CITIZENS' WATER ADVISORY COMMITTEE
CONSERVATION & EDUCATION SUBCOMMITTEE

Wednesday, June 15, 2015, 10 a.m.
Director's Conference Room
Tucson Water, 3rd Floor
310 W. Alameda Street, Tucson, Arizona

Legal Action Report

1. **Call to Order/Roll Call**
   The meeting was called to order by Chairperson Amy McCoy at 10:02 a.m. Those present and absent were:

   Members Present:

Amy McCoy	Chairperson, Representative, Ward 2
* Mark Murphy	Representative, Mayor
Jean McLain	Representative, City Manager
Catlow Shipek	Representative, City Manager
Mark Lewis	Representative, Ward 5

   * Member Murphy arrived at 10:28 a.m.

   Members Absent:

** Placido dos Santos	Representative, City Manager

   Tucson Water Staff Members:

Jeff Biggs	Interim Deputy Director
Andrew Greenhill	Management Coordinator
Pat Eisenberg	Chief Engineer
Melodee Loyer	Chief Planner
Wally Wilson	Chief Hydrologist
Fernando Molina	Public Information Supervisor
Daniel Ransom	Water Conservation Supervisor
Joaquim Delgado	Public Information Specialist
Candice Rupprecht	Public Information Specialist
Valerie Herman	Public Information Specialist
Tom Arnold	Lead Management Analyst
Kris LaFleur	Staff Assistant

   Others Present

Gary Woodard	Montgomery & Associates
Brian Wong	CWAC
Bud Foster	KGUN News

   ** Although Member dos Santos participated in a portion of this meeting by phone, he was not physically present at the meeting and was therefore not considered to be in attendance.

2. **Announcements –** There were no announcements.

3. **Call to Audience –** There were no audience comments.

4. **Review of May 13, 2015, Legal Action Report and Meeting Minutes –** Member Shipek moved to approve the Legal Action Report and Meeting Minutes of May 13, 2015. The motion was seconded by Member McLain and carried by a vote of 4-0.

5. **Monthly Report & Workplan Update** – Mr. Ransom presented Tucson Water's conservation program report for FY15, through the month of May. He indicated that staff labor hours are now properly incorporated in the report, and that total program expenditures are at 92% of budget, with one month remaining in the fiscal year. Mr. Ransom fielded and answered questions from members.

   Mr. Ransom indicated a change to the projected FY15/16 workplan; the FY 16/17 budget proposal will be presented to C&E in September, and approved in October.

6. **Discussion: Conservation Program Roles for Tucson Water & CWAC** – Tucson Water staff and C&E subcommittee members discussed the roles and expectations for staff and members in relation to the development and management of Tucson Water's conservation programs, and in relation to oversight of the Conservation Fund.

   Mr. Biggs indicated that Tucson Water staff are responsible for: day-to-day decisions involved in the operation of the Department; implementation of policies and procedures adopted by Mayor & Council or developed by staff and CWAC; and proper spending and tracking of O&M, capital, and Conservation Fund budgets. He indicated that the role of C&E members is to advise and provide oversight to Tucson Water staff.

   Chairperson McCoy indicated that the C&E subcommittee was seeking to define its role in Tucson Water's conservation programs, and to determine the most effective approach to fulfilling that role. She stated that C&E's role is to advise staff based on three assessment criteria for TW's conservation programs: water saved by the programs, number of people reached by the programs, and equitable distribution of programs across TW's service area.

   Member Lewis suggested that the subcommittee was also responsible for fiduciary oversight of Conservation Fund monies, which are collected by Tucson Water for development and implementation of conservation programs. Extensive discussion on this topic ensued between members and staff, with those present disagreeing with Member Lewis' position. Other members and staff felt that members' role was to advise on conservation program efficacy in terms of water saved, people reached, and equitable distribution, while staff or outside auditors bore responsibility for fiduciary tracking of Conservation Fund expenditures.

   Member Lewis then suggested that the Conservation Fund was being used for projects and programs that do not meet the subcommittee's "water saved" assessment criterion. He suggested that the Conservation Fund's purpose required clarification in order to avoid confusion about the subcommittee's role. Conversation ensued.

   Members agreed to revisit and review Mayor & Council's water conservation policies, and to produce a subcommittee mission statement for approval by full CWAC and submission to Mayor & Council.

7. **Review of FY16/17 Conservation Program Budget Proposal** – Mr. Ransom led a review of the preliminary FY16/17 Conservation Program Budget Proposal. A handout of FY 2016-20 revenue projections included scheduled conservation fee increases in 2016, 2018 and 2020. Members and staff discussed the expansion of rainwater and stormwater projects and the low-interest loan program requested by Mayor & Council, and the need to confirm funding sources for these programs in FY16 and beyond.

   Member Lewis departed at 10:59 and returned at 11:01.

8. **Conservation Planning update: Water Conservation Tracking Tool –** Ms. Rupprecht led a discussion about the Conservation Office's efforts to integrate the Alliance for Water Efficiency's Water Conservation Tracking Tool into the Conservation Program planning and assessment process. Members and staff discussed various aspects of the Tracking Tool integration, including Conservation Office engagement with stakeholders, the Tool's relation to the 2006 Community Conservation Task Force report, and the types of information to be tracked by the Tool.

   Chairperson McCoy departed at 11:04 and returned at 11:06.

   Ms. Rupprecht demonstrated the Tracking Tool's functionality by using sample data from Tucson Water's new residential washing machine rebate program. Discussion between members and staff followed.

9. **Member Proposal: Conservation Through Swimming Pool Retirement –** On behalf of Member dos Santos, who was unable to attend the meeting in person, Mr. Woodard presented a proposal for the creation of a swimming pool retirement rebate program. A handout was circulated that included potential pool rebate program issues and questions, and Mr. Woodard gave a presentation that included historical and current data on residential swimming pools, potential benefits of pool removal, and parameters of a potential pool removal rebate program. Following the presentation, Mr. Woodard, members, and staff discussed the potential for a rebate or education program focused on swimming pool retirement.

   Member McLain departed at 11:43 and returned at 11:45.

   Member dos Santos suggested that the potential for both water and energy savings could provide an opportunity for a joint rebate program with local energy providers. Members discussed the need to gather data on the impact of swimming pool removal, in terms of potential water savings and energy savings.

   Member Shipek made a motion directing Tucson Water's Conservation Office to look into the benefits and issues surrounding pool replacement and modification. Member Lewis seconded the motion and it was passed on a vote of 5-0.

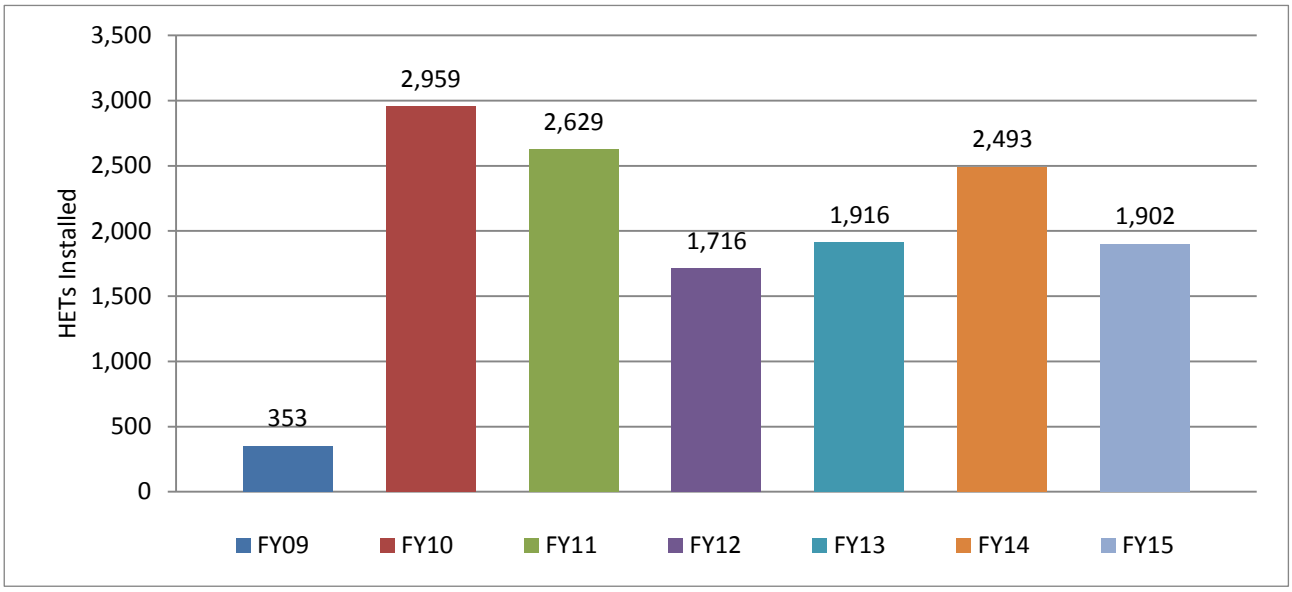
10. **Future Meetings/Agenda Items** – No further items were discussed.

11. **Adjournment** – The meeting was adjourned at 12:10 p.m.

Tucson Water
Incentive Program Implementation
FY 2014-15 Through May

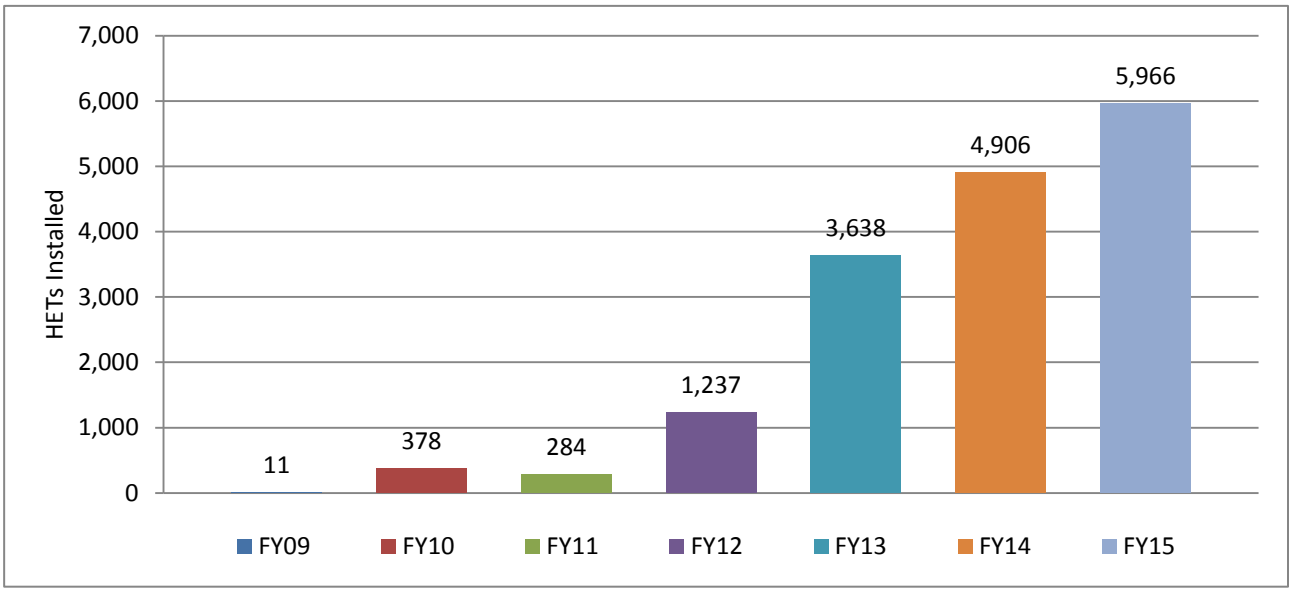
Single-Family HET Rebate

	FY 14/15	Cumulative		Start Date: Jul-08
HETs Installed	1,902	13,968	Staff Labor Hours	1,926
Expenditure[1]	$ 155,497	$ 1,154,210	Budget	$ 200,000
Estimated Gallons Saved	14,231,715	395,599,775	Percent of Budget	78%
Estimated Acre-Feet Saved	44	1,214		



