



Inland Empire Utilities Agency

A MUNICIPAL WATER DISTRICT

Water Use Efficiency Business Plan

September 2010



Table of Contents

Section 1 - Executive Summary	5
Section 2 – The Plan Development Process	15
Section 3 – Market Potential	19
Data Sources	19
Water Accounts by Sector	21
Water Demand by Sector.....	22
Landscape Opportunities	23
Indoor Residential Opportunities	25
<i>Single Family Indoor Water Using Devices.....</i>	<i>26</i>
<i>Multi-family Toilets Indoor Water Using Devices</i>	<i>28</i>
Commercial, Industrial and Institutional Opportunities.....	29
Top Measures for Potential Future Water Savings.....	30
Overall Opportunities and Targets.....	32
Section 4 – BMP and Regulatory Compliance	35
Water Savings Goals	36
California Urban Water Conservation Council (CUWCC)	38
<i>Best Management Practices</i>	<i>39</i>
Legislative Actions and Regulatory Compliance	40
<i>Assembly Bill 1420 (Laird/Feuer)</i>	<i>40</i>
<i>Statewide Water Conservation (SBx 7-7).....</i>	<i>40</i>
<i>Assembly Bill 1881 (2006).....</i>	<i>41</i>
Section 5 - Program Evaluation Modeling	43
Model Description.....	43
<i>Model Structure</i>	<i>45</i>
<i>Activity Library</i>	<i>45</i>
<i>IEUA Activity Definitions</i>	<i>47</i>
<i>Common Assumptions Used in the Model</i>	<i>49</i>
<i>Economic Terms Used in the Model.....</i>	<i>50</i>
<i>Economic Analysis.....</i>	<i>51</i>
<i>Water Resources Analysis</i>	<i>52</i>
<i>Future Program Tracking</i>	<i>52</i>
Section 6 – Implemented Programs and Analyses.....	53
Multi-family High Efficiency Toilet Direct Installation Program	54
Water Wise Landscape Turf Removal Rebate Program.....	55
Save A Buck Incentive Program	56
SoCalWater\$mart Incentive Program	58
Education and Outreach Programs.....	60
Evaluation of Programs.....	61

<i>Economic Analysis</i>	61
<i>Program Evaluation Results</i>	68
Section 7 - Potential Programs, Analyses and Final Program Selection	71
IEUA Administered High Efficiency Toilet Incentive Program.....	73
Multi-family Toilet Direct Installation Program	74
Multi-family Submetering Program	75
SoCalWater\$mart Incentive Program	76
Comprehensive Restaurant Program.....	78
Industrial Process & Cooling Tower Audits & Incentive Program.....	79
Public Sector Incentive Program	82
Commercial Save A Buck Program	84
GeoSmart Landscape Finance Program	87
Smart Controller Direct Installation Program	89
Water Budget Program	91
Landscape Water Use Evaluations	93
High Efficiency Nozzle Distribution Program	95
Analyses and Selection of Potential Programs	97
Ranking of Activities by Cost per Acre-foot and Benefit-to-Cost.....	97
<i>Analysis Outcome</i>	98
Program Selection.....	102
Section 8 - Five Year Action Plan	107
Implementation Schedule.....	108
IEUA Role.....	109
Retail Agency Role	109
Program Implementation Strategy	109
Activities Implemented by Year	110
Water Savings	111
<i>Water Savings by Sector</i>	112
<i>Savings by Year by Activity</i>	112
<i>Programmatic Savings</i>	114
<i>Passive vs. Active Savings Assumptions</i>	115
<i>Historical and Projected Water Savings</i>	116
Budget by Year	117
IEUA Costs and Benefits.....	117
Customer Costs and Benefits	120
Outside Funding Opportunities	121
<i>Metropolitan Water District</i>	121
<i>California Department of Water Resources</i>	122
<i>United States Bureau of Reclamation</i>	122
<i>Other Federal Sources</i>	122
Plan Updates	123

Appendix 1: Measure Guide	126
Appendix 2: Saturation Data and Spreadsheet Calculator	128
<i>Data Parameters for Saturation Calculations</i>	128
<i>Saturation Calculation Methodology</i>	130
Appendix 3: AWE Tracking Tool User Guide	132

Table of Figures

Figure 1- Compliance Requirements.....	6
Figure 2: IEUA 20x2020 per Capita Goals.....	7
Figure 3: Impact of WUE Activities and Recycled Water Supply.....	7
Figure 4: Water Use Reduction Goal Breakdown	8
Figure 5: Recycled Water Supply Projections	8
Figure 6- Lifetime Water Savings by WUE Active Programs	8
Figure 7: Highlights of the Plan	9
Figure 8: Newly Created Tools and Resources.....	13
Figure 9: Plan Development Task Descriptions and Deliverables.....	15
Figure 10: Actions Taken to Complete Tasks 1 — 4	16
Figure 11: Actions Taken to Complete Task 5 - 8.....	17
Figure 12: Number of Accounts by Sector	21
Figure 13: Number of Accounts by Sector by Retail Agency.....	21
Figure 14: Water Demand by Sector.....	22
Figure 15: Water Demand by Agency by Sector	22
Figure 16: Landscape Use Percentage by Customer Sector.....	24
Figure 17: Landscape Use Percentage of Total Demand	24
Figure 18: Number of Single Family Parcels Greater than One Acre	25
Figure 19: Single Family Toilet Inventory	27
Figure 20: Single Family Clothes Washer Inventory	27
Figure 21: Single Family Showerhead Inventory.....	27
Figure 22: Multi-family Toilet Overview	28
Figure 23: Multi-Family Clothes Washer Inventory	28
Figure 24: Multi-Family Showerhead Inventory	29
Figure 25: Number of Customers by Type for Commercial & Institutional Customers.....	30
Figure 26: Water Efficiency Measures Ranked by Potential Water Savings.....	31
Figure 27- Compliance Requirements.....	36
Figure 28 - Historical Demand & Selected Baseline.....	37
Figure 29: IEUA 20x2020 per Capita Goals	37
Figure 30: Retailer and Wholesaler BMPs	40
Figure 31: Conservation Measures included in Activity Library	47
Figure 32: Data Categories and Definitions used in Activity Spreadsheet-	49
Figure 33: Assumptions Used in Tracking Tool Model.....	50
Figure 34: Service Area Population Assumptions-	50

Figure 35: Economic Term Definitions.....	51
Figure 36: Total Cost and Benefit (All Funding Sources) by Measure.....	62
Figure 37: IEUA’s Costs and Benefits by Measure	64
Figure 38: Program Evaluation Results- Work Group Decisions.....	69
Figure 39: List of Potential Programs by Sector.....	72
Figure 40: Measure Ranking Listed by Cost per Acre-Foot.....	98
Figure 41: Activity Ranking Listed by IEUA Benefit-to-Cost Ratio.....	100
Figure 42: Activity Ranking Listed by Participant Benefit-to-Cost Ratio.....	101
Figure 43: Eliminated Programs and Reasons for Elimination.....	102
Figure 44: Selected Programs and Reason for Final Selection.....	104
Figure 45: Graph of Water Savings by Plan Level	107
Figure 46: Base Plan Overview.....	108
Figure 47: Program Launch Schedule	108
Figure 48: Projected Number of Activities Implemented per Year	110
Figure 49: Base Model Annual Water Savings	111
Figure 50: Base Plan Cumulative and Lifetime Water Savings.....	111
Figure 51: Breakdown of Annual Water Savings by Sector.....	112
Figure 52: Graph of Five Year Acre-Feet Savings by Sector	112
Figure 53: Annual Water Savings by Activity by Year	113
Figure 54: Five Year Water Savings per Activity Graph.....	114
Figure 55: Annual Water Savings for Selected Programs	115
Figure 56: Passive and Active Water Savings.....	116
Figure 57: Historical and Projected Water Savings for Base, Medium and High Level Plans	117
Figure 58: Budget by Year over Five Years.....	117
Figure 59: Cost per Acre-Foot per Activity.....	118
Figure 60: Avoided Cost and Benefit-to-Cost Ratio per Activity.....	119
Figure 61: Customer Avoided Utility Bills and Benefit to Cost Ratio per Activity.....	120
Figure 62: Conservation Device Definitions.....	128
Figure 63: Data Parameters Used for Saturation Modeling	129
Figure 64: Assumed Rates of Natural Replacement per Measure.....	129
Figure 65: Existence/Adoption/Compliance Rates per Measure.....	130

Section 1 - Executive Summary

Current Situation

Inland Empire Utilities Agency (IEUA) and its eight member agencies strive to bring about long-term solutions for secure and reliable water supplies.

Prior to the recent decline of the economy, the IEUA service area was one of the fastest growing areas in the State. IEUA and its member agencies currently serve approximately 850,000 residents with an anticipated growth rate of up to 50% over the next 20 years. New supplies of water will be needed to serve that increasing demand. Water use efficiency and conservation are the most cost-effective new source of water. Over the last year, demand reduction from water conservation activities has accounted for approximately 5% or 12,000 acre-feet of the region's total water supply. IEUA's 2005 Urban Water Management Plan projects that conserved water will account for at least 10% percent of annual demand of IEUA's future water portfolio and will be an important component of local resource development.

As the regional wholesale supplier of water for the area, IEUA has assumed the role of coordinating the region's activities and programs to reduce demand for potable water, working closely with the eight member agencies to achieve success.

The Water Use Efficiency Business Plan is to be used as a blueprint to help IEUA and its member agencies comprehensively plan for and implement future active conservation activities and programs.

Purpose of the WUE Plan

- Create the strategy and blueprint to meet per capita water demand reduction goals.
- Deliver the customized tools required to track performance and make future changes.

Water Reduction Goals and BMP and Regulatory Compliance

The strategies and programs included in the plan are designed to meet the requirements of the:

- Governor's call for 20% per capita water use reduction by 2020
- California Urban Water Conservation Council's Best Management Practices
- Assembly Bill 1420 Statute

On February 28, 2008 Governor Schwarzenegger presented a plan to achieve a 20 percent reduction in per capita water use state wide by 2020 (commonly known as 20x2020) , with an incremental milestone of 15 percent reduction by year 2015. This initiative was incorporated into law as Senate Bill x7 7.

Additionally, IEUA and its member agencies are long-standing members of the California Urban Water Conservation Council (CUWCC) and signatories of the Memo of Understanding, committing to implementation of Best Management Practices (BMPs) for more efficient use or conservation of water. This commitment requires that IEUA and its member agencies maintain the staffing, funding and priority levels necessary to achieve the level of water savings called by the BMPs and report performance accordingly.

Lastly, Assembly Bill 1420 became effective in January of 2009 stating that issuance of state loans or grant funding be conditioned on implementation of the DMMs described in Water Code Section 10631. DWR equates the DMMs with the CUWCC BMPs.

In response to these compliance obligations, IEUA and its agencies devised a strategy to meet these requirements in the most cost-effective manner feasible.

Below is a chart showing the compliance requirements and associated strategies for each:

Compliance Requirements

<i>Regulatory Agency or State Organization</i>	<i>Requirements</i>	<i>Approach</i>
20x2020	Reduce per capita water use by 10% by 2015 AND Reduce per capita water use by 20% by 2020	By implementing Active Water Use Programs, Policy Initiatives, and increasing Recycled Water Supply, IEUA and its agencies are projected to be on track to meet per capita water reduction goals for both target years.
CUWCC	Reduce per capita water use by 18% by 2018*	IEUA and its agencies will utilize CUWCC’s new GPCD option, which offers a per capita methodology to track compliance. This will align with the requirements of 20x2020 as well.
AB 1420	Fulfill BMP commitments	Lines up with actions taken to meet CUWCC BMP compliance.

**Changes are currently underway to align the CUWCC requirements with the 20x2020 goals.*

Figure 1- Compliance Requirements

Although the current goals for each of the regulatory agencies and state organizations vary, all are moving to a Gallons per Capita per Day (GPCD) savings goal that is in line with the 20x2020 per Capita Water Use Reduction Goals.

Understanding this movement to a standardized GPCD view for water use reduction, the following chart shows the 20x2020 goals for IEUA territory:

IEUA 20x2020 per Capita per Day Goals

	Baseline (Based upon average annual water demand years 2001 – 2010)	2015 Target (10% Reduction)	2020 Target (20% Reduction)
Gallons per Capita per Day (GPCD)	272	245	217

Figure 2: IEUA 20x2020 per Capita Goals

IEUA expects to exceed the 20x2020 goal; for both the 2015 target and the 2020 target. This will be accomplished through regional and local actions utilizing:

1. **Water Use Efficiency (WUE) Active Programs** –offering customers a program portfolio with cost-effective water efficiency measures,
2. **WUE Passive Policy Initiatives** –including building codes and landscape ordinances,
3. **Recycled Water Supply** –reducing demand for potable water by increasing recycled water supply.

The chart below shows the anticipated GPCD reduction from the WUE activities and recycled water supply:

Impact of WUE Activities and Recycled Water Supply

	YEAR	
	GPCD Reduction by 2015	GPCD Reduction by 2020
Projected GPCD reduction from WUE Activities Only	5	13
Projected GPCD reduction from Recycled Water Supply Only	36	44
TOTAL Projected GPCD Reduction	41 (5 + 36)	57 (13 + 44)
10 Year Baseline GPCD	272	
IEUA GPCD Target	245	217
IEUA Projected GPCD Achievement	231 (272-41)	215 (272-57)

Figure 3: Impact of WUE Activities and Recycled Water Supply

The water use reduction goal, of 5,157 acre-feet for 2015 and 15,020 acre-feet, is the GPCD WUE compliance goal presented in acre-feet. As shown, the WUE active and passive initiatives to be implemented under this plan are estimated to achieve much greater savings than the GPCD requirements.

Water Use Reduction Goal Breakdown in Acre-feet (AF)

	2015	2020
Total Reduction Goal	5,157 AF	15,020 AF
Reduction from WUE Active Programs	6,000 AF	11,555 AF
Reduction from WUE Passive Policies	1,662 AF	10,128 AF
Total Reduction from WUE Initiatives	7,662 AF	21,683 AF
% of Goal	149%	144%

Figure 4: Water Use Reduction Goal Breakdown

As stated, increased recycled water supply is the third mechanism to be implemented for demand reduction attainment. Recycled water supply projections are shown in acre-feet in the chart below:

Recycled Water Supply

	2015	2020
Recycled Water Supply (AF)	38,006 AF	50,008 AF

Figure 5: Recycled Water Supply Projections

In order to achieve the WUE active programs’ goal, IEUA will implement eight active programs. The programs will deliver water savings through the 2015 and 2020 target years and beyond due to the long life for several of the measures being offered. Below is an overview of the lifetime water savings for each of the programs:

Lifetime Water Savings by WUE Active Programs

WUE Active Program	Estimated Lifetime Water Savings (AF)
High Efficiency Nozzle Direct Installation Program	7,500
GeoSmart Landscape Finance Program	766
Save A Buck Program	1,951
SoCalWaterSmart Program	1,945
Smart Controller Direct Installation Program	3,525
Water Budget Program	1,482
Landscape Evaluation Program	118
Multi-family HET Direct Installation Program	4,250
Total	19,592

Figure 6- Lifetime Water Savings by WUE Active Programs

The Plan is estimated to save over 14,260 acre-feet of water at a cost to IEUA of \$187 per acre-foot. This falls well below IEUA’s avoided cost to purchase water from MWD of \$594 per acre-foot (MWD’s Tier 1 rate for untreated water). The avoided purchases equate to \$9.7 Million.

From 2003 – 2009, programs costs IEUA \$57 per acre-foot. Although the plan projections are less financially beneficial than in these previous years, they are still highly advantageous to IEUA and its member agencies.

The reasons that costs have gone up is that the “easy hits” such ULFTs and HETs have achieved high saturation levels. Moving forwards, the landscape market requires more complex products and services and therefore cost more. Another factor impacting cost is reduced funding from outside agencies. MWD and State agencies are no longer offering the level of funding as seen in previous year. Despite these market changes, the economic portfolio for this plan is still extremely favorable to IEUA and its agencies.

Below are highlights of the selected plan:

<i>Plan Overview</i>	
Cost per Acre-foot*	\$187 per acre-foot
Five-Year Water Savings	4,563 acre-feet
Lifetime Water Savings	14,260 acre-feet
Avoided Costs	\$9,707,137
Average Annual Budget	\$480,000
Five-Year Total Budget	\$2,390,000

**Includes education & outreach programs*

Figure 7: Highlights of the Plan

The Water Use Efficiency Business Plan

With major challenges ahead, IEUA recognizes that a sound, fact-based business plan is needed as a tool to guide water use efficiency program implementation over the upcoming years. IEUA, working in tandem with the eight agencies, created at Regional Water Use Efficiency Partnership Workgroup and initiated an eight-step process that resulted in the creation of the regional *Water Use Efficiency Business Plan*.

The Business Plan provides the following information:

- The current water supply situation and usage patterns;
- Specific market opportunities;
- A strategy for reaching water savings goals;
- Recommended programs with budgets, water savings, costs, marketing and operational details;
- A program implementation plan and schedule; and,
- A system for tracking and reporting performance over time.

Strategy Overview

The strategy developed for goal achievement is logical and straight forward:

1. **Target markets with highest water savings opportunity-** Comprising 69% of IEUA's total water demand, landscape usage is the key market to address. Residential landscape water usage, at 66% of the single family consumption, is clearly the prime opportunity for water savings.

Landscape water reduction for the commercial market is another viable prospect as well with 57-94% of commercial demand. This includes homeowners associations and commercial properties with large landscape areas.

2. **Provide program innovation to transform the landscape WUE market** - For years, Southern California water agencies have overlooked outdoor water savings opportunities because retrofit technologies and services were expensive and unreliable. Over the last several years, however, there have been major advancements in product designs and performance. By studying the successes and shortfalls of historical landscape programs, IEUA has devised a cost-effective array of programs to capture outdoor water savings.

Currently, smart controllers, high efficiency sprinkler nozzles and turf removal are the most likely measures to yield water savings in landscaped areas. Since these measures are not well known to most customers, they must be persuaded and enticed to participate. This will be accomplished through offers of free products and free installations whenever cost effective.

Once the products are well established in the market, it will no longer be necessary to provide them at water agency expense. Today, however, the customer is unlikely to invest in unknown technologies and services unless the offer is "too good to pass up."

3. **Secure outside funding for programs-** Grants and funding will be pursued whenever possible in order to drive down IEUA's cost per acre-foot of water saved. There are many funding sources available to the proactive and prepared water agency. Funding sources may include Federal grants offered through the Environmental Protection Agency; efficiency grants offered through State agencies such as the Department of Water Resources and the

State Water Resources Control Board; and regional grants and incentives offered by the Metropolitan Water District of Southern California (MWD).

IEUA, in addition to applying for the competitive offerings of State and Federal agencies, will leverage all MWD incentives and programs including:

- SoCal WaterSmart Program for single family residential water efficient measures.
 - Save A Buck Program for commercial water efficient measures
4. **Provide sustained education and outreach to customers-** IEUA will communicate the continued and urgent need for water use efficiency and direct customers to available programs. This will be accomplished through school education, regional advertising, and communication regarding local ordinances.
 5. **Advocate for State and regionally appropriate rules, regulations and ordinances for the efficient use of water-** Legislation requiring enhanced water efficiency product performance, as well as implementation of local, state, and national ordinances can significantly aid water demand reduction. IEUA and its agencies will advocate for responsible passive savings initiatives.

Selected Programs

The selected programs, with their heavy emphasis on landscape opportunities, will integrate the following elements:

- *High Efficiency Nozzle Installations* – Retrofitting pop-up spray heads with high efficiency rotary nozzles is a low cost measure and delivers high water savings. The saturation rate of high efficiency nozzles is extremely low, and the sheer volume of spray heads offers a prime market opportunity.
- *Smart Controllers in Combination with High Efficiency Nozzle Installations for Larger Landscape Sites* – Smart controllers are cost-effective for sites with large landscape areas. By combining controllers with high efficiency nozzles, significant and cost-effective water savings can be achieved.
- *Turf Removal* – Although turf removal delivers extremely high water savings in most retrofit projects, it is not yet deemed cost-effective for IEUA to fund a turf removal “direct” incentive program at this time, unless substantially funded through outside sources. By offering a low interest financing option customers would not be required to pay for up-front costs and should be able to realize substantial water savings. As a result, IEUA will be driving a market transformation—away from high water use turf and towards regional plants with low precipitation rates and minimal irrigation needs.

- *Water Budgets* – A “water budget” is the calculated amount of water a site would require over a particular time period (usually a month, billing cycle, or year) based on the lot size and local weather conditions. A Water Budget Program would educate customers about their water consumption patterns as compared to their budget. The savvy customer is now armed with a tool to better understand their usage and then independently make modifications to reduce their water use. The program is extremely cost effective because the educated customer makes the changes on their own thereby transforming the market.
- *Landscape Evaluations* – Comprehensive landscape evaluations provide customer education and information on landscape and irrigation system upgrades specific to each individual site. Intended to drive customers to make improvements in their landscape irrigation efficiency, the evaluations will direct customers to SoCalWater\$mart, Save A Buck or customer incentives, as applicable.
- *MWD's SoCalWater\$mart and Save A Buck Programs* – These programs are slated to continue for at least one more year, providing IEUA and its member agencies with continued outside funding and program administration. Moving forward, IEUA will add additional funding to landscape water use efficiency products to provide increased customer response.
- *Multi-family HET Direct Installation Program* – This program leverages Department of Water Resources (DWR) grant funding, as well as MWD incentives. The program will continue until the DWR grant and MWD funding ends.
- *Education and Outreach programs* – IEUA will continue to provide regional educational and outreach programs. Current regional education and outreach programs include the following:
 - National Theatre for Children
 - Garden in Every School
 - Regional Water Use Efficiency Outreach
 - Inland Empire Landscape Alliance
 - No Water Waste Ordinance

On an annual basis, IEUA and its member agencies will review the effectiveness and desirability of regional educational and outreach programs. Budget priority will be given to programs that assist member agencies in meeting state mandates.

