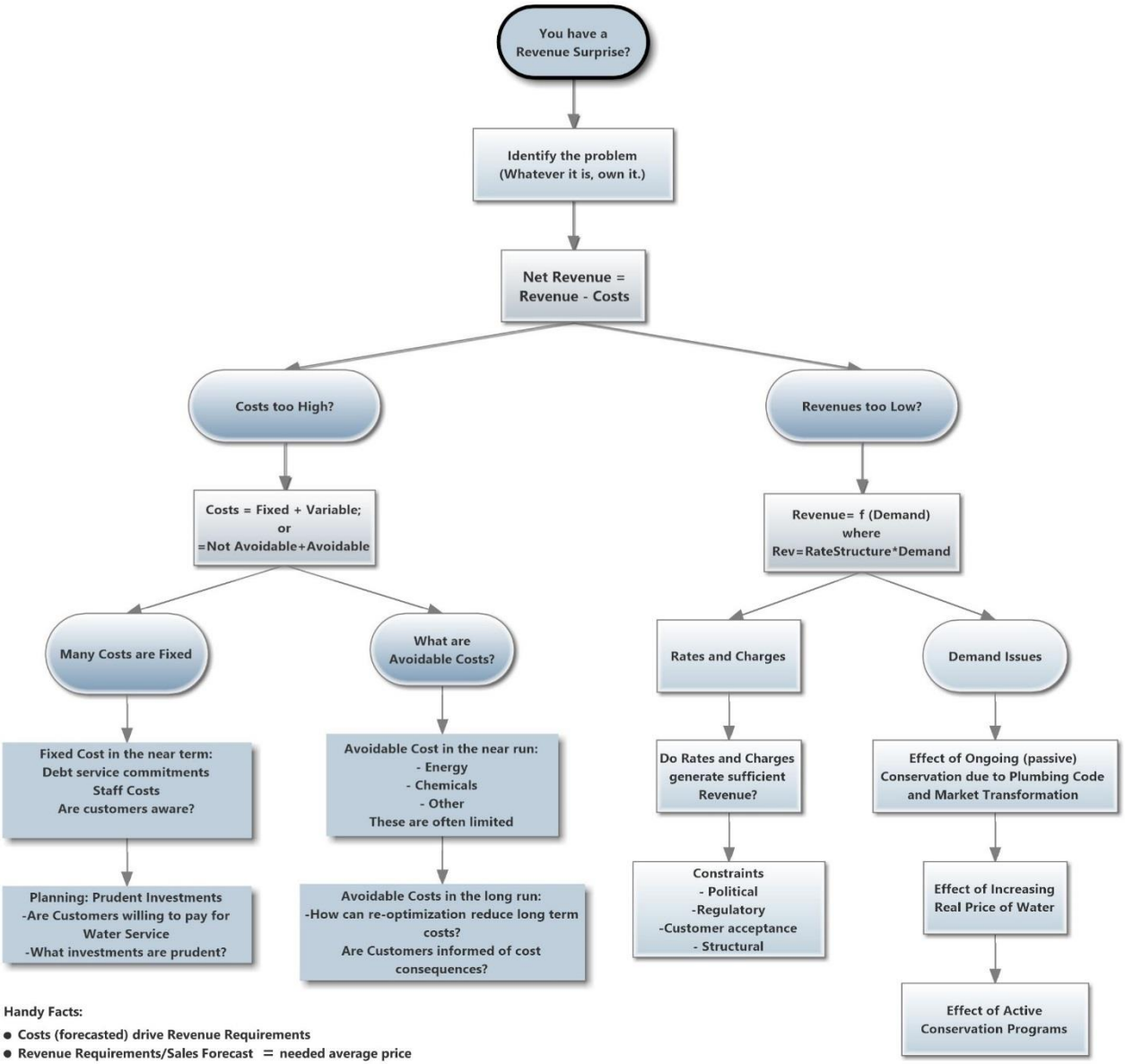
# AWE Self-Assessment Flowchart

## How to Avoid Revenue Surprises: Defining the Problem




**Handy Facts:**

- Costs (forecasted) drive Revenue Requirements
- Revenue Requirements/Sales Forecast = needed average price

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# Texas Municipal Water and Wastewater Rates Dashboard

## Rates in 2013

UNC ENVIRONMENTAL FINANCE CENTER

Smart Management for Small Water Systems

Example Utility

Rates Comparison | Historical D... | Characteristics | Links

Select Service(s) ...

Select Monthly Usage...

**Average Household Water Use (gal./month)**

4,000

0 2 4 6 8 10 (thousands)

Select a comparison group...