Multi-Family HET Rebate

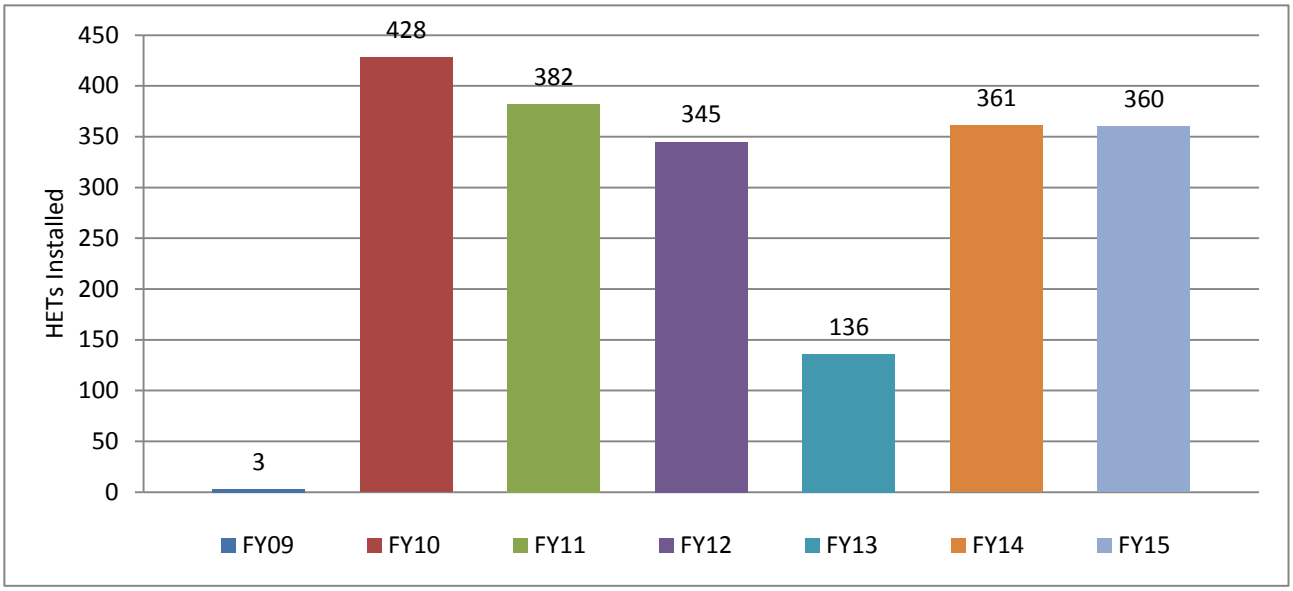
	FY 14/15	Cumulative		Start Date: Jul-08
HETs Installed	5,966	16,420	Staff Labor Hours	178
Expenditure[1]	$ 590,711	$ 1,610,115	Budget	$ 598,000
Estimated Gallons Saved	44,640,595	264,917,913	Percent of Budget	99%
Estimated Acre-Feet Saved	137	813		



Tucson Water
Incentive Program Implementation
FY 2014-15 Through May

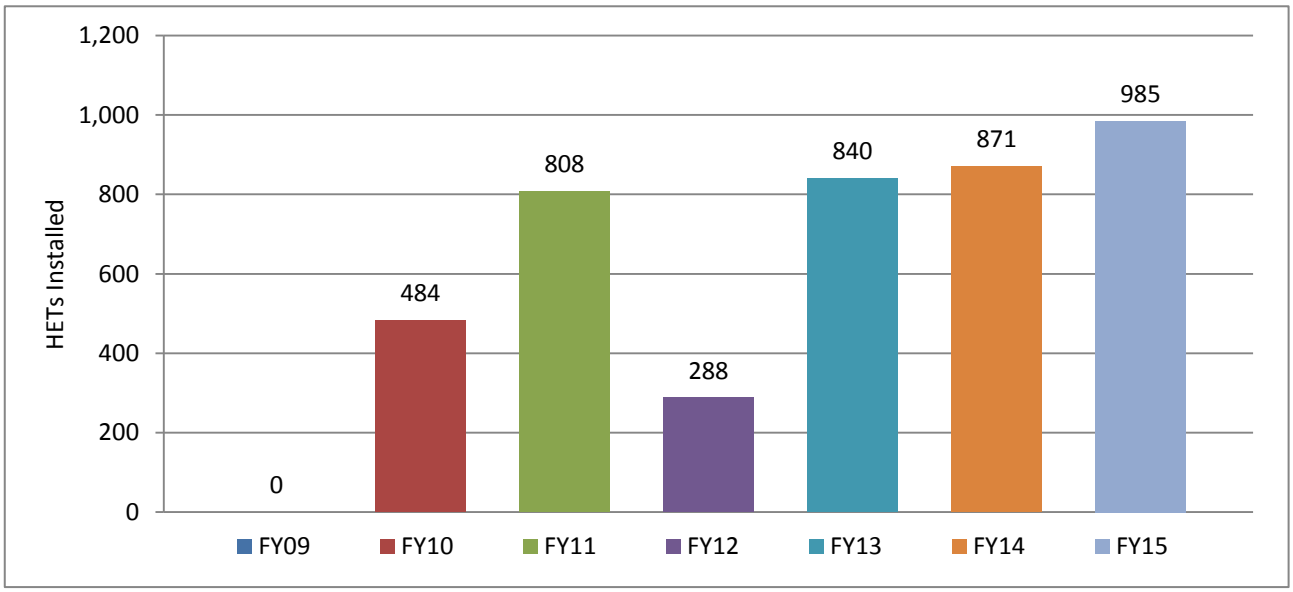
Commercial HET Rebate

	FY 14/15	Cumulative		Start Date: Jul-08
HETs Installed	360	2,015	Staff Labor Hours	47
Expenditure[1]	$ 29,229	$ 171,121	Budget	$ 30,000
Estimated Gallons Saved	3,679,200	75,311,180	Percent of Budget	97%
Estimated Acre-Feet Saved	11	231		



Low-Income HET Direct Install

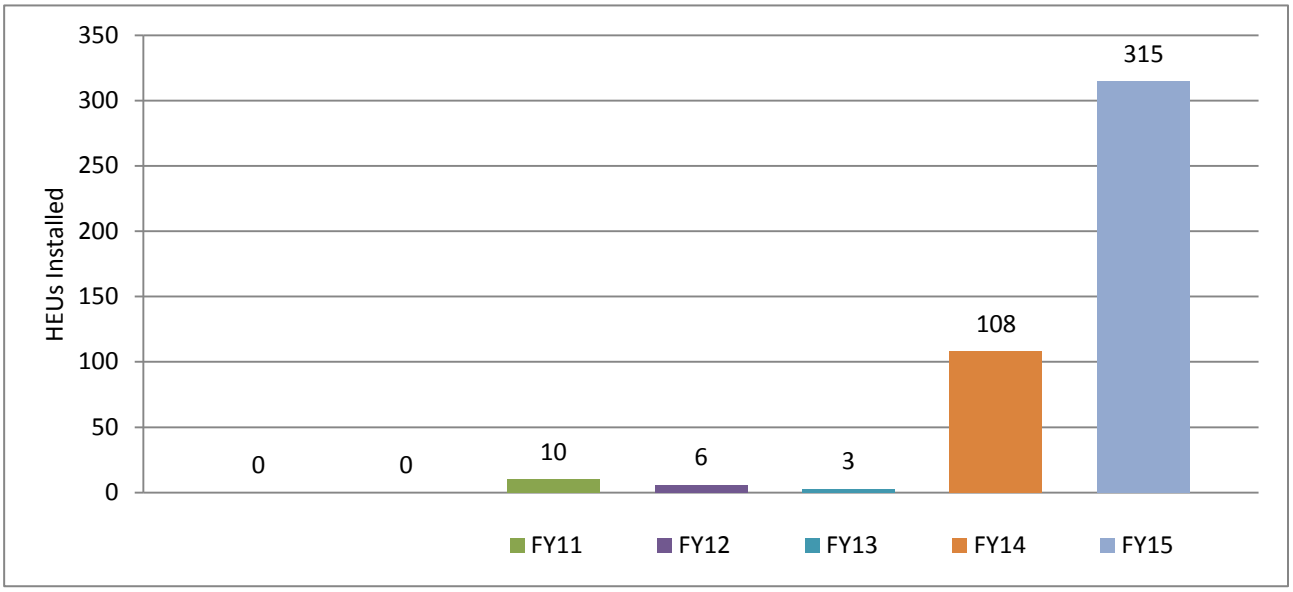
	FY 14/15	Cumulative		Start Date: Oct-09
HETs Installed	985	4,276	Staff Labor Hours	136
Expenditure[1]	$ 311,862	$ 1,552,162	Budget[2]	$ 317,000
Estimated Gallons Saved	8,448,838	114,449,583	Percent of Budget	98%
Estimated Acre-Feet Saved	26	351		



Tucson Water
Incentive Program Implementation
FY 2014-15 Through May

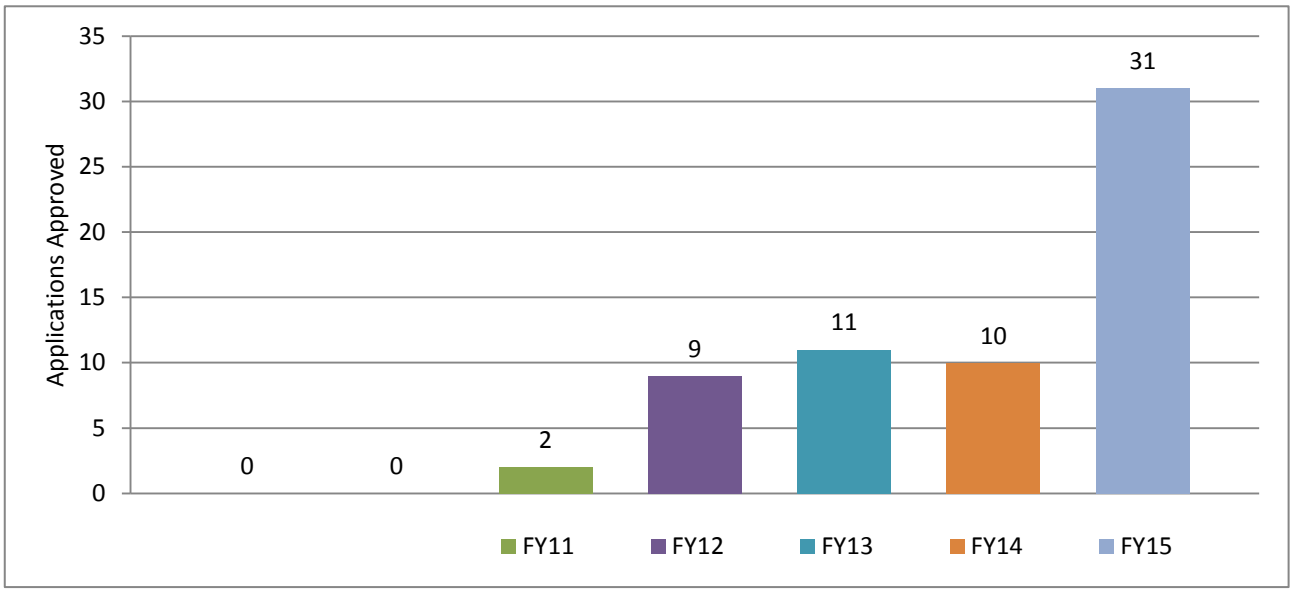
High-Efficiency Urinal Rebate

	FY 14/15	Cumulative		Start Date: Jan-11
HEUs Installed	315	442	Staff Labor Hours	99
Expenditure[1]	$ 134,700	$ 191,200	Budget	$ 125,000
Estimated Gallons Saved	5,633,775	10,981,390	Percent of Budget	108%
Estimated Acre-Feet Saved	17	34		



