

AWE Water Conservation Tracking Tool: *Planning and Evaluating Cost-Beneficial Water Conservation Programs*

Bill Christiansen
Program Manager

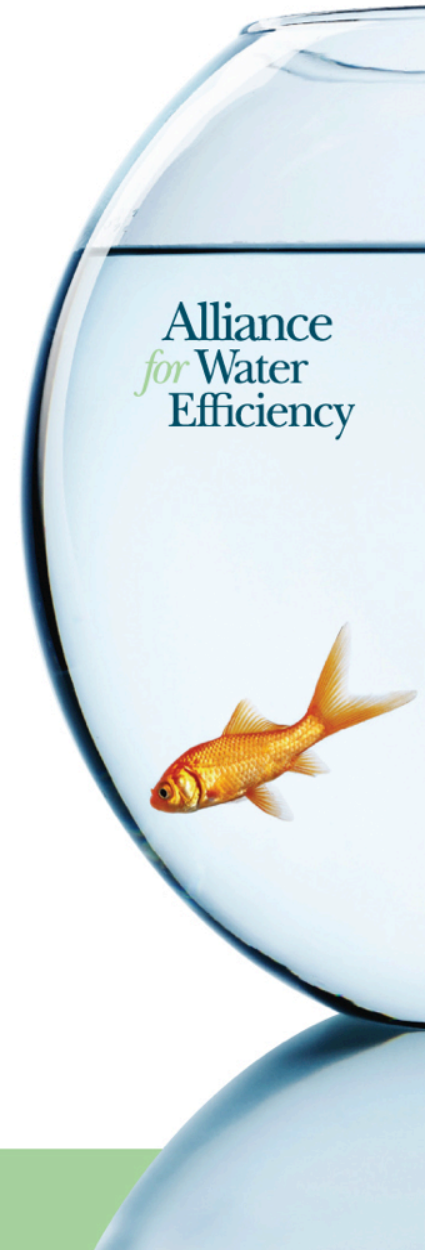
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PROMOTING THE
EFFICIENT AND
SUSTAINABLE
USE OF WATER



Alliance *for* Water Efficiency

What is the AWE Water Conservation Tracking Tool?

- An Excel-based model that can be used to evaluate the costs and benefits of water conservation programs
- Includes pre-defined conservation measures and provides flexibility for customization
- Estimates conservation impact on a utility's revenue requirement
- Estimates energy and GHG emission reductions from conservation
- Available free of charge for AWE members



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

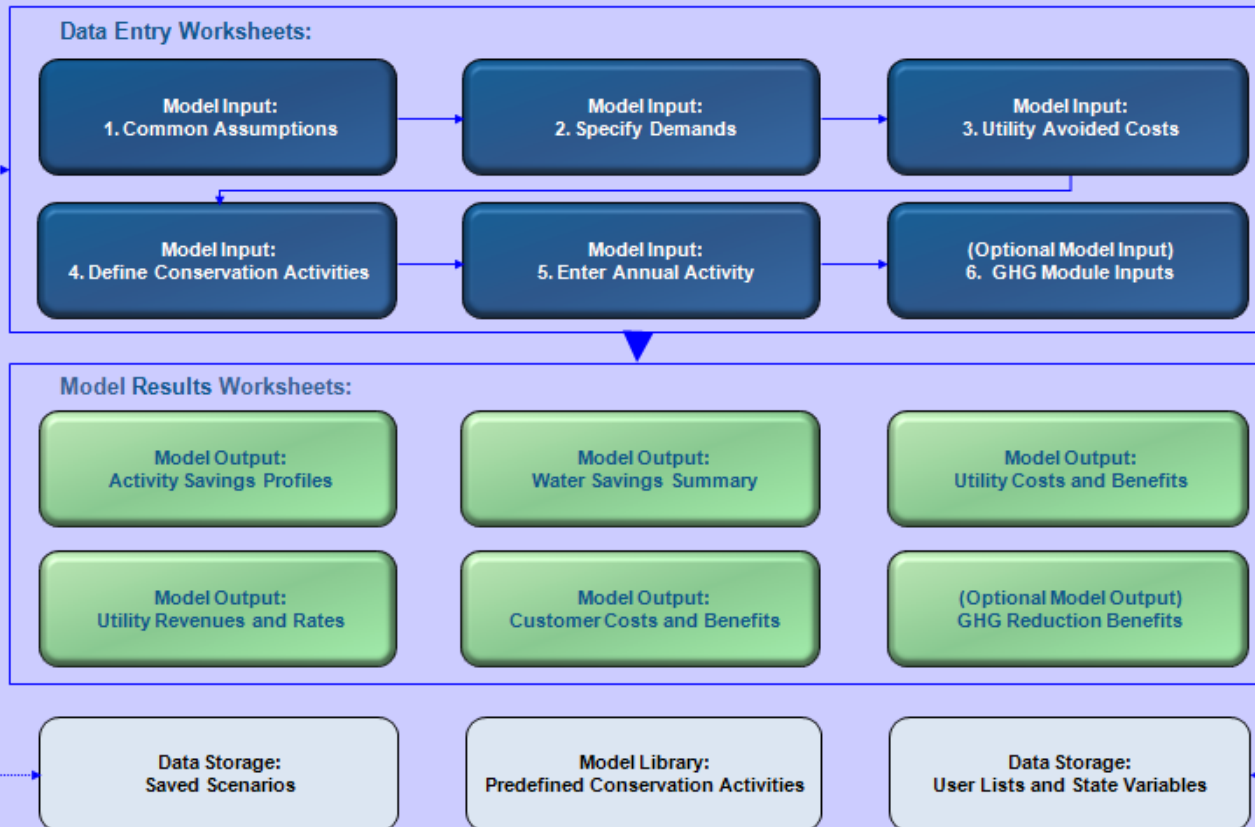
2. First provide information about your system, customers, and water demands. This is done on data entry worksheets 1 thru 3.