Comparing to all utilities in the survey

559 rate structures compared

Observe the effects of raising rates by: 0%

Monthly Water Bill: $27.52

**Bill Comparison**

Water Bill at 5,000 Gallons

$32 $16 $48 $27.52

Min. $9.75 Max. $84.00

**FY11 Cost Recovery**

Water & Sewer - Debt Service Coverage Ratio

1 1.25 -1 1.58 3

**Conservation Signal**

Water Price Increase from 5 to 10 kgal

$2.36 $36.85 $19.21 69.8%

Min. $0.00 Max. $575.00

**Affordability**

% MHI (2011) for Water Bills at 5 kgal

2% 1% 3% 0% 0.88% 4%

Copyright (c) 2013 Environmental Finance Center at the University of North Carolina at Chapel Hill. www.efc.sog.unc.edu. Data sources: Texas Municipal League water & sewer rates surveys; Texas Water Development Board utilities financial data; U.S. Census Bureau; U.S. Bureau of Labor Statistics. Funding assistance provided by U.S. EPA and Water Research Foundation.

Print

**LINK: http://www.efc.sog.unc.edu/node/104**

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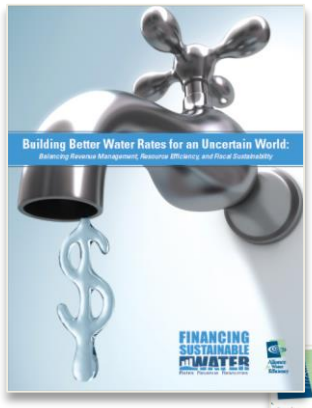
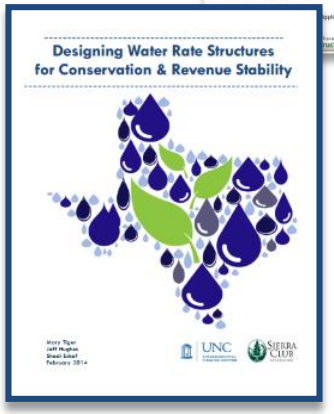
# Rate Design and Evaluation

- AWE Financing Sustainable Water Resources
  - Understanding the Role of Ratemaking
  - Rate Design, Evaluation, Implementation
  - Highlighting the benefits of Efficiency
- Designing Rate Structures for Conservation and Revenue Stability (UNC/Sierra Club)
  - Innovative Rate Structures



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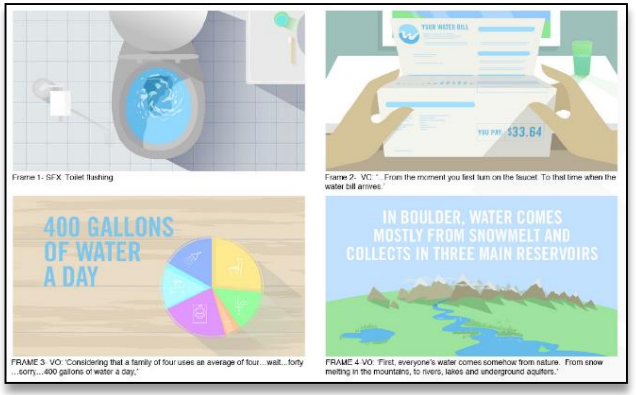
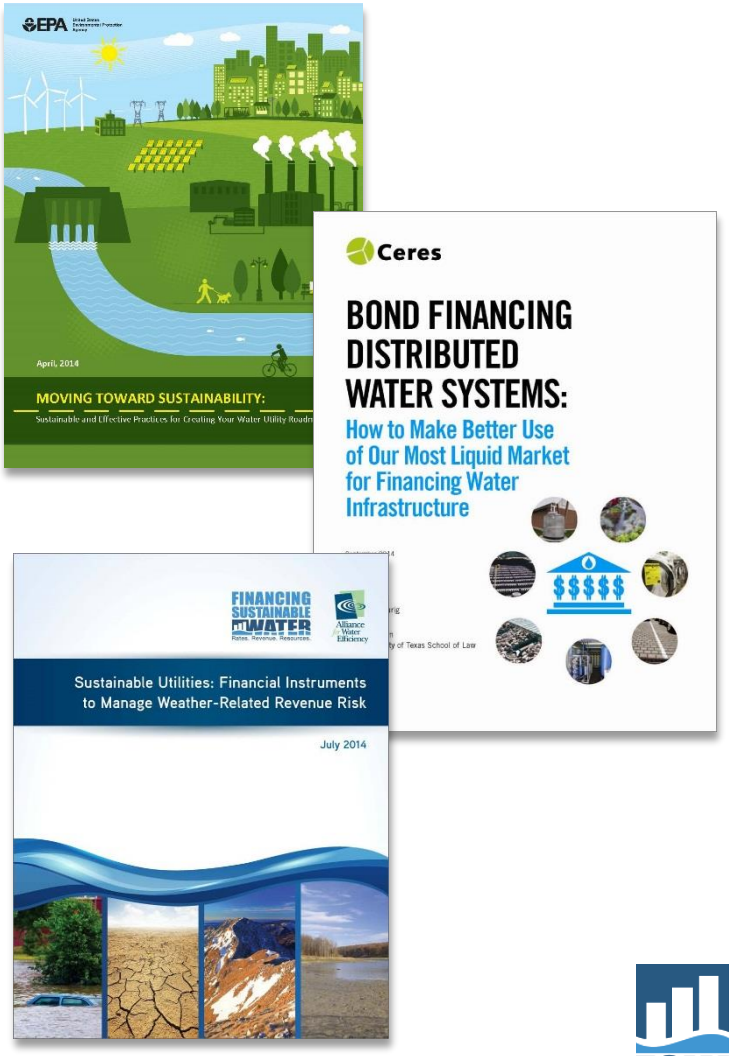
# Communicating with Stakeholders