Gray Water Rebate

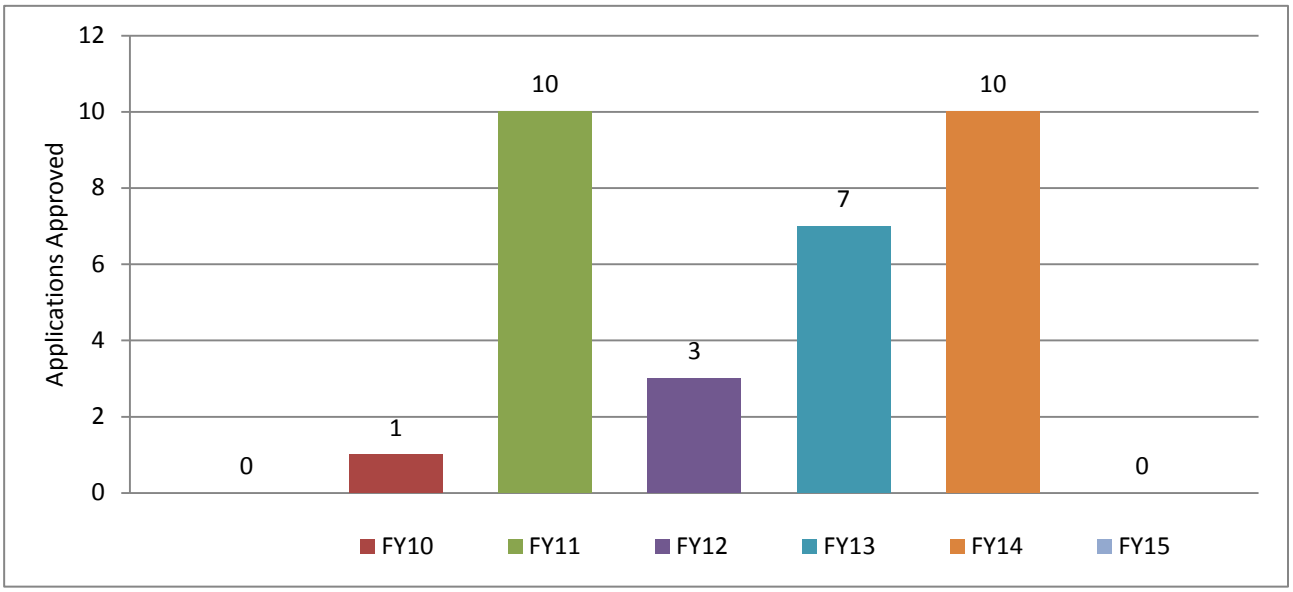
	FY 14/15	Cumulative		Start Date: Jan-11
Applications Approved	31	63	Staff Labor Hours	54
Expenditure[1]	$ 13,496	$ 24,150.16	Budget	$ 20,000
Estimated Gallons Saved	403,961	1,694,030	Percent of Budget	67%
Estimated Acre-Feet Saved	1	5		



Tucson Water
Incentive Program Implementation
FY 2014-15 Through May

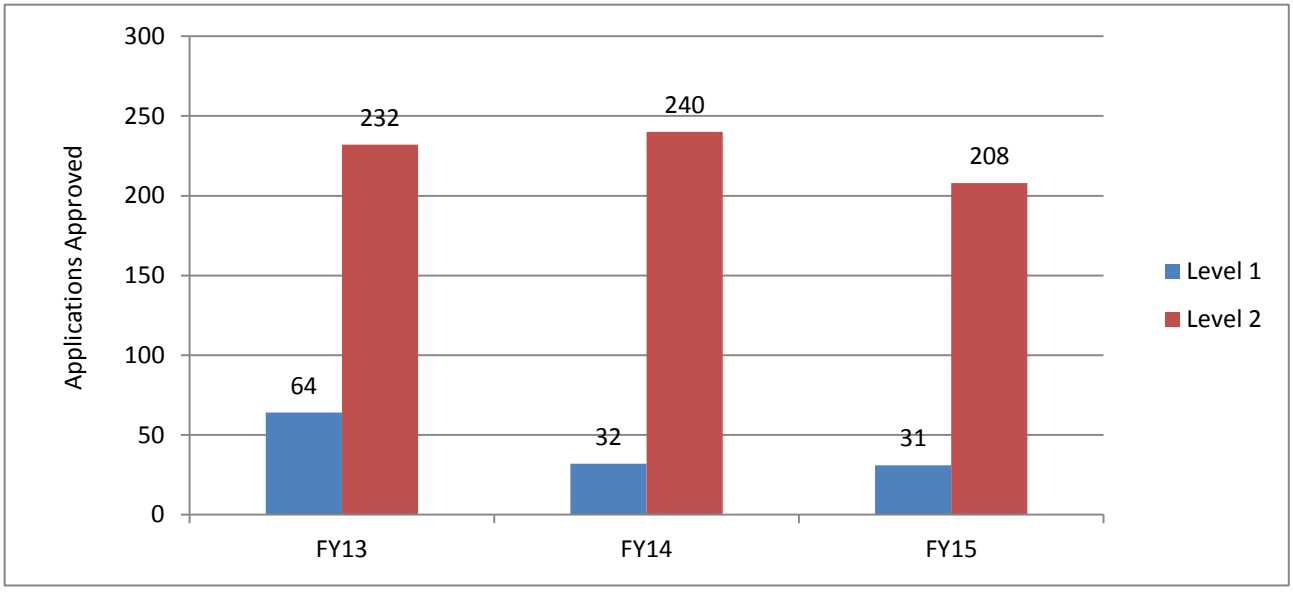
Irrigation Efficiency Rebate

	FY 14/15	Cumulative		Start Date: Jul-08
Applications Approved	0	31	Staff Labor Hours	293
Expenditure[1]	$ -	$ 246,290	Budget	$ -
Estimated Gallons Saved	0	25,064,550	Percent of Budget	
Estimated Acre-Feet Saved	0	77		



Rainwater Harvesting

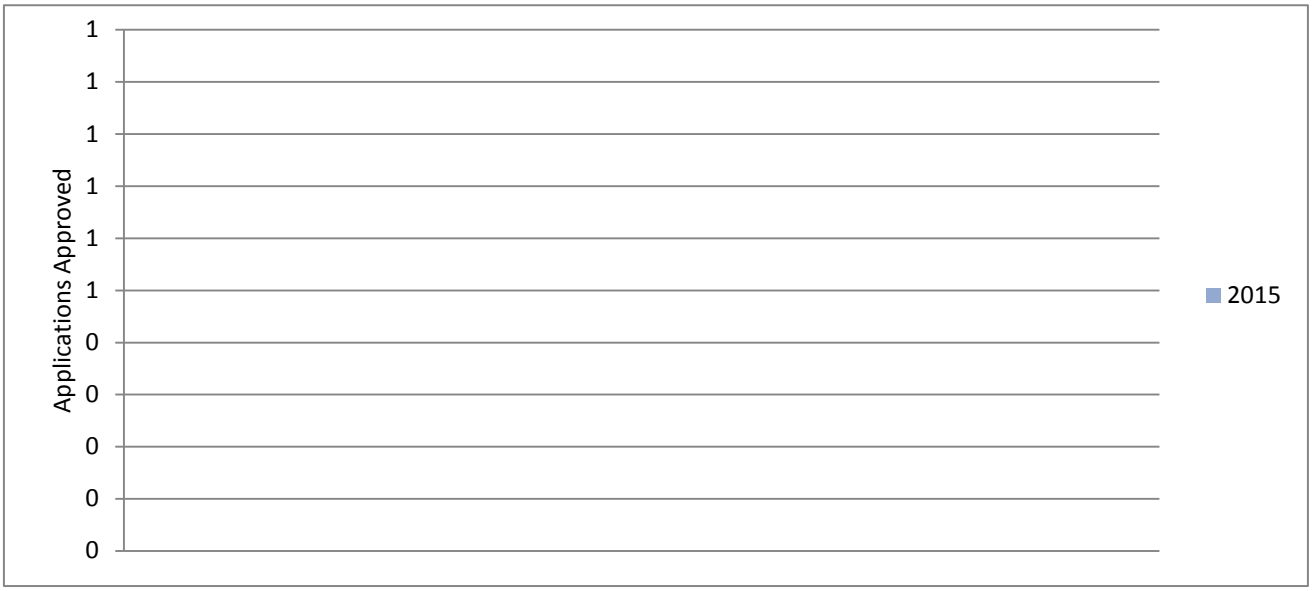
	FY 14/15	Cumulative		Start Date: Jun-12
Applications Approved	239	807	Staff Labor Hours	208
Expenditure[1]	$ 280,799	$ 984,797	Budget	$ 350,000
Estimated Gallons Saved	0	0	Percent of Budget	80%
Estimated Acre-Feet Saved	0	0		



Tucson Water
Incentive Program Implementation
FY 2014-15 Through May

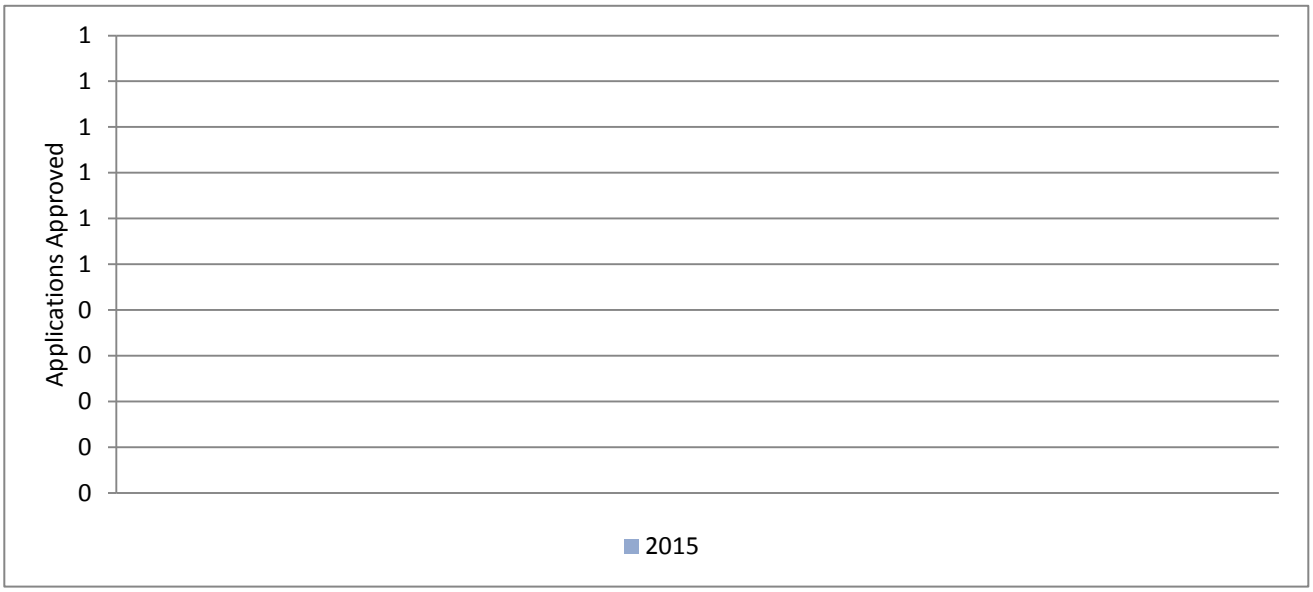
High-Efficiency Clothes Washer Rebate

		Cumulative		Start Date: TBD
Applications Approved	0	0	Staff Labor Hours	0
Expenditure[1]	$ -	$ -	Budget	$ -
Estimated Gallons Saved	0	0	Percent of Budget	
Estimated Acre-Feet Saved	0	0		



Commercial Efficiency Upgrade Rebate

	FY 14/15	Cumulative		Start Date: TBD
Applications Approved	0	0	Staff Labor Hours	0
Expenditure[1]	$ -	$ -	Budget	$ -
Estimated Gallons Saved	0	0	Percent of Budget	
Estimated Acre-Feet Saved	0	0		

