

Perspectives on Water Efficiency

Mary Ann Dickinson

President and CEO

2011 NACWA Summer Conference



Alliance *for* Water Efficiency

A VOICE AND
A PLATFORM
PROMOTING THE
EFFICIENT AND
SUSTAINABLE
USE OF WATER



Perspective #1: Shortage is Likely Already in Your Neighborhood

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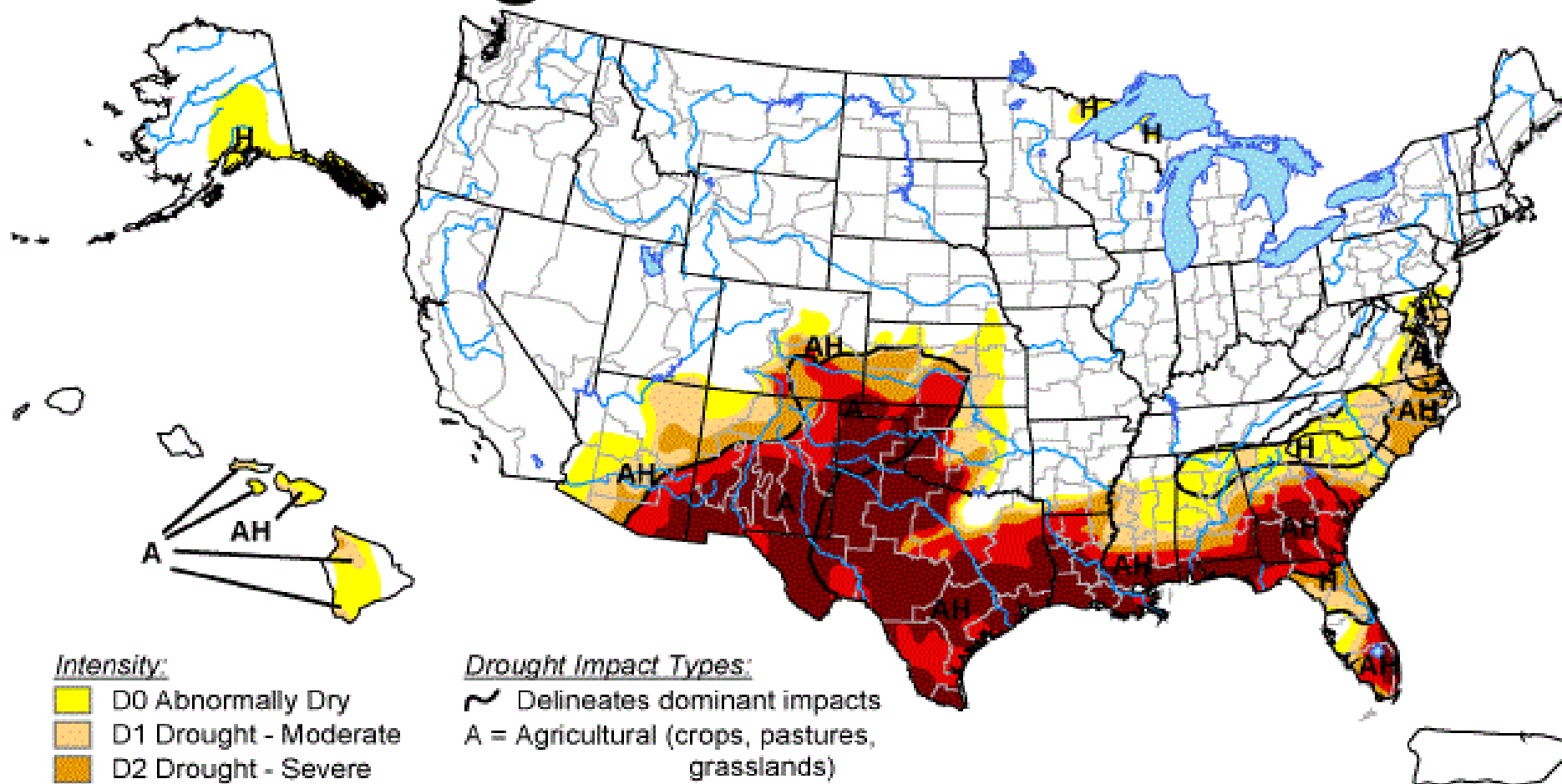


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U.S. Drought Monitor

June 21, 2011

Valid 8 a.m. EDT



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

- Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

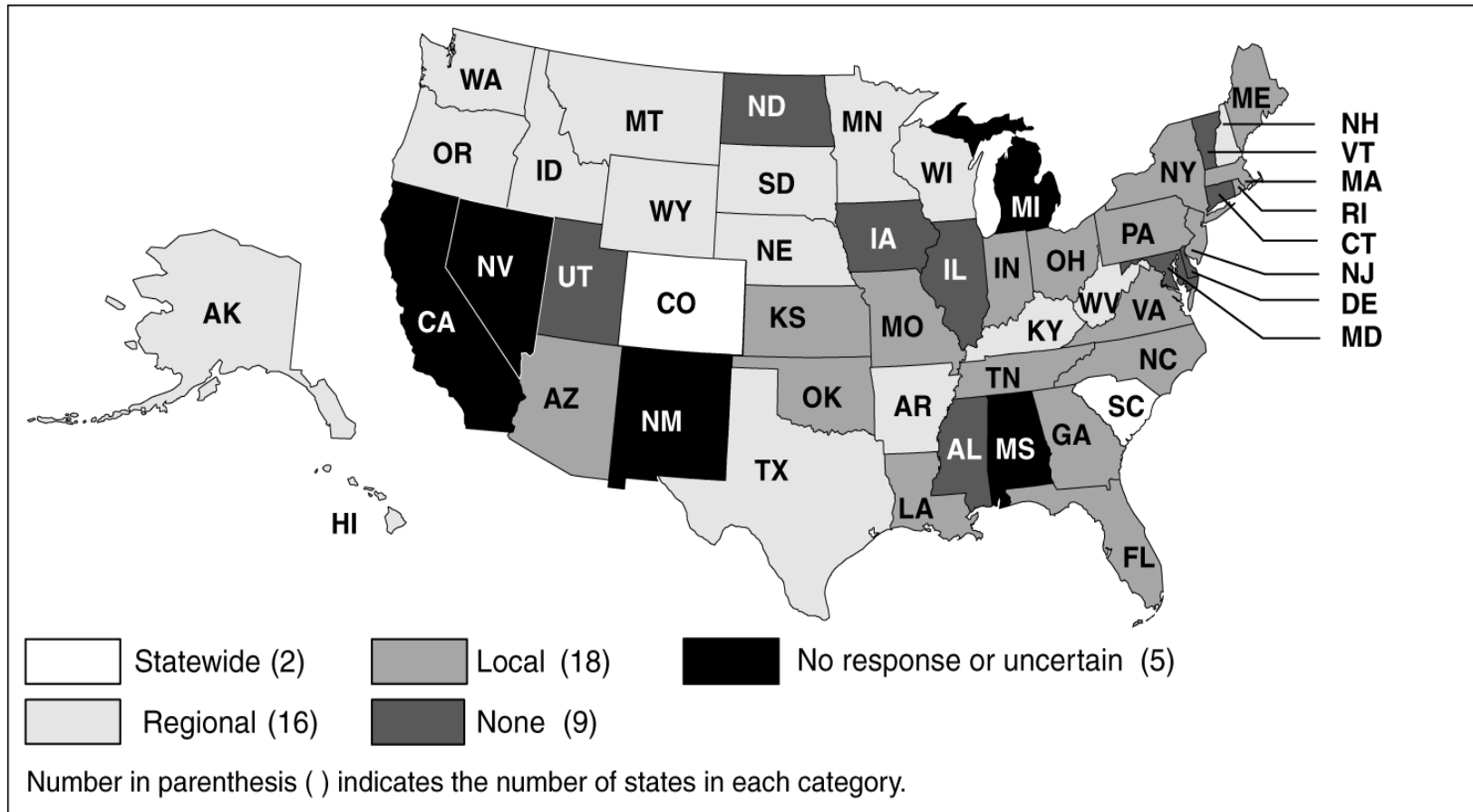
<http://drought.unl.edu/dm>



Released Thursday, June 23, 2011

Author: Brian Fuchs, National Drought Mitigation Center

40 of the 50 States



Source: GAO analysis of state water managers' responses to GAO survey.