Value for Retail Water Agencies

The eight retail agencies, along with IEUA, developed a strong working accord and accomplished the following as a result of the planning process:

- Agreement on a regional strategy to focus on landscape water use efficiency as well as a portfolio of regional programs;

- Completion of a documented plan that provides the implementation steps necessary to launch the programs as well as clearly defined roles/responsibilities between IEUA and the retail agencies; and,
- Commitment from IEUA to administer the regional programs with retail agencies responsible for implementing and possibly augmenting programs within their individual service areas.

Many agencies may need to develop an individual plan for their agency in order to understand their specific compliance requirements and to address the local needs of their respective service areas.

New Tools and Resources

As a part of the planning process, a number of valuable tools and resources were developed for IEUA and its agencies:

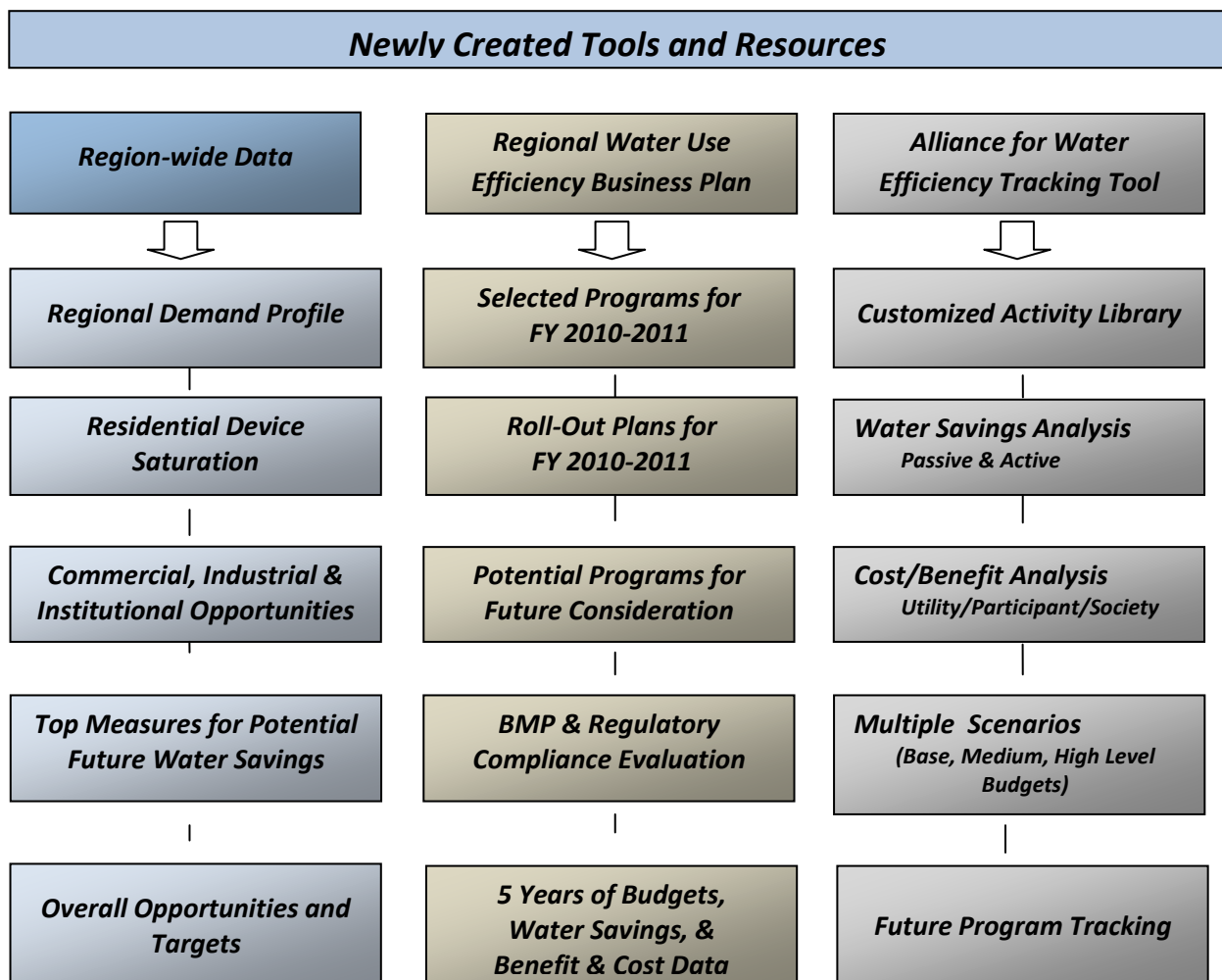


Figure 8: Newly Created Tools and Resources

The IEUA Data Elements, Water Use Efficiency Business Plan and Tracking Tool software are working tools to be used to guide IEUA and member agencies well into the future.

They are designed as flexible resources that adapt to changing circumstances. As budgets and grant funding fluctuate over time, IEUA and its member agencies will be able to enter the new parameters into the software tool and analyze the impact of the new variables. The Tracking Tool will help IEUA and its member agencies evaluate options and track results. The Tracking Tool will be used to record program and economic performance as the programs are rolled out and can be used to ensure that incremental milestones are being met on schedule.

The business plan was modeled using three different budget levels and productivity assumptions, designed to deliver varying degrees of water savings. These three levels of planning assumptions have been set as *Base, Medium, and High*. Because the Base Plan is anticipated to meet the 20x2020 GPCD goal, ***IEUA and its member agencies selected the Base Plan for implementation.***

Comprehensive planning data for all three levels is available in electronic format and included in the back of the document. (File names are AWE Tracking Tool_IEUA_Base Budget; AWE Tracking Tool_IEUA_Medium Budget; and AWE Tracking Tool_IEUA_High Budget).

Section 2 – The Plan Development Process

The work approach to develop the business plan was conducted in a logical and transparent manner. Tasks were well detailed prior to the start of the process with clearly defined deliverables for each task milestone. The tasks and deliverables were detailed on the following chart:

Task #	Description	Deliverable
#1	Gather End Use Data & Organize End Users by Sector	<ul style="list-style-type: none"> • Database of retail agency customers • Customer counts by sector • Summary of demand by sector • Total number of customers by type • Target list of highest demand and largest volume customers
#2	Evaluation of all Water Use Efficiency Programs	<ul style="list-style-type: none"> • Assessment of past programs • Scorecard of past programs • Historical water savings from programs • Estimated saturation of devices
#3	Evaluate Future BMP Compliance	<ul style="list-style-type: none"> • BMP compliance status • AB1420 compliance status • 20x2020 compliance target and status
#4	Identify Potential WUE Program Concepts	<ul style="list-style-type: none"> • Program concepts list with devices, program formats and non-device opportunities
#5	Develop Recommendations for New WUE Programs	<ul style="list-style-type: none"> • Program cut sheets for recommended new programs & high performing existing programs and strategies
#6	Develop WUE Program Evaluation Models	<ul style="list-style-type: none"> • Program evaluation spreadsheet with tracking and evaluation functionality
#7	Perform Economic Analysis of Selected WUE Programs	<ul style="list-style-type: none"> • Economic analysis software module with budget info, annual and lifetime water savings, potential 3rd party funding
#8	Finalize <i>Water Use Efficiency Business Plan</i>	<ul style="list-style-type: none"> • Final <i>Water Use Efficiency Business Plan</i>

Figure 9: Plan Development Task Descriptions and Deliverables

Working in partnership with each IEUA member agency, Maureen Erbeznik and her team gathered and organized water use data for each agency by customer class and subclass. A collective database was created and compiled in order to disaggregate end-use data within IEUA’s territory and complete the requirements of **Task 1**. Spreadsheets with details of agency consumption, estimated landscape usage and market potential can be found in the disk provided in the back of this document titled “*IEUA Agency Consumption and Landscape Usage 08_2010*” and “*IEUA Market Potential by Measure 08_2010*” as well as details of the device saturation provided on the same disk and titled “*IEUA Device Saturation 08_2010*”.

Next, historical water use efficiency programs were evaluated for measured saturation and remaining opportunities. For **Task 2**, A&N Technical Services provided engineering support, savings modeling and economic analysis. Additionally, a scorecard was created and the programs were rated by IEUA and member agencies for each program’s ability to deliver desired outcomes.

Task 3 required that a Best Management Practice (BMP) compliance assessment be performed. BMP revisions were completed in December 2008 at the California Urban Water Conservation Council (CUWCC) with anticipation of the passage of California Assembly Bill (AB) 1420. AB 1420 requires the California Department of Water Resources (DWR) and other State funding agencies to condition loans and grants for urban water supplier water management programs on implementation of Demand Management Measures as documented in the Urban Water Management Planning Act (also known as CUWCC BMPs) or an acceptable alternative. IEUA and its member agencies have chosen to report on a Gallons Per Capita Method to be consistent with the recent passage of SBx 7-7 in November 2009. The Business Plan is in line with the Gallons Per Capita compliance methodology.

With known opportunities and markets for specific technologies, the goal of **Task 4** was to develop a program concept list. The list was a “first pass” at program concepts. These concepts are similar to puzzle pieces in that they are not fully designed programs but, instead, components of a successful program. A concept might be a technology that offers high water savings or a marketing strategy that is known to deliver a high customer response. The developed program concept list included potential devices, program formats and non-device opportunities. An overview of Task 1-4 activities is below:

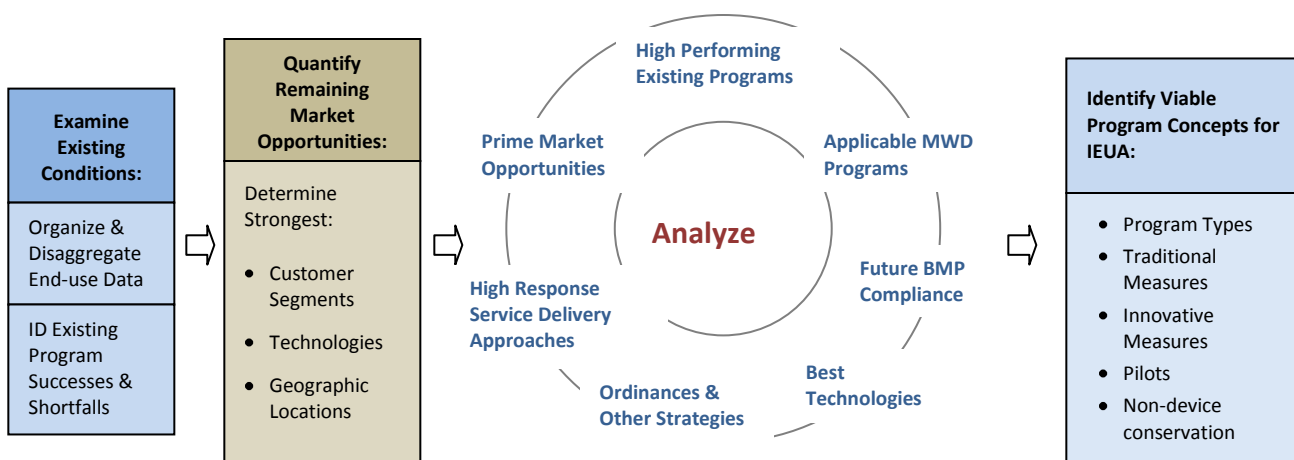


Figure 10: Actions Taken to Complete Tasks 1 – 4

In **Task 5**, the program concept list (completed during Task 4) was reworked and refined into actual program formats. Program “cut sheets” were created for each recommended program with detail regarding budgets, funding, potential market, water savings opportunities, cost/benefit, and marketing approaches. Thirteen program cut sheets were created for programs that would deliver quantifiable water savings.

For **Task 6**, the fourteen programs were evaluated using the Alliance for Water Efficiency’s conservation program evaluation tool (Tracking Tool). Using the tool, IEUA and member agencies were able to better understand the economic and water savings performance for each program possibility.

Final selection of programs was completed under **Task 7**. Of the thirteen programs, six were eliminated for various reasons such as minimal opportunity for savings, low cost-benefit or high budget requirements. Eight programs were selected for implementation in the final WUE program model. In addition, IEUA decided to continue several of their successful education and outreach programs.

The final task, **Task 8**, was the creation of the final regional *Water Use Efficiency Business Plan*.

An overview of Tasks 5-8 is shown below:

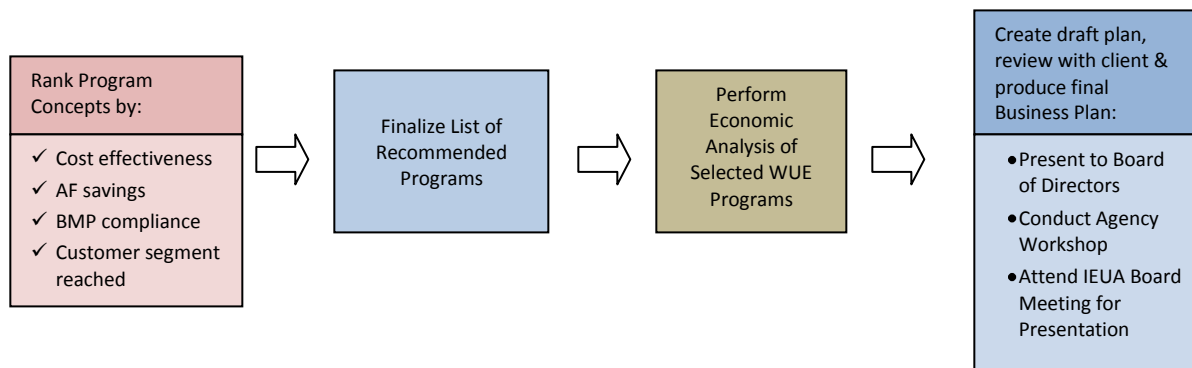


Figure 11: Actions Taken to Complete Task 5 - 8

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Section 3 – Market Potential

In order to complete the required tasks for the Business Plan, a comprehensive data collection and analysis process was undertaken. The sources of data utilized in the Plan are identified in this section along with relevant statistics that characterize IEUA's eight member agency service areas. In addition, this chapter presents data analysis results for future water use efficiency measures with the highest potential for success in reaching IEUA's regional water savings goals.

Data Sources

In developing the Plan, it was critical to utilize reliable and appropriate sources and data to characterize and analyze all aspects of the past, present and future conditions of the service area. Wherever possible, data was confirmed through multiple sources to ensure maximum accuracy and consistency. In selected cases, complete data was not available and it was necessary to blend data and apply professional assumptions. In these cases, it is identified and the method of data collection and analysis is provided.

The five principal data sources utilized were:

1. *California Urban Water Conservation Council Best Management Practices Reports* – The CUWCC reports are comprised of a base year report with annual reporting thereafter. The base year report documents each agency's demographic information and is used to determine coverage requirements. Each of the eight retail agencies in IEUA's service area submits biennial CUWCC water use efficiency best management practices (BMP) reports to document incremental progress. These reports summarize the retail agency's programs and budgets for water use efficiency activities during the prior two years. They are typically based upon information contained in agency customer billing systems and specific program performance data (for example, number of multi-family high efficiency toilets installed per month). They also contain valuable historical information to assist in tracking program performance. These reports provide:
 - Sector level data for residential, commercial, industrial and institutional (CII) accounts, including number and types of accounts and monthly water demand by sector
 - Housing-type descriptions, age and occupant demographic information
 - Residential device inventory
2. *IEUA Member Agency Customer Billing Systems and Program Reports* – Each member agency maintains their own separate customer billing systems. These systems comprise the principal source of data collection. In addition, data from past programs was collected. In combination, these reports typically provide:
 - Sector level data for residential and CII accounts, including number and types of accounts and monthly water demand by sector

- Conservation program production including all MWD supported programs such as SoCalWaterSmart and Save A Buck and grant programs such as the Multi-family Direct Installation Program
- Residential device inventory

It is important to note that each agency maintains their own account categories that, in some cases, are not precisely aligned with one another or with the BMP reporting categories. For example, not all agencies distinguish whether a residence is single or multi-family. In these cases, account categories were combined or professional assumptions applied (such as number of multi-family units) to best reflect the BMP reporting requirements. This data can be found on “*IEUA Agency Consumption and Landscape Usage 08_2010*”.

3. *California Department of Finance* – The Department of Finance publishes regular reports containing census-based housing and demographic data. Data utilized from these reports include:
 - Housing types, persons per household averages and occupancy rates
 - Residential device inventory
 - Population projections and estimates
4. *San Bernardino County Assessor* – The County Assessor publishes tax assessment reports. These reports were utilized to determine:
 - Parcel sizes and percent landscaped
5. *Dunn and Bradstreet Marketplace Business Database* – Dunn and Bradstreet produce databases that categorize business and industry types in regions. The reports utilize Standard Industrial Codes (SIC) to classify businesses from general industry types to specific business descriptions (such as restaurant, school). This data was utilized to better understand and quantify:
 - CII business and industry types in the IEUA service area and projections of their water demand

In addition, numerous secondary databases and information sources were utilized in the development of this plan, including:

- IEUA Interim regional Water Use Efficiency Business Plan
- IEUA Annual Reports and Budgets
- John Husing Economic Reports
- 2005 IEUA Urban Water Management Plan
- Municipal Planning Department Reports
- Watermaster Assessment Tables

Overall, the data utilized from the principal and secondary sources were combined to ensure a complete and robust analysis for this report.

Water Accounts by Sector

This section provides a complete breakdown of the total water service accounts across the IEUA service area and for each of the eight member agency areas. The table below presents the number and type of accounts for the entire IEUA region in 2008.

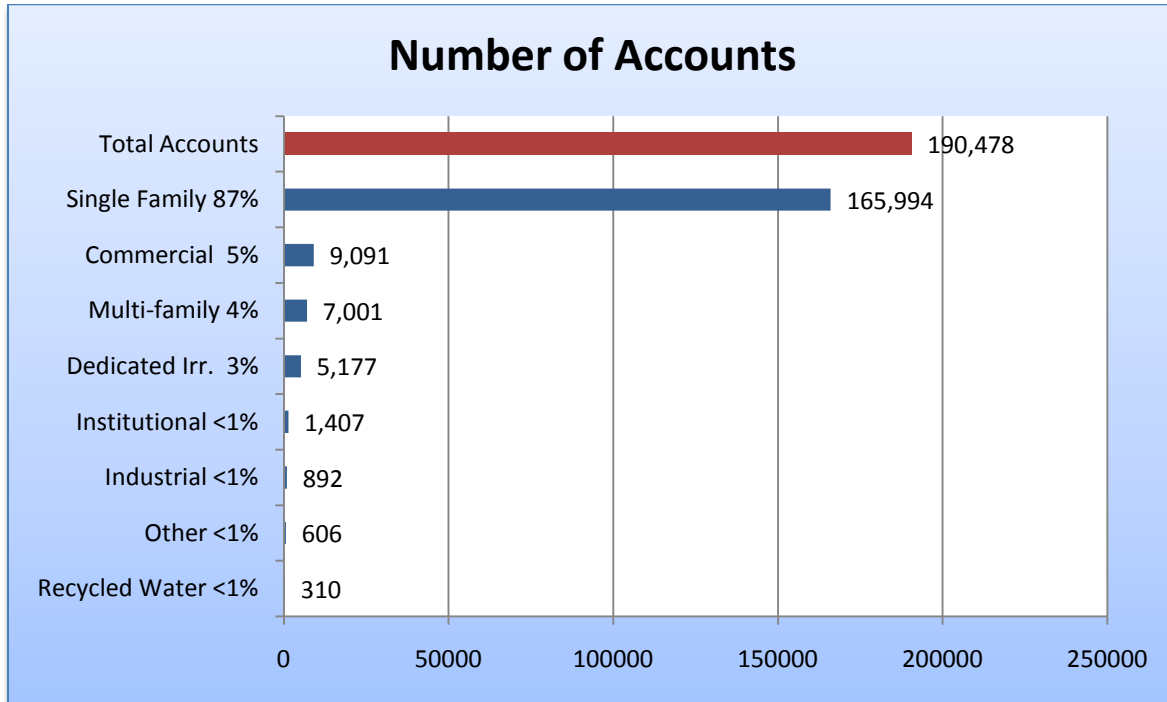


Figure 12: Number of Accounts by Sector

The tables below provide a breakdown by sector for each of the eight member agencies:

Number of Accounts by Sector by Agency

	Fontana Water Co.	City of Ontario	City of Chino	Chino Hills	Upland	San Antonio Water Co.	Monte Vista	Cucamonga
Period	2008	2008	2008	FY07-08	2008	2008	FY08-09	2008
Single Fam.	39,668	26,152	15,830	19,358	12,882	1,142	9,085	41,877
Multi-family	809	1,965	348	598	1,833	16	580	852
Comm.	1,270	2,961	1,539	222	923	15	830	1,331
Industrial	64	288	10	0	0	0	17	513
Institutional	268	298	125	14	164	0	36	501
Irrigation	0	1,205	885	537	312	12	328	1,898
Recycled	0	63	161	86	0	0	0	0
Other	40	69	32	269	0	0	0	196
Total	42,119	33,002	18,930	21,084	16,114	1,185	10,876	47,168

Figure 13: Number of Accounts by Sector by Retail Agency

Water Demand by Sector

This section presents information regarding the water demand for each of the account sectors across the IEUA service area and for each of the eight member agency areas. The graph and chart below shows the water demand by sector in the IEUA service area and percentage of total deliveries.