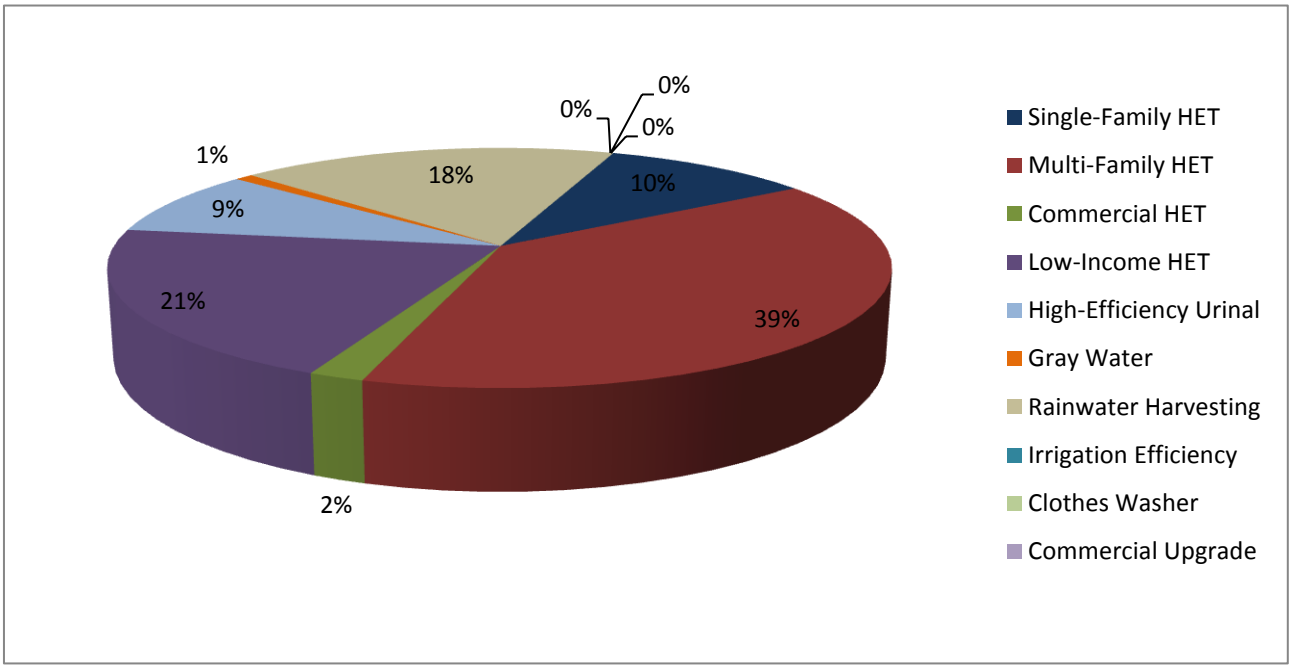


Tucson Water
Incentive Program Implementation
FY 2014-15 Through May

Program Totals

	FY 14/15	Cumulative		
HETs/HEUs Installed	9,528	37,121	Staff Labor Hours	2,938
Expenditure[1]	$ 1,516,295	$ 5,934,045	Budget	$ 1,640,000
Estimated Gallons Saved	77,038,084	888,018,420	Percent of Budget	92%
Estimated Acre-Feet Saved	236	2,725		

Expenditures by Program for FY 2014-15



The numbers and expenditures in this report reflect when the rebate or expenditure is approved and not when paid. This report is an operational report and not intended to reconcile with financial reports.

[1]The expenditure does not include the cost of staff time

[2]The budget for the low-income HET direct install program is combined from two object codes. Toilet installation is categorized in professional services and the cost of the toilet and misc. materials is categorized in materials. All other rebate program expenditures are in the object code for efficiency programs.

CWAC Conservation and Education Subcommittee
Three-Year Work Plan, FY16-18

FISCAL YEAR 2015-16

Month	Items for Subcommittee Review	Completion/Approval by CWAC	Program Updates & Presentations *(tentative)*
July/August 2015		*CWAC Summer Break – No Meetings Scheduled*	
September 2015	- FY14-15 Annual Report - FY16-17 Budget Proposal		- SERI Pilot Program update - Stormwater / Rainwater Mgmt Prgm (Internal presentation)
October 2015	- Conservation Planning Process	- FY14-15 Annual Report - FY16-17 Budget Proposal	- EEExchange Program Update - Low-Income Toilet Program (CHRPA)
November 2015	- New Program Ideas & Research*	- Conservation Planning Process	- Project WET Program Update
December 2015	- New Program Ideas & Research		- SmartScape Program Update
January 2016	- FY 15-16 Mid-Year Report - New Program Ideas & Research		- Conserve2Ehance Program Update
February 2016		- FY 15-16 Mid-Year Report	- Inter-agency Collaboration (Internal presentation) - Zanjero Program Update (Internal presentation)
March 2016			- Commercial/WaterSmart Business Program Update (Internal presentation)
April 2016	- FY16-17 Program Plan		
May 2016	- Five-year Conservation Plan	- FY16-17 Program Plan	
June 2016	- FY17-18 Budget Proposal	- Five-year Conservation Plan	

*New Program Ideas & Research is a designated 3-month period for CWAC Members & Staff to present new program ideas to be considered for evaluation and development in the next fiscal year to start the following July. All ideas should be presented with baseline research completed on resource needs, savings potential and existing case studies and example programs. All ideas will be analyzed using the AWE Conservation Tracking Tool and final determination of programs will be weighed with Conservation Plan goals. Depending on the number and complexity of new program ideas, additional meetings may be scheduled during this time.

TUCSON WATER

CONSERVATION PROGRAM
Preliminary FY 2015 - FY 2020 CCTF

Includes FY 2016 rate increase recommended by the CWAC Conservation and Education Sub-Committee

Revised 01/05/2015

	Inc	Rate	2015	2016	2017	2018	2019	2020
PROJECTED CONSUMPTION*								
Potable Water Consumption Projection (Ccf)			**39,018,442**	**38,307,264**	**37,812,014**	**37,527,754**	**37,396,899**	**37,283,713**
REVENUES								
Beginning Balance			**$ 2,363**	**$ 2,044**	**$ 1,211**	**$ 713**	**$ 540**	**$ 193**
Water Sales (7/05/15 Rates)		0.07	$ 2,731	$ 2,707	$ 2,659	$ 2,611	$ 2,563	$ 2,562
Water Sales Increases from Rate Adjustments:								
FY 2016 Rate Adjustment	0.01	0.08			$ 383	$ 378	$ 375	$ 374
FY 2017 Rate Adjustment	0.00	0.08			$ -	$ -	$ -	$ -
FY 2018 Rate Adjustment	0.01	0.09				$ 378	$ 375	$ 374
FY 2019 Rate Adjustment	0.00	0.09					$ -	$ -
FY 2020 Rate Adjustment	0.01	0.10						$ 374
Total from Rate Adjustments			$ -	$ -	$ 383	$ 756	$ 750	$ 1,122
Water Sales (including Rate Adjustments)			**$ 2,731**	**$ 2,707**	**$ 3,042**	**$ 3,367**	**$ 3,313**	**$ 3,684**
Total Revenues Available			**$ 5,094**	**$ 4,751**	**$ 4,253**	**$ 4,080**	**$ 3,853**	**$ 3,877**
PROJECTED REQUIREMENTS								
Total Conservation Requirements			**$3,050**	**$3,540**	**$3,540**	**$3,540**	**$3,660**	**$3,785**
Projected Surplus/(Deficit)			***$ 2,044***	***$ 1,211***	***$ 713***	***$ 540***	***$ 193***	***$ 92***

* Ties to Potable Consumption Forecast

Water Conservation Program
Budget FY 2016-2017

6/15/2015

	Actual FY15	FY15 (0.07)	FY16 (0.08)	FY17 (0.08)
Program Budget				
Total	$ 2,518,299	$ 3,050,000	$ 3,540,250	$ 3,540,250
Water Sales (estimated)				
		$ 2,731,000	$ 2,707,000	$ 3,042,000
Requested Funding				
Rainwater/Storm Water Management	$ -	$ -	$ 50,000	$ 350,000
Low Interest Loan Program	$ -	$ -	$ 50,000	$ 300,000
Subtotal	$ -	$ -	$ 100,000	$ 650,000
			?	4,190,250

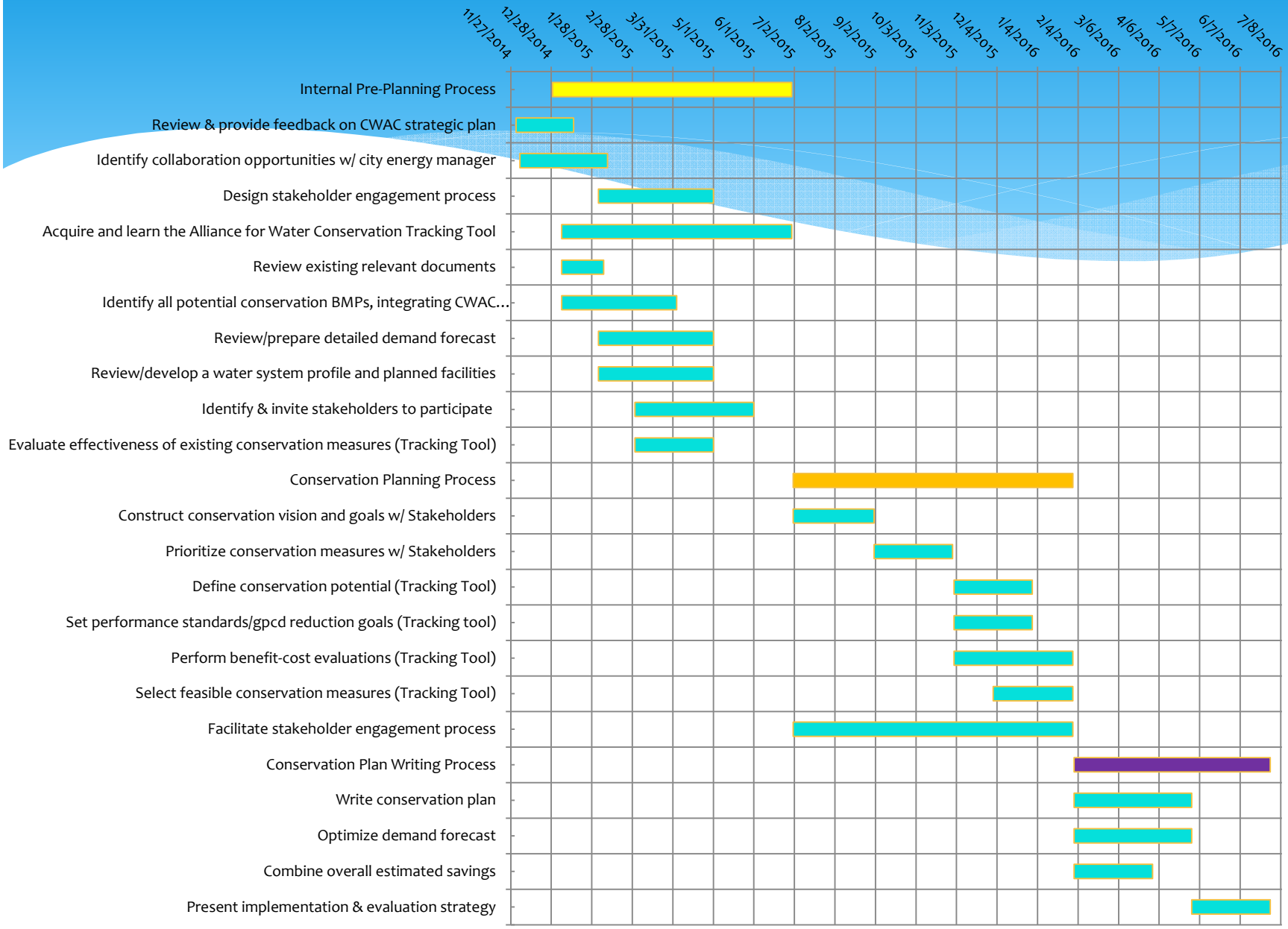
Conservation Planning & the AWE Tracking Tool Update