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

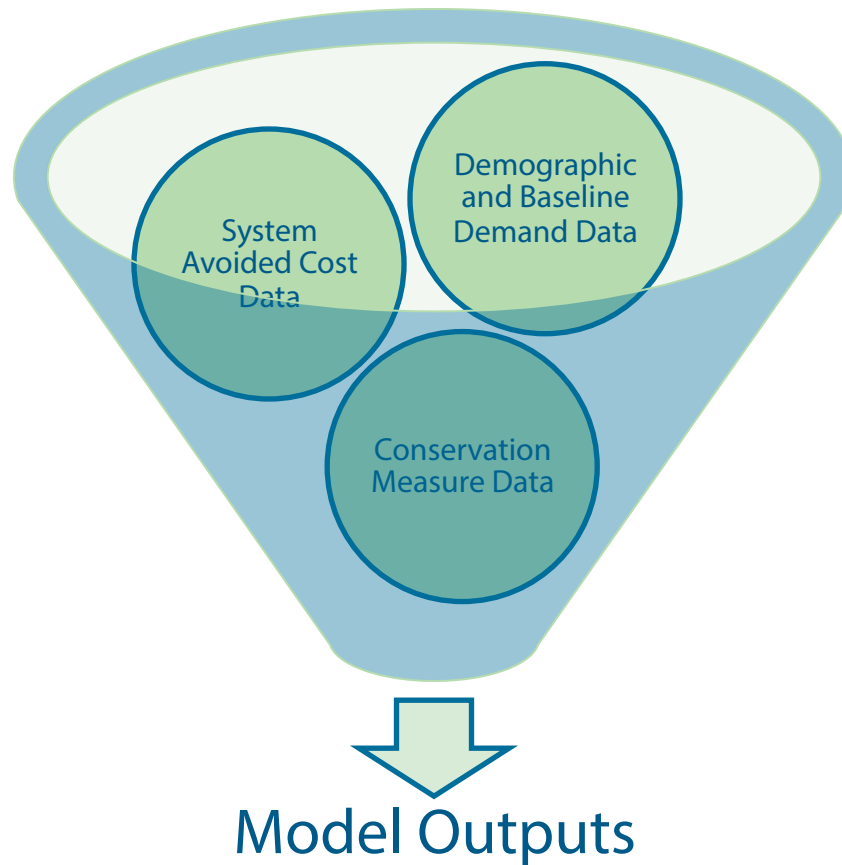
4. You can save conservation activity scenarios at any time. You access the scenario manager on the Common Assumptions worksheet.

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: Only enter data in cells with this color coding.



Tracking Tool Inputs and Outputs



Savings Analysis Benefit-Cost Analysis Revenue/Rate Impacts Energy Savings

Common Assumptions

AWE CONSERVATION TRACKING TOOL: COMMON ASSUMPTIONS WORKSHEET

ENTER COMMON ASSUMPTIONS:

Manage Scenarios

Analysis Start Year	2014	2020	2030	2040	2050
Service Area Population	350,000	355,000	365,000	380,000	395,000
Service Area Population in 1990	300,000				
Peak-Season Start Date (month/day)	31-May				
Peak-Season End Date (month/day)	31-Oct				
Nominal Interest Rate	6.00%				
Inflation Rate	3.00%				
Year in which to Denominate Costs & Benefits	2014				
Persons Per Household - SF	2.25				
Persons Per Household - MF	1.50				
Full Bathrooms Per Household - SF	1.75				
Half Bathrooms Per Household - SF	0.75				
Full Bathrooms Per Household - MF	1.00				
Half Bathrooms Per Household - MF	0.25				
SF Housing Units Built <i>before 1994</i>	100,000				
MF Housing Units Built <i>before 1994</i>	50,000				
Reference ET (inches/yr)	57.33				
Avg. Annual Rainfall (inches/yr)	40.24				

Show Bathroom Lookup Table

CHOOSE VOLUME UNITS:

Water Volume Units

Million Gallons (MG)

Acre-Feet (AF)

Million Cubic Meters (MCM)

Flow Units Will Be: MGD

Last Loaded Scenario:

"All City, USA" loaded on 2/16/2015 6:38:51 AM

Last Saved Scenario:

"All City, USA" saved on 2/16/2015 6:38:57 AM

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Select Water User Classes

Class Names	Selected Classes
<ul style="list-style-type: none"> Single Family Multi Family Residential CII Commercial Industrial Institutional Irrigation Other 	<ul style="list-style-type: none"> Single Family Multi Family CII Irrigation

Buttons: Move Up, Move Down, Delete, OK, Cancel, Add >

SELECT CUSTOMER CLASSES:

Select Water User Classes

ENTER UTILITY RATE INFORMATION:

Water User Classes in Model	Customer Utility Rates (2014 Dollars)				Nominal Rate of Increase			
	Water Rates (\$/Thou Gal)	Sewer Rates (\$/Thou Gal)	Electric Rates (\$/KWh)	Gas Rates (\$/Therm)	Water Rates (%/Yr)	Sewer Rates (%/Yr)	Electric Rates (%/Yr)	Gas Rates (%/Yr)
Single Family	\$3.50	\$0.70	\$0.15	\$1.50	3.0%	3.0%	3.3%	3.3%
Multi Family	\$3.50	\$0.70	\$0.15	\$1.50	3.0%	3.0%	3.3%	3.3%
CII	\$3.50	\$0.70	\$0.15	\$1.50	3.0%	3.0%	3.3%	3.3%
Irrigation	\$3.00	\$0.70	\$0.15	\$1.50	3.0%	3.0%	3.3%	3.3%

AWE CONSERVATION TRACKING TOOL: SPECIFY DEMANDS WORKSHEET

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Enter Demands Manually
 Grow Demands with Population
 Demand projection accounts for plumbing code.