- Handbook Implementation Chapter
- New Multimedia Assets
  - AWE “What’s Water Worth” video for customers (Winter 2014)
  - UNC EFC Water¢lips: Video Series for Water Utilities, their Boards, and Funders
- Rate Approval Process Communication Strategy and Toolkit-WaterRF 4455
  - Communicate the need and impact of rate adjustments with new tool RateCase (Spring 2015)



# Financial Planning and Management

- EPA: Sustainable and Effective Practices for Creating Your Own Water Utility Roadmap
- Ceres: Bond Financing Distributed Water Systems
- AWE: Financial Instruments for Managing Weather Risk

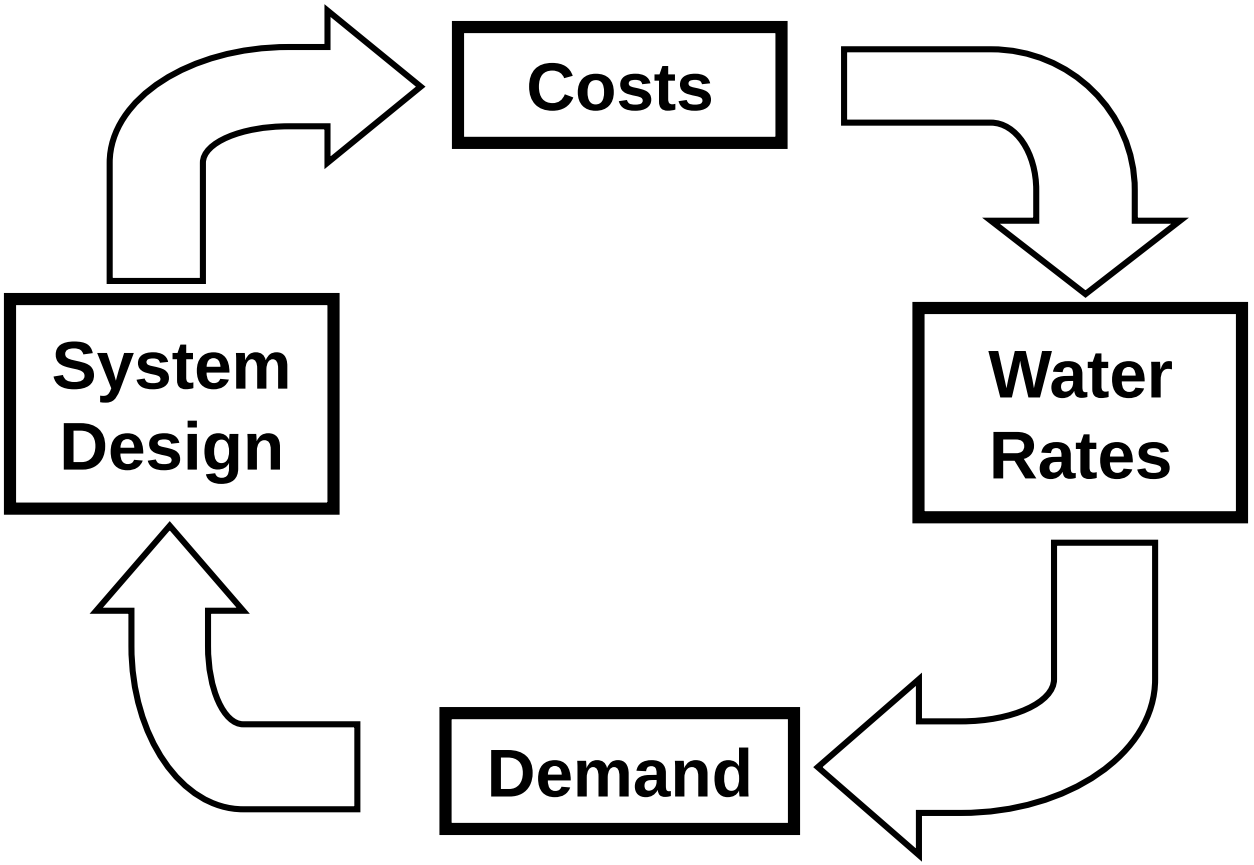


# Financing Sustainable Water

# The Heart of the Problem

- Water rates have traditionally been focused solely on historical cost-recovery
- When system costs change quickly, and perhaps unpredictably, historical rates do not reflect today's cost consequences
- Rates do not then give customers correct information to make consumptive decisions

# Flow of Economic Logic



# How Do Utilities Address This?

- **Ends** of Water Utilities: Water Services
  - *Reliable Delivery of Quality Water*
  - *Handling of Waste water, Storm water, Watershed management*
- By what financial **means** do utilities achieve these ends?
  - *Cost Recovery (Short term)*