CWAC C&E Meeting

June 15, 2015

TUCSON WATER

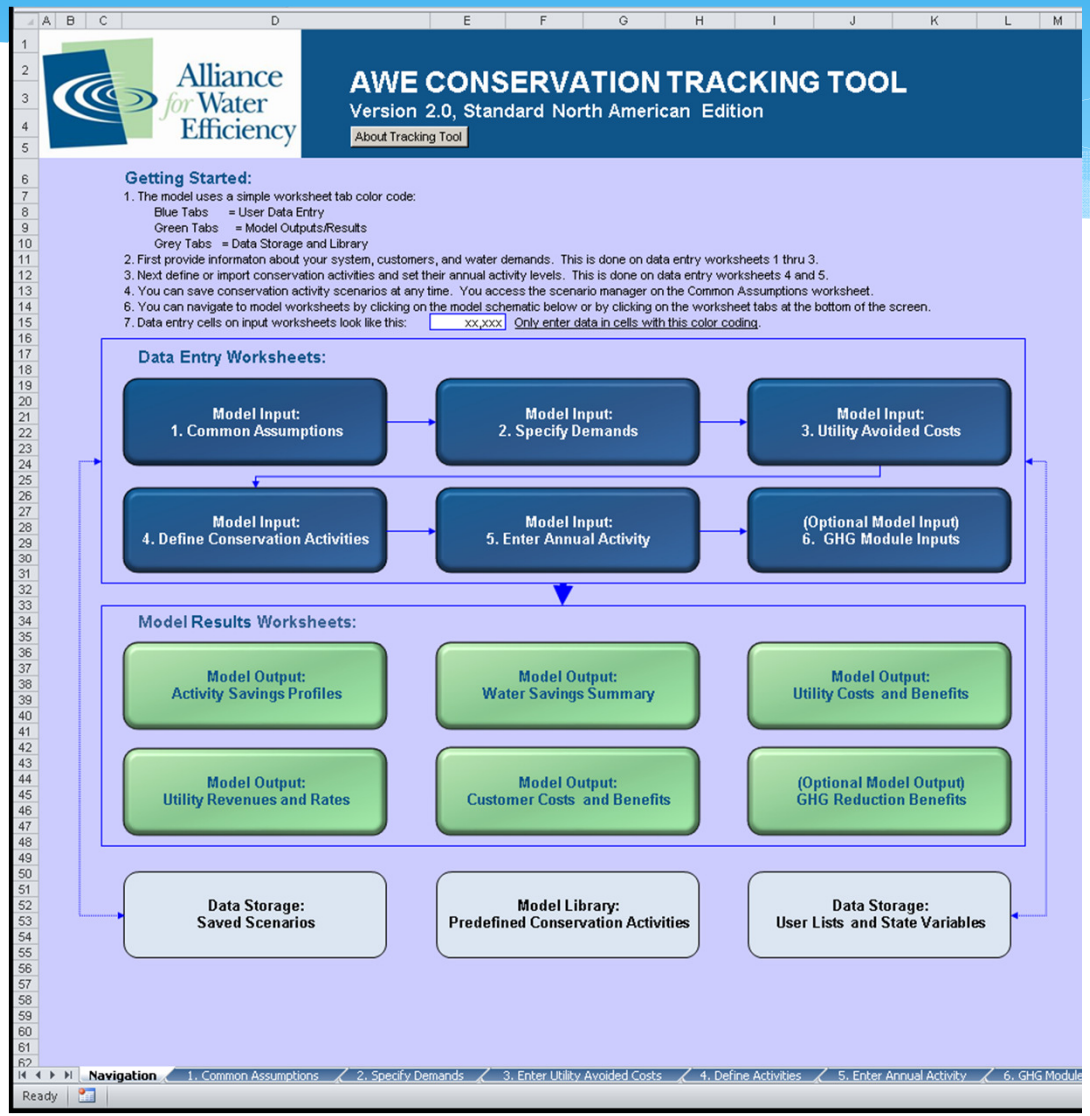
Planning Process



Pre-planning Process

* Familiarization with AWE Tool
* Data collection
* Design of Stakeholder Engagement

AWE Tracking Tool



1. Assumptions

AWE CONSERVATION TRACKING TOOL: COMMON ASSUMPTIONS WORKSHEET

ENTER COMMON ASSUMPTIONS:

Manage Scenarios

Analysis Start Year	2014	2020	2030	2040	2050
Service Area Population	705,909	770,015	870,169	965,735	1,062,707
Service Area Population in 1990	524,438				
Peak-Season Start Date ('month/day')	1-Jun				
Peak-Season End Date ('month/day')	1-Jul				
Nominal Interest Rate	3.00%				
Inflation Rate					
Year in which to Denominate Costs & Benefits	2015				
Persons Per Household - SF	2.72				
Persons Per Household - MF	2.06				
Full Bathrooms Per Household - SF	1.92				
Half Bathrooms Per Household - SF	0.22				
Full Bathrooms Per Household - MF	1.35				
Half Bathrooms Per Household - MF	0.07				
SF Housing Units Built *before 1994*	134,952				
MF Housing Units Built *before 1994*	113,072				
Reference ET (inches/yr)	68.36				
Avg. Annual Rainfall (inches/yr)	11.59				

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

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Return to Navigation Sheet
Report Error

SELECT REGION:

US-Southwest

Show U.S. Regional Map
Show Canada Map

SELECT CUSTOMER CLASSES:

Select Water User Classes

ENTER UTILITY RATE INFORMATION:

	Customer Utility Rates (2015 Dollars)				Nominal Rate of Increase			
Water User Classes in Model	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	$4.52	$3.52	$0.10	$1.32	8.0%	4.5%	1.0%	
Multi Family	$4.64	$3.52	$0.10	$1.32	7.0%	4.5%	1.0%	
Commercial	$4.64	$7.87		$1.06	5.0%	4.5%	1.0%	
Industrial	$4.53	$7.87		$1.01	8.5%	4.5%	1.0%	
Duplex-Triplex	$4.52	$3.52	$0.10	$1.32	8.0%	4.5%	1.0%	
Construction	$4.81			$1.06	8.0%	4.5%	1.0%	

2. Demands

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	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Peak Season	MGD	100.51	102	103	105	107	108	110	111	112	114	115	117	118	119	121	122	124	125	127	128	129	131	132	133	135	136	138	139	140
Off Peak Season	MGD	79.96	81	82	84	85	86	87	88	89	90	92	93	94	95	96	97	99	100	101	102	103	104	105	106	107	108	109	110	112
Average	**MGD**	**80**	**83**	**84**	**85**	**87**	**88**	**89**	**90**	**91**	**92**	**94**	**95**	**96**	**97**	**98**	**99**	**101**	**102**	**103**	**104**	**105**	**106**	**107**	**108**	**109**	**111**	**112**	**113**	**114**
Peak to Average Ratio		1.3	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	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	1.2	1.2

Volumes	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Peak Season	MG	3,015	3,059	3,104	3,149	3,195	3,242	3,289	3,330	3,371	3,412	3,454	3,496	3,540	3,583	3,627	3,672	3,717	3,756	3,795	3,835	3,875	3,916	3,957	3,998	4,040	4,082	4,125	4,165	4,205
Off Peak Season	MG	26,787	27,177	27,574	27,976	28,385	28,799	29,219	29,579	29,943	30,311	30,684	31,061	31,443	31,830	32,222	32,618	33,020	33,366	33,715	34,068	34,425	34,786	35,150	35,518	35,890	36,266	36,646	36,998	37,354
Total	**MG**	**29,802**	**30,237**	**30,678**	**31,126**	**31,580**	**32,041**	**32,508**	**32,908**	**33,313**	**33,723**	**34,138**	**34,558**	**34,983**	**35,413**	**35,849**	**36,290**	**36,737**	**37,121**	**37,510**	**37,903**	**38,300**	**38,701**	**39,107**	**39,516**	**39,930**	**40,349**	**40,771**	**41,163**	**41,559**

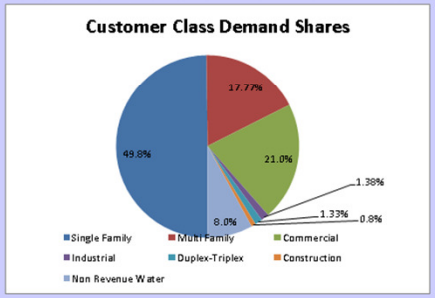
CUSTOMER DEMAND SHARES:

Enter Customer Class Shares (%) | Enter Customer Class Demands

Customer Class	Share (%)	Demand (MG)	Accounts
Single Family	49.8%	14,843	202,988
Multi Family	17.77%	5,296	5,653
Commercial	21.0%	6,244	14,901
Industrial	1.38%	411	337
Duplex-Triplex	1.33%	395	4,369
Construction	[illegible]	235	348
Non Revenue Water	[illegible]	2,379	
Total	**10[illegible]**	**9,803**	**228,595**

Enter demand shares as a percent for the starting year. The model will use them to forecast class demands.

Out of Range! Shares must sum[illegible]



BASELINE CLASS DEMANDS:

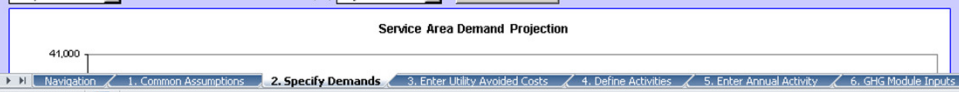
Customer Class	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Single Family	MG	14,843	15,059	15,279	15,502	15,728	15,958	16,190	16,390	16,591	16,795	17,002	17,211	17,423	17,637	17,854	18,074	18,296	18,488	18,682	18,877	19,075	19,275	19,477	19,681	19,887	20,095	20,306	20,501	20,698
Multi Family	MG	5,296	5,374	5,452	5,532	5,612	5,694	5,777	5,849	5,920	5,993	6,067	6,142	6,217	6,294	6,371	6,450	6,529	6,597	6,666	6,736	6,807	6,878	6,950	7,023	7,097	7,171	7,246	7,316	7,386
Commercial	MG	6,244	6,335	6,428	6,521	6,617	6,713	6,811	6,895	6,980	7,066	7,153	7,241	7,330	7,420	7,511	7,603	7,697	7,778	7,859	7,941	8,025	8,109	8,194	8,279	8,366	8,454	8,542	8,624	8,707
Industrial	MG	411	417	423	429	436	442	448	454	459	465	471	477	482	488	494	500	507	512	517	523	528	534	539	545	551	556	562	568	573
Duplex-Triplex	MG	395	401	407	413	419	425	431	436	442	447	453	458	464	469	475	481	487	492	497	502	508	513	518	524	529	535	540	546	551
Construction	MG	235	239	242	246	249	253	256	260	263	266	269	273	276	279	283	286	290	293	296	299	302	305	308	312	315	318	322	325	328
Non Revenue Water	MG	2,379	2,414	2,449	2,485	2,521	2,558	2,595	2,627	2,659	2,692	2,725	2,759	2,793	2,827	2,862	2,897	2,933	2,963	2,994	3,026	3,057	3,089	3,122	3,154	3,188	3,221	3,255	3,286	3,318
Total	MG	**29,803**	**30,238**	**30,679**	**31,127**	**31,581**	**32,042**	**32,510**	**32,910**	**33,315**	**33,724**	**34,139**	**34,559**	**34,985**	**35,415**	**35,851**	**36,292**	**36,738**	**37,123**	**37,512**	**37,905**	**38,302**	**38,703**	**39,108**	**39,518**	**39,932**	**40,350**	**40,773**	**41,165**	**41,561**

BASELINE CLASS DEMANDS ADJUSTED FOR PLUMBING CODE:

Customer Class	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Single Family	MG	14,843	14,909	15,060	15,218	15,383	15,554	15,731	15,877	16,029	16,186	16,347	16,513	16,684	16,858	17,038	17,221	17,409	17,568	17,731	17,897	18,066	18,239	18,414	18,593	18,774	18,959	19,147	19,320	19,496
Multi Family	MG	5,296	5,296	5,325	5,357	5,393	5,432	5,474	5,506	5,541	5,578	5,618	5,660	5,705	5,752	5,801	5,852	5,905	5,948	5,994	6,041	6,089	6,140	6,191	6,245	6,299	6,356	6,414	6,467	6,521
Commercial	MG	6,244	6,327	6,412	6,498	6,586	6,675	6,767	6,844	6,923	7,003	7,084	7,167	7,251	7,336	7,422	7,510	7,599	7,676	7,753	7,831	7,911	7,991	8,073	8,155	8,239	8,323	8,409	8,488	8,568
Industrial	MG	411	416	422	428	433	439	445	450	456	461	466	472	477	483	488	494	500	505	510	515	520	526	531	536	542	547	553	558	564
Duplex-Triplex	MG	395	401	407	413	419	425	431	436	442	447	453	458	464	469	475	481	487	492	497	502	508	513	518	524	529	535	540	546	551
Construction	MG	235	239	242	246	249	253	256	260	263	266	269	273	276	279	283	286	290	293	296	299	302	305	308	312	315	318	322	325	328
Non Revenue Water	MG	2,379	2,414	2,449	2,485	2,521	2,558	2,595	2,627	2,659	2,692	2,725	2,759	2,793	2,827	2,862	2,897	2,933	2,963	2,994	3,026	3,057	3,089	3,122	3,154	3,188	3,221	3,255	3,286	3,318
Total	MG	**29,803**	**30,001**	**30,316**	**30,643**	**30,983**	**31,335**	**31,699**	**32,001**	**32,312**	**32,633**	**32,963**	**33,301**	**33,648**	**34,004**	**34,369**	**34,741**	**35,122**	**35,446**	**35,775**	**36,111**	**36,454**	**36,803**	**37,158**	**37,519**	**37,886**	**38,260**	**38,639**	**38,990**	**39,346**