SERVICE AREA DEMAND:

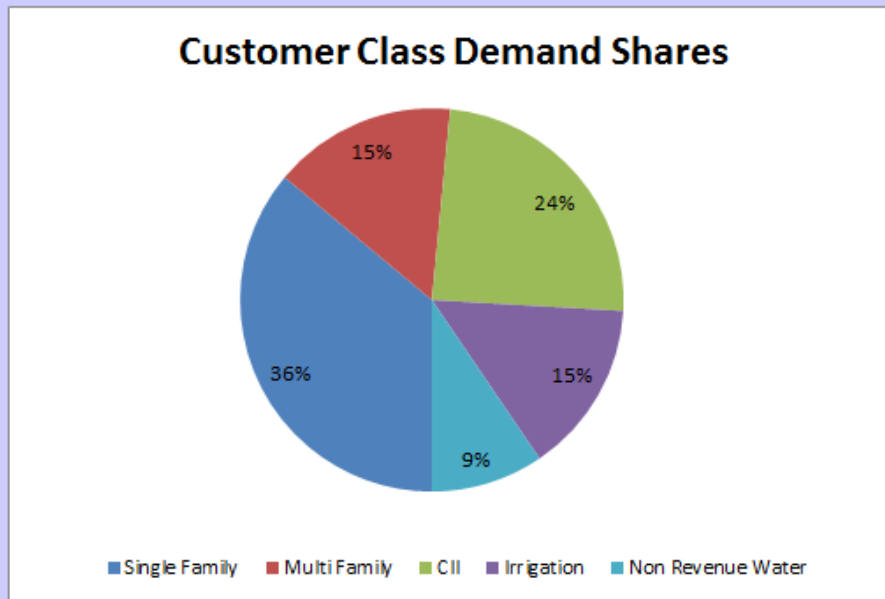
Service Area Demands	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Peak Season	MGD	75	75	75	75	76	76	76	76	76	76	77	77	77
Off Peak Season	MGD	50	50	50	50	50	51	51	51	51	51	51	51	51
Average	MGD	60	61	61	61	61	61	61	61	62	62	62	62	62
Peak to Average Ratio		1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2

Volumes	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Peak Season	MG	11,475	11,498	11,522	11,545	11,568	11,592	11,615	11,639	11,671	11,704	11,736	11,769	11,802
Off Peak Season	MG	10,600	10,622	10,643	10,665	10,686	10,708	10,730	10,751	10,781	10,811	10,841	10,872	10,902
Total	MG	22,075	22,120	22,165	22,210	22,255	22,300	22,345	22,390	22,453	22,515	22,578	22,641	22,704

CUSTOMER DEMAND SHARES:

Enter Customer Class Shares (%)
 Enter Customer Class Demands

Customer Class	Share (%)	Demand (MG)	Accounts
Single Family	36%	7,965	80,000
Multi Family	15%	3,414	350
CII	24%	5,386	1,000
Irrigation	15%	3,223	200
Non Revenue Water	9%	2,097	
Total	100%	22,085	81,550



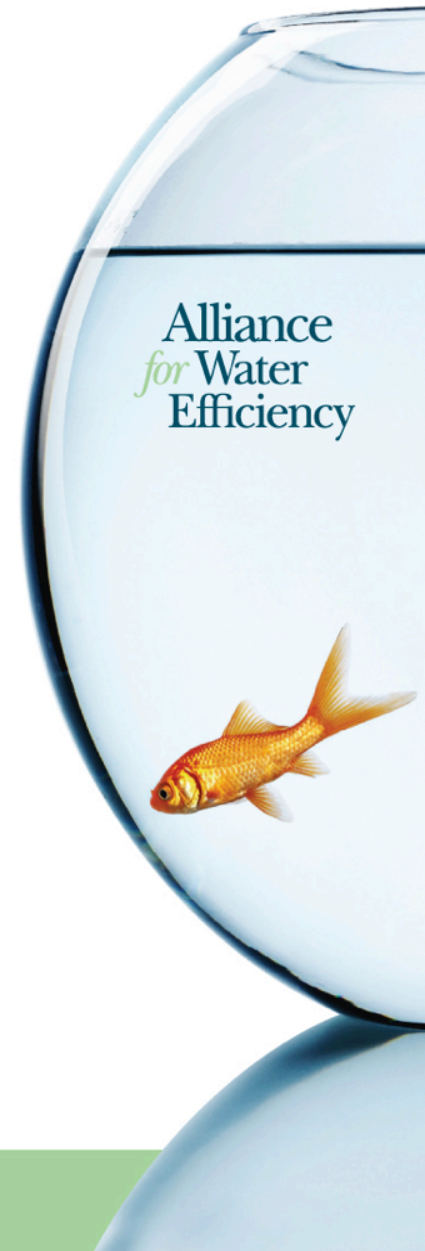
BASELINE CLASS DEMANDS:

Customer Class	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Single Family	MG	7,962	7,978	7,994	8,010	8,026	8,043	8,059	8,075	8,098	8,120	8,143	8,165	8,188
Multi Family	MG	3,412	3,419	3,426	3,433	3,440	3,447	3,454	3,461	3,470	3,480	3,490	3,499	3,509
CII	MG	5,384	5,395	5,406	5,417	5,428	5,439	5,450	5,461	5,476	5,491	5,506	5,522	5,537
Irrigation	MG	3,221	3,228	3,235	3,241	3,248	3,254	3,261	3,267	3,277	3,286	3,295	3,304	3,313
Non Revenue Water	MG	2,096	2,100	2,105	2,109	2,113	2,117	2,122	2,126	2,132	2,138	2,144	2,150	2,156
Total	MG	22,075	22,120	22,165	22,210	22,255	22,300	22,345	22,390	22,453	22,515	22,578	22,641	22,704