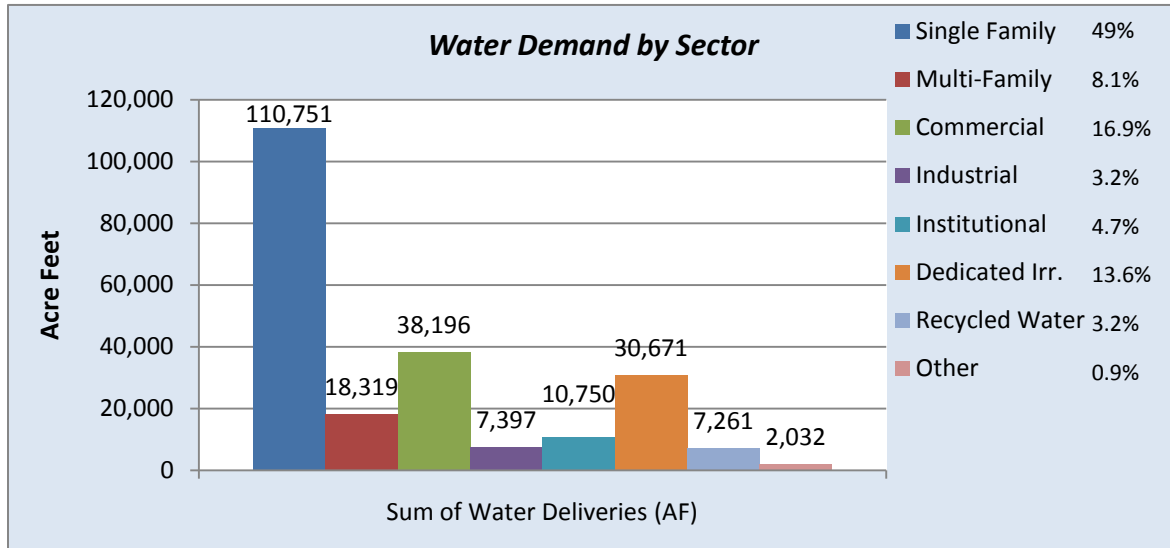


Figure 14: Water Demand by Sector

Water Delivery by Agency by Sector (Acre-feet)

	Fontana Water Co.	City of Ontario	City of Chino	Chino Hills	Upland	San Antonio Water Co.	Monte Vista	Cucamonga
Period	2008	2008	2008	FY07-08	2008	2008	FY08-09	2008
Single Fam.	25,726	15,737	8,659	11,168	10,788	1,534	5,224	31,915
Multi-family	1,934	5,742	1,167	801	3,421	25	1,291	3,938
Comm.	9,722	8,471	3,212	1,709	2,049	9,151	1,515	2,367
Industrial	2,079	2,325	350	0	0	0	34	2,609
Institutional	4,795	1,378	261	44	1,044	0	349	2,879
Irrigation	0	7,857	3,278	2,653	1,765	988	1,202	12,927
Recycled	0	3,497	2,901	863	0	0	0	0
Other	164	330	254	1,282	0	0	0	2
Total	44,421	45,336	20,082	18,521	19,068	11,699	9,614	56,636

Figure 15: Water Demand by Agency by Sector

As presented in the two tables above, member agencies delivered 225,377 AF 2008. The highest demand was from the single family sector; with Cucamonga showing the greatest volume, followed by Fontana Water Company.

When designing and developing programs, it's key to focus on the largest customer segment and largest demand. In reviewing retail agency accounts and demand, the following is of note:

- Single family represents 867% of the accounts and 49% of demand, but far the largest customer segment and demand.
- Dedicated irrigation comprises less than 3% of total accounts but demand for the sector is 14% of total water demand.
- Commercial comprises 5% of total accounts but demand for the sector is 17% of total water demand.
- At 3.2% of total demand, Industrial usage is the lowest with only two agencies having an significant demand.

Landscape Opportunities

The semi-arid climate of southern California, with only 15" of average annual rainfall, combined with the lush landscaping aesthetic that predominates in the region, creates a significant water demand for the irrigation of outdoor landscaping. The IEUA service area reflects this demand, where outdoor water use is estimated to be nearly 70% of total demand across all sectors.

Water used for landscaping is generally not directly metered (except in those cases where dedicated irrigation meters exist). For this reason, outdoor water demand is estimated based upon two methods. All of IEUA's service area is within the same climatic zone, so it is assumed that precipitation and evapotranspiration rates are generally constant across the service area.

Method 1

A common method used to infer outdoor use is to assume that all winter use is categorized as indoor consumption. For example, if we calculate winter minimum use over 12 months we have inferred total indoor use for the year. Total use for the year minus indoor use then equals outdoor use.

In the table below the "low bound" for outdoor use is calculated with this "minimum winter use is indoor use" method. The method underestimates outdoor use because there is likely to be winter irrigation in dry climates such as IEUA's territory.

Method 2

The second method to infer outdoor use consists of employing the pattern of seasonal variation used by dedicated irrigation meters and applying it to other sectors with mixed meters. The reasoning is that with dedicated irrigation meters, winter irrigation is measured. Thus we can observe the relative water use in winter and summer irrigation seasons and then calculate the ratio of variables observable for other sectors. This method will result in a higher estimate of outdoor water use. The method relies on the assumption that the seasonal variation of outdoor use is the same for sites with dedicated meters as for the mixed meter sites.

The table below presents the estimated outdoor water use as ***a percentage of each sector's*** total water demand utilizing both Method 1 and 2 to create a low and high estimate range.

Landscape Use Percentage by Customer Sector				
Sector	% Used Outdoors (low)	% Used Outdoors (high)	AF/ Year per Sector (low)	AF/ Year per Sector (high)
Single Family	35%	66%	38,763	73,096
Multi-family	21%	42%	3,849	7,694
Commercial	28%	57%	10,695	21,772
Industrial	44%	71%	3,255	5,252
Institutional	59%	94%	6,343	10,105
Dedicated Irrigation	100%	100%	30,671	30,671
Total			93,576	148,590

Figure 16: Landscape Use Percentage by Customer Sector

The water demand shown in the table above can also be estimated as **a percentage of total water demand** across the IEUA service area. As shown below, it is estimated that between 38% and 69% of the total water demand is for landscape irrigation.

Landscape Use Percentage of Total Demand		
	% Used Outdoors (low)	% Used Outdoors (high)
Single Family	17%	32%
Multi-family	2%	4%
Commercial	5%	10%
Industrial	1%	2%
Institutional	3%	4%
Dedicated Irrigation	7%	13%
Recycled	3%	3%
Total	38%	69%

Figure 17: Landscape Use Percentage of Total Demand

By both means of measurement, it is clear that a significant percentage of water demand throughout the IEUA service area is utilized for landscape irrigation. At a minimum, this demand represents 83,400 acre-feet per year. Utilizing the upper estimate, this demand may account for over 148,000 acre-feet per year.

The higher estimate is most likely the more accurate approximation and should be used for planning purposes. The reasoning for this is that Method 1, used for the low estimate, assumes that ALL winter water usage is consumed indoors. It is highly likely that customers still water their turf and plant areas

throughout the winter period. For this reason, it is logical to project landscape usage at the higher range for demand, 69% or 148,000 acre-feet per year.

Residential Lot Sizes

The size of residential parcels provides a valuable measure of the potential area, which may be landscaped and irrigated in the service area. Estimates can then be derived regarding the market potential for programs focusing on larger lot sizes. It is assumed that single family lots with over 1 acre of landscaped area offer significant savings and should be targeted for water use efficiency programs. The table below provides the number of single family residential parcels greater than one acre in size in IEUA’s service area.

City	Zip Codes	Lots Between 1-1.5 Acres	Lots Greater than 1.5 Acres	Total Lots over 1 Acre
Rancho Cucamonga	91701, 91730 91737, 91739	245	96	341
Chino Hills	91709	112	54	166
Chino	91710	217	59	276
Mt. Baldy	91759	3	0	3
Ontario	91761, 91762, 91764	91	28	119
Montclair	91763	14	3	17
Pomona/Phillip Ranch	91766	4	2	6
Upland	91784, 91786	100	23	123
Bloomington	92316	18	10	28
Fontana	92335, 92336 92337	471	145	616
Rialto	92376	20	10	30
Total		1,295	430	1,725

Figure 18: Number of Single Family Parcels Greater than One Acre

Throughout the IEUA service area there are a total of 1,295 residential parcels between 1 and 1.5 acres in size, and 430 parcels greater than 1.5 acres. These large parcels are not distributed consistently throughout the service area. Rather, they are concentrated largely in three cities: Rancho Cucamonga, Chino and Fontana. (Note that city and zip code boundaries do not always align with retail water agency boundaries; for instance, some larger single-family properties in the City of Chino are within the Monte Vista Water District service area.)

Indoor Residential Opportunities

This section examines the saturation level and future market potential for indoor water use efficiency devices in both single and multi-family sectors. For purposes of water use efficiency program design, the residential sector is divided into single and multi-family categories. This distinction acknowledges the different demographic, economic and physical development patterns that distinguish single from

multi-family homes and their occupants. For example, the number of people per household is higher in multi-family units than in single family homes thereby offering higher savings per conservation measure.

Although the primary focus of the saturation modeling is centered on toilets, other measures are included as well. The study included the following indoor devices:

<u>Single Family Devices</u>	<u>Multi-family Devices</u>
Toilets	Toilets
Clothes washers	Clothes washers
Showerheads	Showerheads
Dishwashers	Dishwashers
Faucets	Faucets

The residential device saturation overviews residential indoor water using devices including the following:

- Total inventory within IEUA’s entire service territory
- Number of conservation devices
- Remaining potential and respective saturation
- Water savings potential if all remaining non-conserving devices were retrofitted

Single Family Indoor Water Using Devices

As shown in the table below, a market saturation of 75% has been achieved in the replacement of non-efficient toilets in single family homes. Of the 489,331 calculated inventory of toilets in single family homes in IEUA’s service area, nearly 325,000 were replaced passively. Passive replacement refers to those devices that were naturally replaced due to equipment failure and where more efficient devices were installed as a result of improvements made to the plumbing codes (i.e., the 1992 Energy Policy Act requirement for ultra low flush toilets), rather than active water conservation programs such as toilet rebate and installation programs. The remaining 43,125 toilets were replaced through IEUA and MWD programs. The water savings potential available from the 121,021 remaining non-efficient toilets in the current housing stock is 5,161 acre-feet per year (assuming a theoretical achievement of 100% saturation).

Single Family Toilets	
Total Devices	489,331
Remaining Non-efficient Devices	121,021
Devices Actively Retrofitted	43,125
Devices Passively Retrofitted	324,931

Single Family Toilets	
Saturation	75%
Savings per Device	10,901 gallons per year
Total Water Savings Potential	5,161 AFY

Figure 19: Single Family Toilet Inventory

There are estimated 151,693 clothes washers in single family residences within IEUA’s service area, of which 135,610 remain non-efficient (nearly 90%). Of those replaced with efficient devices, nearly twice the number of high efficiency washers were replaced via active water conservation programs compared to passive or natural replacement. An estimated 2,116 acre-feet per year of water savings potential remains with this measure.

Single Family Clothes Washers	
Total Devices	151,693
Remaining Non-efficient Devices	135,610
Devices Actively Retrofitted	10,618
Devices Passively Retrofitted	5,465
Saturation	11%
Savings per Device	5,110 gallons per year
Total Water Savings Potential	2,116 AFY

Figure 20: Single Family Clothes Washer Inventory

Single family showerheads have been a key measure for both passive and active programs and thus a saturation rate of 72% has been achieved. The remaining future savings potential is 503 acre-feet per year.

Single Family Showerheads	
Total Devices	293,599
Conserving Devices	211,904
Remaining Potential	81,695
Saturation	72%
Savings per Device	2,008 gallon per year
Total Water Savings Potential	503 AFY

Figure 21: Single Family Showerhead Inventory

Efficient dishwashers and faucets have been less of a focus in the industry due to their lower water savings potential and currently have only 5% market saturation for each device. Their combined future water savings potential is 133 acre-feet per year and 519 acre-feet per year, respectively.

Multi-family Toilets Indoor Water Using Devices

IEUA has achieved 88% market saturation for multi-family toilets. Of the estimated 103,722 total inventory of toilets in multi-family units, over twice as many have been replaced as the result of passive replacement vs. active programs. There remains a potential additional water savings of 660 acre-feet per year if all non-efficient toilets were replaced. The chart below shows statistics on multi-family toilets:

Multi-family Toilets	
Total Devices	103,722
Remaining Non-efficient Devices	12,582
Devices Actively Retrofitted	29,206
Devices Passively Retrofitted	61,934
Saturation	88%
Savings per Device	12,582 gallons per year
Total Water Savings Potential	660AFY

Figure 22: Multi-family Toilet Overview

Of the 13,484 clothes washers currently in multi-family units, only 5% have been replaced by high efficiency devices. The future water saving potential from this market is estimated at only 201 acre-feet per year.

Multi-Family Clothes Washers	
Total Devices	13,484
Remaining Non-efficient Devices	12,849
Devices Passively Retrofitted	635
Saturation	5%
Savings per Device	5,110 gallons per year
Total Water Savings Potential	201 AFY

Figure 23: Multi-Family Clothes Washer Inventory

Nearly 41,000 or 71% of the total 57,047 multi-family showerheads have already been replaced with low-flow devices. Achieving the full market potential for these devices would result in a future additional savings of 101 acre-feet per year.

Multi-Family Showerheads	
Total Devices	57,047
Remaining (non efficient) Devices	40,672
Devices Passively Retrofitted	16,375
Saturation	71%
Savings per Device	2008 gallons per year
Total Water Savings Potential	101 AFY

Figure 24: Multi-Family Showerhead Inventory

Multi-family dishwashers and faucets were also evaluated for market saturation and future water savings potential. Market saturation for both devices presently is approximately 5%, with future potential water savings with full market saturation of 31 AFY for dishwashers and 124 acre-feet per year for faucets.

The full saturation calculator, titled “*IEUA Device Saturation 08_2010*” is provided on a disk enclosed in the back of this document. In addition, the documentation of the device definitions, data parameters, and natural replacement and adoption rates are included in Appendix 2-Market Data.

Commercial, Industrial and Institutional Opportunities

IEUA’s service area hosts a diverse range of commercial, industrial and institutional (CII) activities, including numerous service industries (such as hotels and restaurants), manufacturing, agriculture and health care, and a large number of schools and colleges. Each of these sectors present unique opportunities to reduce water consumption. In IEUA’s service area, it is important to evaluate the CII sector due to its overall demand. Although commercial accounts comprise only 5% of the total number of accounts in the IEUA area, they use approximately 17% of the overall water demand. This section describes the type and number of the larger business groups and discusses the CII water use efficiency measures with the greatest potential future water savings.

Based upon the number of active businesses and institutions in 2009, the CII sector is dominated by six business types: wholesale, retail, health care, education, restaurants and hotels.

Commercial & Institutional Customers	
Type	Number of Customers
Wholesale	1,838
Retail	1,604
Health Care	1,446
Restaurants	1,398

Commercial & Institutional Customers	
Education	417
Hotel and Lodging	106

Figure 25: Number of Customers by Type for Commercial & Institutional Customers

Wholesale and retail commercial activities are a diverse set of businesses that vary from small single-proprietor stores to large warehouse commodity transfer operations. Of the 1,604 retail operations, 559 are categorized as food stores. The health care sector is comprised of nearly 900 doctor’s offices and 26 hospitals. There are over 400 child-care and primary, middle and high schools, with 27 post-high school institutions. Within the service area, there are also 1,398 restaurants and 106 hotels. In the industrial sector, electrical manufacturers (162), food processors (115), metals fabricators (68) and paper goods manufacturers (62) are the most dominant sub-sectors.

It is also important to note that within the IEUA area 5,177 accounts utilize dedicated irrigation meters (for large-scale landscape and agricultural irrigation) and additional 310 accounts use recycled water.

Unfortunately, past water savings data and device saturation rates are not readily available in the CII sector. Baseline data describing water-use practices and number of devices in businesses is less consistent. For example, the average number of toilets in a residence can be calculated based upon established and reliable databases, such as the U.S. Census. No such databases have yet been constructed for businesses. As such, professional assumptions are required to develop future potential estimates for different conservation measures. These assumptions are based upon data available from the member agencies as well as many years of CII program development, implementation and evaluation.

The market potential calculator (including commercial devices and landscape measures) title “*IEUA Market Potential 08_2010*” is provided on disk enclosed in the back of this document. The spreadsheet also includes the assumptions for how the device potential was built.

Top Measures for Potential Future Water Savings

The next step in the development of IEUA’s plan was the calculation of the future potential water savings from conservation measures that could be implemented in the region in the near-term. For these purposes, a “measure” is defined as a specific approach or device that achieves water savings (such as a residential high efficiency toilet or a smart controller) but does not identify the actual program, which would include a delivery mechanism. A program is defined as a measure plus a delivery mechanism.

To ensure that every reasonable measure received initial evaluation, all water conservation measures were considered. A full list of measures is documented in the “*Measure Guide*”, which is included as *Appendix 1*. The guide includes a description of the measure and estimated water savings. The analysis was complete without regard to any detailed consideration of the financial or programmatic obstacles or restrictions that may otherwise discourage implementation of a measure. Additionally most

measures' savings potential were calculated based upon achieving 100% market saturation for that measure. Although not realistic, this approach allows for a more “apples-to-apples” analysis. Below is a listing of the top measures and their respective water savings potential ranked from highest to lowest:

<i>Water Efficiency Measure</i>	<i>Measure Potential (Acre-feet/Year)</i>
Turf Removal + Low Precipitation Irrigation (all sectors)	40,865
Landscape Smart Controllers (across all sectors)	8,834
Landscape High Efficiency Nozzles (across all sectors)	8,634
Multi-Family Submetering	3,679
Single Family High Efficiency Toilets	5,161
Single Family High Efficiency Clothes Washers	2,116
Industrial Process Water Use Reduction	1,959
Rainfall Catchment (single family only) – 10% saturation	1,076
CII High Efficiency Toilets	977
Multi-Family High Efficiency Toilets	660
Single Family Showerheads with 1.5 gpm	503
CII Ultra Low or Zero Volume Urinals	305 – 457
Gray water (single family only)	382
Cooling Tower Conductivity Controllers	313
Multi-Family High Efficiency Clothes Washers	201
Hot Water Delivery Systems (total devices)	191
Single Family Faucets with 1.5 gpm	184
CII Dishwashers	153
Pavement Cleaning with Water Brooms	138
Steam Sterilizers	119
Single Family Dishwashers	133
Multi-Family Showerheads with 1.5 gpm	101
Dry Vacuum Pumps	50
Food Steamers (large food service)	46
Multi-Family Faucets with 1.5 gpm	45
CII High Efficiency Clothes Washers	40
Car Wash Reclamation Systems	35
Multi-Family High Efficiency Dishwashers	31
Air Cooled Ice Machines (large food service)	6

Figure 26: Water Efficiency Measures Ranked by Potential Water Savings

It is acknowledged that complete market saturation for any measure is largely unachievable, but it is instructive to begin the analyses with an understanding of the measures with the highest water savings potential, as listed above.

When looking at the measure potential by market segment a clear picture emerges showing that landscape usage is the primary opportunity.

- **Landscape Measures** (across all sectors) = 58,330 potential acre-feet savings
- **Single Family** = 9,746 potential acre-feet savings
- **Multi-family** = 4,717 potential acre-feet savings
- **Commercial, Industrial and Institutional*** = 4,293 potential acre-feet savings

**1,959 acre-feet derived from Industrial potential.*

The final measure analyses which are presented in *Section 7: Potential Programs, Analyses and Final Program Selection* include consideration of real-world financial, market and programmatic circumstances that further refine the prioritization of the most cost-effective and productive measures and programs. As will be discussed in Section 7, the final prioritized recommendations for various programs will shift from the more conceptual rankings presented above to a specific set of measure and program recommendations.

Overall Opportunities and Targets

Potential opportunities were identified as a result of the data evaluation. The analysis of water demand by market type revealed the following:

- Landscape water use comprises the highest water use at 148,000 acre-feet per year.
- Single family landscape represents the highest water use within all sectors at 72,121 acre-feet per year.
- The commercial sector has some opportunity but numbers are limited.
- Restaurants, retail and wholesale represent a significant number of customers, but the pocket of opportunities is not evenly spread throughout the region.
- Public sector customers offer some opportunity.
- Industrial opportunities are agency-specific and not found generally across the member agencies' service areas.

The analysis of measure saturation and potential yielded the following information:

- Turf removal offers extremely high water savings, yet true market potential still needs to be verified.
- Smart controllers and high efficiency nozzles offer a high water savings potential.

- Multi-family submetering yields high water savings but there are many cost and administration requirements that need to be assessed.
- Residential devices are highly saturated due to years of code and active programs.
- Toilets (from all sectors) still offer a high volume of savings despite their high saturation rate. The impact of the impending regulations must be factored, as well as the ability to target high volume units.
- Clothes washers afford a reasonable opportunity. The high adoption rate by customers currently needs to be considered when designing future programs.
- Industrial process is a large water savings opportunity, however it may be costly and not equitable across agencies.

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Section 4 – BMP and Regulatory Compliance

The strategies and programs included in the WUE Plan are designed to meet the compliance requirements of the following:

- Governor’s call for 20% per capita water use reduction by 2020
- California Urban Water Conservation Council’s Best Management Practices
- Assembly Bill 1420 Statute

IEUA and its member agencies are signatories to the Memorandum of Understanding regarding Urban Water Conservation in California (MOU) and are members of the California Urban Water Conservation Council (CUWCC). As one of the original signatories to the MOU in 1991, IEUA’s highest conservation priority has been to ensure that good-faith efforts are made in implementing Best Management Practices (BMPs) locally.

Over the last nineteen years, IEUA has been committed to developing and implementing many core regional conservation programs that have been designed on the foundation of BMPs, and these programs continue to serve as a key component in the overall regional water resource management portfolio for the region.

As signatories to the MOU, IEUA and each of its member agencies are required to provide BMP “Activity Reports” biennially. These reports provide specific details of the agency’s efforts to implement each particular BMP. The most recent activity reports filed with the CUWCC were for the 2006-2008 BMP reporting cycle. IEUA and all eight member agencies filed reports during the last reporting cycle with IEUA in full compliance with the wholesaler BMP requirements, and most members at or near full compliance with the retailer BMPs.

The BMPs are functionally equivalent to the Demand Management Measures (DMM) written in Water Code Section 10631 of the Urban Water Management Planning Act (Act). The Act requires an agency to describe each of the DMMs that have been implemented unless the agency is a signatory to the MOU. The Act allows an agency to provide the BMP Activity Report in-lieu of describing each of the DMMs. Therefore, IEUA intends to include its FY 2008-09 and 2009-10 BMP Activity Reports in the 2010 Urban Water Management Plan.

Furthermore, AB 1420 (Laird/Feuer), effective January 1, 2009, makes award of all state water management grants and loans contingent on “full” compliance with the implementation of water demand management practices described in the Urban Water Management Planning (UWMP) Act. DMMs are water conservation measures, programs and incentives that prevent the waste of water and promote the reasonable, beneficial and efficient use and reuse of available supplies.