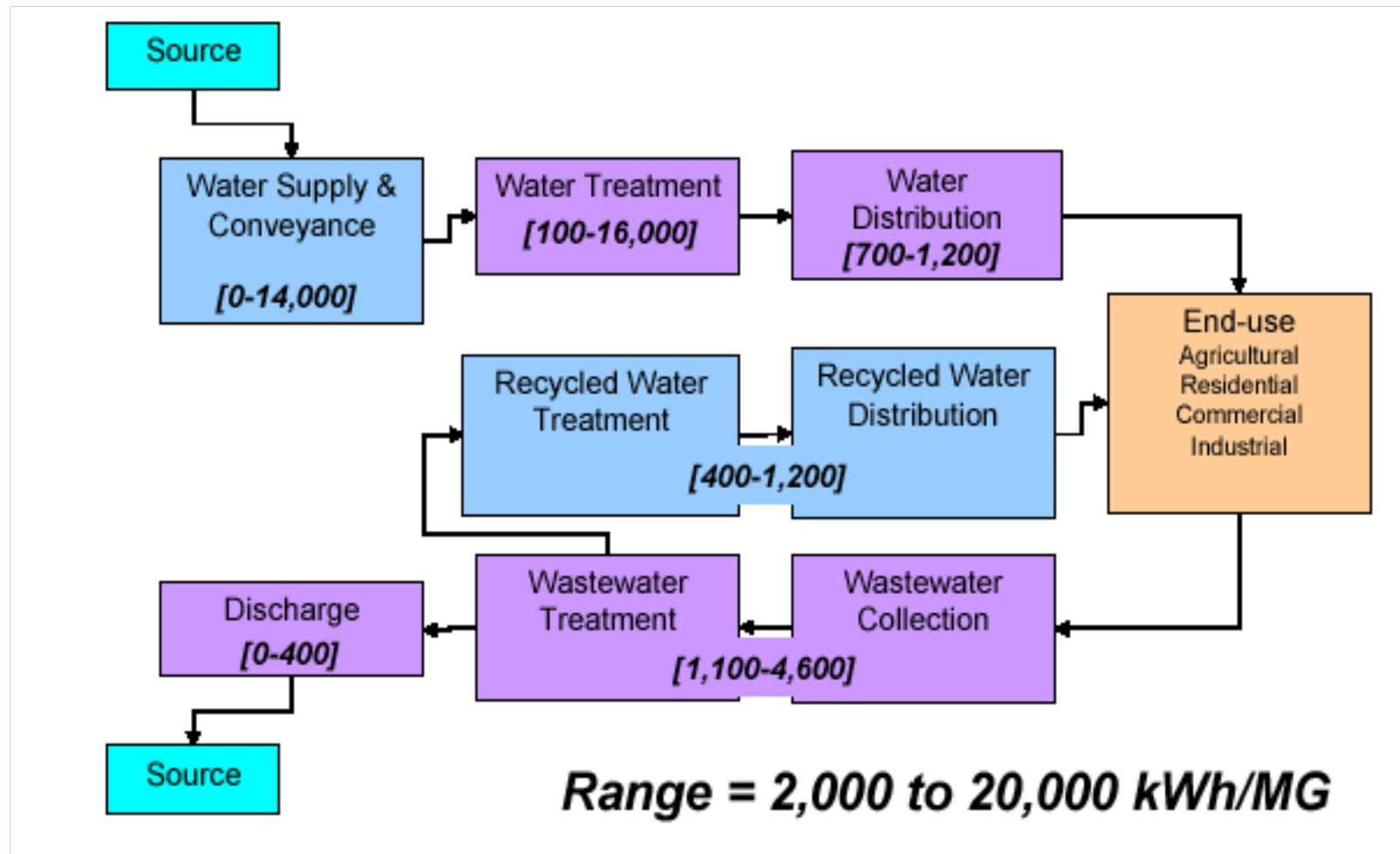
Perspective #2: Energy is Tied to Water Use and Treatment

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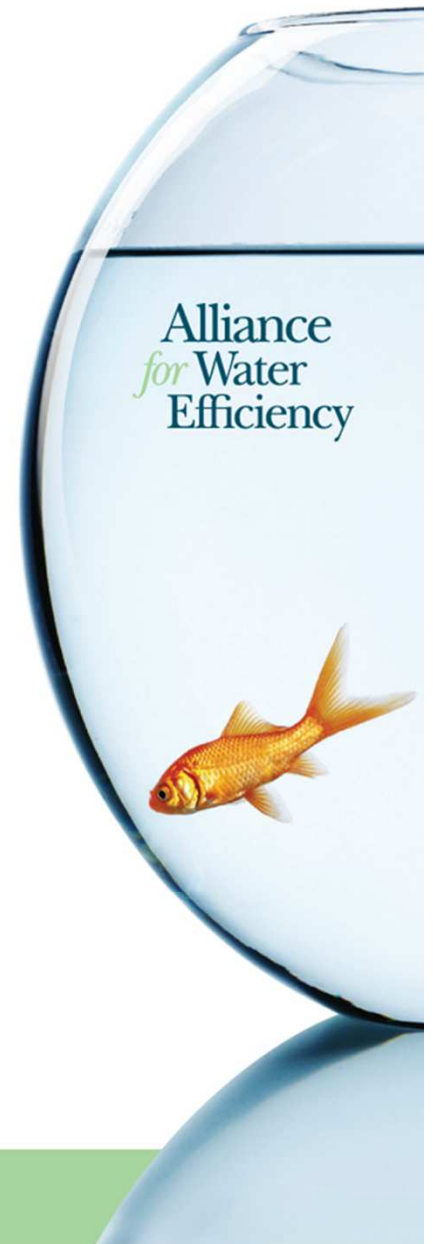
Embedded Energy



Source: California Energy Commission, 2005 IEPR

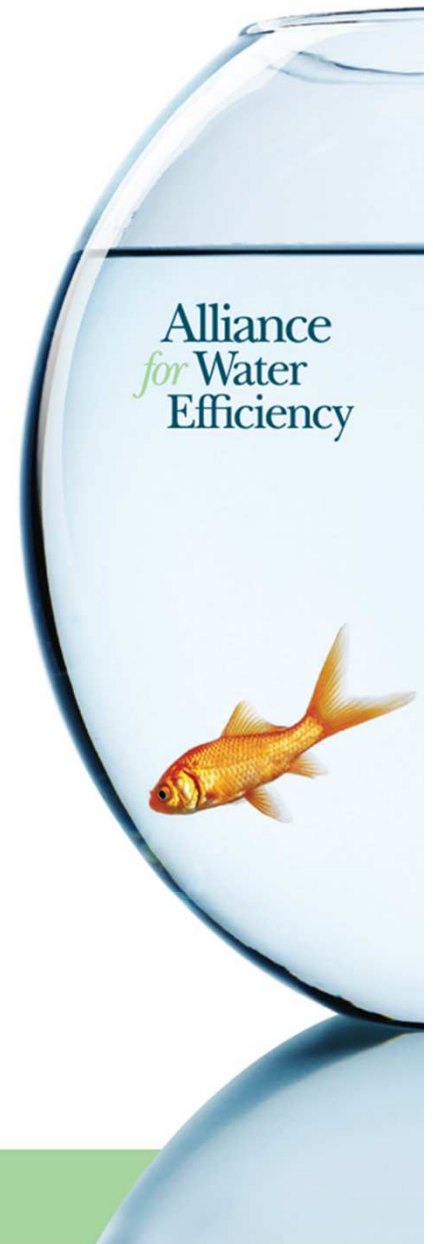
Local Data is Key

- Every water supply running through the utility system has a different embedded energy value
- Utilities need to know what their on-margin energy numbers are for their water supplies
- Water conservation programs can be targeted to reducing demand in the most beneficial place
- Numerous models exist to help analyze this