BASELINE CLASS DEMANDS ADJUSTED FOR PLUMBING CODE:

Avoided Costs

- Two Data Entry Options
 - *Enter or link to an existing avoided cost forecast*
 - *Use model's avoided cost calculator*
- Model's Avoided Cost Calculator
 - Short-run avoided O&M
 - *Water Supply*
 - *Wastewater Treatment*
 - Long-run avoided or deferred capacity
 - *Calculates present value of delaying and/or downsizing peak season capacity expansion*



AWE CONSERVATION TRACKING TOOL: ENTER UTILITY AVOIDED COSTS WORKSHEET

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Use manually entered avoided costs to calculate utility benefits
 Use model's avoided cost calculator to calculate utility benefits

Simple Utility Avoided Cost Calculator

WATER SUPPLY: Variable O&M Costs (2014 Dollars)	\$/MG	Nominal Rate of Increase %/Yr
Water Purchase Cost:	\$1,381.00	3.0%
Energy for Transmission,Treatment,Distribution:	\$245.51	3.3%
Chemicals:	\$138.10	3.3%
Other Variable O&M:	\$15.34	3.0%
Total Variable O&M:	\$ 1,779.95	3.1%

WASTEWATER: Variable O&M Costs (2014 Dollars)	\$/MG	Nominal Rate of Increase %/Yr
Energy for Transmission,Treatment,Discharge:	\$122.76	3.3%
Chemicals:	\$30.69	3.3%
Other Variable O&M:	\$15.34	3.0%
Total Variable O&M:	\$ 168.79	3.2%

Current peak season capacity (MGD):	76.00	Min Peak Demand:	75 MGD
Amount of new capacity that will be added (MGD):	5.18	<input checked="" type="checkbox"/> Check to Use Model Default	
Year new capacity needed under current demand projection:	2020		

Avoidable System Expansion Cost (2014 Dollars)	\$/MGD	Year New Capacity Required	Capacity Required (MGD)
System Expansion Cost	\$7,000,000	2020	5.18

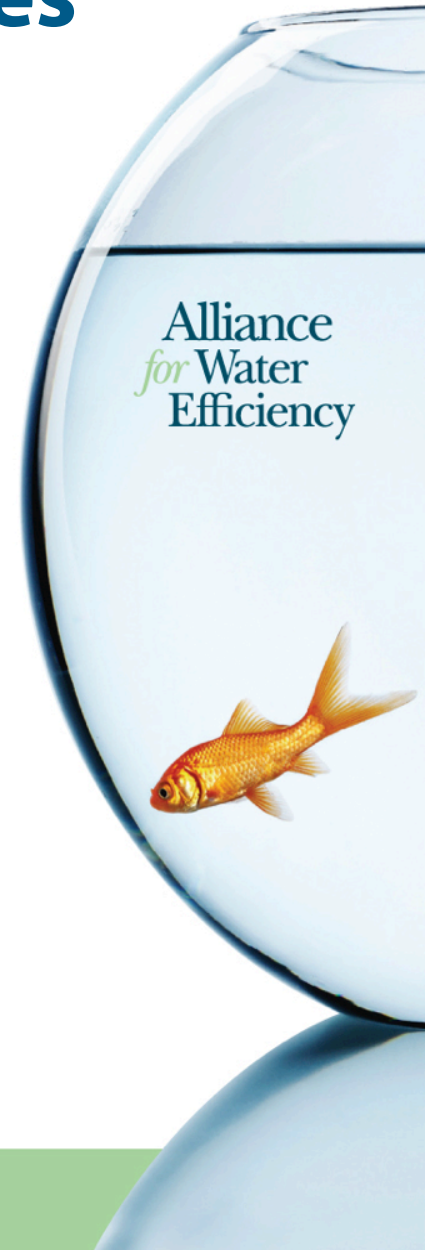
Variable O&M (2014 Dollars)	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Water Supply	MG	\$ 1,780	\$ 1,781	\$ 1,782	\$ 1,783	\$ 1,784	\$ 1,785	\$ 1,786	\$ 1,787	\$ 1,788	\$ 1,789	\$ 1,790	\$ 1,791	\$ 1,791	\$ 1,792
Wastewater	MG	\$ 169	\$ 169	\$ 170	\$ 170	\$ 170	\$ 171	\$ 171	\$ 171	\$ 172	\$ 172	\$ 173	\$ 173	\$ 173	\$ 174

Enter Other Benefits of Reduced Water Demands (2014 Dollars)

\$/Unit	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Peak Season	MG														

Setting Up Conservation Measures

- Two Specification Options
 - *Build from scratch*
 - *Import pre-defined measures from library*
 - *Pre-defined measures can be customized*
- Library currently includes 25 measures
 - *13 residential measures*
 - *8 CII measures*
 - *4 large landscape measures*



Defining Conservation Measures

AWE CONSERVATION TRACKING TOOL: DEFINE CONSERVATION ACTIVITIES WORKSHEET

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Define Conservation Program Activities

Define/Edit/Delete Conservation Activities

Hide Table of Activities in Model

Warning: Only use the form to edit or delete activities. Editing/deleting activities directly in the table may result in model errors!