Lastly, also effective on January 1, 2010, SBx 7-7 requires a 20% reduction in statewide urban per capita water use by the year 2020 and requires urban retail water suppliers to establish a baseline and set targets to meet those goals by 2015 and 2020.

IEUA, as an urban wholesale water supplier, is not required to develop a baseline or set reduction targets to achieve by 2020 under SBx 7-7. However, as the statute does require urban retail water suppliers to comply, IEUA takes the position of preparing a baseline and setting targets based on regional demands and in support of its eight retail member agencies that must comply. As IEUA doesn't have any direct retail customers, IEUA has established a gallons per day per capita baseline (listed below) based on a 10-year average of regional demands. In addition, IEUA also incorporated a demand management portfolio forecast on how the Agency intends to meet the "interim goal of 10%" by 2015 and the total reduction goal of 20% by 2020. The reduction projections have been developed from the IEUA three-year Recycled Water Business Plan and the Water Use Efficiency Plan.

Water Savings Goals

IEUA and agencies devised a strategy to meet all compliance requirements in the most cost-effective manner feasible. Below is a chart showing the compliance requirements and associated strategies for each:

Compliance Requirements

Regulatory Agency or State Organization	Requirements	Approach
20x2020	Reduce per capita water use by 10% by 2015 AND Reduce per capita water use by 20% by 2020	By implementing Active Water Use Programs, Policy Initiatives, and increasing Recycled Water Supply, IEUA and its agencies are projected to be on track to meet per capita water reduction goals for both target years.
CUWCC	Reduce per capita water use by 18% by 2018*	IEUA and its agencies will utilize CUWCC's new GPCD option, which offers a per capita methodology to track compliance. This will align with the requirements of 20x2020 as well.
AB 1420	Fulfill BMP commitments	Lines up with actions taken to meet CUWCC BMP compliance.

*Changes are currently underway to align the CUWCC requirements with the 20x2020 goals.

Figure 27- Compliance Requirements

Although the current goals for each of the regulatory agencies and state organizations vary, all are moving to a Gallons per Capita per Day (GPCD) savings goal that is in line with the 20x2020 per Capita Water Use Reduction Goals.

Calculating historical water use in Gallons per Capita per Day (GPCD) – The first step taken to calculate the 20x2020 water savings target was to determine historical water use in gallons per capita per day (GPCD). To do this, IEUA analyzed historical retail demand data from 1996 to 2008. The

targets set in the 20x2020 Water Conservation Plan do not include recycled water use. Thus, recycled water use was subtracted from historical recycled water production to get retail demands for non-recycled supplies. Next, using historical population over the same time period, the following formula was applied to calculate GPCD.

$$\text{Non-Recycled Demand (Acre-feet)} \times 325,851 \text{ gallons / population} / 365 \text{ days}$$

The historical demand and per capita water use data used in this analysis can be found in the table below. The 10 years with the highest average GPCD was chosen to provide the most opportunity for reduction. The 10-year period selected as the baseline is highlighted in blue:

Historical Demand & Selected Baseline Years

	Year	Useable Acre-feet Demand*	GPCD	
Potential Baseline Years	1995	170,976	240	
	1996	192,633	264	
	1997	196,409	264	
	1998	171,721	226	
	1999	190,474	245	
	2000	219,313	277	
	Selected Baseline Years	2001	201,162	248
		2002	207,752	251
		2003	213,736	252
		2004	209,522	241
2005		204,482	230	
2006		222,111	246	
2007		242,280	264	
2008		228,431	245	
2009		217,799	239	
2010		206,000	224	

*Does not include Recycled Water

Figure 28 - Historical Demand & Selected Baseline

Understanding the methodology used to determine the GPCD, the following chart shows the 20x2020 goals for IEUA territory:

IEUA 20x2020 per Capita per Day Goals

	Baseline (Based upon average annual water sales years 2001 – 2010)	2015 Target (10% Reduction)	2020 Target (20% Reduction)
Gallons per Capita per Day	272	245	217

Figure 29: IEUA 20x2020 per Capita Goals

IEUA expects to exceed the 20x2020 goal for both the 2015 target and the 2020 target. This will be accomplished through regional and local actions utilizing:

1. **Water Use Efficiency (WUE) Active Programs** –offering customers a portfolio of programs including cost-effective indoor and outdoor water efficiency measures
2. **WUE Passive Policy Initiatives** –including building codes and landscape ordinances
3. **Recycled Water Supply** – reducing demand for potable water by increasing recycled water supply.

The chart below shows the anticipated GPCD reduction from the WUE activities and recycled water supply:

Impact of WUE Activities and Recycled Water Supply

	YEAR	
	2015	2020
Projected GPCD reduction from WUE Activities:	5	13
Projected GPCD reduction from Recycled water supply Only	36	44
TOTAL Projected GPCD reduction from	41 (5 + 36)	57 (13 + 44)
Current GPCD	272	
IEUA GPCD Target	245	217
IEUA Projected GPCD Achievement	231 (272-41)	215 (272-57)

The history and roles of the water efficiency organizations and legislative initiatives are overviewed below:

California Urban Water Conservation Council (CUWCC)

The CUWCC was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations and private entities. The CUWCC's goal has been to integrate urban water conservation Best Management Practices (BMPs) into the planning and management of California's water resources.

A historic Memorandum of Understanding regarding Urban Water Conservation in California (MOU) was signed by nearly 100 urban water agencies and environmental groups in December 1991. Since then the CUWCC has grown to over 389 members. Those signing the MOU pledge to develop and implement conservation activities or BMPs that result in water use reduction and efficiency.

Direction for the CUWCC is from a Board of Directors comprised of eight Group 1 members and eight Group 2 members, both with voting privileges, plus four Group 3 members and an ad-hoc representative from the Department of Water Resources and the Bureau of Reclamation.

Best Management Practices

A Best Management Practice (BMP) means a policy, program, practice, rule, regulation or ordinance, or the use of devices, equipment or facilities, which meets either of the following criteria:

- a) An established and generally accepted practice among water suppliers that results in more efficient use or conservation of water;
- b) A practice for which sufficient data are available from existing water conservation projects to indicate that significant conservation or conservation related benefits can be achieved; that the practice is technically and economically reasonable and not environmentally or socially unacceptable; and that the practice is not otherwise unreasonable for most water suppliers to carry out.

Implementation

"Implementation" means achieving and maintaining the staffing, funding and, in general, the priority levels necessary to achieve the level of activity called for in the descriptions of the various BMPs and to satisfy the commitment by the signatories to use good faith efforts to optimize savings from implementing BMPs as described in the MOU.

The following is a list of the BMPs currently incorporated into the MOU, listed by category:

RETAILER BMPS		WHOLESALE BMPS	
<i>Foundational</i>		<i>Foundational</i>	
BMP 1	Utility Operations	BMP 1	Utility Operations
BMP 1.1	Conservation Coordinator	BMP 1.1	Conservation Coordinator
BMP 1.2	Water Waste Prevention	BMP 1.3	Wholesale Agency Assistance Programs
BMP 1.4	System Water Audits, Leak Detection and Repair	BMP 1.4	System Water Audits, Leak Detection and Repair
BMP 1.5	Metering with Commodity Rates For All New Connections and Retrofit of Existing Connections	BMP 2	Education Programs
BMP 1.6	Retail Conservation Pricing	BMP 2.1	Public Information Programs
BMP 2	Education Programs	BMP 2.2	School Education
BMP 2.1	Public Information Programs		
BMP 2.2	School Education		
Programmatic			
BMP 3	Residential Programs		

<i>Programmatic</i>	
BMP 3.1	Residential Landscape Water Survey Program
BMP 3.2	Residential Leak Assistance Program
BMP 3.3	High Efficiency Clothes Washers
BMP 3.4	WaterSense Specification Toilets
BMP 4	Commercial, Institutional, Industrial
BMP 5	Landscape

Figure 30: Retailer and Wholesaler BMPs

As of June 2009, the CUWCC has offered a GPCD compliance methodology. The GPCD target is an 18% reduction by 2018. It is one of three compliance options, including the traditional BMP approach, and the Flex Track approach. CUWCC is in the process of lining up the GPCD baseline calculation and goal target with SBx 7-7. IEUA has chosen the GPCD methodology and is on track to meet both the 18% by 2018 required by CUWCC and the 20% by 2020 required by SBx 7-7.

Legislative Actions and Regulatory Compliance

Assembly Bill 1420 (Laird/Feuer)

AB 1420 requires the “full” implementation of water demand management practices (BMPs) described in the Urban Water Management Planning (UWMP) act a requirement of eligibility for all state water management grant and loan programs.

The Department of Water Resources (DWR) must consider whether an agency is implementing or has scheduled for implementation the DMM activities that the agency identified in its UWMP in evaluating applications for grants and loans financed by specified bond funds. Those programs include funds from the Department of Water Resources, State Water Resources Control Board and the Bay-Delta Authority. This translates to millions of dollars at risk for IEUA including SWRCB loans for wastewater treatment plants and grants for EIR studies.

DMMs are water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable, beneficial, and efficient use and reuse of available supplies.

There are currently efforts being made to modify this law to incorporate the new CUWCC BMP compliance methodologies such as the GPCD method. Once the change is enacted, IEUA will be compliance due to the current compliance with the CUWCC BMPs through the GPCD method.

Statewide Water Conservation (SBx 7-7)

SBx 7-7 establishes a statewide urban per capita water use reduction of 20% by 2020. This initiative applies to all urban retail water suppliers serving a minimum of 3,000 customers or supplying 3,000 acre-feet or more. Urban retail water suppliers must establish a baseline daily per capita water use (GPCD) and report it in their 2010 urban water management plans by July 1, 2011.

Urban retail water suppliers have the option to choose one of four methods identified in the bill. There are currently three established methods of compliance with a fourth option under development.

- Option One: 80% of baseline GPCD water use
- Option Two: Water budget based method
- Option Three: State hydrologic target
- Option Four: Under development

Beginning in 2010, an urban retail water supplier must establish a baseline and continue to implement required demand management measures (BMPs) under AB 1420. On July 1, 2016, SBx 7-7 will repeal AB 1420 and condition eligibility of all state water management grants and loans on meeting or exceeding the 20% water use reduction target. An interim target of 10% must be met by December 1, 2015. In addition to the urban water supplier requirements listed above, a task force will be convened to develop BMPs for commercial, industrial and institutional sector. Agencies that do not meet their intended goal will lose eligibility for state grant and loan funding.

Assembly Bill 1881 (2006)

AB1881 (Laird 2006), the Water Conservation in Landscaping bill requires statewide agencies to update and adopt local landscaping ordinances by January 1, 2010. The adopted landscaping ordinances must be “at least as effective as” the State Model Landscape Ordinance (SMO) developed by the Department of Water Resources.

Key elements in the updated ordinances include: a water budget approach and applies to large new and redeveloped landscapes which require a permit, reducing the evapotranspiration adjustment factor used in the calculation of a the water budget to at least 0.7, increasing the public’s awareness of the importance of water use efficiency in landscaping, requiring Smart Controllers, and adopting and enforcing statewide prohibitions on overspray and runoff.

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Section 5 - Program Evaluation Modeling

After reviewing numerous options, IEUA chose the Alliance for Water Efficiency Tracking Tool to conduct its analysis as well as future program tracking. The Tracking Tool is a widely recognized Excel-based model that can provide in-depth evaluation of program water savings and costs and benefits of conservation programs over time. The program was developed by the Alliance for Water Efficiency (AWE). The AWE is a stakeholder-based non-profit organization dedicated to the efficient and sustainable use of water. Located in Chicago, the Alliance serves as a North American advocate for water efficient products and programs, and provides information and assistance on water conservation efforts. The Home Depot Foundation funded part of the development of the Tracking Tool.

Model Description

Over the past several years, conservation planning and implementation efforts have reached a point of complexity, sophistication and interconnection throughout the entire water industry, making transparent and defensible decision-making critical. To achieve these goals, it is necessary to comprehensively access and analyze complete program-by-program data, including water savings, budget and cost effectiveness, as well as environmental and societal impacts.

There are numerous computer-based instruments available for conducting these analyses. The selected Tracking Tool ensures confidence and credibility in the outcomes of the analyses, the instrument is accessible (with easy-to-follow instructions and coding), robust (allowing for an adequate depth of analysis), flexible (allowing for variations and local priorities) and transparent (ensuring defensibility and credibility), and provides outputs that are comprehensible and relevant to program managers and decision-makers.

Using information entered electronically into the Tool from a water agency's system, The Tracking Tool provides a standardized methodology for water savings and benefit-cost accounting, and includes a library of pre-defined conservation activities from which users can build conservation programs.

A condensed version of the "*AWE Water Conservation Tracking Version 1.1 Tool User Guide*" is provided as *Appendix 3*. In addition electronic copies of the model's multiple versions are included in on a disk enclosed in the back of this document. Each version evaluates the same criteria but has different costs, production and budgets. The five versions are titled:

1. IEUA Cost Benefit Evaluation of Implemented Programs 2003-2009
2. AWE Tracking Tool_IEUA_Measure Screening
3. AWE Tracking Tool_IEUA_Base Budget
4. AWE Tracking Tool_IEUA_Medium Budget
5. AWE Tracking Tool_IEUA_High Budget

The following is a listing of some of the key features of the Tracking Tool:

- *Multiple Analysis Perspectives* – The tool evaluates conservation program costs and benefits from three perspectives: (1) the utility's, (2) the program participant's, and (3) society's. Each perspective provides insight into a key aspect of conservation program planning and evaluation.
- *Flexible Modeling of Water Savings* – Water savings for an activity can be modeled as having a fixed life or as persisting indefinitely. A conservation activity's savings profile can include a decay process or it can be modeled as constant. Savings from conservation activities that interact with existing plumbing/energy codes, such as toilet, showerhead, and clothes washer replacement/rebate programs, can be disaggregated into program-related and code-related savings components.
- *Conservation Activity Library* – The tool includes a library of pre-defined, fully parameterized conservation activities that users can import into the model. At their option, users can use these activities as is or customize them to better match their service area conditions and program characteristics.
- *Water Savings Disaggregation* – The tool disaggregates water savings three different ways: (1) by water user classification, (2) between system peak and off-peak periods, (3) and between program-related and code-related water savings. The tool has built-in capability to estimate service area water savings due to national toilet, showerhead, clothes washer and dishwasher water efficiency code requirements.
- *Demand Forecasting* – The tool can modify a baseline water demand forecast to account for both program-related and code-related water savings over time. The tool can also generate a simple baseline demand forecast if the user does not have one. The tool also allows for demand disaggregation for peak/off-peak demand and by customer sector.
- *Avoided Cost Analysis* – Users have the option to use their own forecasts of system avoidable costs, or they can use the tool's avoided cost calculator to estimate avoidable system operating and capital costs due to conservation water savings.
- *Minimal Data Requirement* – Every effort has been made to minimize the tool's data requirement so that users are not overburdened with data collection and input tasks.
- *Data Entry Assistance* – The tool includes custom data entry forms and dialogs to help users define or edit conservation activities, import conservation activities from the tool's library, and save and retrieve scenarios. Data input cells are color coded to make them easy to spot. A brief message explaining the necessity for the information requested appears whenever a data entry cell is activated by the user.
- *Charting & Reporting Capability* – The tool includes dynamic charts and tables that automatically adjust to user settings and conservation program specifications. Charts are embedded within worksheets, but also can be displayed in their own windows with a click of

a button (this feature is not available if you are using Excel 2007). Charts and reports can be easily copied into other documents for report generation.

- *Scenario Management* – Users can easily save scenarios and retrieve them for later use. This makes it easy to see how different program mixes or assumptions about water savings or program costs impact the overall results.
- *Open Source* – Users can examine the tool’s internal logic. Users can customize or extend the capabilities of the tool to meet their specific planning needs. Visual basic code used by the tool is transparent and extensively commented to make it easy to follow.

Water agency managers can use the Tool in a variety of ways to aid their water resource planning and operations:

- Quickly compare alternative conservation measures in terms of their water savings potential, impact on system costs, and potential benefits to the utility, its customers and the environment;
- Develop long-range conservation plans;
- Construct conservation portfolios containing up to 50 separate conservation program activities;
- Track the implementation, water savings, costs and benefits of actual conservation activities over time;
- Evaluate a water agency’s changing revenue requirement with conservation; and,
- Track and graph the benefits of actual conservation activities over time.

Model Structure

The Tracking Tool is structured with two sections: data entry and model results. The data entry section allows the user to define basic modeling assumptions, specify future water demand projections and utility costs, and define specific conservation activities to be modeled. The model results section provides a complete series of economic and water savings summaries.

Activity Library

The model also provides a library of pre-defined activities from which to choose. The measures are drawn from agencies across the country and provide an excellent foundation for planning in agencies without an extensive history of conservation activities. For purposes of this analysis, we concluded that the analysis would benefit from an IEUA-specific library of conservation activities based upon IEUA’s aggressive program activity and specific territory needs. As a result, we developed a separate data library based specifically upon the conditions, circumstances and program knowledge of the IEUA service area. The library contains 13 single family activities, 2 multi-family activities, 17 CII and 2 large landscape (dedicated irrigation) activities. Below is a table that describes each activity contained in the library:

Conservation Measure	Customer Sector
HET, Single Family Rebate, IEUA Administered	Single Family
HE Clothes Washer, SoCalWater\$mart Rebate	Single Family
HE Nozzle Direct Install, IEUA Administered	Single Family
Turf Removal, IEUA Administered	Single Family
Turf Removal, MWD Administered	Single Family
HE Nozzles, SoCalWater\$mart Rebate	Single Family
WBIC (subscription) < 1 acre, SoCalWater\$mart Rebate	Single Family
WBIC (no subscription) < 1 acre, SoCalWater\$mart Rebate	Single Family
WBIC Direct Install + Nozzles, SF (1.5 acres/site), IEUA Administered	Single Family
Turf Removal, IEUA Finance	Single Family
WBIC + 20 Nozzles, IEUA Finance	Single Family
HET Direct Install, IEUA Administered	Multi-family
Submetering, Incentive, IEUA Administered Pilot	Multi-family
HET (Valve) Direct Install, CII: Restaurant, IEUA Administered	Commercial
HET (Tank) Rebate, CII Save A Buck Rebate	Commercial
HET (Valve) Rebate, CII Save A Buck Rebate	Commercial
ULVZ Urinal, CII Save A Buck Rebate	Commercial
Cooling Tower Conductivity Controller, CII Save A Buck Rebate	Commercial
Cooling Tower pH Controller, CII Save A Buck Rebate	Commercial
Air Cooled Ice Machines, CII Save A Buck Rebate	Commercial
Connectionless Food Steamers, CII Save A Buck Rebate	Commercial
Dry Vacuum Pumps, CII Save A Buck Rebate	Commercial
HE Nozzles for Pop Ups, CII Save A Buck Rebate	Commercial
Smart Controller, CII Save A Buck Rebate	Commercial
Smart Controller +50 Nozzles Direct Install (1.5 acres/site), CII IEUA Administered	Commercial
Industrial Use Evaluation & Incentive, IEUA Administered + MWD Incentive	Industrial
Cooling Tower Evaluation & Incentive Program, IEUA + MWD Save A Buck	Commercial
HE Nozzles for Pop Ups, IEUA Administered Public Sector Incentive	Commercial
WBIC, IEUA Administered Public Sector Incentive	Commercial
Landscape Evaluation, SF (.5 acre), IEUA Administered	Single Family
Landscape Evaluation, CII (2 acres/site), IEUA Administered	Commercial

Conservation Measure	Customer Sector
Smart Controller + 100 Nozzles Direct Install (3 acres/site), Large Landscape, IEUA Administered	Irrigation
Large Landscape Water Budgets (Dedicated Meter Accts), IEUA Administered	Irrigation
Single Family Water Budgets, IEUA Administered	Single Family

Figure 31: Conservation Measures included in Activity Library

It should be noted that the 34 activities represented above are in many cases bundled together to make a program. For example, SoCalWater\$mart offers incentives for three conservation measures (high efficiency nozzles, high efficiency washers, weather based irrigation controllers). These measures are represented through 4 activities.

1. HE Clothes Washer, SoCalWater\$mart Rebate
2. HE Nozzles, SoCalWater\$mart Rebate
3. WBIC (subscription) <1acre, SoCalWater\$mart Rebate
4. WBIC (no subscription) <1acre, SoCalWater\$mart Rebate

Since a weather based irrigation controller (WBIC) may require a monthly subscription paid for by the customer, while another WBIC model may not require this, the customer benefit-to-cost is different for each and therefore considered two unique activities. As such, if any measure has different costs (from a utility or participant perspective) or different savings it must be evaluated as a separate activity.

IEUA Activity Definitions

The IEUA Activity spreadsheet is a tabular summary of the 34 measures that were evaluated in the final step of program analysis. The following section provides descriptions of each of the data categories that were utilized to fully characterize each of the activities for the analysis. The following is a list of the data categories and descriptions:

Column Heading	Definition
Library Identification	Internal tracking number assigned to each activity.
Group	A group an activity is assigned to such as: irrigation, toilets, and washers.
Program	The name of the existing or future program such as SoCalWater\$mart, Save A Buck.
Delivery	The program delivery mechanism such as: incentive, installation, finance.
Activity Name	A brief narrative description of the activity including which agency is responsible for administration.
Class	The targeted sector such as single family, multi-family, commercial or irrigation.
Unit	The unit in which the program is represented per toilet, per home, per meter.
Non-Efficient Units Available to Retrofit	The number of non-efficient devices or potential participating sites estimated to remain in IEUA's service area.