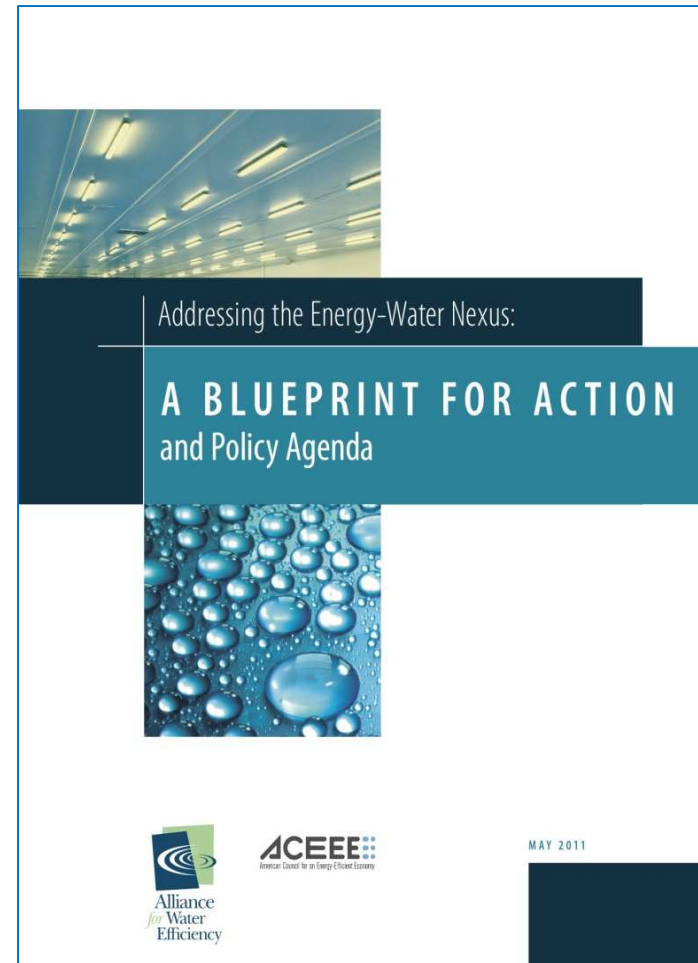
Utility Opportunities

- System optimization is important, but a large energy benefit can also come from customer demand side conservation
- Energy efficiency funding can be used to fund customer water efficiency programs when the energy benefit is calculated



National Action

- More attention is needed at the federal level to the water-energy nexus
- Blueprint document recently issued w/over 50 recommendations from stakeholders
- www.a4we.org



Perspective #3: Customer Efficiency Can Have Benefits for Wastewater

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AWE CONSERVATION TRACKING TOOL

Getting Started:

1. The model uses a simple worksheet tab color code:

Blue Tabs = User Data Entry

Green Tabs = Model Outputs/Results

Grey Tabs = Data Storage and Library

2. First provide information about your system, customers, and water demands. This is done on data entry worksheets 1 thru 3.

3. Next define or import conservation activities and set their annual activity levels. This is done on data entry worksheets 4 and 5.

4. You can save conservation activity scenarios at any time. You access the scenario manager on the Common Assumptions worksheet.

6. You can navigate to model worksheets by clicking on the model schematic below or by clicking on the worksheet tabs at the bottom of the screen.

7. Data entry cells on input worksheets look like this: xxx,xxx Only enter data in cells with this color coding.

Data Entry Worksheets:



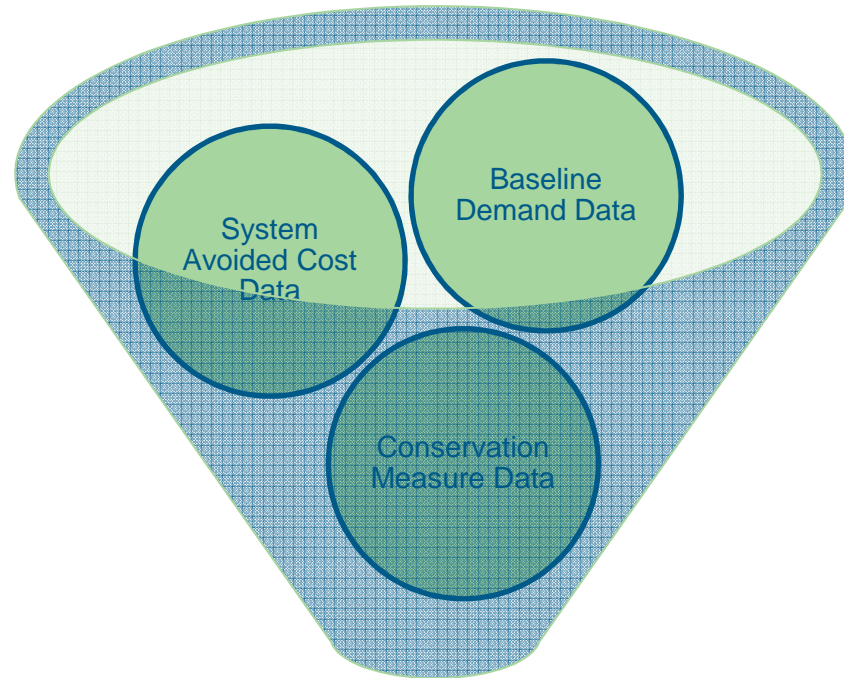
Model Results Worksheets:



Data Storage:
Saved Scenarios

Data Storage:
User Lists and State Variables

Tracking Tool Inputs and Outputs



Model Outputs

Savings Analysis

Benefit-Cost Analysis

Revenue/Rate Impacts



AWE CONSERVATION TRACKING TOOL: UTILITY COSTS & BENEFITS WORKSHEET

Show Budget Table

[Return to Navigation Sheet](#) [Report Error](#)

Conservation Program Cost Analysis (2010 Dollars)

Amort. Years: 20

Class	Activity Name	Unit Cost (\$/AF)	PV Cost	Amortized Cost
Single Family	Residential Surveys, SF	\$ 832	\$ 1,469,277	\$ 97,962
Single Family	Residential HE Toilets, SF	\$ 403	\$ 1,694,499	\$ 112,979
CII	CII HE Toilet	\$ 787	\$ 4,220,334	\$ 281,386
Single Family	Residential Irrigation Controller, SF	\$ 783	\$ 7,687,606	\$ 512,563
Irrigation	Large Land. Irrigation Controller	\$ 193	\$ 2,520,977	\$ 168,083
CII	CII Spray Rinse Valve	\$ 324	\$ 318,207	\$ 21,216
CII	CII Cooling Tower	\$ 201	\$ 1,055,409	\$ 70,368
Subtotal Conservation Activities		\$ 469	\$18,966,309	\$ 1,264,557
Total With Overhead & Public Information		\$ 469	\$18,966,309	\$ 1,264,557

Conservation Benefit Analysis (2010 Dollars)

Class	Activity Name	Unit Benefit (\$/AF)	PV Benefit	Avoided Supply	Avoided Wastewater	Capacity Benefit
Single Family	Residential Surveys, SF	\$ 662	\$ 1,167,828	\$ 898,505	\$ 40,596	\$ 228,728
Single Family	Residential HE Toilets, SF	\$ 676	\$ 2,841,271	\$ 2,280,326	\$ 240,463	\$ 320,482
CII	CII HE Toilet	\$ 676	\$ 3,624,397	\$ 2,908,842	\$ 306,741	\$ 408,815
Single Family	Residential Irrigation Controller, SF	\$ 620	\$ 6,089,920	\$ 4,773,421	\$ -	\$ 1,316,499
Irrigation	Large Land. Irrigation Controller	\$ 634	\$ 8,295,971	\$ 6,369,481	\$ -	\$ 1,926,490
CII	CII Spray Rinse Valve	\$ 695	\$ 683,579	\$ 536,074	\$ 57,006	\$ 90,499
CII	CII Cooling Tower	\$ 748	\$ 3,927,857	\$ 2,862,134	\$ 303,931	\$ 761,792
Total		\$ 658	\$26,630,822	\$20,628,782	\$ 948,736	\$ 5,053,304

Utility Conservation Program NPV and B/C Ratio (2010 Dollars)

Class	Activity Name	NPV (\$)	B/C Ratio
Single Family	Residential Surveys, SF	\$ (301,449)	0.79
Single Family	Residential HE Toilets, SF	\$ 1,146,772	1.68
CII	CII HE Toilet	\$ (595,937)	0.86
Single Family	Residential Irrigation Controller, SF	\$ (1,597,686)	0.79
Irrigation	Large Land. Irrigation Controller	\$ 5,774,994	3.29
CII	CII Spray Rinse Valve	\$ 365,371	2.15
CII	CII Cooling Tower	\$ 2,872,448	3.72
Subtotal Conservation Activities		\$ 7,664,513	1.40
Total With Overhead & Public Information		\$ 7,664,513	1.40

Select Chart to View

Unit Costs Sorted

Chart Explanations

Define Conservation Activities

Activity Name:

Residential Surveys, SF

Affected Customer Class:

Single Family

**Import an
Activity from
the Library**

Unit Water Savings

Utility Costs

Participant Costs

Participant Non-Water Benefits

Plumbing Code

Close Form

Unit Water Savings (Gal/Yr):

Annual Rate of Savings Deca

Peak Period Savings (% of A

Useful Life (Years):

5

Participant Freeriders (% of Participants):