Activity ID	Activity Name	Class	Savings, Per Unit (gpy)	Savings, Annual Rate of Decay (%)	Savings, Peak Period (% of Annual Savings)	Savings, Useful Life (yrs)	Savings, Participant Free Riders (% of Participants)	Utility Costs, Year Denominated	Utility Costs, Initial Fixed (\$)	Utility Costs, Initial Variable (\$/unit)	Utility Costs, Years of Follow-up (yrs)	Utility Costs, Follow-up Fixed (\$/yr)	Utility Costs, Follow-up Variable (\$/unit/yr)
1	Residential Surveys, SF	Single Family	12,373	20%	68%	5	0%	2014		\$40.00			
2	Residential HE Toilets, SF	Single Family											
3	CII Tank-Type HE Toilet	CII											
4	Residential Irrigation Controller, SF	Single Family											
5	Large Land. Irrigation Controller	Irrigation											
6	CII Dishwasher	CII											
7	CII 1/2 Gallon Urinal	CII											
8	CII Cooling Tower	CII											
9	CII Laundromat	CII											
10	CII Food Steamer 10% FR	CII											
11													
12													
13													
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Define Conservation Activities

Activity Name:

Affected Customer Class:

Unit Water Savings | Utility Costs | Participant Costs | Participant Non Water Benefits | Plumbing Code

Unit Water Savings (Gal/Yr):

Annual Rate of Savings Decay (%/Year):

Peak Period Savings (% of Annual): Peak days = 42% of days in a year.

Useful Life (Years):

Participant Freeriders (% of Participants):

2 of 10

Activity Savings Profile Worksheet

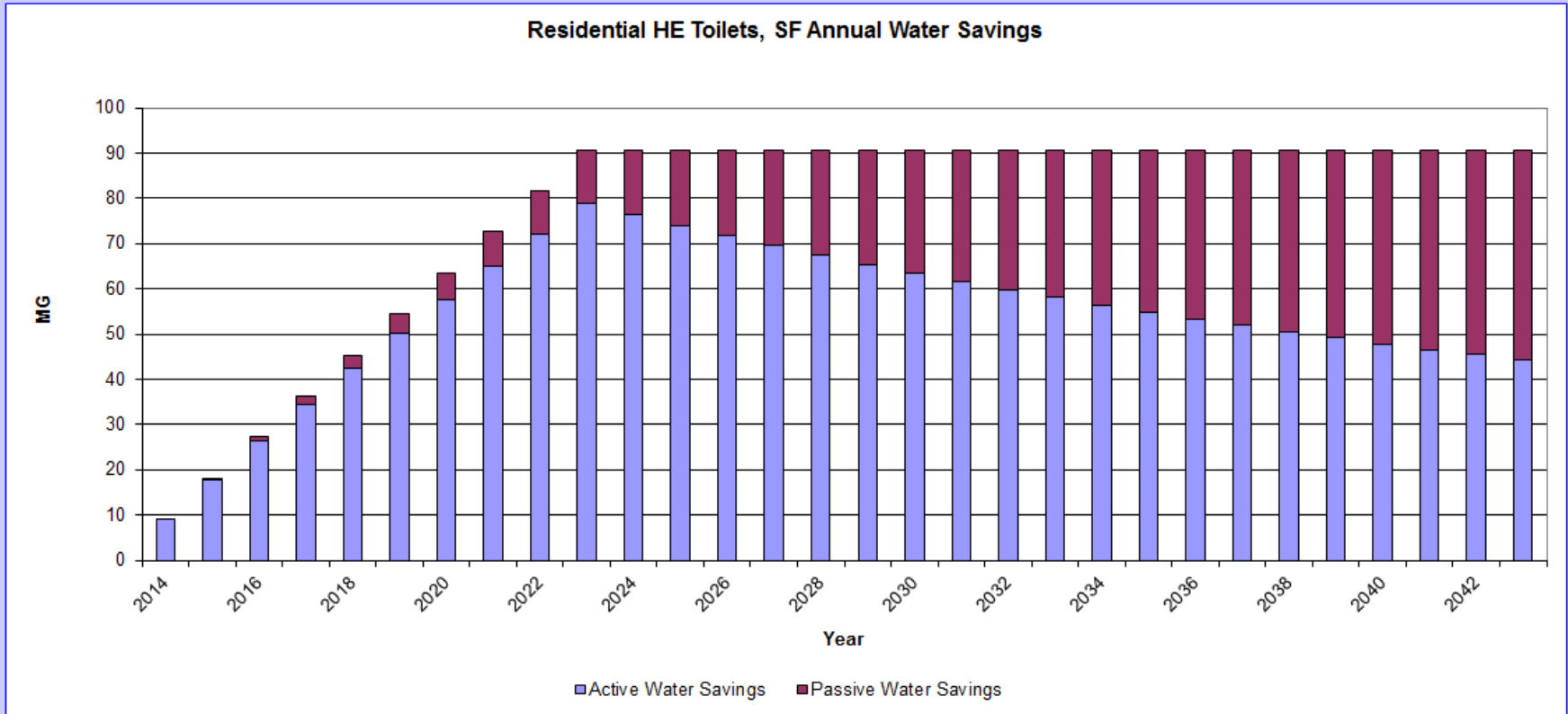
AWE CONSERVATION TRACKING TOOL: ACTIVITY SAVINGS PROFILES WORKSHEET

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Activity Name Residential HE Toilets, SF