  - *Resource Efficiency (Short and Long term)*
  - *Fiscal Sustainability (Long term)*

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# Questions in Designing Better Rates

In an uncertain world, what information could lead to better water rates?

- *Customer Consumption Variability*—How can weather, drought/shortage, or external shock affect customer consumption?
- *Demand Response*—If I change rates, what happens to demand volume and revenue?
- *Drought Pricing*—How should I plan for water rates under the contingency of nonzero drought/shortage occurrence?
- *Probability Management*—What is the likelihood of deficit?
- *Fiscal Sustainability*—What are likelihoods over a 5-year time horizon
- *Affordability*—Can customers afford water service?

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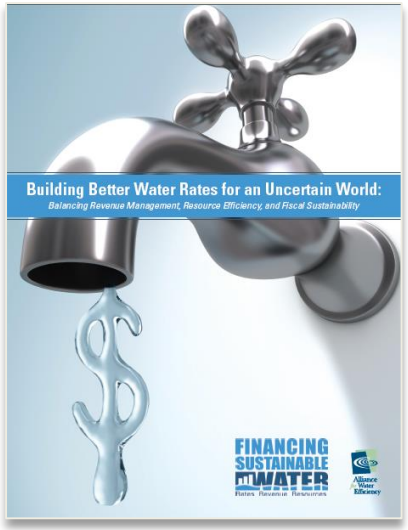
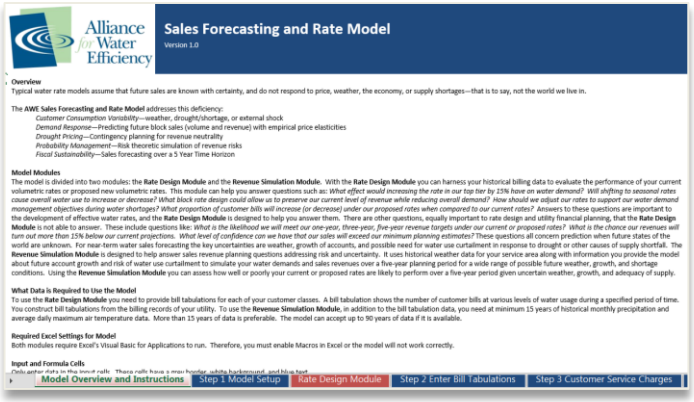
# Financing Sustainable Water

- **Building Better Rates in an Uncertain World:** A Handbook to explain key concepts, provide case studies and implementation advice
- **AWE Sales Forecasting and Rate Model:** An innovative, user-friendly tool to model scenarios, solve for flaws, and incorporate uncertainty into rate making
- **FinancingSustainableWater.org:** Web-based resources to convene the latest research and information in one location