0.00%

Import from Library

Residential Surveys, SF
Residential Surveys, MF
Residential ULF Toilets, SF
Residential ULF Toilets, MF
Residential HE Toilets, SF
Residential HE Toilets, MF

OK

Cancel

Previous Record

Next Record

New Record

Delete Record

AWE CONSERVATION TRACKING TOOL: ENTER ANNUAL CONSERVATION ACTIVITY WORKSHEET

Enter Annual Conservation Activity

[Return to Navigation Sheet](#)
[Report Error](#)

Class	Activity Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	201
Single Family	Residential Surveys, SF	1000	1000	1000	1000	1000						
Single Family	Residential HE Toilets, SF	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
CII	CII HE Toilet	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Single Family	Residential Irrigation Controller, SF	1000	1000	1000	1000	1000	1000	1000	1000			
Irrigation	Large Land. Irrigation Controller	100	100						100	100		
CII	CII Spray Rinse Valve	100	100	100	100	100						
CII	CII Cooling Tower			25	25	25	25	25	25	25	25	

Effective Conservation Activity

Class	Activity Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	201
Single Family	Residential Surveys, SF	1,000	1,800	2,440	2,952	3,362	2,362	1,562	922	410	0	
Single Family	Residential HE Toilets, SF	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	10,00
CII	CII HE Toilet	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000	10,00
Single Family	Residential Irrigation Controller, SF	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	8,000	8,000	7,00
Irrigation	Large Land. Irrigation Controller	100	200	200	200	200	200	200	300	400	400	30
CII	CII Spray Rinse Valve	100	200	300	400	500	500	500	500	500	500	50
CII	CII Cooling Tower	0	0	25	50	75	100	125	150	175	200	20

Gross Water Savings (AF)

Class	Activity Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	201
Single Family	Residential Surveys, SF	37.971343	68.3	92.7	112.1	127.6	89.7	59.3	35.0	15.6	0.0	0.
Single Family	Residential HE Toilets, SF	27.8	55.7	83.5	111.4	139.2	167.0	194.9	222.7	250.6	278.4	278.
CII	CII HE Toilet	35.5	71.0	106.5	142.1	177.6	213.1	248.6	284.1	319.6	355.1	355.
Single Family	Residential Irrigation Controller, SF	61.6	123.1	184.7	246.3	307.8	369.4	431.0	492.5	492.5	492.5	431.
Irrigation	Large Land. Irrigation Controller	134.1	268.2	268.2	268.2	268.2	268.2	268.2	402.3	536.4	536.4	402.
CII	CII Spray Rinse Valve	8.7	17.4	26.0	34.7	43.4	43.4	43.4	43.4	43.4	43.4	43.
CII	CII Cooling Tower	0.0	0.0	28.5	57.0	85.5	114.0	142.5	171.0	199.5	228.0	228.
Total Gross Water Savings		305.7	603.7	790.1	971.7	1,149.3	1,264.8	1,387.8	1,651.0	1,857.5	1,933.8	1,738.

Peak Gross Water Savings (AF)

Class	Activity Name	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	201
Single Family	Residential Surveys, SF	24.7	44.4	60.2	72.9	83.0	58.3	38.5	22.7	10.1	0.0	0.
Single Family	Residential HE Toilets, SF	11.7	23.5	35.2	47.0	58.7	70.5	82.2	94.0	105.7	117.5	117.
CII	CII HE Toilet	15.0	30.0	45.0	59.0	74.0	89.0	104.0	119.0	134.0	149.0	149.