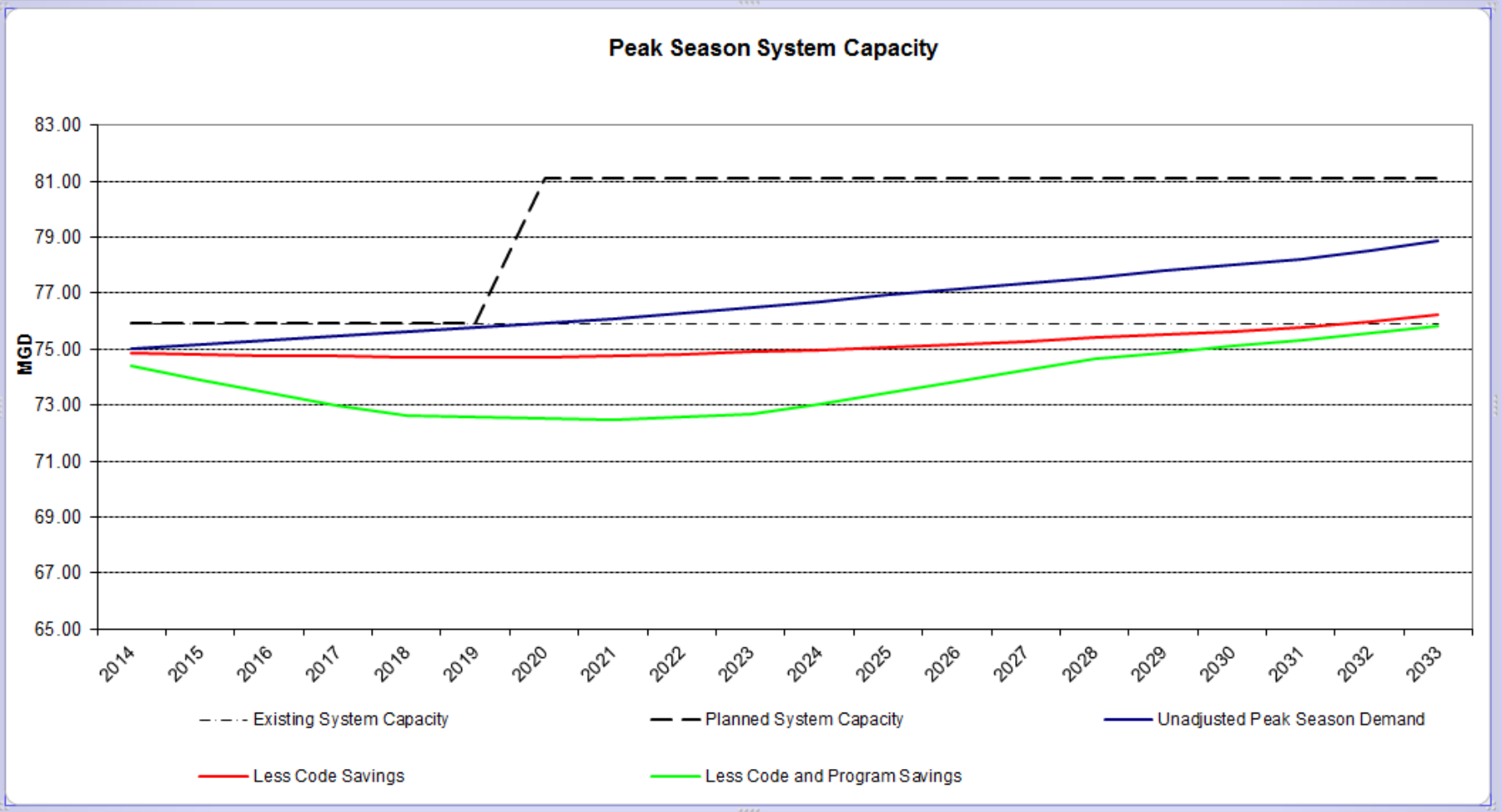
Residential HE Toilets, SF	Gross	Active	Passive
Lifetime Water Savings (MG)	5,035	2,593	2,442
Average Annual Water Savings (MG)	84	43	41

Year forecasted peak season demand equals existing peak season delivery capacity		Deferred 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	5.2	\$8,271,646	0.0	\$0
Baseline - Code Savings - Program Savings	2033	13	5.2	\$9,514,556	0.0	\$0

Select Chart to View

Peak Season Capacity

No. of Years to Display



Utility Conservation Program NPV and B/C Ratio (2014 Dollars)

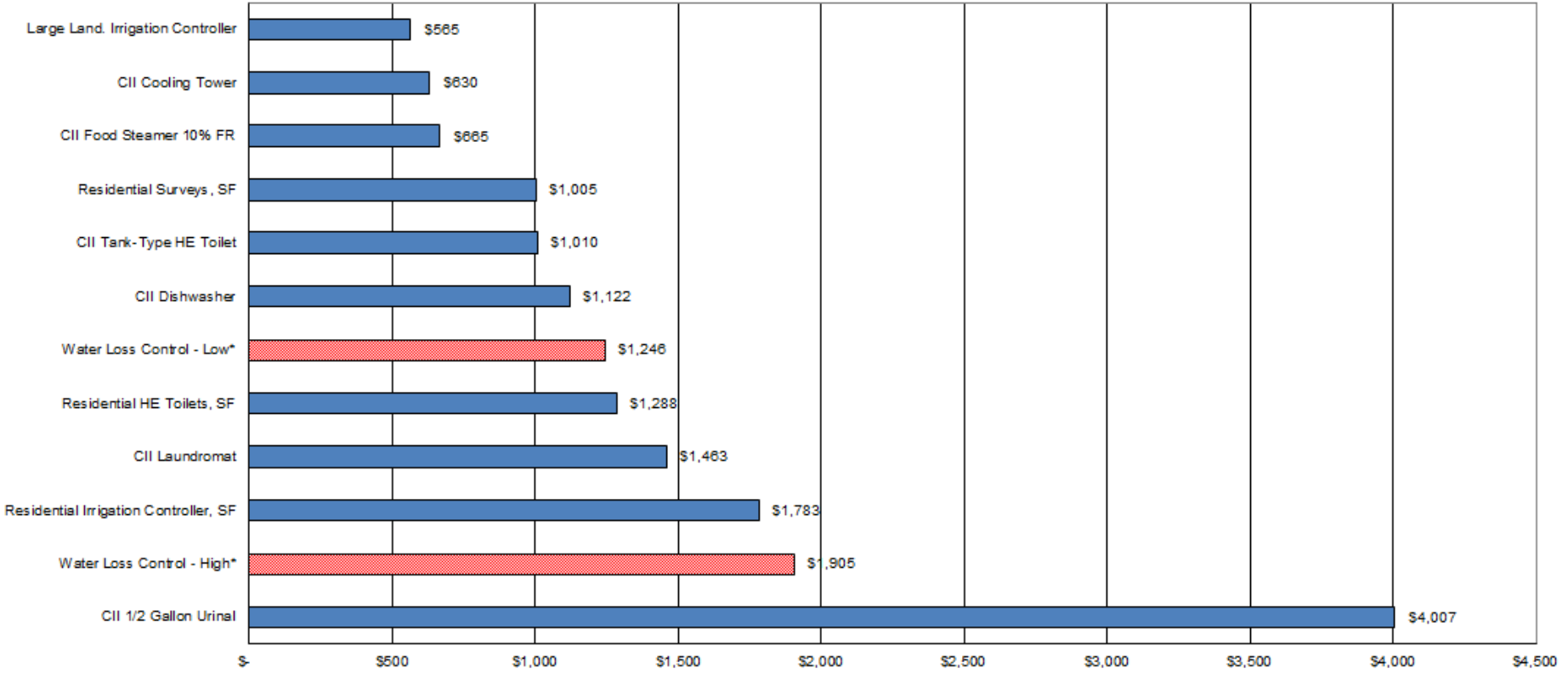
Class	Activity Name	NPV (\$)	B/C Ratio
Single Family	Residential Surveys, SF	\$ 154,483	2.01
Single Family	Residential HE Toilets, SF	\$ 1,185,226	1.67
CII	CII Tank-Type HE Toilet	\$ 1,997,995	2.13
Single Family	Residential Irrigation Controller, SF	\$ 246,219	1.11
Irrigation	Large Land. Irrigation Controller	\$ 2,441,863	3.50
CII	CII Dishwasher	\$ 204,408	1.87
CII	CII 1/2 Gallon Urinal	\$ (101,002)	0.52
CII	CII Cooling Tower	\$ 351,437	3.38
CII	CII Laundromat	\$ 36,161	1.41
CII	CII Food Steamer 10% FR	\$ 125,832	3.12
Subtotal Conservation Activities		\$ 6,642,622	1.88
Total With Overhead & Public Information		\$ 5,979,478	1.73