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# AWE Handbook

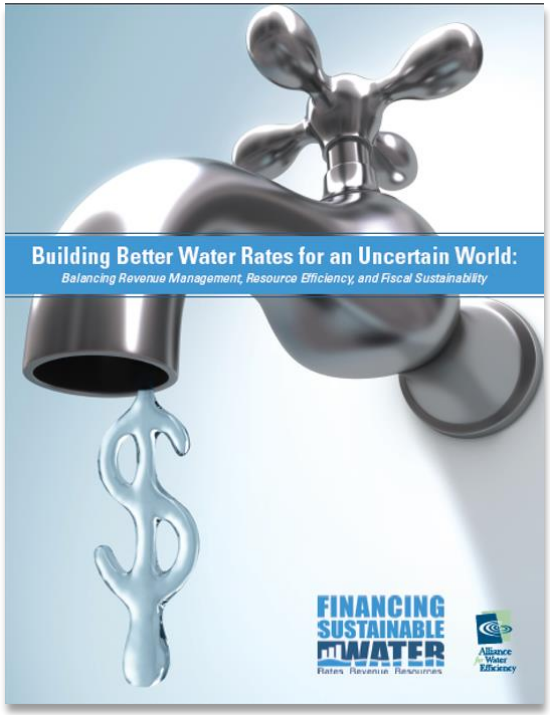
## Building Better Water Rates for an Uncertain World

*Balancing Revenue Management, Resource Efficiency, And Fiscal Sustainability*

SECTION I: Introduction
SECTION II: Today's Imperative for Utility Financial Management
SECTION III: The Role of Ratemaking
SECTION IV: Building a Better (Efficiency-Oriented) Rate Structure
SECTION V: Financial Policies & Planning for Improved Fiscal Health
SECTION VI: Implementing an Efficiency-Oriented Rate Structure

**Appendices**

- Appendix A – Costing Methods
- Appendix B – Demand and Revenue Modeling
- Appendix C – AWE Sales Forecasting and Rate Model User Guide

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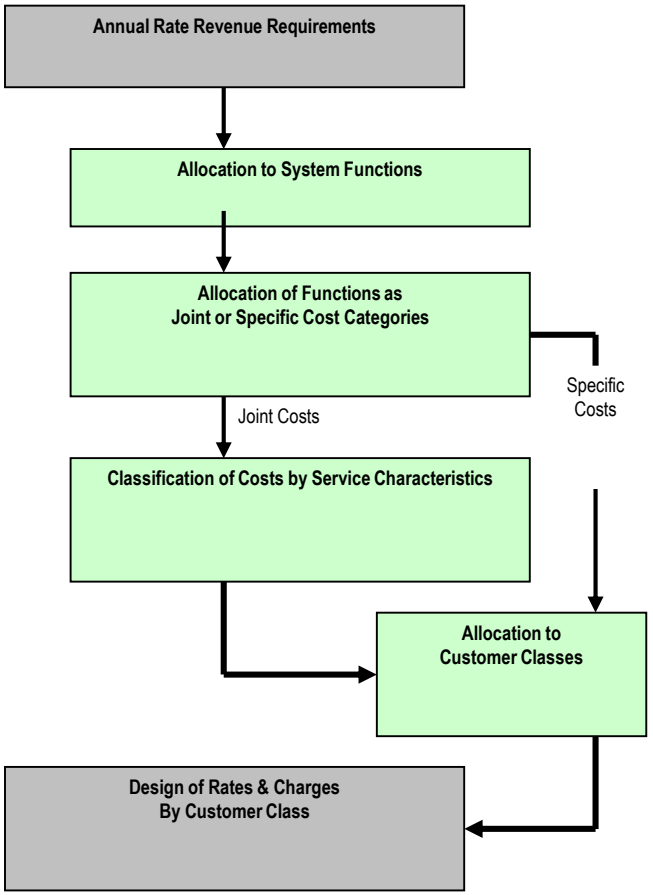
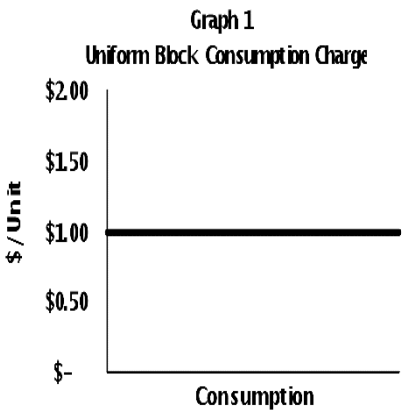
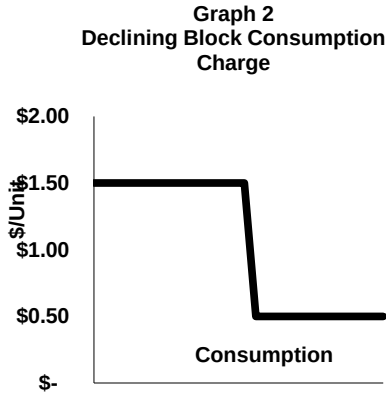
# Building a Better Rate Structure