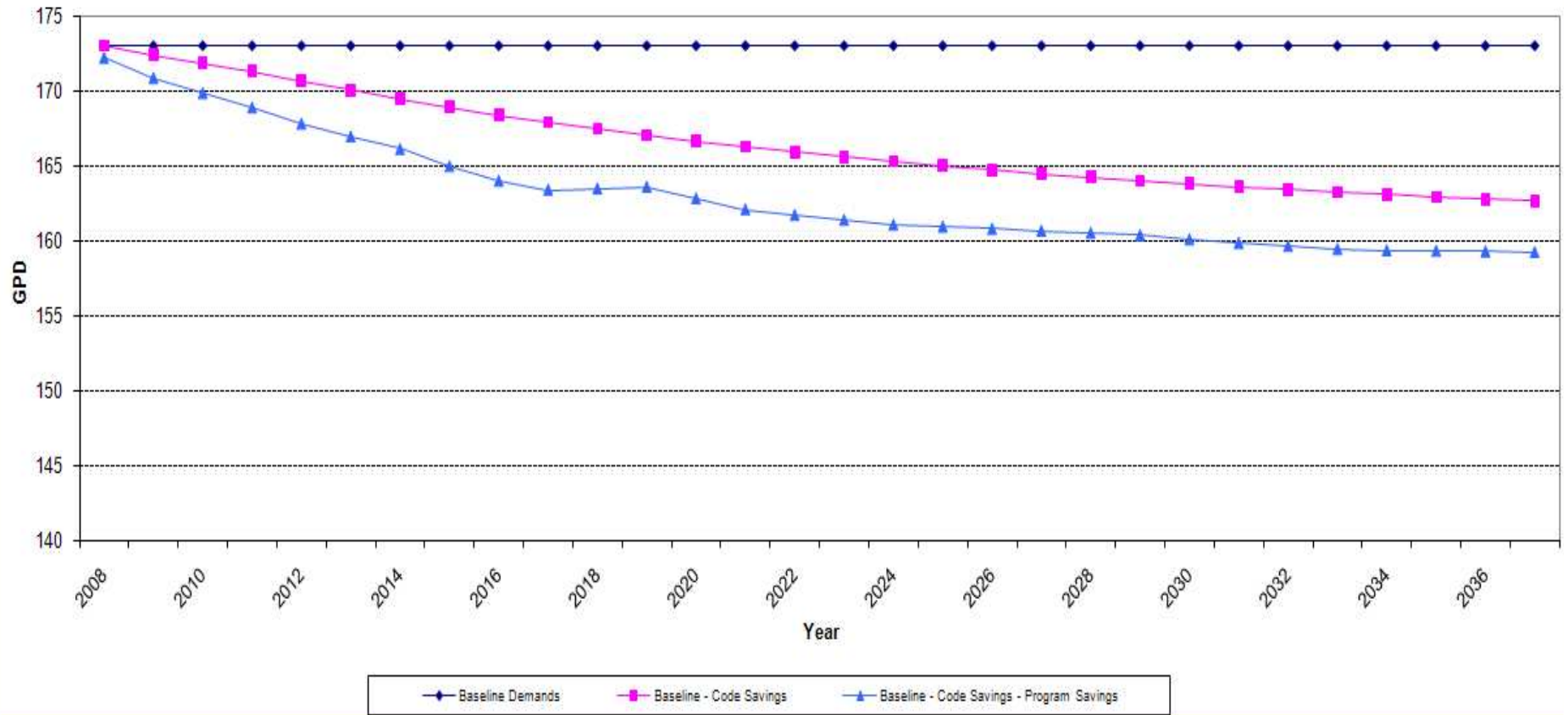


Select Chart to View

Per Capita Demands

Chart Explanations

Per Capita Demands



1 AWE CONSERVATION TRACKING TOOL: WATER SAVINGS SUMMARY WORKSHEET

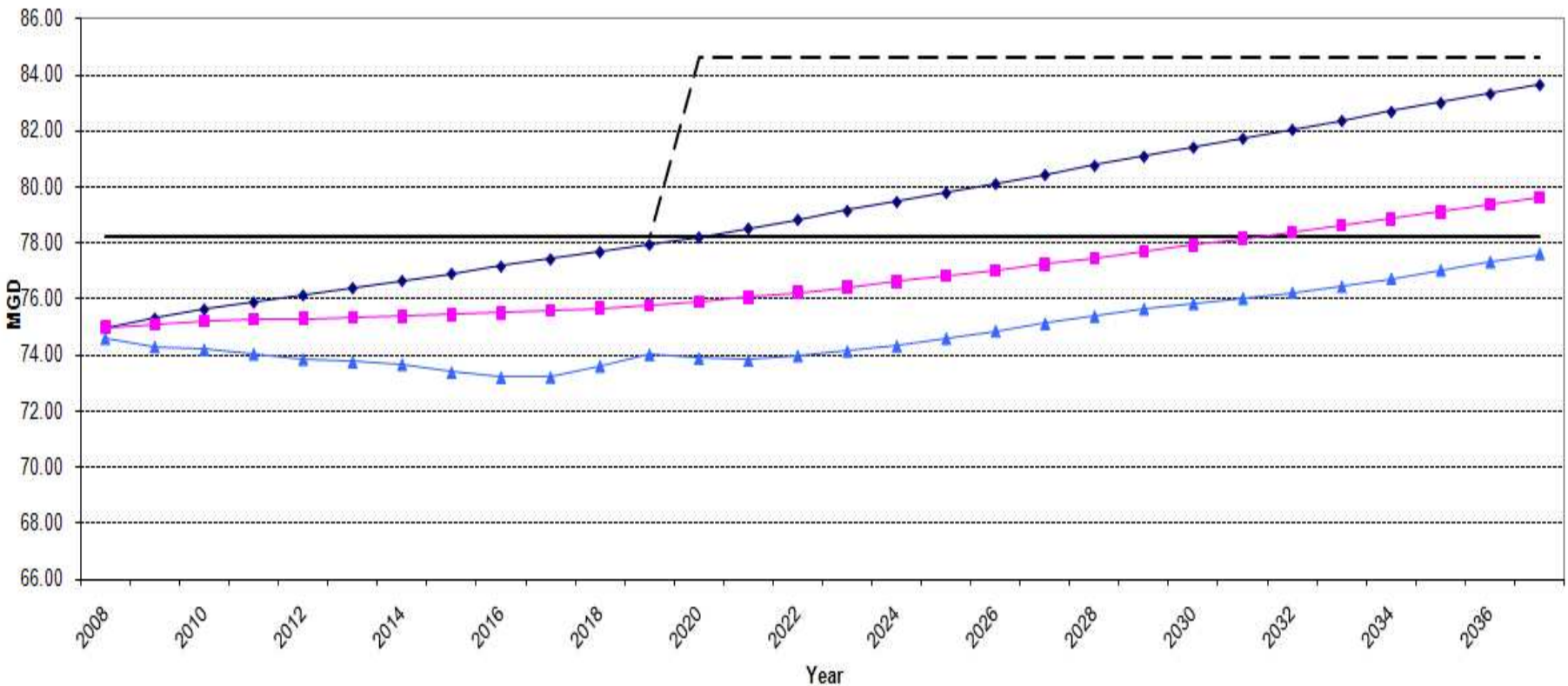
Year forecasted peak season demand equals existing peak season delivery capacity		Expansion (Years)	Deferred Capacity (MGD)	Benefit of Deferred Expansion (\$)	Avoided Capacity (MGD)	Benefit of Avoided Expansion (\$)
Baseline Demands	2020	N/A	N/A	N/A	N/A	N/A
Baseline - Code Savings	2031	11	6.4	\$9,144,908	0.0	\$0
Baseline - Code Savings - Program Savings	2039	19	6.4	\$14,198,213	0.0	\$0

Select Chart to View

Peak Season Capacity

Chart Explanations

Peak Season System Capacity



Current System Capacity

Planned System Capacity

Gross Peak Season Demand

Less Passive Savings

Less Active Savings

Activity Savings Profiles

Water Savings Summary

Utility Costs and Benefits

Utility Revenues and Rates

Customer Costs and Benefits

Society

AWE CONSERVATION TRACKING TOOL: GHG MODULE INPUTS WORKSHEET

Last Loaded Scenario: "GHG Scenario" loaded on 4/19/2011 6:11:20 PM

[Return to Navigation](#)

Select eGRID Region:

In which eGRID Region are you located? (See map) RFCE

Average Generation Emission Rates	lb/MWhr
CO ₂	1,139
CH ₄	0.03027
SO ₂	7.7918
NO _x	1.6307
N ₂ O	0.01871
Hg	0.0000387

Energy Used for Water Supply and Wastewater Treatment:

Average Energy Intensity For:	KWh/AF
Water Supply Withdrawal, Treatment, and Distribution	2,200
Wastewater Pumping and Treatment	850

Tables for Estimating Water and Wastewater Embedded Energy

Water Supply, Treatment, and Distribution Energy Intensity Default Values

Local Water Supply Sources	KWh/AF	% of Local Supply
Local Surface Water	222	40%
Groundwater	624	40%
Brackish Desalination	528	0%
Recycled Water	730	10%
Seawater Desalination	4,497	10%
Total:		100%

Average Energy Intensity of Local Water Supply 861 KWh/AF

Imported Water Supply Sources	KWh/AF	Default Value
Select the imported water energy intensity level	High	
Average Energy Intensity of Imported Water Supply		2,473 KWh/AF
Imported Water Supply as % of Total Supply	40%	
Local Water Supply as % of Total Supply	60%	