Column Heading	Definition
Annual Activity Production	The estimated number of installations or water-saving activities to be completed per year.
Savings Per Unit	The gallons per year each device or water-saving activity is estimated to save. The Turf Removal measure assumes 1,000 sq. ft of turf removed. The WBIC and Nozzles measures assume one WBIC and 50 nozzles per site unless otherwise specified.
Source of Unit Savings Estimates	The specific source or engineering reference for each of the water-savings estimates.
Savings, Peak Period	The percent of annual water savings, which are estimated to be achieved during the peak summer season due to the measure.
Savings Useful Life	The number of years that the device or water-saving activity is expected to achieve water savings or the estimated life of the product.
Plumbing Code, Year Effective	The year in which a change occurred in the Uniform Plumbing Code, which would result in water savings when compared to the prior standard. If a "0" is entered, then there has not been a Plumbing Code change for that device which impacts water savings.
Plumbing Code, Unit Savings	The gallon per year the device is anticipated to save when compared to the prior standard.
Plumbing Code, Natural Replacement Rate	The rate at which the product is naturally purchased and replaced in the market. For example, toilets have a useful life of 20 years, which can be translated into a replacement rate of 4% per year.
Program Administration Costs Per Unit	The per unit cost to IEUA for program administration. This cost is shown only for measures administered by IEUA.
Program Marketing Costs Per Unit	The per unit cost to IEUA for program marketing and advertising. The cost is shown only for measures marketed by IEUA.
Program Installation and Distribution Cost Per Unit	The per unit cost to IEUA for the installation and/or distribution of a device or the implementation of a survey.
Customer Incentive Cost Per Unit	The per unit incentive paid to customers for the measure.
MWD or Other Grant Funding Per Unit	The per unit 3 rd party funding for each unit. This includes DWR and USBR grant funding as well as MWD incentives.
Net IEUA Cost Per Unit	The net per unit cost to IEUA minus MWD or other grant funding.
Participant Cost Year Denominated	The base year in which all present value costs are calculated.
Participant Cost Initial	The out-of-pocket costs that participants would have to pay to first implement the measure at their site.
Incentive Description	The assumptions that are used to calculate each measure's cost and incentive.
Participant Cost, Years of On-going	The number of years that a participant would have to pay annual costs to maintain a cost saving device or practice.
Participant Costs, On-going	The annual cost for those measures whose costs continue beyond the first year, such as an annual maintenance or subscription cost.

Column Heading	Definition
Participant Savings, Sewer	The avoided gallons of sewage generated per year due to the measure's implementation. This applies only to interior measures whose wastewater is plumbed to the sanitary sewer.
Participant Savings, Gas	The number of therms per gallon of water that are saved due to the measure's implementation. This applies only to those measures, which impact the heating of water.
Participant Savings, Electricity	The number of kilowatt hours per gallon of water that are saved due to the measure's implementation. This applies only to those measures in which devices or practices consume electricity.

Figure 32: Data Categories and Definitions used in Activity Spreadsheet-

The custom data library is linked into the overall modeling process and the outcomes reflect a more IEUA area-specific set of outcomes.

Common Assumptions Used in the Model

Computer modeling tools, such as the Tracking Tool, require the input of numerous common or universal assumptions. These assumptions establish the descriptive statistical foundation of the service area, which is utilized throughout the analysis. Common assumptions in the Tracking Tool cover demographic, climatic and utility rate information. The following table lists common statistics used in the analysis:

Analysis Start Year	2010
Service Area Population	839,700
Service Area Population in 1990	473,613

Peak-Season Start Date ('month/day')	1-Jun
Peak-Season End Date ('month/day')	30-Sep

Nominal Interest Rate	5.75%
Inflation Rate	2.50%

Persons Per Household – Single Family	3.34
Persons Per Household – Multi-family	2.20

Full Bathrooms Per Household – Single Family	2.29
Half Bathrooms Per Household – Single Family	--

Full Bathrooms Per Household – Multi-family	1.54
Half Bathrooms Per Household – Multi-family	--

Single Family Housing Units Built <i>before 1992</i>	114,261
Multi-family Housing Units Built <i>before 1992</i>	37,532

Reference Evapotranspiration (inches/yr)	51.25
Average Annual Rainfall (inches/yr)	15.32

Figure 33: Assumptions Used in Tracking Tool Model

Also important are the population growth assumptions that are utilized for future projections. The population growth forecast presented below is based on data from both the IEUA’s 2005 Urban Water Management Plan and the 2008 California Department of Finance projections. Please note the anticipated reduction in growth rate to 1.0% beginning in 2040.

Analysis Start Year	2010	2020	2030	2040	2050
Service Area Population	839,700	981,200	1,101,984	1,217,276	1,344,680
Service Area Population in 1990	473,613	1.57%	1.17%	1.00%	1.00%

Figure 34: Service Area Population Assumptions-

Lastly, an economic assumption used in the model for IEUA’s avoided costs is the current Tier 1 cost for untreated water of \$594 per acre-foot.

Economic Terms Used in the Model

Because water conservation activities are funded with limited resources, economic analysis is a critical component of program modeling and comparison. Programs are often rolled out over several years during which the value of the dollar can vary. This is also true for the value of water saved and the avoided costs. To properly appraise a long-term project, there must be an “apples-to-apples” cost and benefit comparison. By converting all program costs into the present value of the dollar, long-term projects can be accurately assessed.

It is important to understand the language of the economic modeling performed by the Tracking Tool. To assist, we have provided economic terms and their definitions used in the Tracking Tool to analyze IEUA’s programs. Probably the most useful categories for assessing water conservation programs are “Net Present Value” and “Benefit-to-Cost Ratio.”

Economic Term Definitions

Label	Full Name	Definition
Total Costs	Total Costs	The amount of money spent over the course of the program.
PV Total Costs	Present Value Total Costs	Present value reflects the “time value of money.” IEUA’s analysis uses an inflation-adjusted discount rate of 2% per

Economic Term Definitions

Label	Full Name	Definition
		year. This reflects the real growth of money accrued over time. It demonstrates how it matters if money is spent over a span of time vs. all up front. The money not spent up front can gain interest.
Lifetime Savings (AF)	Lifetime Savings in Acre-feet	Total water savings over the life of the water conservation measure per product.
PV Lifetime Savings (AF)	Present Value Lifetime Savings in Acre-feet	The value of water saved over a period of time. The same discount rate was used for water savings as with money spent. By using present value of water savings it allows the comparison of savings in future time periods with savings in the present time period.
PV\$/PVAF	Present Value in Dollars / Present Value of Acre-feet Saved	Present value of the total cost divided by the present value of the water saved represented in a dollars per acre-foot.
PV Benefits	Present Value of the Benefits	By eliminating water purchases, IEUA avoids spending those dollars (avoided costs). The “present value benefits” illustrates those savings in dollars and represents them in today’s value.
NPV	Net Present Value	Present value of the benefits minus the present value of the costs. It’s basically netting out the true benefits.
B/C	Benefit to Cost Ratio	Present value of the benefits divided by the present value of the costs. A value of “1” or above is deemed cost effective. A “1” means that for every dollar you spend you get a dollar back. The higher the number, over “1,” the better.

Figure 35: Economic Term Definitions

Economic Analysis

The Tracking Tool provides modeling results in two categories: financial/economic impacts, and water savings results. Together, these outputs comprise a complete set of information and data to confidently undertake strategic decision-making about future conservation programming activities.

To describe the financial impacts of each measure, the model outputs three cost-benefit calculations, including analysis for the utility service provider, the customer and society in general.

The utility cost-benefit analysis evaluates the impact of conservation programs from the utility’s perspective, and examines the utility’s cost of implementing a conservation program as compared to

the accrued benefits from avoided supply and capacity requirements as well as avoided wastewater costs.

The utility and rates analysis summarizes the overall impacts of conservation programs throughout future years on the utility's revenue requirements, on an average customer's bill and on water rates. Note that the model is not set up to calculate the revenue impact at the wholesaler level.

The customer cost benefit calculates and summarizes the economic impacts based upon the customer's perspective. The per unit value of saved water and the value cost of conservation activities are compared to the benefits of reduced water, gas, electricity and sewer costs. The analysis recognizes the basis of each of these related customer expenditures to water use and calculates the value of avoiding them through water conservation.

Society cost benefit captures all of the costs and benefits from a water conservation measure that is shared throughout a community. The societal (or total resource) perspective compares the resources used to produce the conservation activity to the resources saved as a result of the activity. On the cost side, it includes all costs incurred by the utility and its participating customers to produce the conservation savings. On the benefits side, it includes the net savings of actual resources, as measured by avoided water and wastewater consumption.

Water Resources Analysis

The Tracking Tool provides two outputs which describe the planned measures' impact on water demand: an activity savings profile, and a water savings summary. The Activity Savings Profiles output allows the reader to visually inspect the temporal pattern of water savings for each defined activity. It also provides a table and chart depicting both the lifetime and average annual water savings for each measure

The Water Savings Summary output summarizes water savings from the defined activities and from code-driven replacement of toilets and clothes. It also shows the tool's calculation of the benefits from deferred and avoided infrastructural capacity.

There are several water savings summary outputs. Per Capita Demands Table converts the demands from the Service Area Demands table to per capita demands using the population forecast from the Common Assumptions worksheet. The Service Area Water Savings Table shows water savings from code requirements, water savings from program activity, and total water savings. The Customer Class Water Savings Table shows how total water savings are divided among customer classes.

Future Program Tracking

The Tracking Tool provides not only the ability to select water conservation programs for implementation based upon a thorough analysis of the program's anticipated impacts, but also allows for the tracking of future program performance. The model can be adapted and adjusted at any time and impacts re-calculated based upon real world program performance.

Section 6 – Implemented Programs and Analyses

Over the past six years, IEUA has been successful delivering high volume water savings at an extremely low cost. During this period, over 54,000 acre-feet of water has been saved at a cost to IEUA of \$54 per acre-foot. This equates to avoided purchases valued at \$29 Million. The overall benefit to cost ratio is 16.3, an unusually high ratio for any water agency. IEUA leveraged outside funding at every opportunity securing over \$9 million in program funding. The following section reviews these programs in detail.

There are eleven water efficiency programs that are currently being offered, or have recently been offered, to IEUA customers. Of the eleven, four of the programs have water savings that can be quantified. The remaining seven are education and outreach programs with water savings impacts that are largely unknown and difficult to quantify, but are deemed valuable to some extent.

The four programs with **quantifiable water savings** are:

1. Multi-family High Efficiency Toilet Direct Installation Program
2. Turf Removal Incentive Program
3. Save A Buck Incentive Program
4. SoCalWaterSmart Incentive Program

Water savings for these programs can be calculated because they require the installation of water saving equipment or, in the case of the Turf Removal Program, the removal of grass. Water efficiency experts have studied these measures extensively in a variety of contexts and can reliably determine water savings for each. The seven **educational and outreach programs** are:

1. Landscape Evaluation Program
2. Ontario Cares Program
3. Inland Empire Landscape Alliance
4. Garden in Every School
5. National Theatre for Children Program
6. Regional Water Use Efficiency Outreach
7. No Water Waste Ordinance

Detailed program write ups (cut sheets) for the four quantifiable programs and descriptions of the educational programs are provided on the following pages.

Multi-family High Efficiency Toilet Direct Installation Program

<p>Leveraging DWR grant money & MWD incentives, this program delivered the highest cost effectiveness ranking of all the programs. Pre-1992 properties are targeted for replacement of high volume toilets with new High Efficiency Toilets. The new fixtures and the installation are free to the property owner, in order to achieve a high response rate.</p>					
Funding	<p>Funding was a major issue throughout the past years with the state suspending all bond-funded programs. Additionally, MWD funding ran out last fiscal year and will be limited in the upcoming year with a first come, first served funding format. Per unit funding for the current DWR grant is listed below.</p> <p>IEUA = \$35.66 per toilet DWR = \$83.34 per toilet MWD = \$60-\$165 (now \$82.50)</p>				
Program Advantages	<ul style="list-style-type: none"> – Highest Cost Effectiveness Ranking of any IEUA program – Ease of operation – High water savings 	Program Disadvantages	<ul style="list-style-type: none"> – Erratic Funding – Saturation Rate at 88 % 		
Water Savings to Date	<p>25,606 acre-feet PV = 16,352 acre-feet</p>	Remaining Potential	<p>12,582 units remaining 660 acre-feet per year 13,200 lifetime acre-feet</p>		
Measures	<p>High Efficiency Toilets: mid-2007 – 2009 ULF Toilets: 2003 – mid-2007</p>	Target Customer	<ul style="list-style-type: none"> - Multi-family property owners - Property management companies - Now target condos 		
Key Participants & Stakeholders	<ul style="list-style-type: none"> • IEUA & Agencies • Building owners • Residents 	<ul style="list-style-type: none"> • Manufacturers • Program Vendor • Installers 	Timeline	<p>2003-2009 DWR Grant: mid-2006-Present</p>	
Program Goals	DWR Grant remaining = 6,000 units	Annual Production	Avg: 4,100 toilets per year	Active* & Passive <i>*20% Freeridership</i>	Active = 23,364 Passive = 67,774
Implementer	Bottom Line Utility Solutions	Marketing Methods	Postcard mailing	Device per Unit Savings	ULFT = 38 gpd HET = 47 gpd
Other Benefits	Reduced wastewater	IEUA PV\$ / PF Acre-feet	ULFT = \$81 HET = \$41	IEUA Net Present Value	ULFT = \$11.03 M HET = \$2.63 M Total = \$13.66 M
Program Costs	Total = \$4.5 M IEUA = \$1.6 M	IEUA Cost/ Benefit Ratio	ULFT = 11 HET = 24	Participant Costs	\$0 cost

Water Wise Landscape Turf Removal Rebate Program

<p>The Water Wise Residential Landscape Rebate Program encouraged customers to remove high water consuming turf and replace with alternative solutions such as low water using indigenous California plants and surfaces that allow for ground water infiltration and reduce runoff. Qualifying applicants were eligible to receive \$2 per square foot of turf removed with a maximum incentive of \$2,000. The program fostered 136 successfully completed landscape conversions, delivering a total aggregated amount of 182,446 square feet of turf removed. The Program ended on July 31, 2009.</p>					
Cost Effectiveness	<p>Cost for both the utility, as well the participant is the major issue with turf removal. In order to obtain a significant response, customers should be offered \$1.00 - \$2.00 per square foot of turf removed. This would cover between 20-50% of the participant's costs. However it would result in a cost/benefit ratio of below .8. Although the customer may have reduced water and maintenance costs, their cost to benefit ratio would be well below .2.</p>				
Program Advantages	<ul style="list-style-type: none"> - Market transformation - Highest potential water savings 	Program Disadvantages	<ul style="list-style-type: none"> - Low utility cost effectiveness - High participant costs - Customers still want turf 		
Water Savings to Date	<p>25.5 acre-feet per year 251 lifetime acre-feet</p>	Remaining Potential	<p>40,865 acre-feet</p>		
Measures	<ul style="list-style-type: none"> - Turf removal - Low water use plants - Low precipitation irrigation systems 	Target Customer	<ul style="list-style-type: none"> - Single family customers - Could move to CII and Public Sector 		
Key Participants & Stakeholders	<ul style="list-style-type: none"> • IEUA & Agencies • Single Family Customers 	<ul style="list-style-type: none"> • Landscape Contractors • Nurseries and Home Improvement Stores 	Timeline	<p>2007 - 2009</p>	
Program Goals	<p>Transform public's attitude and perception of low water using alternatives.</p>	Production	<p>136 customers 182,446 sq ft removed</p>	Active & Passive	<p>Not available</p>
Implementer	<p>IEUA</p>	Marketing Methods	<p>Workshops & Local Demo Gardens</p>	Device per Unit Savings	<p>.125 gpd sq. ft.</p>
Other Benefits	<ul style="list-style-type: none"> - Reduced runoff - Market transformation 	IEUA PV\$ / PF Acre-feet	<p>\$240</p>	IEUA Net Present Value	<p>\$(28,879)</p>
Program Costs	<p>\$240,620</p>	IEUA Cost/Benefit Ratio	<p>0.8</p>	Participant Costs	<p>\$3-\$5 per sq. ft.</p>

Save A Buck Incentive Program

<p>One of IEUA’s key programs, the regional wide Commercial and Multi-family Save A Buck Program sponsored by MWD has grown over the years to include twelve different measure offerings for IEUA customers. MWD hires a regional vendor to operate the program.</p>					
Funding	<p>Funding was a major issue throughout the year with MWD funding running out last fiscal year. MWD budgets are limited in the upcoming year with a first come, first served funding format. IEUA will need to promote the program to their customers early in the fiscal year so applications are in queue to be paid before funds run out.</p>				
Program Advantages	<ul style="list-style-type: none"> – 75% of funding from MWD – Ease of Implementation for IEUA – Water savings is 2nd highest of all programs 	Program Disadvantages	<ul style="list-style-type: none"> – Uncertain MWD funding levels – Many measures do not have significant savings potential in IEUA territory 		
Water Savings to Date Acre-feet (Lifetime PV)	ULFT Flushometers	2	Remaining Potential (Acre-foot/Year)		
	ULFT Tank	742			
	HETs	1,812		HETs	977
	Waterless Urinals	1,567		Waterless Urinals	305-457
	Conductivity Controllers	51		Conductivity Controllers	313
	HEWs	163		HEWs	101
	Water Brooms	168		Water Brooms	138
	WBICs	224		WBICs	2,718
	Synthetic Turf	33		Synthetic Turf	NA
	HENs	2		HENs	2,653
Measures	<ul style="list-style-type: none"> • ULFT and HET Tank and Flushometers • HE, ULV and Waterless Urinals • Conductivity and pH Controllers • High Efficiency Washers • Pre-rinse Spray Valves • Steam Sterilizers • Dry Vacuum Pump • Water Brooms • Weather Based Irrigation Controllers • Synthetic Turf • High Efficiency Nozzles 		Target Customer	MWD marketed the program through trade allies.	
Key Participants & Stakeholder	<ul style="list-style-type: none"> • IEUA & Agencies • Com & MF Owners • Toilet Installation Contractors • Program Vendor 		Timeline	2002 – Present	

Measure Production	FY 03-04	FY 04-05	FY 05-06	FY 06-07	FY 07-08	FY 08-09
ULFT Tank	-	5	1,133	379	9	1
HETs	-	-	-	1	1,916	1,554
Waterless Urinals	-	-	-	97	606	332
Conductivity Controllers	-	-	-	4	12	4
HEWs	111	26	83	140	48	19
Water Brooms	210	0	3	1	1	5
WBICs	-	-	22	16	6	57
Synthetic Turf	-	-	-	-	32,525	1,925
Rotating Nozzles for Pop Ups	-	-	-	-	65	43
Large Rotary Nozzles	-	-	-	-	-	120
Pre-rinse Spray Valves*	462	1	-	-	-	31

Measures	IEUA Total Costs	IEUA Cost per Acre-foot	IEUA Net Present Value	IEUA Benefit to Cost Ratio
ULFT Flushometers	\$45	-	\$172	-
ULFT Tank	\$5,075	\$7	\$664,038	58
HETs	\$345,045	\$190	\$1,434,224	5.2
Waterless Urinals	\$0	\$0	\$1,525,465	-
Conductivity Controllers	\$1,700	\$33	\$35,350	21.8
HEWs	\$20,093	\$123	\$109,398	6.4
Water Brooms	\$21,513	\$128	\$70,672	4.3
WBICs	\$0	\$0	\$183,710	-
Synthetic Turf	\$7,671	\$234	\$19,418	3.5
Rotating Nozzles- Pop Ups	\$0	\$0	\$1,169	-
Large Rotary Nozzles	\$0	\$0	\$6,014	-
Pre-rinse Spray Valves	\$0	\$0	\$160,225	-

SoCalWaterSmart Incentive Program

<p>The Water Smart Program offers residential customer incentives for a menu of indoor and outdoor devices. It delivered the highest volume of savings of all programs offered over the last year. With seven program measures, the program saved 166 acre-feet for fiscal year 2008-2009.</p>					
Funding	<p>Funding was a major issue throughout the year with MWD funding running out last fiscal year. MWD budgets are limited in the upcoming year with a first come, first served funding format. IEUA will need to promote the program to their customers early in the fiscal year so applications are in queue to be paid before funds run out.</p>				
Program Advantages	<ul style="list-style-type: none"> – Majority of funding from MWD – Ease of Implementation for IEUA – Water savings from Water Smart is the highest of all IEUA programs 		Program Disadvantages	<ul style="list-style-type: none"> – Uncertain MWD funding levels – MWD does not continually market 	
Water Savings to Date Acre-feet (Lifetime PV)	High Efficiency Toilets	898	Remaining Potential (Acre-feet/Year)	High Efficiency Toilets	5,161
	High Efficiency Clothes Washers	776		High Efficiency Clothes Washers	2,116
	Rotating Nozzles	33		Rotating Nozzles	4,066
	Weather Based Irrigation Controllers	151		Weather Based Irrigation Controllers	4,167
	Turf Removal	On-hold		Turf Removal	19,243
	Synthetic Turf	155		Synthetic Turf	NA
Measures	<ul style="list-style-type: none"> • High Efficiency Toilets • High Efficiency Clothes Washers • Rotating Nozzles- Pop Ups • Weather based Irrigation Controllers • Synthetic Turf 		Target Customer	Retailer in-store promotional materials and salesperson training	
Key Participants & Stakeholders	<ul style="list-style-type: none"> • Customers • Manufacturers • Retailers • Landscape Equipment Suppliers 		Timeline	2008 – Present	

<i>Measures</i>	<i>IEUA Total Costs</i>	<i>IEUA Cost per Acre-foot</i>	<i>IEUA Net Present Value</i>	<i>IEUA Benefit to Cost Ratio</i>
High Efficiency Toilets	\$0	\$0	\$625,073	490
High Efficiency Clothes Washers	\$0	\$0	\$89,852	-
Rotating Nozzles-Pop Ups	\$0	\$0	\$24,932	-
Weather based Irrigation Controllers	\$161,645	\$1.067	\$122,656	.8
Synthetic Turf	\$49,246	\$234	\$131,134	3.6
<i>Incentive Dollars</i>				
<i>Device</i>	<i>MWD Rebate</i>	<i>IEUA Add-on</i>	<i>Total Customer Rebate</i>	
HET	\$50	\$35	\$85	
HECW	\$	\$60	\$110	
Nozzles	\$4	\$2	\$6	
Synthetic Turf	\$0.30	\$0.45	\$0.75	
WBIC	\$80	\$45	\$125	

Education and Outreach Programs

Below is a description of the education and outreach programs currently or recently offered by IEUA:

<p>1. Landscape Evaluation Program</p>	<p>The Landscape Water Evaluation Program provides landscape evaluations, recommendations and education to commercial, institutional and industrial customers within the IEUA service area on water efficient irrigation practices.</p>
<p>2. Ontario CARES</p>	<p>The Ontario CARES Program improves eligible Ontario homes located in designated focus areas with California Friendly® landscaping designed to blend native and drought-tolerant plants, trees and groundcover into attractive, low-maintenance and water saving yards.</p>
<p>3. Inland Empire Landscape Alliance</p>	<p>The Landscape Alliance coordinates development and implementation of the Chino Basin Water Efficient Landscape Model Ordinance. The Alliance is currently developing manuals to support the implementation of adopted landscape ordinances.</p>
<p>4. Garden-In-Every School®</p>	<p>Garden-In-Every School educates elementary school-age children, their families, school staff and community members about wise water usage through the establishment of thematic school gardens that feature drought tolerant plants and efficient irrigation methods that are aligned with state curriculum standards.</p>
<p>5. National Theatre for Children</p>	<p>The National Theatre for Children is a live interactive theatre performance that advances water and environmental awareness, and introduces simple water conservation practices that students can incorporate into their daily lives and at home.</p>
<p>6. Regional Water Use Efficiency Outreach</p>	<p>Regional Water Use Efficiency Outreach is a regional public outreach campaign aimed at encouraging the public to make lifestyle changes that save water.</p>
<p>7. No Water Waste Ordinance</p>	<p>IEUA assisted member agencies in updating and adopting No Water Waste Ordinances in order to educate customers and eliminate waste. Typical ordinances prohibit certain water uses and irrigation practices and provide specific enforcement and penalty mechanisms.</p>

Evaluation of Programs

In order to create a business plan for the future, it was important to measure the historical level of success for each of the programs. There are two primary components of the evaluation:

1. Program cost and benefit results, and
2. Program's level of goal achievement compared to IEUA's set of criteria

Economic Analysis

The first step in the evaluation process was to determine the cost and benefit performance of the programs with quantifiable water savings. The economic model examined each measure within the program to evaluate the strengths or shortfalls within each program.