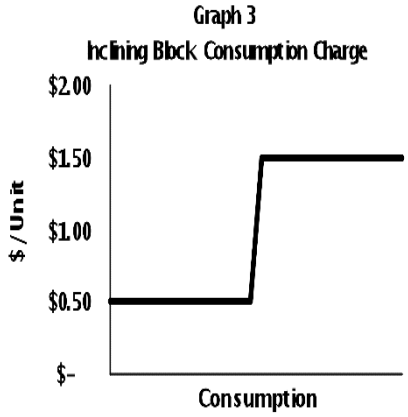
1. Identify and Prioritize Ratemaking Objectives
2. Determine Revenue Requirements
3. Allocate Costs
4. Design A Rate Structure
5. Evaluate the Rate Structure against Objectives
6. Decide on a Rate Structure

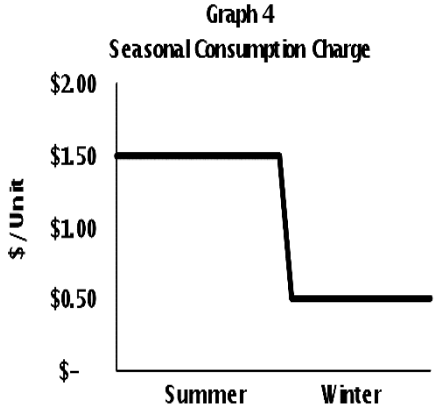


# Types of Rate Structures



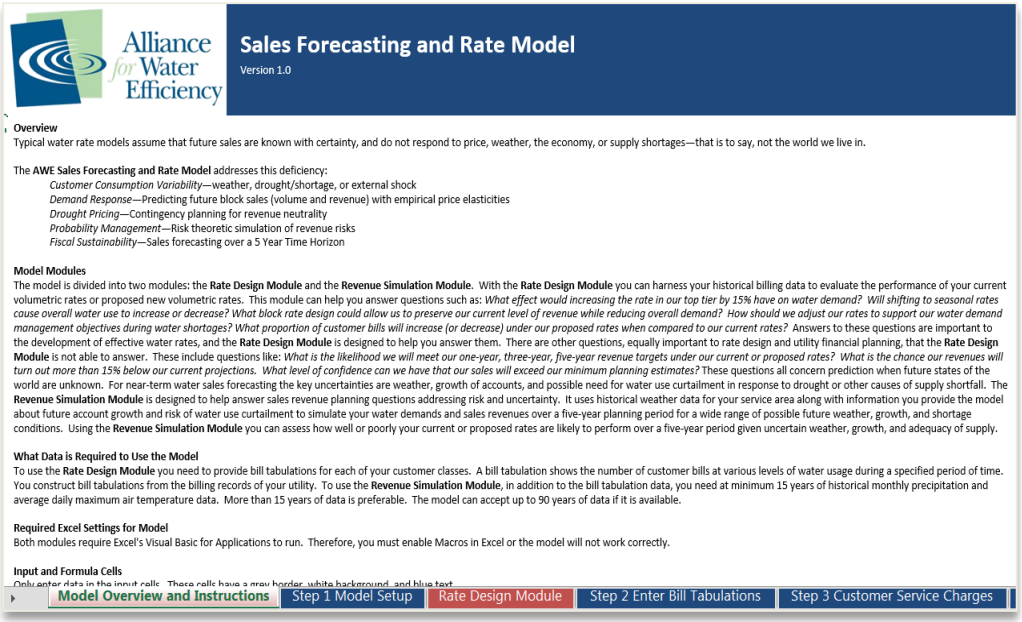




- Marginal/Incremental Cost pricing
- Budget-based water rates
- Volumetrically-based Fixed Charges
- “Value of Service” pricing
- Policy-based rates
- Drought pricing
- Additional “innovative” rate structures

# Evaluating For Your Objectives

- Modeling Water Demand Variability
- Modeling Water Revenue Variability
- Customer Bill Analysis
- Affordability Assessment
- Assessing Fiscal Sustainability
- **The AWE Sales Forecasting and Rate Model can do all this!**



Alliance for Water Efficiency

**Sales Forecasting and Rate Model**

Version 1.0

**Overview**

Typical water rate models assume that future sales are known with certainty, and do not respond to price, weather, the economy, or supply shortages—that is to say, not the world we live in.