Average Energy Intensity per AF of Total Supply 1,506 KWh/AF

	% of Total Supply
--	-------------------

eGRID Subregion Representational Map

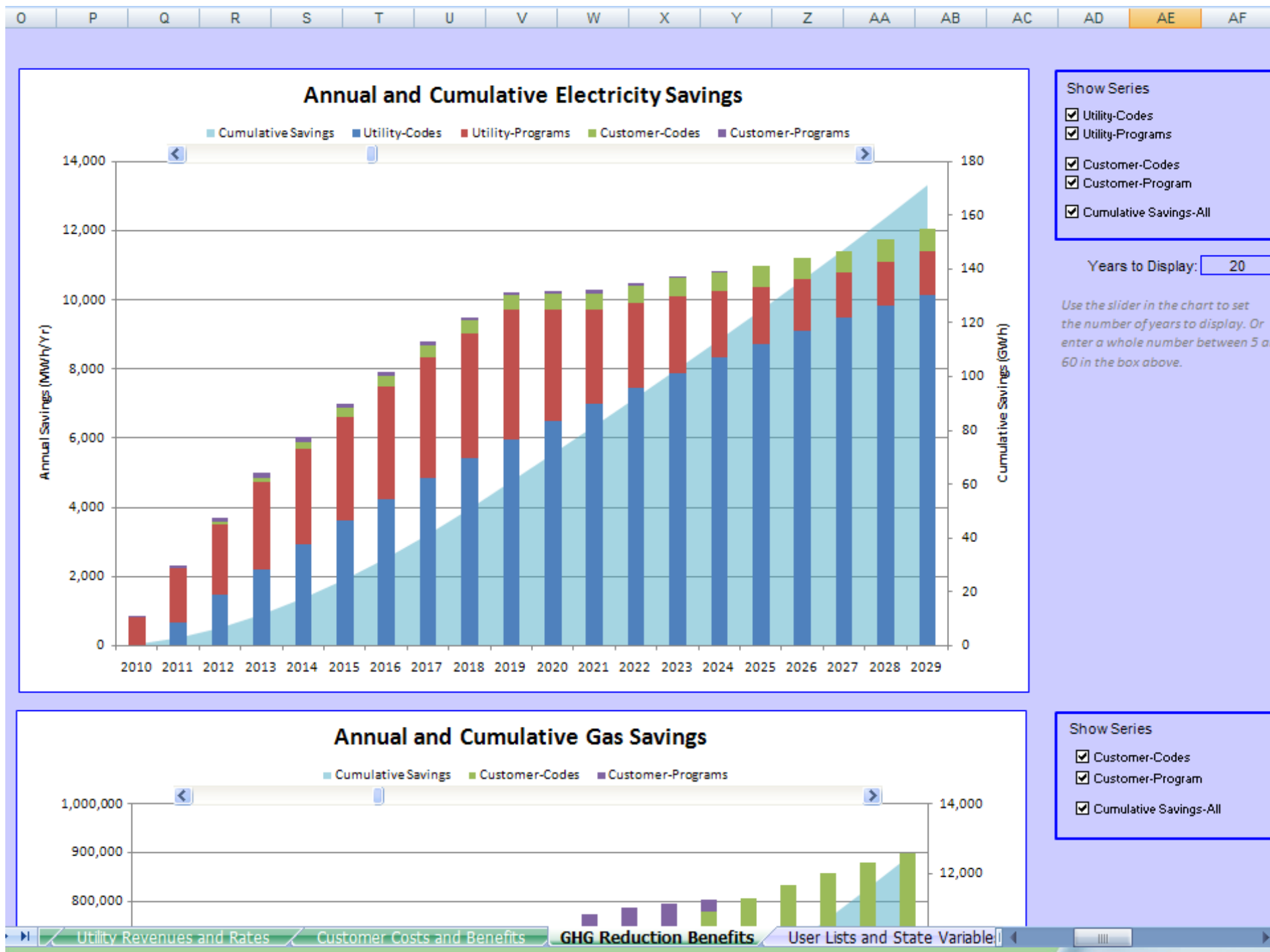


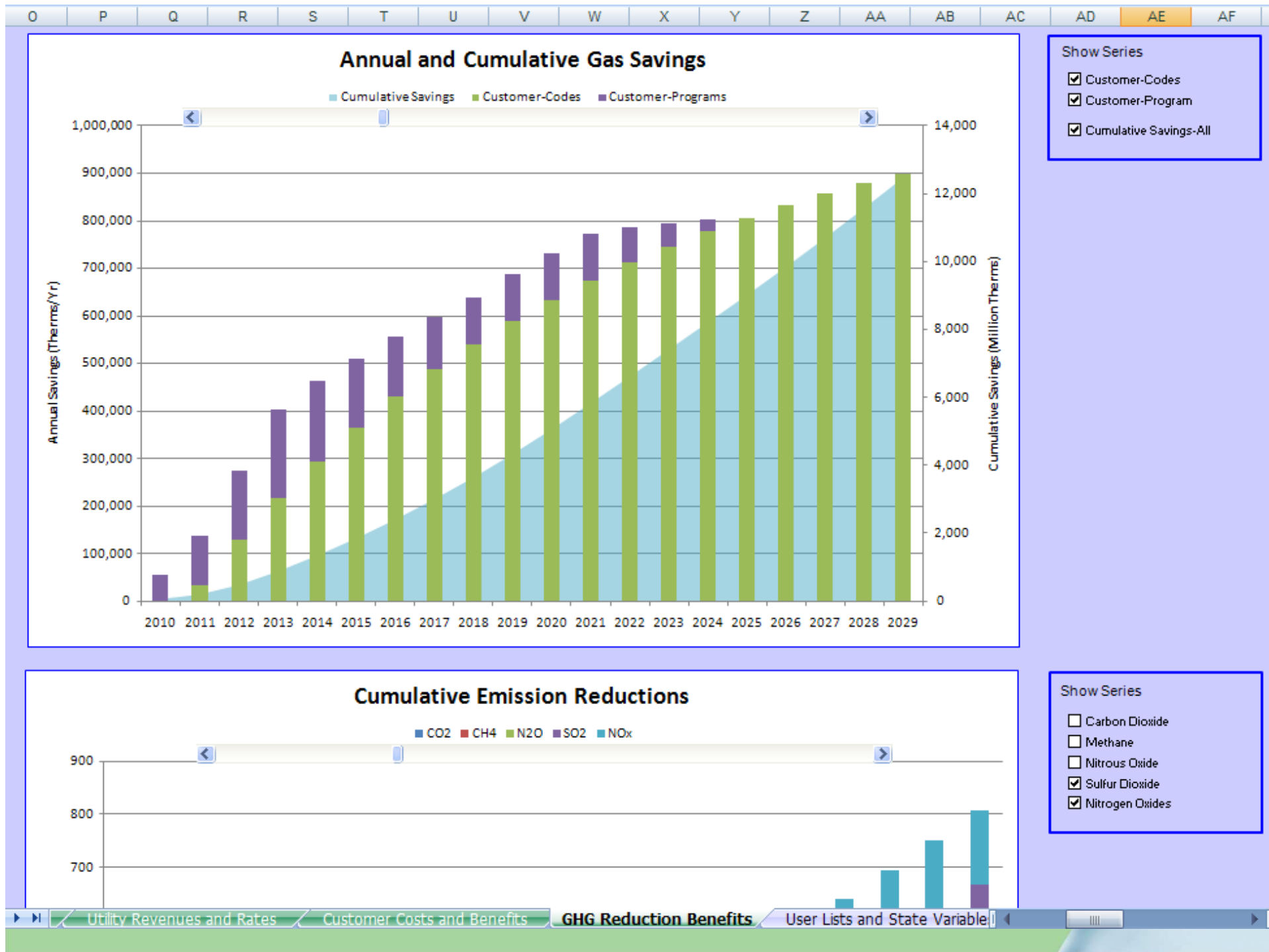
Imported Water Energy Intensity Key

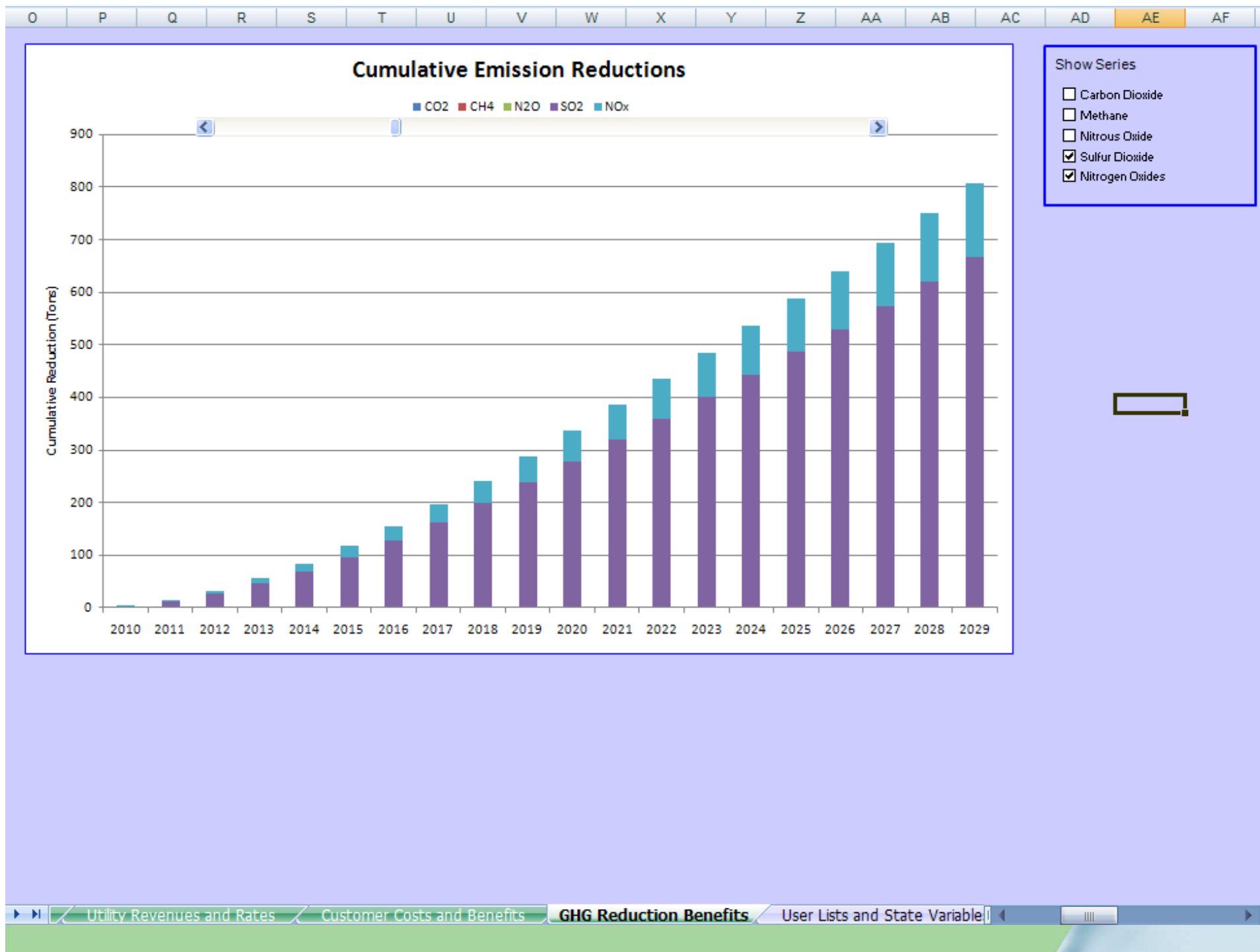
Low - Transmission mostly via gravity with limited pumping. More likely raw than treated.