Use Drop-Down List to Select Chart to Display

Unadjusted Baseline | No. of Years to Display 25 yrs | Chart Explanations



Navigation | 1. Common Assumptions | 2. Specify Demands | 3. Enter Utility Avoided Costs | 4. Define Activities | 5. Enter Annual Activity | 6. GHG Module Inputs | Activity Savings Profiles | Water Savings Summary | Utility Costs and Benefits

Ready | Calculate | 85%

3. Utility Avoided Costs

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 (Dollars)	$/MG	Nominal Rate of Increase %/Yr
Water Purchase Cost:	$0.00	
Energy for Transmission,Treatment,Distribution:	$345.00	
Chemicals:	$16.00	
Other Variable O&M:	$0.00	
Total Variable O&M:	$ 361.00	0.0%

WASTEWATER: Variable O&M Costs (Dollars)	$/MG	Nominal Rate of Increase %/Yr
Energy for Transmission,Treatment,Discharge:	$0.00	
Chemicals:	$0.00	
Other Variable O&M:	$0.00	
Total Variable O&M:	$ -	0.0%

Current peak season capacity (MGD):		Min Peak Demand:	100.51 MGD
Amount of new capacity that will be added (MGD):		☐ Check to Use Model Default	
Year new capacity needed under current demand projection:	#N/A		

Avoidable System Expansion Cost (Dollars)	$/MGD	Year New Capacity Required	Capacity Required (MGD)
System Expansion Cost		#N/A	0.00

Variable O&M (Dollars)	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Water Supply	MG	$ 361	$ 361	$ 361	$ 361	$ 361	$ 361	$ 361	$ 361	$ 361	$ 361	$ 361	$ 361
Wastewater	MG	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Enter Other Benefits of Reduced Water Demands (Dollars)

$/Unit	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Peak Season	MG												
Off Peak Season	MG												
Average	MG	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -

Navigation | 1. Common Assumptions | 2. Specify Demands | **3. Enter Utility Avoided Costs** | 4. Define Activities | 5. Enter Annual Activity | 6. GHG Module Inputs

Ready Calculate

4. Define Activities

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X
1	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)	Participant Costs, Year Denominated	Participant Costs, Initial ($)	Participant Costs, Years of On-going (yrs)	Participant Costs, On-going ($/Yr)	Participant Savings, Sewer (gpy)	Participant Savings, Gas (Therms/Gal)	Participant Savings, Electricity (KWh/Gal)	Plumbing Code, Year Effective	Plumbing Code, Unit Savings (gpy)	Plumbing Code, Natural Replacement Rate NRR (%)
2	1	Tank-Type HE Toilet, CII	Commercial	13019.6	0%	8%	N/A. Toilet	0%			$75 + adm	0	$0.00	$0.00	2015	$132.06	0.00	$0.00	13,020	0.0000	0.0000	1994	13019.6	4.00%
3	2	HE Toilets, MF	Multi Family	16878.8	0%	8%	N/A. Toilet	0%			75 + admi	0	$0.00	$0.00	2015	$151.40	0.00	$0.00	16,879	0.0000	0.0000	1994	13722.58	4.00%
4	3	Low-income HET Replace, SF	Single Family		0%	8%	N/A. Toilet	0%				0	$0.00	$0.00	2015	$0.00	0.00	$0.00		0.0000	0.0000	1994		
5	4	High-Efficency Urinal Rebate, CII	Commercial	0					0						0				0			0		
6	5	Gray Water Rebate, SF	Single Family	0					0						0									
7	6	Irrigation Efficency Rebate, CII	Commercial																					
8	7	Rainwater Harvesting Rebate, SF	Single Family																					
9	8	Residential Surveys, SF	Single Family	12373	20%	68%	5	0%	2008		$95.00				2008	$0.00	0.00	$0.00	4,949	0.0010	0.0000	0	0	0.00%
10	9	Residential HE Toilets, SF	Single Family	7482.5	0%	8%		23%	2015		$75.00				2015	$194.52	0.00	$0.00	7,483	0.0000	0.0000	1994	8067.83	4.00%
11	10	Valve-Type HE Toilet, CII	Commercial	11595.18	0%	8%	N/A. Toilet	0%	2015		$150 + admin processing				2008	$125.00	0.00	$0.00	11,595	0.0000	0.0000	1994	9426.972	4.00%
12	11	CII 1/2 Gallon Urinal	Commercial	6206	0%	8%	25	0%	2008		$450.00				2008	$0.00	0.00	$0.00	6,206	0.0000	0.0000	0	0	0.00%
13	12	Residential HE Washer, SF	Single Family	7043	0%	8%	11	0%	2015		200 + adm	0	$0.00	$0.00	2015	$150.00	0.00	$0.00	7,043	0.0035	0.0036	0	0	0.00%
14	13	Open Rebate, CII	Commercial																					
15	14	Swimming Pool Ret., SF	Single Family																					
16	15	Swamp to AC, SF	Single Family						2015						2015									
17	16	Large Landscape Surveys	Commercial	394670.3	0%	70%	5	0%	2008		$571.00				2008	#########	0.00	$0.00	0	0.0000	0.0000	0	0	0.00%
18																								
19																								
20		Library default value																						
21		calculated by model																						
22		TW data																						
23		similar condition to library default																						
24																								

5. Annual Activity

AWE CONSERVATION TRACKING TOOL: ENTER ANNUAL CONSERVATION ACTIVITY WORKSHEET

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Enter Annual Conservation Activity

Class	Activity Name	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Commercial	Tank-Type HE Toilet, CII	148																					
Multi Family	HE Toilets, MF	2632																					
Single Family	Low-income HET Replace, SF	454																					
Commercial	High-Efficency Urinal Rebate, CII	68																					
Single Family	Gray Water Rebate, SF	5																					
Commercial	Irrigation Efficency Rebate, CII	1																					
Single Family	Rainwater Harvesting Rebate, SF	114																					
Single Family	Residential Surveys, SF																						
Single Family	Residential HE Toilets, SF	1092																					
Commercial	Valve-Type HE Toilet, CII																						
Commercial	CII 1/2 Gallon Urinal																						
Single Family	Residential HE Washer, SF																						
Commercial	Open Rebate, CII																						
Single Family	Swimming Pool Ret., SF																						
Single Family	Swamp to AC, SF																						
Commercial	Large Landscape Surveys																						

Effective Conservation Activity

Class	Activity Name	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Commercial	Tank-Type HE Toilet, CII	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148	148
Multi Family	HE Toilets, MF	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632	2,632
Single Family	Low-income HET Replace, SF	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454	454
Commercial	High-Efficency Urinal Rebate, CII	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68	68
Single Family	Gray Water Rebate, SF	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Commercial	Irrigation Efficency Rebate, CII	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Single Family	Rainwater Harvesting Rebate, SF	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114	114
Single Family	Residential Surveys, SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family	Residential HE Toilets, SF	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092	1,092
Commercial	Valve-Type HE Toilet, CII	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	CII 1/2 Gallon Urinal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family	Residential HE Washer, SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	Open Rebate, CII	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family	Swimming Pool Ret., SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Single Family	Swamp to AC, SF	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	Large Landscape Surveys	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Gross Water Savings (MG)

Class	Activity Name	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
Commercial	Tank-Type HE Toilet, CII	1.926901	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.9
Multi Family	HE Toilets, MF	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4	44.4
Single Family	Low-income HET Replace, SF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial	High-Efficency Urinal Rebate, CII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Family	Gray Water Rebate, SF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Commercial	Irrigation Efficency Rebate, CII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Family	Rainwater Harvesting Rebate, SF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Family	Residential Surveys, SF	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Single Family	Residential HE Toilets, SF	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Commercial	Valve-Type HE Toilet, CII	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Navigation | 1. Common Assumptions | 2. Specify Demands | 3. Enter Utility Avoided Costs | 4. Define Activities | 5. Enter Annual Activity | 6. GHG Module Inputs | Activity Savings Profiles | Water Savings Summary | Utility Costs and Benefits

Ready 100%

6. GHG Module Inputs

Select eGRID Region or Enter Your Own Emission Factors:

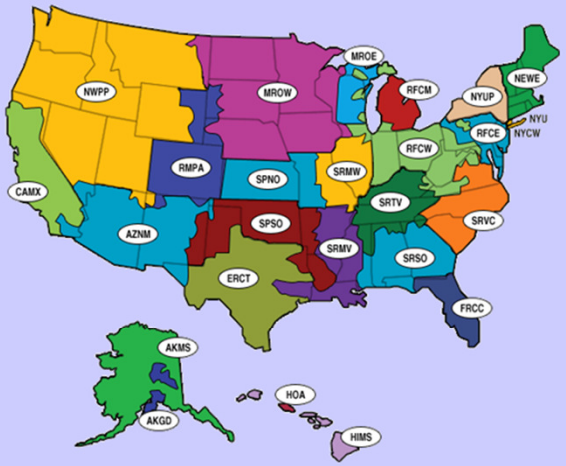
Note: Model will use eGRID factors if User Entered Factors left blank.

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

Average Generation Emission Factors	eGRID Factors (lb/MWhr)	User Entered Factors (lb/MWhr)
CO_2	1,311	
CH_4	0.01745	
SO_2	1.0806	
NO_x	2.1114	
N_2O	0.01794	
Hg	0.0000244	

Model will use eGRID factor if User Entered Factor is blank.

eGRID Subregion Representational Map



Energy Used for Water Supply and Wastewater Treatment:

Enter the average rate ($/KWh) your utility pays for electricity:	

○ User Entered Energy Intensity Values ◉ AWE Energy Intensity Calculator Values

1. Click the first radio button if you already know the energy intensity of your water and wastewater services.

2. Click the second radio button if you want to use the **AWE Energy Intensity Calculator** to estimate these values.

AWE Water and Wastewater Energy Intensity Calculator

Water Supply, Treatment, and Distribution Energy Intensity Default Values

Local Water Supply Sources	KWh/MG	% of Local Supply
Local Surface Water	683	
Groundwater	1,915	
Brackish Desalination	1,620	
Recycled Water	2,241	
Seawater Desalination	13,800	
	Total:	0%

Must add to 100%!

Average Energy Intensity of Local Water Supply	0	KWh/MG

Imported Water Supply Sources	KWh/MG	Default Value
Select the imported water energy intensity level	High	
Average Energy Intensity of Imported Water Supply		7,589 KWh/MG
Imported Water Supply as % of Total Supply		
Local Water Supply as % of Total Supply	100%	

Imported Water Energy Intensity Key

Low - Transmission mostly via gravity with limited pumping. More likely raw than treated water.
Moderate - Some transmission pumping required. Source may be groundwater. Delivered water may be raw or treated water.
High - Transmission involves significant pumping. Source may be groundwater. Delivered water more likely treated than raw water.