The **AWE Sales Forecasting and Rate Model** addresses this deficiency:

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

**Model Modules**

The model is divided into two modules: the **Rate Design Module** and the **Revenue Simulation Module**. With the **Rate Design Module** you can harness your historical billing data to evaluate the performance of your current volumetric rates or proposed new volumetric rates. This module can help you answer questions such as: *What effect would increasing the rate in our top tier by 15% have on water demand? Will shifting to seasonal rates cause overall water use to increase or decrease? What block rate design could allow us to preserve our current level of revenue while reducing overall demand? How should we adjust our rates to support our water demand management objectives during water shortages? What proportion of customer bills will increase (or decrease) under our proposed rates when compared to our current rates?* Answers to these questions are important to the development of effective water rates, and the **Rate Design Module** is designed to help you answer them. There are other questions, equally important to rate design and utility financial planning, that the **Rate Design Module** is not able to answer. These include questions like: *What is the likelihood we will meet our one-year, three-year, five-year revenue targets under our current or proposed rates? What is the chance our revenues will turn out more than 15% below our current projections. What level of confidence can we have that our sales will exceed our minimum planning estimates?* These questions all concern prediction when future states of the world are unknown. For near-term water sales forecasting the key uncertainties are weather, growth of accounts, and possible need for water use curtailment in response to drought or other causes of supply shortfall. The **Revenue Simulation Module** is designed to help answer sales revenue planning questions addressing risk and uncertainty. It uses historical weather data for your service area along with information you provide the model about future account growth and risk of water use curtailment to simulate your water demands and sales revenues over a five-year planning period for a wide range of possible future weather, growth, and shortage conditions. Using the **Revenue Simulation Module** you can assess how well or poorly your current or proposed rates are likely to perform over a five-year period given uncertain weather, growth, and adequacy of supply.

**What Data is Required to Use the Model**

To use the **Rate Design Module** you need to provide bill tabulations for each of your customer classes. A bill tabulation shows the number of customer bills at various levels of water usage during a specified period of time. You construct bill tabulations from the billing records of your utility. To use the **Revenue Simulation Module**, in addition to the bill tabulation data, you need at minimum 15 years of historical monthly precipitation and average daily maximum air temperature data. More than 15 years of data is preferable. The model can accept up to 90 years of data if it is available.

**Required Excel Settings for Model**

Both modules require Excel's Visual Basic for Applications to run. Therefore, you must enable Macros in Excel or the model will not work correctly.

**Input and Formula Cells**

Only enter data in the input cells. These cells have a grey border, white background, and blue text.

Model Overview and Instructions | Step 1 Model Setup | Rate Design Module | Step 2 Enter Bill Tabulations | Step 3 Customer Service Charges

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# Assessing Customer Affordability

- Always an issue with consumers and regulators
- Need to understand the depth of the issue in your community
- See AWE Sales Forecasting and Rate Model for an example
- Other resources: UNC EFC Water Rates Affordability Assessment Tool

% Change in Average and Median Annual Water Service Cost by Customer Class

| Customer Class | Average Annual Water Service Cost | | | Median Annual Water Service Cost | | |
|---|---|---|---|---|---|---|
| | Current | Proposed | % Change | Current | Proposed | % Change |
| Single Family | $777 | $805 | 3.5% | $650 | $672 | 3.3% |
| Multi Family | $4,254 | $4,393 | 3.2% | $1,930 | $1,994 | 3.3% |
| CII | $3,323 | $3,464 | 4.3% | $1,481 | $1,556 | 5.0% |
| Landscape | $5,599 | $6,094 | 8.8% | $2,503 | $2,771 | 10.7% |
| Not in use | | | | | | |
| Not in use | | | | | | |

Affordability index equals the median annual water cost for the primary residential customer class divided by median household income.

Affordability Index



Bill Impacts Table

| Customer Class | % of bills decreasing by | | | | No More Than | % of bills increasing by | | | |
|---|---|---|---|---|---|---|---|---|---|
| | more than 20% | 15 to 20% | 10 to 15% | 5 to 10% | +/- 5% | 5 to 10% | 10 to 15% | 15 to 20% | more than 20% |
| Single Family | 0% | 0% | 21% | 38% | 9% | 4% | 17% | 11% | 0% |
| Multi Family | 0% | 0% | 20% | 26% | 19% | 1% | 6% | 28% | 0% |
| CII | 0% | 0% | 15% | 14% | 23% | 15% | 14% | 18% | 0% |
| Landscape | 0% | 0% | 19% | 10% | 13% | 28% | 4% | 26% | 0% |
| Not in use | | | | | | | | | |
| Not in use | | | | | | | | | |