The "perfect program" would possess the following cost and benefit attributes:

- Low overall costs
- High acre-foot lifetime savings
- Low cost per acre-foot
- Value of the benefits
- Benefit to cost ratio higher than 1

The completed economic evaluation is based on program activities from 2003 to 2009 and shows each measure's number of units installed or completed, total costs, lifetime savings and benefit-to-cost ratio. Past programs that are no longer offered such as ultra low flush toilet rebates and giveaways were evaluated to better understand IEUA's performance and how that may change in the future as programs costs, savings and funding options change.

On the following pages are two charts depicting the economic evaluation results.

The first chart is the **Total Cost and Benefit Chart**. The analysis includes all costs, regardless of the funding source, so that grants and incentives provided by entities other than IEUA are included. This approach is advantageous in that it allows the ability to evaluate the past performance of each program simply from a "bang-for-the-buck" perspective no matter how it was funded.

The **IEUA Cost and Benefit Chart** shows the programs with IEUA costs only. As you can see, IEUA has been extremely successful in leveraging outside funds and has been able to produce significant savings for low costs.

Total Costs and Benefits: 2003-2009 Programs

Activity	No. of Units	Total Costs	Lifetime Water Savings (AF)	Cost per Acre-foot	Net Present Value	Benefit-to-Cost Ratio
Residential Measures						
ULFT Rebate	3,111	\$ 190,230	1,692	\$ 135	\$ 798,193	6.3
ULFT Agency Giveaway	5,435	\$ 351,753	2,956	\$ 143	\$ 1,363,775	5.9
ULFT Regional Giveaway	3,461	\$ 243,885	1,883	\$ 155	\$ 839,393	5.3
HET Rebate	2,203	\$ 363,495	1,486	\$ 293	\$ 639,188	3.4
HEWs Rebate	10,618	\$ 1,179,669	4,396	\$ 307	\$ 1,508,891	2.6
HE Nozzle Rebate	2,309	\$ 9,236	46	\$ 208	\$ 18,116	3.7
WBIC Rebate	68	\$ 221,519	221	\$ 1,094	\$ (43,058)	0.7
WBIC Distribution	330	\$ 79,200	1,073	\$ 81	\$ 523,513	9.7
Turf Removal (sf)	182,446	\$ 240,620	255	\$ 1,028	\$ (28,879)	0.8
Synthetic Turf (sf)	164,153	\$ 98,492	230	\$ 468	\$ 58,847	1.8
Pool Covers	524	\$ 24,698	7	\$ 3,693	\$ (17,058)	0.1
MF ULFT Direct Install	24,872	\$ 3,580,280	21,056	\$ 204	\$ 9,363,541	4.4
MF HET Direct Install	4,334	\$ 909,118	4,550	\$ 240	\$ 2,070,752	4.1
Commercial Measures						
ULFT Flushometer Rebate	4	\$ 600	-	\$ -	\$ (455)	-
ULFT Tank Rebate	1,527	\$ 127,019	1,157	\$ 132	\$ 571,421	6.8
HET Rebate	3,471	\$ 1,041,210	2,950	\$ 423	\$ 1,012,421	2.3
Waterless Urinal Rebate	1,035	\$ 414,000	2,540	\$ 195	\$ 1,219,215	5.0
Conductivity Ctrl Rebate	22	\$ 15,775	71	\$ 232	\$ 25,262	3.1
HEW Rebate	575	\$ 143,580	238	\$ 690	\$ 16,885	1.1
Water Brooms Rebate	282	\$ 55,650	216	\$ 268	\$ 47,346	2.1
Water Broom Distribution	113	\$ 21,900	87	\$ 263	\$ 19,208	2.1
CII WBIC Rebate	101	\$ 51,993	328	\$ 173	\$ 145,044	4.8
Synthetic Turf (sf) Rebate	34,450	\$ 20,672	48	\$ 468	\$ 11,747	1.8
HE Nozzle Rebate	108	\$ 432	2	\$ 208	\$ 851	3.7
Large Rotary Nozzle Rebate	120	\$ 1,560	11	\$ 150	\$ 4,878	5.3
X-ray Film Processor Rebate	19	\$ 38,000	63	\$ 661	\$ (415)	1.0
Spray Valve	494	\$ 25,010	378	\$ 69	\$ 139,854	7.9
Public Sector Measures						
PSP HET Rebate	4	\$ 1,285	3	\$ 453	\$ 1,135	2.2
PSP Waterless Urinals	58	\$ 69,671	145	\$ 576	\$ 35,055	1.7
PSP Water Brooms	147	\$ 53,946	113	\$ 498	\$ 21,029	1.5
PSP WBIC	115	\$ 163,204	700	\$ 254	\$ 280,009	3.3
PSP Central Irrigation Ctrl	551	\$ 2,216,332	5,466	\$ 443	\$ 1,529,230	1.9
PSP Synthetic Turf (sf)	185,612	\$ 139,209	260	\$ 641	\$ 57,234	1.6
Total		\$ 11,895,635	54,625	\$ 254	\$ 22,373,924	3.5

Figure 36: Total Cost and Benefit (All Funding Sources) by Measure

Major findings of the analysis show:

- Nearly \$12 million was spent on water conservation programs between 2003 and 2009, achieving a lifetime water savings of over 54,000 acre-feet of water.
- The average benefit-to-cost ratio for residential programs was 4, while for CII programs it was 3.1.
- The program with the highest benefit to cost ratio (9.7) was WBIC distribution, although its lifetime savings was a modest 1,073 acre-feet.
- The Multi-family ULFT Direct Installation program cost over 3.5 million dollars and achieved a lifetime water savings of over 21,000 AF and a great benefit-to-cost ratio of 4.4.
- Central irrigation controllers installed at public sector sites saved the second highest lifetime volume of water at 5,466 AF and was funded at over 2.2 million dollars, with a relatively low benefit-to-cost ratio under 2.

IEUA Costs and Benefits: 2003 - 2009 Programs

Activity	No. of Units	Total Costs	Lifetime Water Savings (AF)	Cost per Acre-foot	Net Present Value	Benefit-to-Cost Ratio
<i>Residential Measures</i>						
UFLT Rebate	3,111	\$ 2,850	1,692	\$ 2	\$ 948,810	420.5
ULFT Agency Giveaway	5,435	\$ 21,653	2,956	\$ 9	\$ 1,627,109	95.2
ULFT Regional Giveaway	3,461	\$ 37,785	1,883	\$ 24	\$ 1,005,412	34.0
HET Rebate	2,203	\$ -	1,486	\$ -	\$ 904,266	-
HEW Rebate	10,618	\$ 6,373	4,396	\$ 2	\$ 2,419,097	490.3
HE Nozzle Rebate	2,309	\$ -	46	\$ -	\$ 24,932	-
WBIC Rebate	68	\$ 216,079	221	\$ 1,067	\$ (38,989)	0.8
WBIC Distribution	330	\$ -	1,073	\$ -	\$ 583,536	-
Turf Removal (sf)	82,446	\$ 240,620	255	\$ 1,028	\$ (28,879)	0.8
Synthetic Turf (sf)	164,153	\$ 49,246	230	\$ 234	\$ 94,990	3.6
Pool Covers	524	\$ 24,698	7	\$ 3,693	\$ (17,058)	0.1
MF ULFT Direct Install	24,872	\$ 1,423,097	21,056	\$ 81	\$ 11,028,692	11.0
MF HET Direct Install	4,334	\$ 154,564	4,550	\$ 41	\$ 2,627,131	24.1

Activity	No. of Units	Total Costs	Lifetime Water Savings (AF)	Cost per Acre-foot	Net Present Value	Benefit-to-Cost Ratio
Commercial Measures						
ULFT Flushometer Rebate	4	\$ 60	-	\$ -	\$ (45)	-
ULFT Tank Rebate	1,527	\$ 6,599	1,157	\$ 7	\$ 664,038	131.8
HET Rebate	3,471	\$ 468,495	2,950	\$ 190	\$ 1,434,224	5.2
Waterless Urinal Rebate	1,035	\$ -	2,540	\$ -	\$ 1,525,465	-
Conductivity Ctrl Rebate	22	\$ 2,275	71	\$ 33	\$ 35,350	21.8
HEW Rebate	575	\$ 25,620	238	\$ 123	\$ 109,398	6.4
Water Brooms Rebate	282	\$ 26,700	216	\$ 128	\$ 70,672	4.3
Water Broom Distribution	113	\$ 10,600	87	\$ 127	\$ 28,296	4.3
WBIC Rebate	101	\$ -	328	\$ -	\$ 183,710	-
Synthetic Turf (sf) Rebate	34,450	\$ 10,336	48	\$ 234	\$ 19,418	3.5
HE Nozzle Rebate	108	\$ -	2	\$ -	\$ 1,169	-
Large Rotary Nozzle Rebate	120	\$ -	11	\$ -	\$ 6,014	-
X-ray Film Processor Rebate	19	\$ -	63	\$ -	\$ 30,376	-
Spray Valve	494	\$ -	378	\$ -	\$ 160,225	-
Public Sector Measures						
PSP HET Rebate	4	\$ -	3	\$ -	\$ 2,071	-
PSP Waterless Urinals	58	\$ -	145	\$ -	\$ 86,786	-
PSP Water Brooms	147	\$ -	113	\$ -	\$ 60,849	-
PSP WBIC	115	\$ -	700	\$ -	\$ 399,763	-
PSP Central Irrigation Ctrl	551	\$ -	5,466	\$ -	\$ 3,145,818	-
PSP Synthetic Turf (sf)	185,612	\$ -	260	\$ -	\$ 158,640	-
Total		\$ 2,530,042	54,625	\$ 54	\$ 29,440,788	16.3

Figure 37: IEUA's Costs and Benefits by Measure

Major conclusions reflected in the IEUA Programs Costs and Benefit analysis are described below. Please note that if there were no monetary contributions from IEUA, the cost, cost per acre-foot and benefit-to-cost ratio was left blank.

- IEUA was highly successful in efforts to secure outside funding at nearly \$9.4 million.
- The average program cost per acre-foot is \$54—an extremely low price for avoided water purchases.
- The total benefit-to-cost ratio for the programs is 16.3, showing a high economic value received by IEUA.
- High Efficiency Washer rebates ranked the best overall with a benefit-to-cost ratio over 490 (the majority of funding was from outside sources).
- ULF Toilets ranked second with a benefit-to-cost ratio of 420.5.

- Measures that showed poorly were Residential WBIC Rebates, Single Family Turf Removal and Pool Covers with benefit-to-cost ratios of less than 1.0.
- There are several program measures that have no cost or savings numbers entered. These are the measures that are not funded with IEUA dollars and therefore cannot be calculated.

Evaluation of Program Goal Achievement

In order to determine the level of goal achievement for each program, it was first necessary to define the elements of “success”. The Workgroup, consisting of IEUA, agency representatives and consultants worked together and determined that the following criteria were the major elements of success for ***Programs with Quantifiable Water Savings***:

***Programs with Quantifiable Water Savings
Major Elements of Success***

- *Cost effective avoided water purchases* – The program provides economical water savings.
- *Lifetime water savings potential* – The program yields a high volume of water savings over the measure life.
- *Certainty of water savings* – The program uses “tried and true” measures that have proven savings.
- *Customer receptivity* – Customers respond well to the program and give high customer satisfaction marks for the service or products provided.
- *Ease of operation* – The program is not burdensome for IEUA to operate
- *Drives market transformation* – The program helps to forge the way into a specific market (such as landscape) so that vendors offer water use efficiency measures and customers make water use efficiency upgrades on their own.

Other considerations were also factored into the evaluation but were considered of less importance. These were:

***Programs with Quantifiable Water Savings
Secondary Indicators of Success***

- *BMP or regulatory compliance* – The program fulfills one of the CUWCC’s Best Management Practices or satisfies a regulatory requirement.
- *Outside funding potential* – There is a possibility of third-party funding or grant money, which would reduce overall program costs and increase IEUA’s benefit-to-cost ratio.
- *Equity for all agencies* – The program serves customers within each of the member agency’s territory.

- *Can be leveraged with other agencies* – The program may be able to “piggyback” or done in partnership with another agency’s program and thereby share overhead and marketing costs and increase response.
- *Quickly scalable* – The program can be ramped up or down according to regional needs.
- *Fits regional plan* – The program helps IEUA to meet the goals of the business plan.

IEUA and the member agencies determined that the Educational and Outreach Programs required a different mix of elements to be evaluated. The six required criteria for ***Educational and Outreach Programs*** are:

Educational and Outreach Programs

Elements of Success

- *BMP compliance* – Fulfills one or more of CUWCC’s BMPs.
- *Potential for hard water savings* – May go beyond education and outreach and achieve actual water savings.
- *The ability to reach a high quantity of customers* – Program will reach a wide audience.
- *Customer receptivity* – Customers desire the program and give it high marks.
- *Ease of operation* – Program does not provide an operational burden for IEUA.
- *Drives market transformation* – Program helps to forge the way into a specific market (such as landscape) so that vendors offer water use efficiency measures and customers make water use efficiency upgrades on their own.

Two “scorecards” were developed, one for the programs with Quantifiable Water Savings and one for the Education and Outreach Programs. The scorecards were designed to analyze each program against IEUA’s criteria of success and rank the programs from the highest to the lowest level of success. Nine representatives, one from each of the eight member agencies and one from IEUA, then evaluated and assigned criteria ranking scores to each of the 11 measures. Results of the Scorecard ranking process follow.

The completed scorecard for the four programs yielded the following ranking:

1. **Multi-family HET Direct Install Program** ranked the highest of the four programs with 357 points. This was due to the extremely high cost effectiveness in combination with the high water saving potential of the program. There is also a high certainty of water savings with a direct installation design since program personnel are performing the installations.
2. **Residential SoCalWater\$mart Program** secured a second place ranking with 351 points. It has the highest water savings of all the IEUA programs offered in Fiscal Year 2008-2009. The program is cost-effective and administered by MWD so therefore not overly burdensome for IEUA to manage.
3. **Commercial & Multi-family Save A Buck Program** was ranked a close third with 344 points and was also rated in high water savings and cost-effectiveness, but slightly lower regarding the certainty of future water savings. This is because the real potential for commercial measures are less known than for residential measures. The program was scored lower than SoCalWater\$mart in regards to agency equity.
4. **Water Wise Turf Removal Rebates** scored the lowest of the four programs showing low cost-effectiveness marks (it scored less than half of the total cost effectiveness score compared to the other programs), low lifetime water savings potential and a very low market transformation score. This measure scored the lowest in every primary criteria category.

The completed scorecard for the seven programs resulted in the following:

1. **The Regional Water Use Efficiency Outreach Program** ranked the highest with a total point value of 113, scoring higher in nearly all categories.
2. **The National Theatre for Children Program** earned 111 points and was ranked second highest. It was a high performer in all categories except *Potential for Hard Water Savings*.
3. **Phase III Landscape Evaluation Program** was ranked third (107 points) with high scores in most categories except *Reaches High Quantities of Customers*.
4. **No Water Waste Ordinance** scored 100 points, placing it fourth out of the seven programs. Although this scored high in nearly all categories, it scored highest in driving of all measures in market transformation, potential water savings and number of customers reached, but second from the lowest for *Ease of Operation*.
5. **Inland Empire Landscape Alliance** placed fifth with 91 points, scoring low for *BMP Compliance, Potential for Hard Water Savings, and Reaches High Quantity of Customers*. The program did however score high for the *Drives Market Transformations* category.

6. **The Garden in Every School Program** was second to last with 76 points. This was due to low scores for *Potential for Hard Water Savings, Quantity of Customers* and *Drives Market Transformation*.
7. **Ontario Cares** ranked last with 40 points with low scores for all categories. This was because many agencies did not provide a score because the program was not operated in their territory.

Program Evaluation Results

Armed with the results of the economic analysis and the program scorecards rankings, IEUA now possessed a clear picture of each program’s overall merit and significance. The final step in the process was to assimilate all the findings and create the best portfolio of programs for the future. IEUA, its member agencies and the consultants reviewed each program and initiated one of the following actions:

- Eliminated the program because it would not meet the future needs of the region;
- Modified the program in order to increase its effectiveness; or,
- Selected the program, as is, for the regional program portfolio

Workgroup decisions regarding each program are shown below:

<i>Program</i>	<i>Decision</i>	<i>Reason for Decision</i>
1) Multi-family High Efficiency Toilet Direct Installation Program	Continue program until grant funding runs out.	Grant money available and high benefit cost ratio.
2) Turf Removal Incentive Program	Redesign program to increase cost effectiveness. <ul style="list-style-type: none"> • Reduce utility incentive • Add customer financing 	Turf removal provides the largest opportunity and drives market transformation, but is extremely expensive.
3) Save A Buck Incentive Program	Continue program as is.	MWD is cost effective and easy to operate for IEUA.
4) SoCalWater\$mart Incentive Program	Continue program as is.	MWD is cost effective and easy to operate for IEUA.
5) Landscape Evaluation Program	Continue program as is.	Low-cost approach to meet AB 1881.
6) Ontario Cares Program	Program completed.	Program ended.
7) Inland Empire Landscape Alliance	Continue with focus on implementation of local agency water efficient landscape ordinances.	Highly effective in providing assistance to local agencies with landscape ordinance implementation.
8) Garden in Every School	Review program to increase hard water savings and lower costs.	Results of evaluation.

<i>Program</i>	<i>Decision</i>	<i>Reason for Decision</i>
9) National Theatre for Children Program	Continue program as is.	Low cost, high PR value, & provides BMP compliance.
10) Regional Water Use Efficiency Outreach	Continue program as is.	Highly effective, & provides BMP compliance.
11) No Water Waste Ordinance	Continue program as is.	Low cost with potential high volume water savings & provides BMP compliance.

Figure 38: Program Evaluation Results- Work Group Decisions

The findings of this analysis of existing programs are combined with the findings in *Section 7: Potential Program, Analyses & Final Program Selection* to develop the final portfolio of recommended programs for IEUA.

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Section 7 - Potential Programs, Analyses and Final Program Selection

The next step in the process was to create a comprehensive list of programs and measures that corresponded to IEUA’s water demand and measure potential as an efficiency solution. At this stage of the process all possibilities were listed, with the understanding that many of these programs would not make the final cut.

The design team examined the remaining market opportunities, including the predominant customer segments, technologies available and retail water agency needs. They next analyzed strong delivery options for each market opportunity and created viable program concept designs. These new program designs were created to “fill in the gaps” in addressing IEUA’s water demand profile. The new potential programs were then added into the mix for consideration, along with the existing programs with quantifiable water savings, for a list of fourteen program possibilities.

Over the next fiscal year, IEUA will continue funding several of the existing educational programs, with the exception of the Ontario Cares, which concluded in December 2009. Since these are not programs with quantifiable water savings, they were not included in the following analysis. The List of Potential Programs is below:

<i>Residential Sector</i>	<i>Reason</i>
IEUA Administered HET Incentive Program	Cost effective program with high water savings when replacing high water use fixtures.
Multi-family Toilet Direct Installation Program*	High cost effectiveness and water savings.
Multi-family Submetering Incentive Program	Saturation is low and potential water savings are high volume.
SoCalWater\$mart Incentive Programs*	Majority of funding from MWD. Ease of operation for IEUA.
<i>CII Sectors</i>	<i>Reason</i>
Comprehensive Restaurant Program	Large target of potential customers. High water savings for plumbing fixtures due to high foot traffic.
Industrial Process & Cooling Tower Survey & Incentive Program	High volume of water savings, drives market for water reuse.
Public Sector Program	High number of public agency properties within IEUA territory. Typically large landscape properties.
Save A Buck Incentive Program*	Cost effective program. 75%+ of funding from MWD. Ease of operation for IEUA.

Large Landscape Sector	Reason
GeoSmart Landscape Finance Program	More cost-effective approach to turf removal. Allows all size landscape customers to participate. Good finance terms offered.
Smart Controller Direct Installation Program	Targets largest water use in IEUA’s territory and has high water savings per site.
Water Budget Program	Targets landscape market and is extremely cost effective. Educated customers will see opportunity for savings and implement projects on their own.
Turf Removal Program*	Significant impact on market transformation. Very high potential for water savings.
Landscape Evaluation Program*	IEUA would be able to target highest water consuming landscape customers and motivate them to make water use efficiency improvements.
High Efficiency Nozzle Distribution Program	Cost effective program and large number of pop up heads to be retrofitted. Program has great savings potential and is easily scalable to larger productivity if needed.