Average Energy Intensity per MG of Total Supply	**0**	**KWh/MG**

Water Treatment	KWh/MG	% of Total Supply Receiving This Treatment
Coagulation, Flocculation, Filtration	251	
Microfiltration	469	
Disinfection (Ozone)	220	

Navigation | 1. Common Assumptions | 2. Specify Demands | 3. Enter Utility Avoided Costs | 4. Define Activities | 5. Enter Annual Activity | **6. GHG Module Inputs** | Activity Savings Profiles | Water Savings Summary | Utility Costs and Benefits

Ready

Model Outputs

AWE CONSERVATION TRACKING TOOL: ACTIVITY SAVINGS PROFILES WORKSHEET

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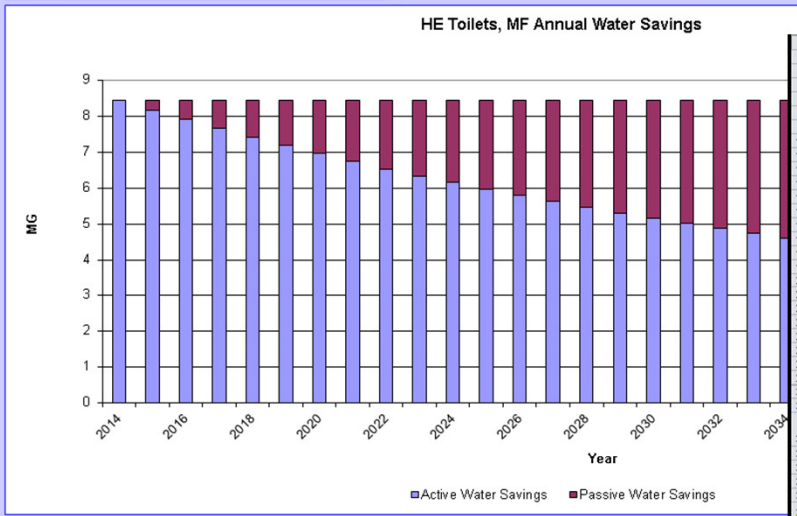
Activity Name HE Toilets, MF



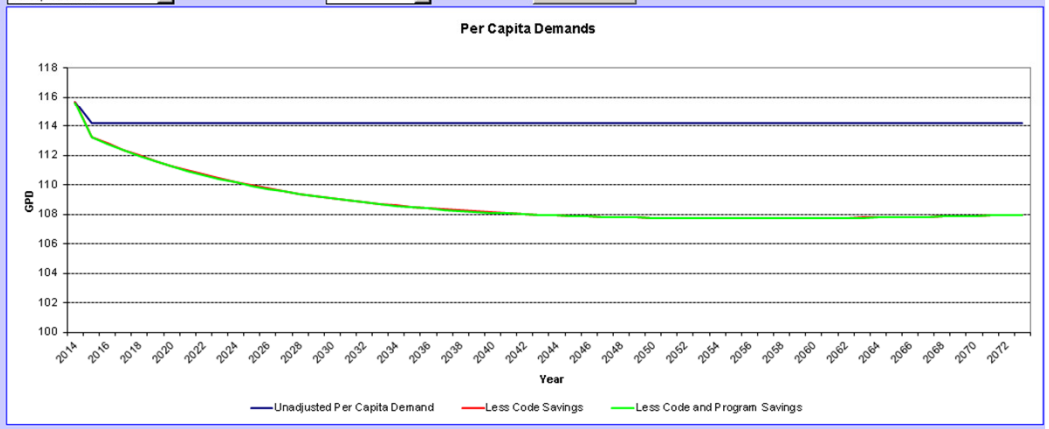
HE Toilets, MF	Gross	Active	Passive
Lifetime Water Savings (MG)	**506**	251	255
Average Annual Water Savings (MG)	**8**	4	4

Service Area Demands	**Units**	*2014*	**2015**	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Baseline Demands	MG	29,802	30,237	30,678	31,126	31,580	32,041	32,508	32,908	33,313	33,723	34,138	34,558	34,983	35,413
Baseline - Code Savings	MG	29,802	29,999	30,312	30,638	30,977	31,328	31,691	31,992	32,302	32,622	32,950	33,288	33,634	33,990
Baseline - Code Savings - Program Savings	MG	29,785	29,983	30,297	30,624	30,963	31,314	31,678	31,979	32,290	32,610	32,939	33,277	33,624	33,979
Per Capita Demands	**Units**	*2014*	**2015**	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Baseline Demands	GPD	115.7	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2	114.2
Baseline - Code Savings	GPD	115.7	113.3	112.8	112.4	112.0	111.6	111.3	111.0	110.7	110.4	110.2	110.0	109.8	109.6
Baseline - Code Savings - Program Savings	GPD	115.6	113.2	112.7	112.3	111.9	111.6	111.2	110.9	110.7	110.4	110.2	109.9	109.7	109.5
Service Area Water Savings	**Units**	*2014*	**2015**	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Code Water Savings	MG	0.0	238.1	365.9	487.3	602.7	712.6	817.3	916.6	1,011.2	1,101.4	1,187.6	1,269.9	1,348.5	1,423.8
Program Water Savings	MG	16.7	16.0	15.5	14.9	14.4	13.8	13.4	12.9	12.4	12.0	11.6	11.2	10.8	10.4
Total Water Savings	**MG**	**16.7**	**254.1**	**381.3**	**502.2**	**617.1**	**726.5**	**830.7**	**929.4**	**1,023.6**	**1,113.4**	**1,199.1**	**1,281.0**	**1,359.3**	**1,434.2**
% of Baseline Demands	**%**	**0.1%**	**0.8%**	**1.2%**	**1.6%**	**2.0%**	**2.3%**	**2.6%**	**2.8%**	**3.1%**	**3.3%**	**3.5%**	**3.7%**	**3.9%**	**4.0%**
Class Water Savings	**Units**	*2014*	**2015**	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Single Family	MG	6.3	155.9	224.4	289.3	350.7	409.1	464.5	516.8	566.6	613.9	659.0	702.0	743.1	782.3
Multi Family	MG	8.4	86.3	135.5	182.4	227.0	269.6	310.2	348.9	385.9	421.2	454.9	487.2	518.1	547.7
Commercial	MG	1.9	10.0	17.8	25.3	32.4	39.3	45.9	52.2	58.3	64.2	69.8	75.2	80.3	85.3
Industrial	MG	-	0.6	1.1	1.6	2.1	2.6	3.0	3.5	3.9	4.3	4.7	5.1	5.4	5.8
Duplex-Triplex	MG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Construction	MG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non Revenue Water	MG	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**MG**	**16.7**	**252.8**	**378.8**	**498.5**	**612.3**	**720.6**	**823.7**	**921.5**	**1,014.7**	**1,103.6**	**1,188.4**	**1,269.4**	**1,346.9**	**1,421.1**

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	**2031**	N/A	N/A	N/A	N/A	N/A
Baseline - Code Savings	**2034**	**3**	0.0	$0	0.0	$0
Baseline - Code Savings - Program Savings	**2034**	**3**	0.0	$0	0.0	$0

Select Chart to View

Per Capita Demands | No. of Years to Display | Chart Explanations



Navigation | 1. Common Assumptions | 2. Specify Demands | 3. Enter Utility Avoided Costs | 4. Define Activities | 5. Enter Annual Activity | 6. GHG Module Inputs | Activity Sav

Ready | Calculate

Active Planning Process

* Stakeholder Process to set vision & goals for water conservation in Tucson
  * Vision will be driven by realistic community priorities
  * Goals to achieve vision will be analyzed in tracking tool (will include existing programs, programs coming online and "dream" programs)
* Work in tracking tool will continue throughout this process

Stakeholder Engagement

Next Steps This Summer…

* Gather remaining data inputs for tool
* Finalize stakeholder engagement process & begin recruitment
* Begin building scenarios to show how AWE tool can be used

Clothes Washer Rebate Pricing Example

Brand	Model	Price	Old CEE	New CEE
Amana	NTW4605EW	$ 399		
GE	GTWN2800DWW	$ 599		
GE	GFWS1700HWW	$ 798	3	
GE	GFDS170EHWW	$ 798		
GE	GTWN7450HWW	$ 799	3	
GE	GFWR2700HWW	$ 986	3	2
LG	WM3170CW	$ 799	3	2
LG	WT5480CW	$ 999	3	
LG	WM3575CW	$ 999		
LG	WM8000HVA	$ 1,599	3	2
Maytag	MVWX655DW	$ 649		
Maytag	MHW5100DW	$ 865	3	2
Samsung	WA45H700AW	$ 699		
Samsung	WA48J7700AW	$ 781		
Samsung	WA48H7400AW	$ 799		
Samsung	WF42H5200AP	$ 999		
Whirpool	WTW4815EW	$ 443		
Whirpool	WTW7300DW	$ 696		
Whirpool	WTW7300DW	$ 696		
Whirpool	WFW72HEDW	$ 718	2	2
Whirpool	WF425000AW	$ 799		
	Avg all	$ 806		
	Avg CEE	$ 993		

Historic Pricing Premiums

The U.S. EPA and DOE (2004) report that the typical price premium for an Energy Star certified washing machine is $300. Not all energy star rated machines are considered high efficiency in terms of their water use.

THELMA (1997) reports the incremental cost of high efficiency washers is $400 more than comparable conventional washers.

The Integrated Water Factor is a ratio that calculates the number of gallons of water needed for each cubic foot of laundry

$$= \frac{\text{weighted water use per load (in gallons)}}{\text{washer capacity (in cubic feet)}}$$

A lower number indicates lower consumption and a more efficient use of water.

The Integrated Modified Energy Factor is a ratio that calculates the capacity of the clothes container divided by the total clothes washer energy consumption per cycle.

$$= \frac{\text{washer capacity (in cubic feet)}}{\text{total energy consumption per cycle (in kWh)}}$$

A higher number indicates lower consumption and more efficient use of energy.

Essentially, both factors help consumers evaluate and compare the amount of water and energy needed per cubic foot of laundry.

CEE SUPER EFFICIENT HOME APPLIANCES INITIATIVE

High efficiency specifications for RESIDENTIAL CLOTHES WASHERS

(Terms of Usage below)

Effective March 7, 2015

Efficiency Level	Integrated Modified Energy Factor	Integrated Water Factor
Federal Standard Top Load	1.29	8.4
Federal Standard Front Load	1.84	4.7
ENERGY STAR® Top Load	2.06	4.3
ENERGY STAR® Front Load	2.38	3.7
CEE Tier 1	2.38	3.7
CEE Tier 2	2.74	3.2
CEE Tier 3	2.92	3.2

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POTENTIAL POOL REBATE QUESTIONS

Characterize current stock of swimming pools

- Use Assessor data to determine:
  - number
  - types of houses with pools – age, value, neighborhoods
- Use building permit data to determine:
  - age distribution of pools (not straight-forward)
  - size distribution (straight-forward for last several years only)

What is current rate of pool retirement? What is trend in rate?

- Identify removed pools through County Assessor databases and determine:
  - age and value of home
  - impact on assessed valuation
  - how did they do it? DIY? Pool company? Other? Costs?
- What was water savings from pool removal?
  - Use water bill records for pooled time series-cross sectional est of demand change
- Survey people who have removed pools to determine:
  - motivations for removing
  - costs and benefits
  - age and size of pools removed
  - what they replaced pool with

- Survey pool owners re possible rebate program:
  - pool usage frequency, costs
  - have they ever considered removing pool? Questions/concerns/issues

Identify and estimate all benefits of pool removal, including:

- Financial
  - lower water bill
  - lower electric bill
  - no more expenditures on chemicals, filter media, pool company
  - lower homeowners insurance, especially if the pool has a slide or diving board
  - lower property taxes (new pool raises home value by about 50% of cost of pool; not clear what removing an old pool does to home value)
- Landscaping
  - reclaim pool area for other uses
  - no longer need pool fence
- Reuse of pool basin, system components for rainwater harvesting, koi pond, other
- Psychic
  - conserving water and energy, living more sustainably, smaller carbon footprint
  - no concerns about animals, kids getting into pool – "an attractive nuisance"

Identify and estimate costs of pool removal, including:

- sss
- reduced home value

Determine possible components and parameters of a pool removal rebate program, including:

- Size of rebate
- Conditions and limitations
- How to lower costs for participants
- Information dissemination approaches

Review any similar programs by other water providers; look at local pool removal workshops