Multi Family Customer Class Bill Impact Histogram

# Revenue Neutral Drought Pricing

- Shortages are **when**, not **if**
- Imposing curtailments on customers affects revenues
- Drought rates that maintain revenue neutrality through various drought stages are possible
- They can be planned for, communicated, and effectively implemented

**3. Calculate Revenue Neutral Rates by Drought Stage**

The revenue neutral rates calculator will quickly find a set of rates for a given drought/shortage stage that will generate the same reve
condition. There are four steps to using the calculator:

**Choose Drought Stage to Evaluate:** Stage 0

**Choose Method for Calculating Revenue Neutral Rates:** 1. Scale rates so that each customer class is revenue neutral

**Leave or Adjust Rate in Block?**

| Class | Block 1 | Block 2 | Block 3 | Block 4 | Block 5 |
|---|---|---|---|---|---|
| Single Family | Leave | Adjust | Adjust | Adjust | Adjust |
| Multi Family | Adjust | Adjust | Adjust | Adjust | Adjust |
| CII | Adjust | Adjust | Adjust | Adjust | Adjust |
| Landscape | Adjust | Adjust | Adjust | Adjust | Adjust |
| Not in use | Leave | Leave | Leave | Leave | Leave |
| Not in use | Leave | Leave | Leave | Leave | Leave |

# Financial Planning and Policies

- Revenue and Expense Forecasting
- Revenue Management and Fiscal Sustainability
- Rate Stabilization – Financial Planning
- Adaptive Rate Design
- Revenue Recovery Mechanisms
- Cost Recovery Mechanisms
- Conclusion: Transformational Change for Efficiency

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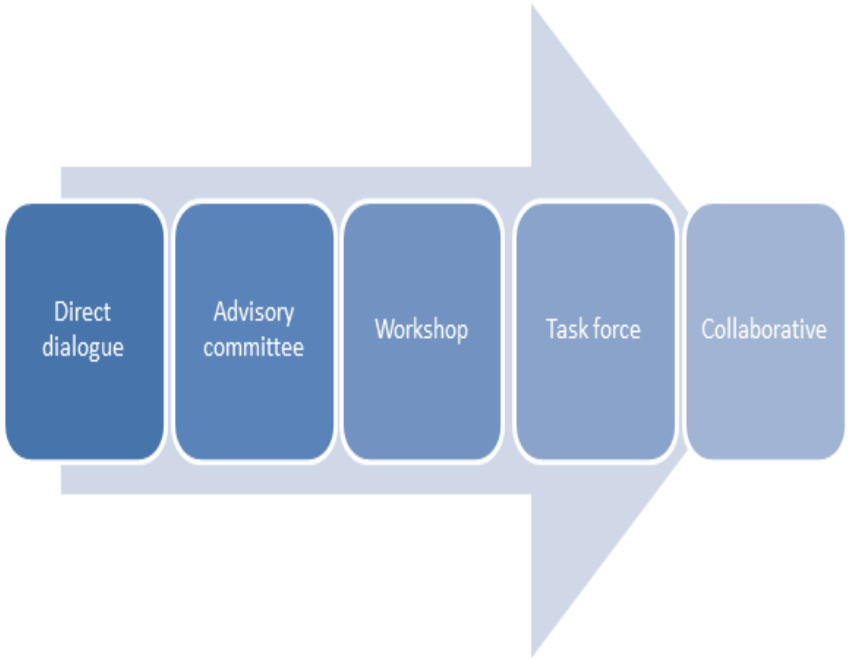
# Implementation and Public Engagement

- Integrated and Collaborative Planning is key to success
- Securing Buy-In from Leadership
- Getting to Yes: Approval from Elected Officials
- Internal Communications and Customer Service
- The Public as Partners
- Clear Signals and Empowered Customers
- Maintaining Dialogue and Fine-tuning



# Summary Key Concepts

- Revenue instability is a feature of ALL rate structures
- Efficiency objectives should be identified at the start
- One size does not fit all
- Embracing uncertainty enables better decision-making
- Better rate analysis requires good data
- Sound financial policies can support fiscal sustainability
- Customer understanding and empowerment is key

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# FINANCING SUSTAINABLE WATER

Rates. Revenue. Resources.

A project of the Alliance for Water Efficiency

## Rates. Revenue. Resources.

Financing Sustainable Water is an initiative of the Alliance for Water Efficiency. It was created to provide practical information to guide utilities from development through implementation of rate structures that balance revenue management, resource efficiency and fiscal sustainability. This website will be updated frequently with new content and we encourage visitors to return often for additional information and resources. The Alliance serves as a North American advocate for water efficient products and programs, and provides information and assistance on water conservation efforts. Learn More

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