**denotes an existing program*

Figure 39: List of Potential Programs by Sector

On the following pages are program “cut sheets” for the 14 potential programs under consideration in the WUE program portfolio. Each cut sheet provides a program description, measure(s) offered, target customer segments, marketing methods, delivery mechanisms, production numbers, program costs and economic evaluation results.

IEUA Administered High Efficiency Toilet Incentive Program

MWD eliminated high efficiency toilet rebates under the SoCalWaterSmart Program.

MWD now only funds through member agency implemented methods. MWD will be allocating a portion of funds to each agency based upon total urban water demand. For fiscal year 2010/11 the total MWD member agency implemented program budget is \$5.5 million, of which IEUA will receive only a small portion.

The HET Incentive Program would offer single family customers a \$100 rebate for the purchase of an HET. The program would be administered internally by IEUA. Marketing would include general advertising and web postings.

Program Advantages:

- Cost effective program
- Water savings is high when replacing high water use fixtures

Program Disadvantages:

- Market is saturated at 75% with ULFT & HET retrofits
- Would use up MWD Member Agency implemented program budget
- Program not considered innovative or landscape-focused
- Decreases potential recycled water supply

Funding	\$50.00 from MWD + \$50.00 IEUA = \$100.00 Note: MWD funding is not guaranteed.				
Measures	High Efficiency Toilets		Target Customer	Single family homes built prior to 1992	
Potential for IEUA Service Area	121,021 non-ULFT or HET fixtures 5,161 acre-feet per year		Water Savings per Device	0.03345 acre-feet per year (10,901 gpy) 20 year life = 0.669 acre-feet	
Program Delivery	IEUA will administer the rebate program internally.		Marketing	Marketed through direct mail, IEUA website, and general outreach.	
Annual Production	1,000 units		Program Goals	Program would run through 2014 when code requires HETs 3,000 unit goal	
Other Benefits	Wastewater reduction	Utility Cost per AF	\$112	Participant Costs	\$100
Program Costs	<u>Annual Budget</u> \$62,500	Utility Cost/ Benefit Ratio	12.35	Participant Cost / Benefit Ratio	6.53

Multi-family Toilet Direct Installation Program

Leveraging DWR grant money & MWD incentives, this program delivers the highest cost effectiveness ranking of all the programs. Pre-1992 multi-family properties are targeted for replacement of high volume toilets with new high efficiency toilets.

The new fixtures and the installation are offered to the customer at a significantly subsidized price of \$24 per fixture. The program began in 2007 and is currently being administered by BottomLine Utility Solutions, Inc. BottomLine is marketing and installing the remaining 6,000 units from the grant. Because the market is saturated they are attempting to target condos. They expect to do 3,000 units in FY 2009/10 and the remaining 3,000 in FY 2010/11.

Program advantages:

- High cost effectiveness ranking
- Ease of operation
- High water savings

Program disadvantages:

- Erratic funding
- Saturation rate is at 88% for multi-family toilets
- Reduces potential recycled water supply

Funding	Funding was a major issue throughout the past years with the state suspending all bond-funded programs. Additionally, MWD funding ran out last fiscal year and is limited to 50% for the remaining units. Per unit funding for the current phase is listed below.				
	IEUA = \$35.66 per toilet	DWR = \$73.34 per toilet	MWD = \$82.50 per toilet		
Measures	High Efficiency Toilets	Target Customer	<ul style="list-style-type: none"> • Multi-family property owners • Property management companies • Present targets are condo properties 		
Potential for IEUA Service Area	<ul style="list-style-type: none"> • 12,582 units remaining • 660 acre-feet per year • 13,200 lifetime acre-feet 	Water Savings per Device	0.0425 acre-feet per year (13,848 gpy) 20 year life = .85 acre-feet		
Program Delivery	Outsourced to BottomLine Utility Solutions	Marketing	Direct sales to property owners and managers		
Annual Production	3,000 HETs	Program Goals	DWR Grant remaining for FY 2010/11 = 3,000 units		
Other Benefits	Wastewater reduction	IEUA Cost per Acre-Foot	\$78	Participant Costs	\$24 per fixture
Program Costs	<u>Annual Budget</u> \$106,980	IEUA Cost/ Benefit Ratio	12.64	Participant Costs	16.51

Multi-family Submetering Program

Submetering multi-family individual units:

- Makes residents responsible for their own water use
- Encourages residents to fix or report leaks
- May help keep rents low because water costs are separated out
- Can reduce water use by 20% or more

IEUA would pilot an incentive program targeting multi-family property owners and encouraging them to install submeters for each dwelling unit. The property owner would receive the incentive, purchase and install the meters on their own and be responsible for billing their tenants. It is well documented that residents with master metered water supply use more water and have little motivation to initiate water efficiency retrofits within their home. By reconfiguring the metering to remove the master meter and install individual meters, the end-user will now have a vested interest in reducing their usage.

The customer would be offered \$675 incentive for each meter.

Program Advantages:

- Market is unsaturated

Program Disadvantages:

- Requires incentive to motivate property owners is expensive
- Billing the tenant adds a complicated process onto the building owner
- Unknown life of savings
- Decreases potential recycled water supply

Funding	No outside funding is currently available.				
Measures	Multi-family submeters		Target Customer	Multi-family building owners	
Potential for IEUA Service Area	53,054 multi-family dwelling units		Water Savings per Device	-20% of water use -Average of 0.0245 acre-feet per year per dwelling unit (8,000 gpy) -Unknown life of savings	
Program Delivery	Internally administered by IEUA		Marketing	Marketed through direct outreach to multi-family property owners	
Annual Production	1 year pilot 144 units		Program Goals	Long term goals would be determined after pilot results are evaluated	
Other Benefits	Wastewater reduction	IEUA Cost per Acre-Foot	\$1,954	Participant Costs	\$430 per meter
Program Costs	<u>Annual Budget</u> \$82,650	IEUA Cost/ Benefit Ratio	0.52	Participant Cost / Benefit Ratio	1.07

SoCalWater\$mart Incentive Program

The SoCalWater\$mart Program offers residential customer incentives for a menu of indoor and outdoor devices. The program is operated by EGIA, MWD's regional vendor. Last year, the program delivered the highest volume of savings of all programs. MWD will continue the program through FY 2010/11 with several programmatic changes including the following:

- High efficiency toilet incentives have been eliminated
- High efficiency washer incentive increased from \$50 to \$85, however agencies must provide matching funds
- Multi-family customers are now eligible for high efficiency washer incentives
- Synthetic turf incentives have been eliminated
- The pressure regulator requirement for nozzles has been removed and the incentive has been reduced from \$4 to \$3 per nozzle

MWD has been cautious about marketing the program due to the increased demand last year and subsequent budget overruns. It will be necessary to augment MWD marketing activities in order to ensure participation. Marketing could focus on the landscape products. In addition, IEUA will augment the incentives as detailed in the chart on the following page.

Program Advantages:

- Majority of funding from MWD
- Ease of Implementation for IEUA
- High efficiency clothes washer incentives provide good PR with customers and additional incentives are available from energy utilities

Program Disadvantages:

- Uncertain MWD funding levels
- MWD does not continually market

Funding	Funding was a major issue throughout the year with MWD funding running out last fiscal year. MWD budgets are limited in the upcoming year with a first come, first served funding format.		
Measures	<ul style="list-style-type: none"> • High Efficiency Clothes Washers, 4.0 water factor or better • Weather Based Irrigation Controllers • High Efficiency Nozzles 	Target Customer	<ul style="list-style-type: none"> • Retailer in-store promotional materials and salesperson training • Irrigation distributor in-store promotional materials and contractor training
Potential for IEUA Service Area	<ul style="list-style-type: none"> • 135,610 single family clothes washers • 12,849 multi-family clothes washers 	Water Saving per Device	<p><u>HECWs</u> = 0.0157 af / year (5,110 gpy) 10 year life = 0.15682 af</p> <p><u>WBICs</u> = 0.04145 af / year (13,505 gpy) 10 year life = 0.4145 af</p> <p><u>Nozzles</u> = 0.004 af / year (1,303 gpy) 5 year life = 0.02 af</p>

Incentive Dollars					
Device	MWD Rebate		IEUA Add-on		Total Customer Rebate
High Efficiency Clothes Washers	\$85		\$85		\$170
Weather Based Irrigation Controllers	\$80		\$45		\$125
High Efficiency Nozzles	\$3		\$2		\$5
Annual Production	-2,000 High Efficiency Clothes Washers -15 Weather Based Irrigation Controllers -1,500 High Efficiency Nozzle		Program Goals		<i>5 Year Program Implementation</i> -10,000 High Efficiency Clothes Washers - 75 Weather Based Irrigation Controllers -7,500 High Efficiency Nozzles
Other Benefits	Reduced runoff for landscape measures	IEUA Cost per Acre-foot	HECW = \$551 WBIC = \$124 Nozzle = \$106		Participant Costs HECW = \$630 (incremental after incentive) WBIC = \$435 + annual signal fee Nozzle = \$1
Program Costs	<u>Annual Budget</u> \$226,500 -Single Family = \$23,00 -Commercial= \$52,500 -Dedicated = \$150,000	IEUA Cost/ Benefit Ratio	HECW = 1.81 WBIC = 7.63 Nozzle = 8.31		Participant Cost / Benefit Ratio HECW = 0.58 WBIC = 0.88 - without subscription 0.45 with subscription Nozzle = 19.37

Comprehensive Restaurant Program

IEUA's service territory has over 1,300 restaurants offering a healthy number of sites to target for a pilot program. Restaurant restrooms have extremely high foot traffic, making toilets and faucets key measures to target. IEUA would conduct a pilot program for this market. The program would include direct installation of high efficiency toilets and faucet aerators. The program would also include marketing incentives for urinals and food steamers offered through MWD's Save A Buck Program. These incentives would be paid directly to the customer.

The program has several advantages:

- Large target of potential customers
- High water savings for plumbing fixtures due to high foot traffic

Disadvantages are:

- Flush valve toilets and installations are expensive
- Decreases potential recycled water supply

Funding	MWD incentive of \$50 per HET may be available. In addition, MWD incentives for food steamers and urinals will probably be available.				
Measures	<ul style="list-style-type: none"> • High Efficiency Toilets • Faucet Aerators • Ultra Low Water Urinals • Connectionless Food Steamers 		Target Customer	<ul style="list-style-type: none"> • Large restaurants • Restaurants with bars • Fast food restaurants 	
Potential for IEUA Service Area	1,398 restaurants	Water Savings per Device	$\text{HETs} = 0.0425 \text{ af/year (13,870 gpy)}$ 20 year life = 0.85 acre-feet		
Program Delivery	Outsourced to contractor to solicit customers and install fixtures.		Marketing	Door-to-door sales	
Annual Production	1 year pilot -25 restaurants -50 toilets -50 faucets		Program Goals	Goals to be determined based upon results of pilot	
Other Benefits	Wastewater reduction	IEUA Cost per Acre-Foot	\$1,011	Participant Costs	\$0
Program Costs	<u>Annual Budget</u> \$30,000	IEUA Cost/ Benefit Ratio	1.45	Participant Costs	NA

Industrial Process & Cooling Tower Audits & Incentive Program

The program will focus on two opportunities for major water savings:

- 1) Industrial Process
- 2) Cooling Towers

Surveys and Incentives will be offered to qualifying commercial and industrial customers.

Cooling Towers

There are three categories of cooling tower upgrades:

1. Maximize performance through low cost measures-
A standard conductivity controller can be used to monitor the water chemistry and reduce the amount of blowdown and make-up water. Installing a new conductivity controller and increasing the cycles of concentration to 3 to 3.5 cycles can save a significant amount of water. A standard controller costs ranging \$400 to \$800.
2. Upgrade cooling tower system with mid-level cost measures by adding a pH controller-
A pH controller is a more sophisticated type of controller that monitors the pH of the water. The pH controller combined with acid-based chemical treatment can push the cycles of concentration to 5 to 7 cycles. This upgrade, although higher in initial costs than Category 1, typically yields much higher savings. The costs of a pH controller range from \$2,400 to \$4,000.
3. Upgrade cooling tower system with high level technologies – There are an array of ultra high efficiency options available today. Options might include:
 - a) Installation of a water softening system
 - b) Utilization of recycled water for the cooling tower
 - c) Water from other equipment within a facility can be recycled and reused for cooling tower make-up.

Industrial Process Water Use

Industrial process water use comprises approximately 3.2% of all demand in IEUA's service territory (13% of CII usage), yet few programs have been directed at the process water use industry. Five industry sectors offer the most promising opportunities for water efficiency improvements:

- Food processing
- Textiles
- Fabricated metals
- Electronics
- Industrial laundries

Cooling tower and industrial programs have had low participation mostly due to poor marketing, low incentives and lack of assistance through the implementation process. The industrial program will target the five sectors listed above. Customers using over 6 million gallons per year will be contacted and offered a survey. The engineer will focus on the best bang-for-the-buck retrofits for the customer and the program. For this reason, the Industrial process surveys will include two levels of surveys, the Walk-through Survey and the Comprehensive Survey. The Walk-through Survey will be limited in scope and identify if there are cost effective opportunities and if so, which ones should be further flushed out. The Comprehensive Survey will focus on the selected projects and provide details on the project, diagrams of the system modifications, projected savings, the payback and the next steps. In order to achieve 1 water savings project it will be necessary to conduct 6 Walk-

through Surveys of which 3 turn into Comprehensive Surveys and 1 customer implements the recommendation.

Cooling tower customers will receive a simple report detailing customer costs vs. benefit and payback, as well as education on the retrofit options.

Traditional programs have failed to support the customer once the survey is delivered. For the program, the report will be delivered on site after which a trained technical program staff person will follow up with the customer on continuous basis. The follow up will include assistance in finding vendors, generating bid requests, and evaluating bids.

Program advantages:

- Large water savings per site
- Program drives the market for process water reuse and water reduction products and services

Program disadvantages:

- Low opportunity for process water use reduction in IEUA territory (except specific agencies)
- High initial survey costs
- Large incentive required in order to drive down payback to under 2 years
- Decreases potential recycled water supply

<p>Funding</p>	<p>MWD funding may be available for:</p> <ul style="list-style-type: none"> • Standard Cooling Tower Conductivity Incentive = \$625 • pH Cooling Tower Controller Incentive = \$1,900 <p>IEUA Performance Incentive = \$3.00 per 1,000 gallon saved (MWD may fund after FY 2010/11)</p>		
<p>Measures</p>	<ul style="list-style-type: none"> -Cooling tower conductivity controllers -Cooling tower ph controllers -Industrial process water reuse technologies 	<p>Target Customer</p>	<p>Office buildings over 3 stories for cooling towers upgrades.</p> <p>Manufacturing sites for process water and cooling tower upgrades.</p> <p>Food processing, textiles, fabricated metals, electronics and industrial laundries for process water use reduction for sites using over 6 million gallons per year</p>
<p>Potential for IEUA Service Area</p>	<ul style="list-style-type: none"> -892 manufacturing sites -275 cooling towers 	<p>Water Savings per Device</p>	<p><u>Standard CT conductivity controller</u> = .644 af/year (209,848 gpy) with 5 year life = 3.22 af lifetime</p> <p><u>CT pH controller</u>= 1.944 af/year (633,345 gpy) with 5 year life = 9.72 af lifetime</p> <p><u>Industrial process</u> = 20% of use</p> <p>Average of 3.68 af/year (1.2 million gpy)</p>
<p>Program Delivery</p>	<p>Outsource to qualified engineering firm</p>		<p>Marketing</p> <p>Telesales to business owners, managers & industrial customers</p> <p>Co-sales with water treatment companies for cooling tower measures</p>

Annual Production	<ul style="list-style-type: none"> - 3 cooling towers per year - 1 process water use reduction 	Program Goals	<i>5 Year Program Implementation</i>		
Other Benefits	Wastewater reduction (customer benefit)	IEUCA Cost per Acre-Foot	Industrial = \$7,291 Cooling Towers = \$164	Participant Costs	Industrial =\$285,000 Cooling Towers = \$4,000
Program Costs	<ul style="list-style-type: none"> • \$1,500 per CTCC Survey • \$2,000 per Walk-through Survey • \$10,000 per Comprehensive Survey • \$100,000 average Industrial incentive • \$1,900 average CTCC incentive <u>Annual Budget</u> Industrial = \$126,250 Cooling Tower = \$4,500	IEUA Cost/Benefit Ratio	Industrial = 0.12 Cooling Towers = 5.39	Participant Cost/Benefit Ratio	Industrial = 0.12 Cooling Towers = 5.39

Public Sector Incentive Program

There are 1,407 institutional account (not including public sector dedicated irrigation meters accounts) including 206 schools, 27 colleges and 7 cities. Due to budget constraints, most public sector customers will not implement water use efficiency measures unless the costs are minimal. This program would be built off the success of Metropolitan Water District's Public Sector Program and offer cities, counties, state and federal agencies increased incentives to purchase and install landscape water saving devices. Program could also include private schools.

Incentive amounts would be based upon \$500 per acre-foot of water saved (or the average price of the product and installation) and would be given upfront to eliminate the cash requirement that is a barrier with customer participation especially for public sector customers. \$500 per acre-foot appears to be the amount necessary to motivate the public sector customers.

The incentive would focus on landscape measures. Upfront incentives would include:

- Weather Based (and Central) Irrigation Controllers - \$64 per stations
- High Efficiency Nozzles for Pop-Up Spray Heads - \$8 per nozzle

The public agency would install and maintain the equipment as their contribution.

Many public sector customers have received landscape evaluations through the LEEP or MWD Public Sector program. First priority marketing would be to follow up with those customers to ascertain what they have done, what the barriers are and offer the increased incentive.

Program should include follow up to verify irrigation controllers, specifically the central systems, are installed and using the weather based functionality.

Program Advantages:

- Excellent response to MWD's Public Sector Program
- Provides goodwill to public agencies
- Public agencies cannot initiate conservation projects without increased incentives and upfront dollars
- High volume of public agency properties within IEUA territory
- Doesn't impact recycled water supply

Disadvantages:

- Need customer follow-up to ensure that central irrigation control systems are installed and programmed accurately to use weather based functionality
- Central irrigation control systems are expensive. Many were done under the MWD Public Sector Program

Funding	<p>MWD funding may be available:</p> <ul style="list-style-type: none"> • \$25 per valve for Smart Controllers • \$3 per nozzle
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Measures	<ul style="list-style-type: none"> -Smart or Central Irrigation Controllers -High Efficiency Nozzles for Pop-up Spray Heads 		Target Customer	<ul style="list-style-type: none"> -Cities & Counties -Schools -State and Federal Agencies 	
Potential for IEUA Service Area	<ul style="list-style-type: none"> -1,407 institutions -206 schools -27 colleges 		Water Savings per Device	<p>WBICs = 0.0129 af/year/station (4,203 gpy/station)</p> <p>10 year life = .129 af/station</p> <p>High Efficiency Nozzles = 0.004 af/year/nozzle (1,303 gpy/nozzle)</p> <p>5 year life = .02 af/nozzle</p>	
Program Delivery	Internally administered by IEUA		Marketing	Telesales to public agencies	
Annual Production	<ul style="list-style-type: none"> - 25 Controllers per year - 500 Nozzles 		Program Goals	<p><i>5 Year Program Implementation</i></p> <ul style="list-style-type: none"> - 125 Controllers - 2500 Nozzles 	
Other Benefits	Reduced runoff	IEUA Cost per Acre-Foot	WBIC = \$355 Nozzles = \$292	Participant Costs	WBIC = \$5,964 Nozzles = \$0
Program Costs	<u>Annual Budget</u> WBICs = \$24,000 Nozzles = \$2,750 Total = \$26,750	IEUA Cost/Benefit Ratio	WBIC = 2.67 Nozzles = 3.02	Participant Cost/Benefit Ratio	WBIC = .35 Nozzles = NA

Commercial Save A Buck Program

The Save A Buck Program offers commercial customers incentives for a menu of indoor and outdoor devices. The program is operated by MWD's regional vendor. The next phase of the program will include several changes:

- Multi-family high efficiency toilet incentives have been eliminated
- Tank type toilet incentives remain at \$50 per HET
- Flush valve type HET incentives are increased to \$75
- Multi-family washers moved to Residential SoCalWaterSmart Program
- Ultra low volume urinal incentives reduced from \$200 to \$100
- Waterbroom incentives limited to food service and schools
- Incentives for synthetic turf and steam sterilizers eliminated
- The pressure regulator requirement for nozzles has been removed and the incentive has been reduced from \$4 to \$3 per nozzle

IEUA will add additional funds to targeted technologies as detailed in the chart on the following page. In addition IEUA should consider working with the local trades, specifically irrigation suppliers and landscape contractors to provide education on the program and tools to assist in selling water use efficiency measures.