Moderate - Some transmission pumping required. Source may be groundwater. De

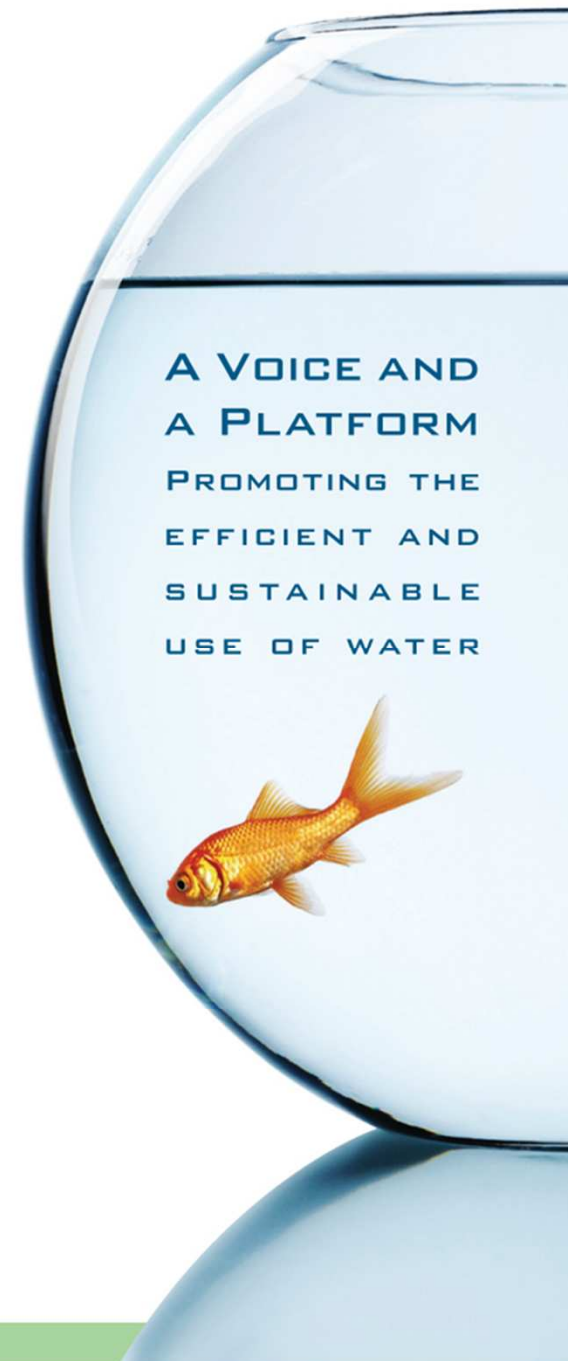
High - Transmission involves significant pumping. Source may be groundwater. De







Perspective #4: Revenue Loss Can be Avoided with Good Planning

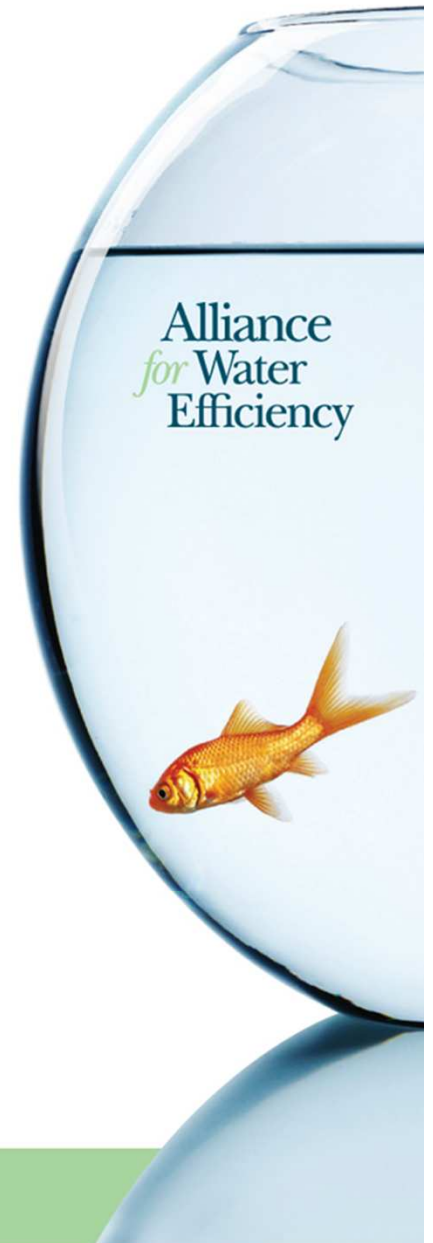


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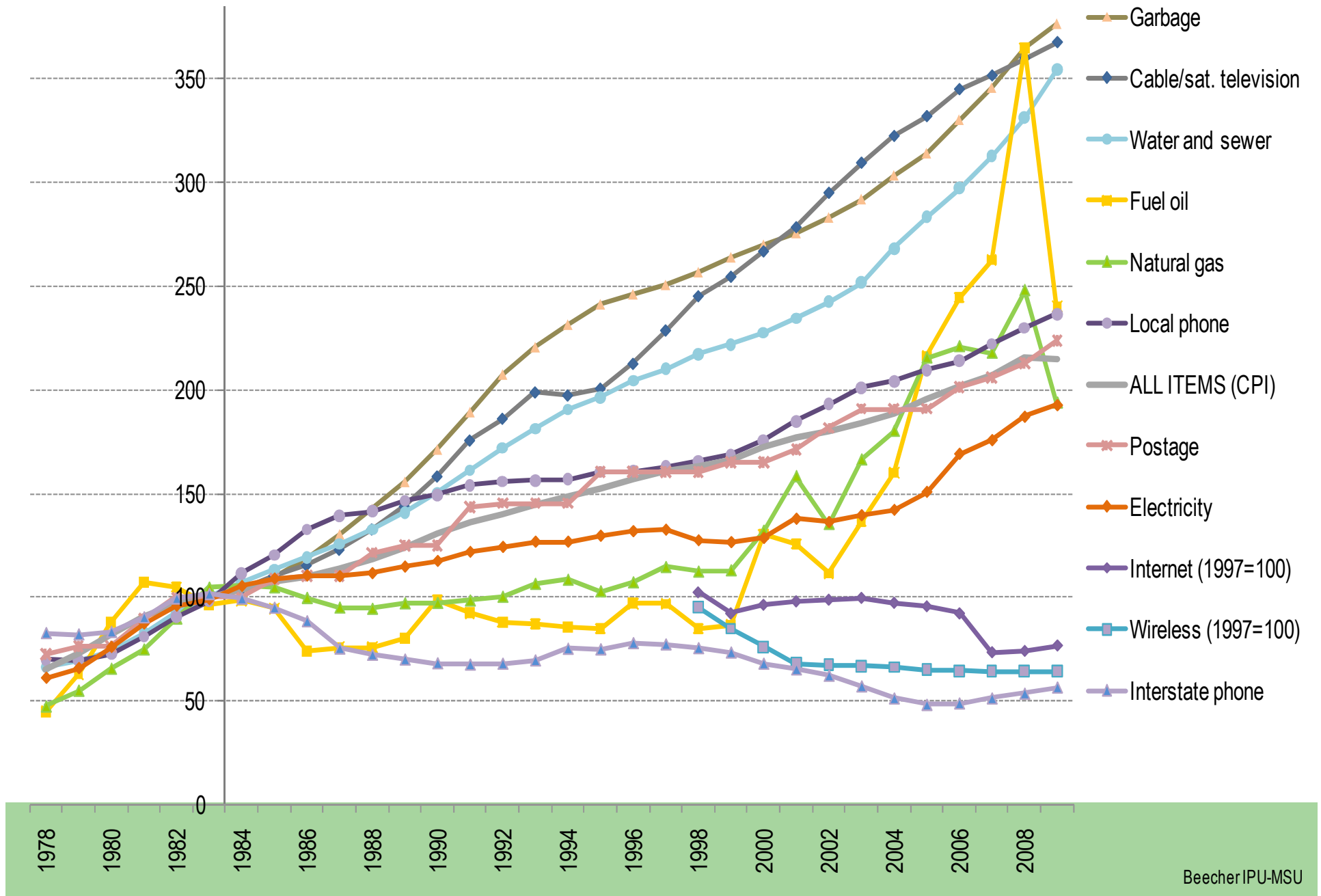
The Drivers

Rates are rising for a number of reasons

- Reduced demand from efficient fixture replacement under the plumbing codes
- Reduced demand from conservation programs
- Reduced demand from the recession: industrial shift layoffs, home foreclosures
- Unmaintained infrastructure
- **Inflation**
- **Rise in fixed costs**



Trends in consumer prices (CPI) for utilities [1978 to 2009]



AWE CONSERVATION TRACKING TOOL: UTILITY REVENUES & RATES WORKSHEET

Utility Revenue Requirement and Rate Impacts

[Return to Navigation Sheet](#) [Report Error](#)