Select Chart to View

Unit Costs Sorted

Chart Explanations

Conservation Activities Sorted by Utility Unit Cost



AWE CONSERVATION TRACKING TOOL: UTILITY REVENUES & RATES WORKSHEET

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Utility Revenue Requirement and Rate Impacts

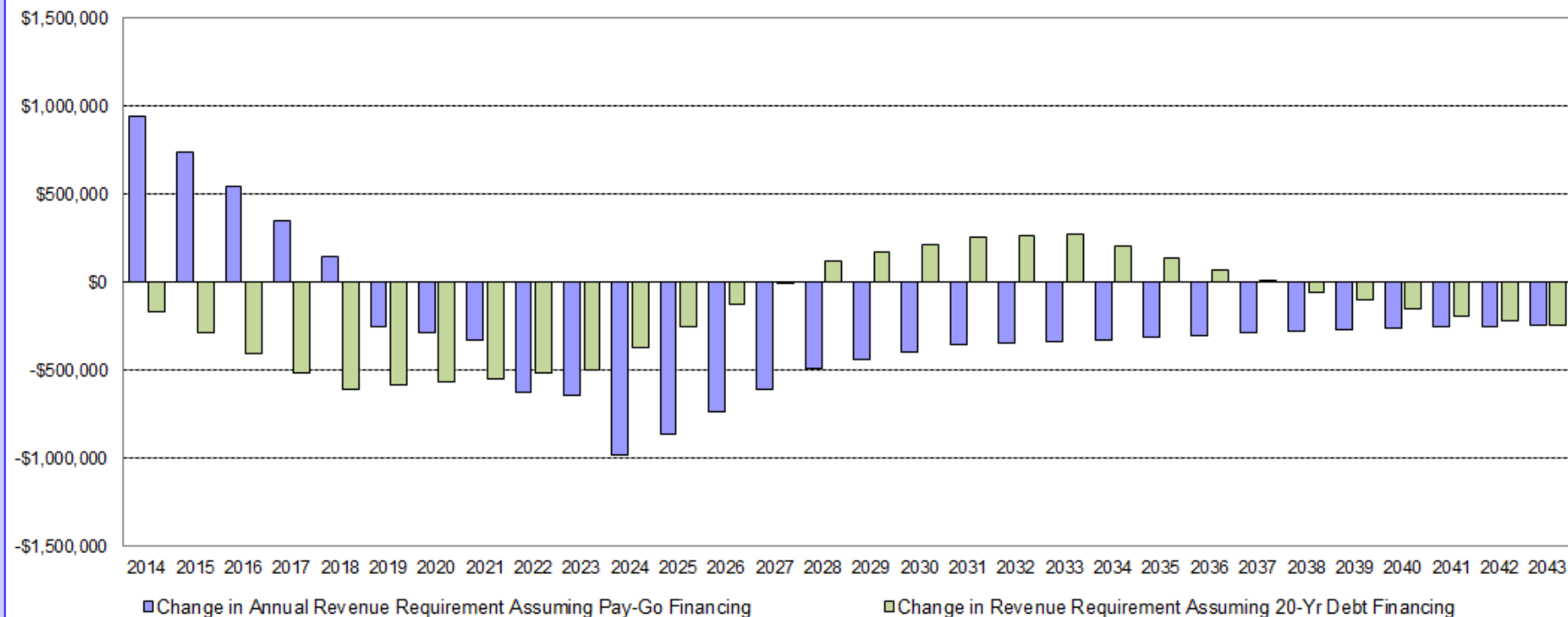
Program Impact on...	Baseline	With Conserv.	Change to Baseline
Water Utility Annual Sales Revenue Requireme	\$ 69,972,667	\$ 69,766,640	(\$206,027)
% change from baseline			-0.29%
Avg. Water Rate (\$/Thou Gal)	\$3.08	\$3.43	\$0.36
% change from baseline			11.64%
Annualized Bill Impact (\$/Mo.)	66.77	\$66.57	(\$0.19)
% change from baseline			-0.29%