Encouraging Swimming Pool Removals
Potential for a Rebate Program

Gary Woodard, JD MPP

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& ASSOCIATES

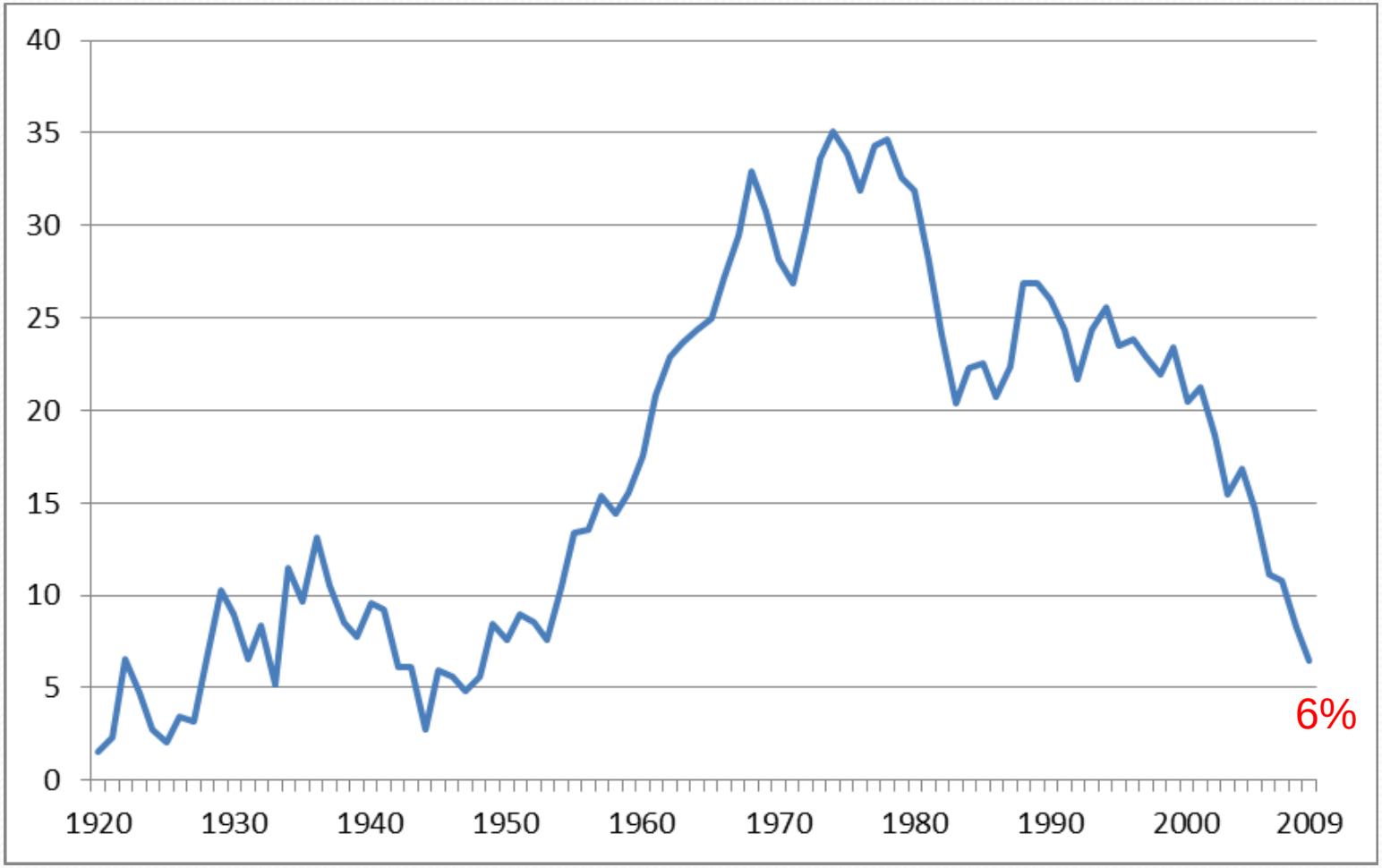
Tucson Water
Citizens Water Advisory Committee
Conservation & Education Subcommittee

Tucson Water Headquarters
North Conference Room, 2nd Fl.
Monday, 15 June 2015

Factors of decline in SFR demand:

- water (and sewer) rate increases
- more effective water conservation programs
- changing tastes in landscaping
- more water-efficient fixtures and appliances in new homes
- replacement of old, less efficient fixtures and appliances in existing homes
- swamp coolers replaced by AC
- declines in popularity of backyard pools

Declining popularity of backyard pools



20% of SFRs have a pool, but the popularity appears to have been in decline for decades.

Pools are not only scarcer, they're shrinking

Swimming pools built today are only a bit more than half the size of pools installed in the 1970s and early 1980s.

What's a spool?

"Stu sure is getting a lot of use out of the new lap pool."

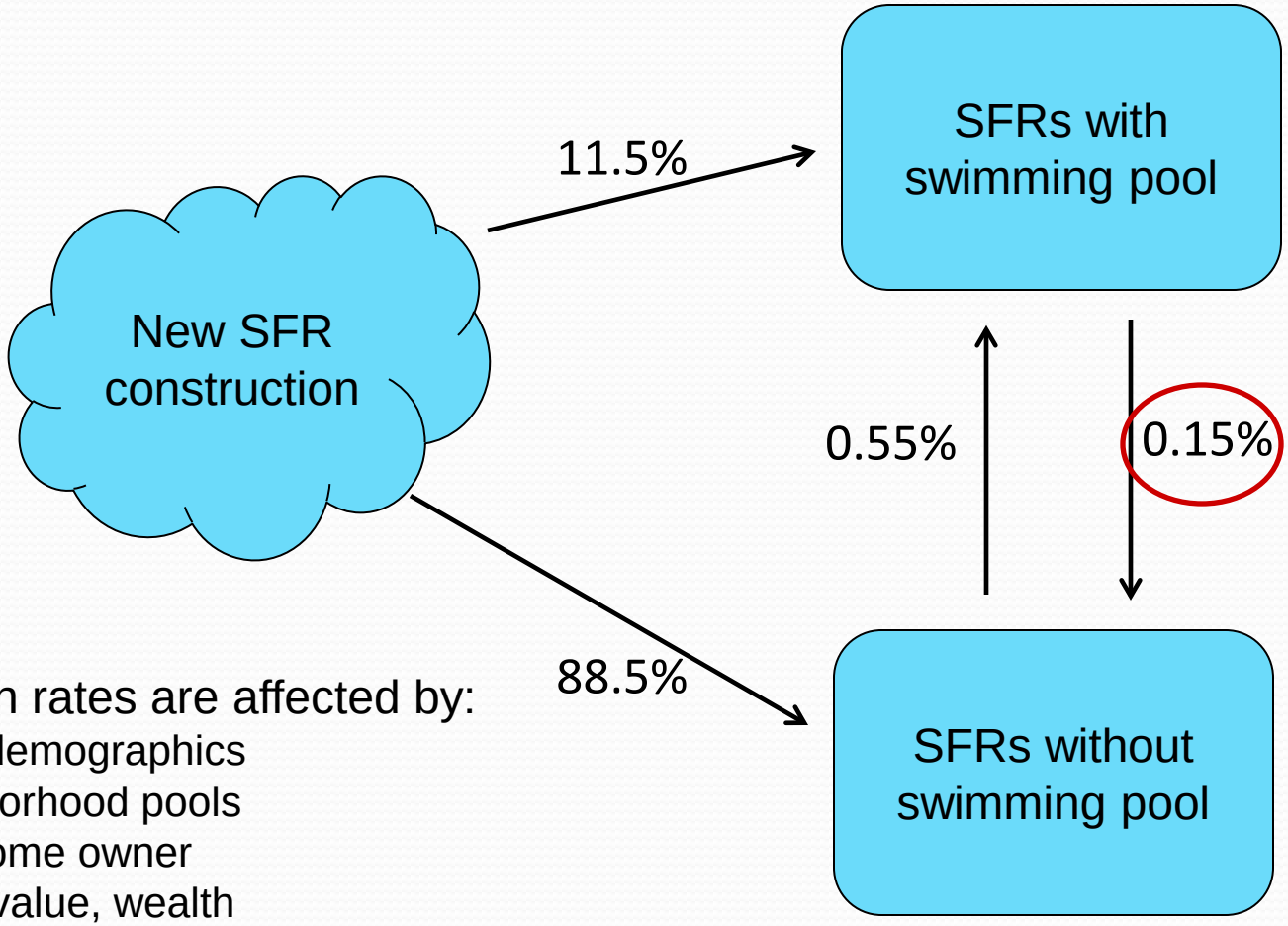
Close to Home by John McPherson, 12 Aug. '13

Typical pools – past

Typical pools – past, present

Typical pools – past, present, future

Home swimming pool transition rates, 2002-2012



Transition rates are affected by:

- PPH, demographics
- neighborhood pools
- new home owner
- home value, wealth

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When do anecdotes become a trend?

Maybe when humorists start to notice….

F Minus, *Arizona Daily Star*, Jan. 5, 2013

…or maybe when someone discovers a profit motive.

ARCSA
American Rainwater Catchment Systems Association

Webinar:
Swimming pools converted to rainwater harvesting tanks

Swimming pools are fun, but are they worth the time and effort?

Feb. 26, 2013

See how you can save time and money by converting a swimming pool to a rainwater harvesting tank.

$20 for Members
$40 for Nonmembers

When it’s a home improvement topic in the paper, it’s passe.

New uses for old swimming pools

Convert space into useful, attractive landscape features

Mark "Eb" Eberlein, near a pond on his property, put a deck over the swimming pool and created a cistern that stores rainwater for a Painted Hills home's garden and desert landscaping. *Arizona Daily Star, March 7, 2013.*

Backyard pools are becoming:

- less popular
- smaller in size
- used by adults, not families with children
- more likely to be removed

What is best term for this phenomenon?

- Retirement?
- Removal?
- Filling in?

The concept of a *trigger*

Why does someone decide that *today* is the day

to replace their evaporative cooler with AC?

to buy a horizontal-axis clothes washer?

to build or remove a pool?

Why today and not yesterday, or a month ago?

What triggers these types of decisions?

Transitions can be triggered by:

- new home owners
- switch between owner-occupied and rented
- major home renovation
- current water-using fixture or appliance breaks
- empty nest syndrome
- contagion effect – the neighbors do something
- targeted conservation program, e.g., rebate

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Questions regarding a potential pool removal rebate

- What is the current stock of swimming pools?
- What is the current rate of pool retirement? Is it trending?
- Why have some TW customers decided to remove a pool?
- How much water did the pool removal save?
- How many & which pool owners are interested in pool removal?
- What are the costs of removing a pool?
- What are all the benefits of pool removal for Tucson Water and its customers?
- What might a potential rebate program look like?

Characterize the current stock of swimming pools

Use Assessor data to determine:

- Number of pools
- Types of houses with pools – age, value, neighborhoods

Use building permit to determine:

- Age distribution of pools (not straight-forward)
- Size distribution of pools (simple for last few years only)

Determine the current rate of pool retirement

Identify removed pools through a combination of:

- Year-over-year changes in the assessors database
- Google Earth

Determine from assessors database:

- Age distribution of homes where pool was removed
- Value distribution of these homes
- Impact of removal on assessed valuation

Survey TW customers who recently removed a pool

What was water savings from pool removal? Estimate using pooled time series/cross-sectional analysis based on water bill records

Survey people who have removed pools to determine:

- Major motivations for removing the pool?
- How was it done? DIY? By pool company? Other? Costs?
- Other costs and benefit?
- Age, size, condition of pools removed; were they full?
- What was the pool/decking area was replaced with?

Survey pool owners to gauge interest in removal rebate

What fraction of pool owners express high / medium / low / no interest in removing their swimming pool?

How does interest in a potential pool removal rebate correlate with:

- Condition of pool
- Whether pool is currently full
- Make-up of household
- Frequency of pool use
- Perceived costs of owning the pool

Identify and estimate costs of pool removal

- Demolition work, pool and decking
- Changing/removing plumbing
- Changing/removing electrical wiring
- Acquiring fill material
- Re-landscaping or other repurposing of area
- Other

Identify and estimate all benefits of pool removal

From Tucson Water perspective:

- CAP costs
- Energy costs
- Chemical costs
- Avoided costs

Non-pecuniary benefits:

- Customer good will
- Positive image for being conservation leader
- Other?

Identify and estimate all benefits of pool removal

From customer's perspective – financial benefits:

- Lower water bill
- Lower electric bill
- No expenditures on chemicals, filter media, pool company
- Lower property taxes
- Lower homeowner insurance rates, especially if pool had a slide or diving board

Identify and estimate all benefits of pool removal

Other potential customer benefits:

- Pool area can be put to other uses
- Pool fence can be removed
- Pool can be repurposed for rainwater harvesting, koi pond, etc.
- Removal of an attractive nuisance and danger to children & pets
- Feel good about conserving water, having a smaller carbon footprint, living more sustainably

Outline parameters of a potential rebate program

Review any similar programs elsewhere and address the following questions:

- Should rebate be a:
  - flat amount
  - % of removal cost
  - function of pool area or volume
- What rebate conditions and limitations should apply?
- How to lower costs for participants?
- What are best information dissemination approaches?

Compare potential rebate with others

How do pecuniary benefits to Tucson Water compare with other rebate programs, such as toilet rebates and rain water harvesting systems?

How do non-pecuniary benefits compare?

How do benefits to customers compare with other rebate programs?

Could such a rebate potentially trigger a substantial increase in pool removals?