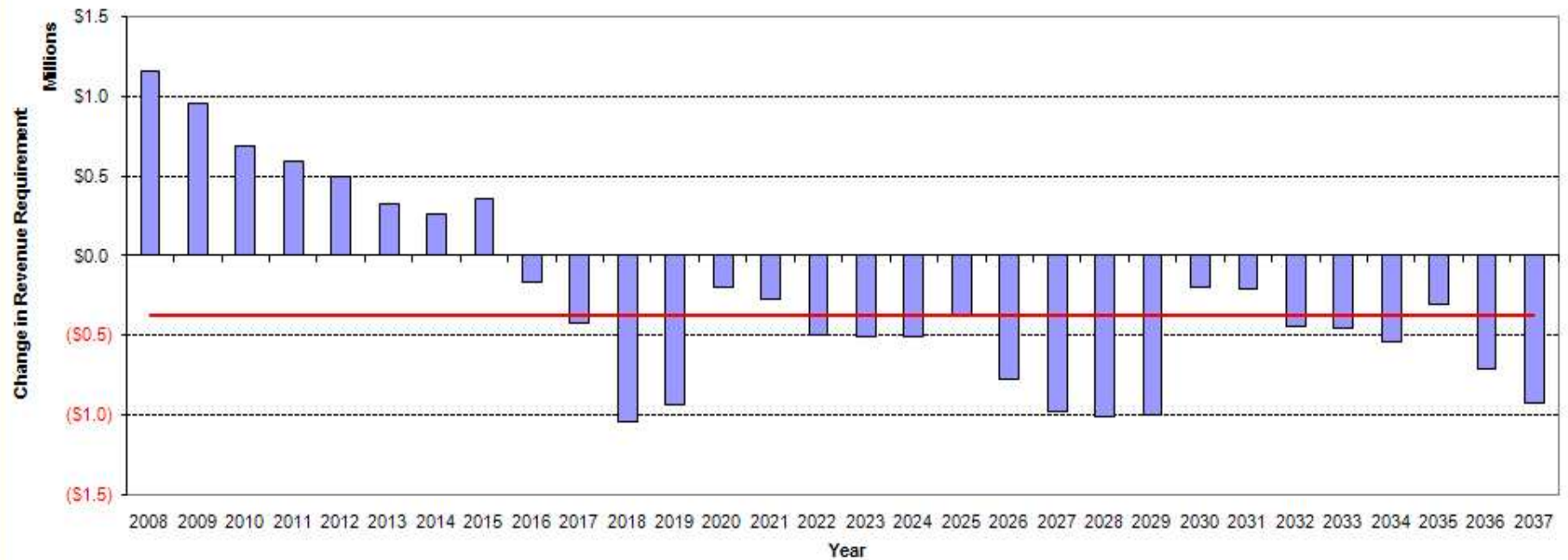
Program Impact on...	Baseline	With Conserv.	Change to Baseline
Water Utility Annual Sales Revenue Requirement	49,750,031	\$49,378,362	(\$371,668)
% change from baseline			-0.75%
Avg. Water Rate (\$/Thou Gal)	\$2.17	\$2.31	\$0.14
% change from baseline			6.60%
Annualized Bill Impact (\$/Mo.)	46.91	\$46.58	(\$0.32)
% change from baseline			-0.69%

Select Impact Chart to View

Revenue Requirement

Chart Explanations

Impact to Utility Sales Revenue Requirement



Change in Annual Revenue Requirement Annualized Change

5. Enter Annual Activity

Activity Savings Profiles

Water Savings Summary

Utility Costs and Benefits

Utility Revenues and Rates

Customer Costs

Water Pricing Primer

Introduction

The Rationale for Efficiency

Cost Knowledge

The Cost of Water

Cost-based Rates

Pricing and Efficiency

How Price Matters

Rate Design

Efficiency-oriented Rates

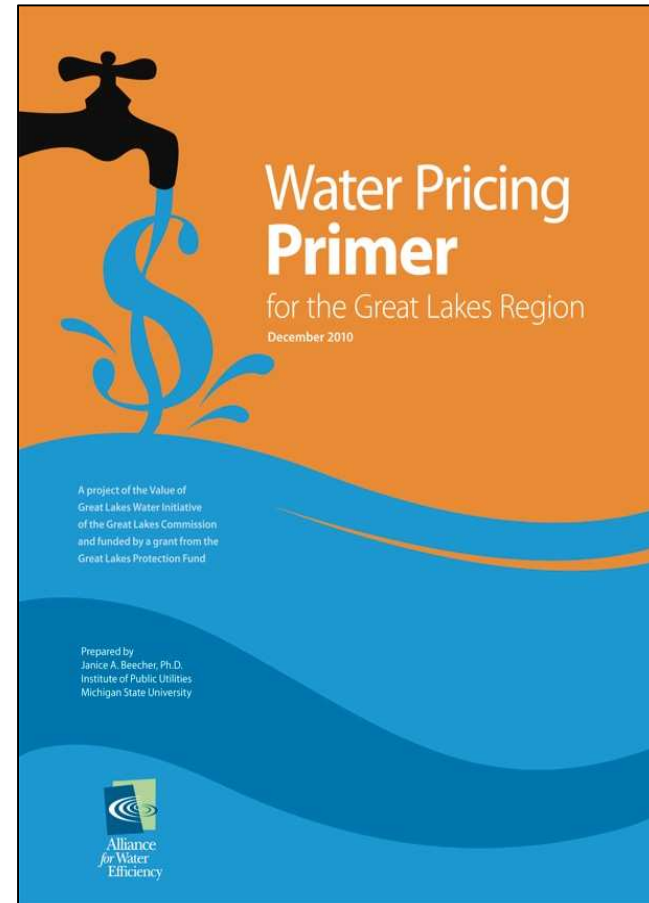
Conservation and Revenues

Implementing a Change in Rates

Communication is Key

Appendix

Resources



Perspective #5: The First Class Utility Is not Crisis-Driven

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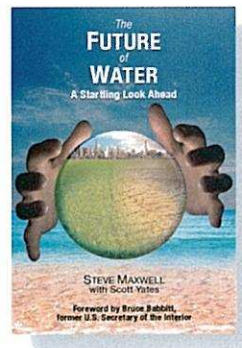


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The coming water crisis is like a giant asteroid hurtling toward Earth.

We are rushing headlong into a global water crisis of calamitous proportions. It is not too late to prevent it. AWWA's new book, *The Future of Water*, looks at what might be in store for us and how individuals, water utilities, industries, and countries can change the future of water.



NEW!

The Future of Water

Steve Maxwell and Scott Yates



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Energy Bill Balancing Energy Production and Water Efficiency Advances

Congress acted on a comprehensive energy bill last week as the Senate Energy and Natural Resources Committee advanced legislation. The legislation highlights the nexus between water resources and energy production and begins to integrate decision-making related to both resources. [Learn more here.](#)



AWE Testifies Before Senate Subcommittee on Water and Wildlife

The Alliance for Water Efficiency urged Congress to ramp up the funding for WaterSense, the federal government's three-year-old program to promote and label more water efficient appliances and plumbing products. [Learn more here.](#)

American Recovery and Reinvestment Act Signed by President Obama

The Act signed by President Obama allocates \$6 billion for local clean and drinking water infrastructure improvements. For more information on taking action to seek stimulus funding for your water

Calendar of Events



7/28/2009	A National Water Policy Event
8/18/2009	World City Water Forum 2009
9/13/2009	Water/Energy Sustainability Symposium at the GWPC Annual Forum 2009
9/21/2009	2009 ENERGY STAR Appliance Partner Meeting
10/6/2009	WaterSense & Water Efficient Products Committee Meeting

Latest Information



Water Efficiency Watch Newsletter July 2009



Water Use Efficiency Guide for New Businesses



New 13th Edition MaP and UNAR Toilet Testing Results and Info



AWE Launches Major On-Line Water Efficiency Information Library



NRDC Report - Increasing Water Efficiency in California's Oil Sector



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Resource Lib

Welcome to the Alliance for Water Efficiency's Resource Library. We provide the best online resources to provide the best online resources for water conservation and efficiency through our collection of a wealth of useful, technical information assembled. Enter keywords in the search box below or select from the list on the right. Search instructions are available here.



Resource Lib

Use the tool below to search the Alliance for Water Efficiency library:

[Basic Search](#)[Advanced Search](#)
Site[Definition of Terms](#)

Recent Library Updates



10/30/2008	Water Efficiency Watch Listing
10/30/2008	Szann, A (2008) Australia - Water Wastage of Instantaneous Gas Water Heaters
10/30/2008	Tucson rainwater ordinance
10/30/2008	Heinrich, M (2008) New Zealand - Water Use in Auckland Households
10/29/2008	Commercial Food Service Introduction

AWE Library Sections

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