Select Impact Chart to View

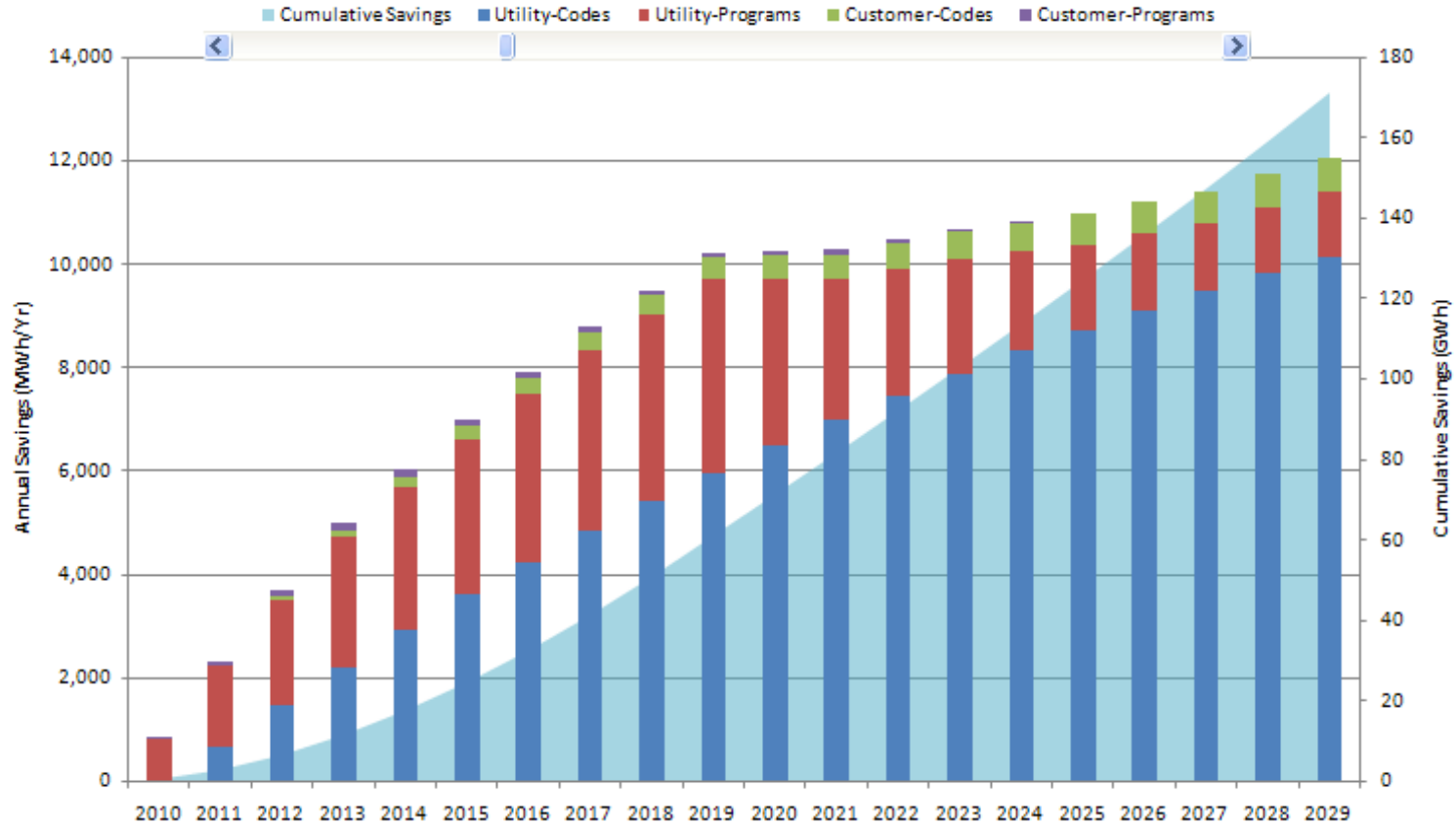
Revenue Requirement

[Chart Explanations](#)

Impact to Utility Sales Revenue Requirement Under Two Financing Approaches



Annual and Cumulative Electricity Savings



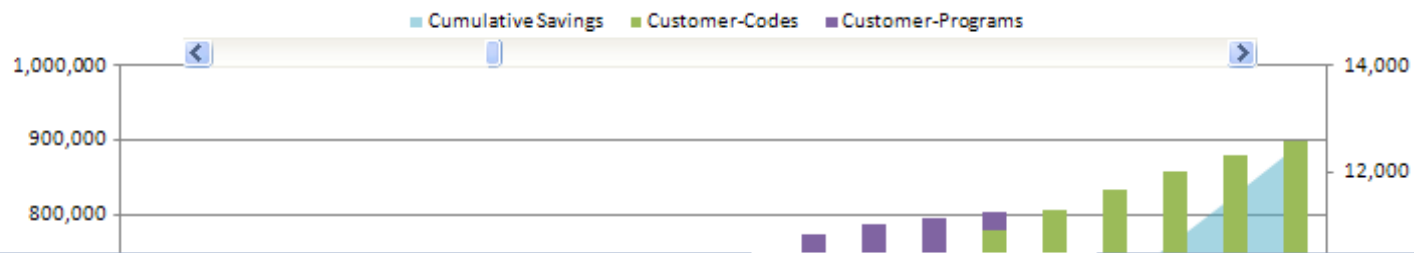
Show Series

- Utility-Codes
- Utility-Programs
- Customer-Codes
- Customer-Program
- Cumulative Savings-All

Years to Display:

Use the slider in the chart to set the number of years to display. Or enter a whole number between 5 and 60 in the box above.

Annual and Cumulative Gas Savings



Show Series

- Customer-Codes
- Customer-Program
- Cumulative Savings-All



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