Program Advantages:

- 75% of funding from MWD
- Ease of Implementation for IEUA
- Cost effective

Program Disadvantages:

- Uncertain MWD funding levels
- Trade allies do not market program equitably among all MWD agencies
- Many measures do not have significant savings potential in IEUA territory

Funding	Funding was a major issue throughout the year with MWD funding running out last fiscal year. MWD budgets are limited in the upcoming year with a first come, first served funding format. IEUA will need to promote the program to their customers early in the fiscal year so applications are in queue to be paid before funds run out.			
Program Measures	Measure	Savings per device (acre-feet per year)	Device Lifetime (years)	Lifetime Savings (acre-feet)
	High Efficiency Toilets	0.0425	20	0.85
	Ultra Low Volume Urinals	0.1227	20	2.454
	Conductivity Controllers	0.644	5	3.22
	pH Controllers	1.944	5	9.72
	Food Steamers	0.25	10	2.5
	Ice Machines	0,154	10	1.54

	Measure	Savings per device (acre-feet per year)	Device Lifetime (years)	Lifetime Savings (acre-feet)	
	Waterbrooms	0.1534	5	0.767	
	Dry Vacuum Pumps	0.0916	7	0.641	
	Weather Based irrigation Controllers (per station)	0.0129	10	0.129	
	High Efficiency Nozzles	0.004	5	0.02	
Incentive Dollars					
Measures	Annual Production per Measure	Program 5 Year Goals	MWD Incentive	IEUA Add-on	Total Customer Rebate
High Efficiency Tank Type Toilets	100	500	\$50	\$45	\$95
High Efficiency Valve Type Toilets	100	500	\$75	\$45	\$120
Ultra Low Volume Urinals	100	500	\$100	\$100	\$200
Conductivity Controllers	1	NA	\$625	\$0	\$625
pH Controllers	1	NA	\$1,900	\$0	\$1,900
Food Steamers	1	NA	\$485	\$0	\$485
Ice Machines	1	NA	\$300	\$0	\$300
Waterbrooms	1	NA	\$150	\$0	\$150
Weather Basined Irrigation Controllers	10	50	\$25 per station	\$25 per station	\$50 per station
High Efficiency Nozzles	100	500	\$3 per nozzle	\$2 per nozzle	\$5 per nozzle
Program Delivery	MWD administered through outside vendor		Marketing	Through trade allies such as plumbing fixture suppliers and installation contractors, irrigation equipment suppliers, landscape contractors	

Economic Evaluation					
Measures	Annual Budget	IEUA Costs per Acre-Foot	IEUA Cost/Benefit Ratio	Participant Costs	Participant Cost/Benefit Ratio
High Efficiency Tank Type Toilets	\$4,500	\$87	11.8	\$85	9.89
High Efficiency Valve Type Toilets	\$4,500	\$87	11.8	\$410	2.05
Ultra Low Volume Urinals	\$10,000	\$46	25.1	\$500	7.25
Conductivity Controllers	\$0	NA	NA	\$800	3.17
pH Controllers	\$0	NA	NA	\$2,100	1.87
Food Steamers	\$0	NA	NA	No incremental costs	NA
Ice Machines	\$0	NA	NA	\$50 incremental costs after rebate	948.32
Waterbrooms	\$0	NA	NA	NA	NA
Weather Basined Irrigation Controllers	\$6,000	\$222	4.27	\$450 plus \$82 annual fee	2.02
High Efficiency Nozzles	\$200	\$106	8.31	\$1 per nozzle	15.74
Total	\$25,200				

GeoSmart Landscape Finance Program

Landscape upgrades can cost well into the thousands of dollars to implement and many single family homeowners do not have the upfront money required. Through the Landscape Finance Program, eligible single family customers are offered financing through GE Capital (administered by EGIA) to conduct landscape water use efficiency upgrades.

The program will primarily target the following combined measures:

- Turf removal
- Installation of low water using plants and
- Retrofit to low precipitation irrigation systems

If customer is not interested in turf removal and low water use plants then they have the option of the following measures:

- Irrigation system replacement
- Installation of smart controllers
- Nozzle retrofit to high efficiency nozzles

The programs incentive funds are used to buy-down the interest rate. The goal is to get the interest rate below 10%. Other programs have shown that 7.99% is deemed a competitive rate by customers.

A key to success will be to bring on board several qualified contractors as program partners. This will be done as a cooperative effort with Western MWD. Contractors will be educated on the value of water efficiency measures; up selling the customer, and building a new line of revenue stream through water efficiency. They will be provided with sales tools including brochures and cost/benefit calculators. Contractors must qualify to participate in the program. Qualifications include 3 years of business, \$250,000 in annual sales, satisfactory trade and credit references, as well as licensing and insurance as required by law. Water agencies can elect to provide additional marketing and provide leads to appropriate contractors.

The GeoSmart Loan Program offers:

- Loans from \$1,000 - \$25,000
- 3.99 – 9.99% APR (depending on buy-down amount)
- 1.25% payment factors to keep customer payments low
- 100% unsecured financing (no liens)
- No closing costs or prepayment penalties
- Instant in-home approval
- Program branded credit applications
- Quick contractor direct funding (wire transfer)
- No financial risks to IEUA

Program Advantages:

- Targets customers not deemed cost effective such as smaller lot size
- Promotes large scale retrofits
- Educates the contractor market and builds a new business line for them
- Provides customers with options
- Financing terms are some of the best in the industry today
- Doesn't impact recycled water supply

Program Disadvantages:

- High up-front cost
- Does not target the many non-licensed contractors performing services within IEUA territory
- Unknown contractor and customer response

Funding & Costs	<ul style="list-style-type: none"> • \$50,000 start up • \$35 administration fee per loan • \$255 to buy down turf removal (sample) • \$206 to buy down smart controller and nozzles (sample) • IEUA will continue to apply for grants 				
Measures	<ul style="list-style-type: none"> • Turf removal • Low water using plants • Low precipitation irrigation systems • Smart controllers • High efficiency nozzles 	Target Customer	Single family customers		
Potential for IEUA Service Area	82,000 of single family homes with turf and irrigation systems	Water Savings per Device (acre-feet)	<u>Turf Removal</u> = .0732 afy / sq ft (23,852 gpy) 10 year life = .732 af / sq ft <u>WBICs</u> = 0.0325 afy / acre (10,590 gpy / acre) 10 year life = 0.325 af / acre <u>Nozzles</u> = 0.004 afy / nozzle (1,303 gpy) 5 year life = 0.02 af / nozzle		
Program Delivery	EGIA will administer loan program RSG will conduct contractor outreach		Marketing	Contractor conducts direct sales to consumer	
Annual Production	<ul style="list-style-type: none"> • 100 homes for turf removal • 100 smart controllers • 5000 high efficiency nozzles 	Program Goals	<i>5 Year Program Implementation</i> <ul style="list-style-type: none"> • 500 homes for turf removal • 500 smart controllers • 25,000 high efficiency nozzles 		
Other Benefits	Reduced runoff & market transformation	IEUA Cost per Acre-Foot	Turf = \$454 WBIC = \$339	Participant Costs	Turf = \$60 / month for 60 months WBIC = \$30 / month for 45 months
Program Costs	<u>Annual Budget</u> Turf = \$29,000 WBIC = 48,200 Total = \$77,200	IEUA Cost/ Benefit Ratio	Turf = 2.09 WBIC = 2.8	Participant Cost/Benefit Ratio	Turf = 0.14 WBIC = 0.56

Smart Controller Direct Installation Program

The largest water consumption sector in IEUA's service territory is landscape water use, which accounts for an estimated 69% of the total water demand. The ultimate goal of the Smart Controller Direct Installation Program is to reduce water consumption in landscape irrigation through direct installation of smart controllers and high efficiency nozzles for irrigated landscapes greater than 1 acre. This program will target each retail agency's highest single family water use customers through use of GIS mapping or assessor data to identify parcels. As an addition, and in order to reduce overhead costs, commercial and dedicated irrigation customers will be included under the program.

The Program Contractor would market the program to targeted customers, audit the irrigated landscape, and oversee installation of the products. A follow-up site visit by the Program Contractor would verify the installation to ensure water savings are maximized and customer issues reduced.

Program advantages:

- Targets largest water use in IEUA's territory
- High water savings per site
- Focuses on landscape water use efficiency market
- Doesn't impact recycled water supply

Program disadvantages:

- Limited number of large residential customers
- Program model does not aggressively transform the market...only one contractor

Funding	MWD incentive of \$25 per valve may be available.		
Measures	-Smart Controllers -High efficiency nozzles for pop up spray heads	Target Customer	-Residential customers with 1 acre + of irrigated landscape -Commercial customers with 3 acres + of irrigated landscape -Dedicated irrigation meter customers
Potential for IEUA Service Area	- 1,116 single family sites 1-1.5 acres - 283 single family sites with 1.5 acre+ - 5,177 dedicated irrigation meter accounts	Water Savings per Device	<u>WBICs</u> = 0.0325 acre-feet per acre (10,590 gpy) 10 year life = 0.325 acre-feet per acre <u>Nozzles</u> = 0.004 acre-feet per nozzle (1,303 gpy) 5 year life = 0.02 acre-feet per nozzle
Program Delivery	Outsourced to landscape contractor		Marketing -Initial introductory letter -Telesales to target customers -Email follow up

Annual Production	<ul style="list-style-type: none"> - 145 controllers per year - 9,400 nozzles per year - 20 single family sites - 75 dedicated irrigation meter customers - 50 commercial customers 	Program Goals	<i>5 Year Program implementation</i> -725 smart controllers -47,000+ nozzles		
Other Benefits	Reduced runoff	IEUA Cost per AF	Single Family = \$224 Commercial= \$205 Dedicated = \$195	Participant Costs	<i>Annual Signal Fee of</i> Single Family = \$48 Commercial = \$82 Dedicated =
Program Costs	<u>Annual Budget</u> \$226,500 -Single Family = \$23,00 -Commercial= \$52,500 -Dedicated = \$150,000	IEUA Cost/ Benefit Ratio	Single Family = 4.23 Commercial= 4.63 Dedicated = 4.87	Participant Cost / Benefit Ratio	Single Family = 4.23 Commercial= 4.63 Dedicated = 4.87

Water Budget Program

A water budget is the calculated amount of water a customer needs for their site for a specific month. A Water Budget Program (not Water Budget Rate Structure) would provide customers with information on their monthly or bi-monthly usage vs. budget allocation. Each customer would be given a water budget allocation based on their lot size and the local weather. The water budget allocation would vary monthly based on seasonal outdoor watering needs.

Customers would be sent a report via US mail or email with detailed information on their site and their monthly budget vs. their actual use. The water budget provides information and guidance as to reasonable water usage for a customer's site. The budget is a tool customers can use to make informed choices about their water usage each month. If a customer is over their budgeted amount they would be given a list of recommendations and next steps.

The program would begin by targeting dedicated irrigation meter customers and could move to single family customers.

Lot sizes would be calculated using GIS or Google Pro for 60% of the sites, the remaining 40% would require a site visit (or we could have customers provide self reported acreage). A vendor would be hired to collect the water usage from each respective water agency, enter the acreage and local weather data, calculate the budget and generate the customer report. This could be a onetime annual report or could be sent bimonthly.

The MWDOC Landscape Certification Program saw reduction of 20% through implementation of a similar program.

Program Advantages:

- Targets landscape market to aid in market transformation
- Educated customers will initiate changes on their own with sustainable savings
- Doesn't impact recycled water supply

Program Disadvantages:

- No verifiable water savings (unless there is a follow up inspection)
- Savings duration is unknown
- Site ownership changes could reduce water savings if modifications in water use were behavioral or temporary (i.e. irrigation schedule)
- MWD does not fund water budget programs since they are not device driven

Funding	<ul style="list-style-type: none"> • 100% funded by IEUA 		
Measures	Water budget report and continue communication	Target Customer	<ul style="list-style-type: none"> -Dedicated irrigation meter accounts -Could move to single family customers
Potential for IEUA Service Area	<ul style="list-style-type: none"> • 5177 dedicated irrigation meter customers • 30,671 acre-feet per year demand • Total potential for irrigation meter customers (20% reduction)= 6,134 AF/year 	Water Savings per Device	<ul style="list-style-type: none"> • 20% reduction per meter • Average of 1.18 acre-feet per dedicated meter account

Program Delivery	Outsource program delivery		Marketing	Direct mail followed by phone outreach	
Annual Production	500 dedicated irrigation meter accounts per year		Program Goals	5 Year Program Implementation 50% of all dedicated irrigation meter accounts	
Other Benefits	Reduced runoff	IEUA Cost per Acre-Foot	\$23	Participant Costs	\$100 per year for repairs, etc.
Program Costs	\$120 per meter to measure site \$2.00 per meter per month to communicate budget to customer <u>Annual Budget:</u> \$120,000 per year	IEUA Cost/Benefit Ratio	40.89	Participant Cost/Benefit Ratio	19.45

Landscape Water Use Evaluations

Customers with irrigated landscape will be offered free landscape water use evaluations. The key targets will be commercial and large single family customers. Currently IEUA offers audits through Chino Basin Water Conservation District to commercial customers and they will begin offering audits to single family customers in 2010. The below description includes potential improvements to the program offer.

The program will offer:

- Irrigation system evaluation,
- Incentives available through MWD regional programs SoCalWaterSmart and Save A Buck,
- Customized incentives for equipment replacements with low precipitation and drip irrigation systems (if MWD incentives are available in FY 2011-2015),
- Custom report with evaluation findings, recommendation and cost/benefit analysis,
- Water budgeting and education (could be added as new service).

Customers will be contacted via phone to solicit participation. They will be encouraged to have their landscape service company attend the evaluation. The evaluators will survey the landscape area to identify key water saving opportunities.

The outdoor evaluation will include a comprehensive assessment of the irrigation system.

Following the site visit, an analysis of the irrigation system findings will be conducted and a water budget could be developed based upon the size of their landscape. Using the information from the site visit and the analysis, a clear and concise report would be generated with upgrade recommendations, available incentives, a water budget and a cost/benefit analysis. If possible, the report would be delivered in person to walk-through the report and further educate the customer on the value of implementing the water saving measures. In addition customers could be provided with regular communication regarding their performance to budget.

Included in the report would be an application for available incentives or other applicable programs. The available incentives will include all incentives offered through MWD's programs as available. This could include customized incentives offered for savings achieved from irrigation system replacements with drip irrigation or low precipitation systems. In order to maximum the incentive, it would be based upon the customer's site and would be paid at a per-acre-foot saved value. In the past, MWD has offered \$3.00 per 1,000 gallons saved. IEUA may consider adding to this incentive based on customer payback values and response rates. Using the report as back up documentation, the customer would submit the application for incentive reimbursement to MWD's Water Saving Performance Program (if available).

Continued follow up with customers could be added to ensure water savings measures are implemented.

Program Advantages:

- Best opportunities are identified
- Customer education
- Can link customer with best fit programs including Landscape Finance Program
- Doesn't impact recycled water supply

Program Disadvantages:

- No verifiable water savings (savings would be associated with other programs)
- Expensive

Funding	MWD incentives for weather based irrigation controllers and nozzles may be available. In addition after FY2010/11 MWD may fund the Performance Program customized incentives.				
Measures	Audit and report of findings and recommendations		Target Customer	-Top 20% of single family and commercial customers -All institutional and dedicated irrigation meters	
Potential for IEUA Service Area	<ul style="list-style-type: none"> • 33,000 single family • 9,091 commercial • 1,407 institutional • 5,177 dedicated irrigation meters 		Water Savings per Device	Savings associated with implemented measures	
Program Delivery	Through Chino Basin Water Conservation District		Marketing	Direct outreach with commercial customers	
Annual Production	- 100 audits per year - 200 acres of irrigated area		Program Goals	<i>5 Year Program Implementation</i> - 500 audits	
Other Benefits	Reduced runoff	IEUA Cost per Acre-Foot	NA	Participant Costs	NA
Program Costs	<u>Audit Fees</u> Single Family = \$200 per Commercial = \$600 per <u>Annual Budget</u> \$80,000 Single Family = \$20,000 Commercial = \$60,000	IEUA Cost/ Benefit Ratio	NA	Participant Cost / Benefit Ratio	NA

High Efficiency Nozzle Distribution Program

The highest water use in the IEUA service territory is landscape water use. Standard utility-driven water use efficiency programs have had a hard time penetrating this market due to costs. The High Efficiency Nozzle (HEN) Distribution Program will meet a number of key requirements for IEUA:

- The HENs are a retrofit for standard pop up sprinkler heads. Pop up sprinkler heads are the most common sprinkler type and there are hundreds of thousands located within IEUA’s service territory.
- The retrofit is a simple process. The old pop up nozzle is removed and replaced with the new high efficiency nozzle.
- HENs provide a low cost solution for landscape efficiency; a traditionally complex and expensive target opportunity.
- Due to the high cost-benefit ratio, this program can be offered to all types of customers including single family, multi-family and commercial.

IEUA would purchase the nozzles in bulk and distribute them through several methods including:

- Local events
- High bill complaints
- Direct mail to high water use customers
- Direct outreach reach to HOA and other commercial customers

Program Disadvantages

- Managing inventory can be time consuming
- Nozzles come in several models and without on-site audit IEUA will be not know which nozzles to give customers, therefore there will be an added step of reconciling with each customer

Program Advantages

- Cost effective
- Enormous savings potential and can quickly escalate to thousands per year

Funding	MWD would provide \$3 per nozzle.		
Measures	High Efficiency Nozzles	Target Customer and Marketing Methods	Single Family HOAs Commercial Any customer with pop ups Events, direct mail and direct outreach
Potential for IEUA Service Area	Over 110,000 single family homes with irrigated areas and pop ups	Water Savings per Device	4 gallons per day 0.004 acre-feet per year per nozzle (1,303 gpy) 5 year life = .02 acre-feet

Production	5,000 per year		5 Year Program Goals	25,000 nozzles	
Other Benefits	Reduced runoff	IEUA Cost per Acre-Foot		Participant Costs	\$0
Program Costs	\$4 per nozzle	IEUA Cost/ Benefit Ratio		Participant Cost / Benefit Ratio	NA

Analyses and Selection of Potential Programs

With the potential programs list now completed, there were 34 possible measures under 14 program designs. In totality, the programs provided a water efficiency solution to match IEUA’s demand profile and measure potential.

Program selection was not a cut-and-dry process. The evaluation team recognized that some of the water efficiency possibilities would not meet other IEUA criteria for selection, such as the benefit-to-cost ratio, market need or overall program budget dollars. The evaluation team also needed to take advantage of MWD funding and grant opportunities that were available.

With possible solutions listed, the next action was to run each measure through the economic analysis model and compare against IEUA’s overall strategy to better examine the pros and cons of each.

With a \$594 cost to purchase imported Tier 1 water from MWD, possible programs should come below this cost threshold. Although cost was not the only consideration, it was obviously a critical evaluation component. The lower the cost per acre-foot, the more attractive the program is the regional program portfolio.

Potential Programs were compared against IEUA’s strategy. The ideal program would possess the following economic attributes:

- Low overall costs
- High acre-foot lifetime savings
- Low cost per acre-foot
- Value of the benefits
- Benefit to cost ratio higher than 1

Ranking of Activities by Cost per Acre-foot and Benefit-to-Cost

The economic analysis resulted in each activity’s cost per acre-foot as shown in the chart below:

Activity Ranking by Cost per Acre-Foot

Water Efficiency Activity	IEUA Costs per Acre-Foot
Large Landscape Water Budgets	\$23
ULVZ Urinal, Save A Buck Rebate	\$46
HET Direct Install, MF, IEUA	\$78
HET (Tank) Rebate, CII Save A Buck Rebate	\$87
HET (Valve) Rebate, CII Save A Buck Rebate	\$87
HE Nozzles, SF SoCalWater\$mart Rebate	\$106

Activity Ranking by Cost per Acre-Foot

Water Efficiency Activity	IEUA Costs per Acre-Foot
HE Nozzles for Pop Ups Save A Buck Rebate	\$106
HET, SF Rebate, IEUA Administered	\$112
WBIC (subscription) < 1 acre, SF SoCalWaterSmart Rebate	\$124
WBIC (no subscription) < 1 acre, SF SoCalWaterSmart Rebate	\$124
Cooling Tower Evaluation & Incentive Program, IEUA	\$164
HE Nozzle Direct Install, SF, IEUA	\$186
WBIC + 100 Nozzles Direct Install (3 acres/site), Large Landscape, IEUA	\$195
WBIC+50 Nozzles Direct Install (1.5 acres/site), CII, IEUA	\$205
WBIC CII Save A Buck Rebate	\$222
WBIC Direct Install + Nozzles, SF (1.5 acres/site), IEUA	\$224
HE Nozzles for Pop Ups, IEUA PSP Rebate	\$292
WBIC + 20 Nozzles, IEUA Finance	\$339
WBIC, IEUA PSP Rebate	\$355
Turf Removal, SF, IEUA Finance	\$454
HE Clothes Washer, SF SoCalWaterSmart Rebate	\$551
Landscape Evaluation, CII (2 acres/site), IEUA	\$607
HET (Valve) Direct Install, CII: Restaurant, IEUA	\$698
Turf Removal, SF, MWD Administered	\$782
Turf Removal, SF, IEUA Administered	\$1,189
Landscape Evaluation, SF (.5 acre), IEUA	\$1,275

Figure 40: Measure Ranking Listed by Cost per Acre-Foot

Analysis Outcome

With the analysis completed, program and activity performance was clearly delineated. Results of the analysis were positive, overall, and revealed that 21 measures cost less than MWD’s Tier 1 Untreated Water rate of \$594. Landscape Evaluations, HET Direct Install, and Turf Removal Rebates (non Finance Program) did not meet this performance level, with costs per acre-feet over \$594.

Of interest were the following findings:

- Landscape water budgets (with an assumed 20% savings) had the lowest cost per acre-foot at \$23. This was later re-evaluated and, in order to insure 10 years of savings, 10 years of communication costs were included in the budget and thereby increased the cost per acre-foot to \$79 for Large Landscape and \$408 for single family sites.

- Not surprisingly, activities and programs that were substantially funded by MWD, such as ULV (Ultra Low Volume) Urinal Rebates, had a low cost per acre-foot.
- Turf removal with financing (to buy down the interest rate) was more cost effective (with only a \$235 incentive) than the traditionally designed direct rebate of \$1 per square foot.
- Obviously programs administered and marketed by MWD such as Turf Removal, SF, MWD were less costly than programs administered directly by IEUA (\$782 per acre-foot vs. \$1,189).
- Single Family Landscape Evaluations with unknown length of savings had the highest cost at \$1,296 per acre-foot.

Another analysis determined the benefit-to-cost ratio for each water efficiency measure and respective delivery mechanism. The benefit-to-cost ratios were calculated for both IEUA and for the program participant.

The IEUA Benefit-to-Cost Ratio chart below lists the water efficiency measures from highest benefit – to-cost benefit ratio to lowest. Measures falling below 1.0 are not deemed cost effective. The higher the number, the better the overall performance.

Activity Ranking by IEUA Benefit-to-Cost Ratio

<i>Water Efficiency Activity</i>	<i>IEUA Benefit-to-Cost Ratio</i>
Large Landscape Water Budgets, Dedicated Meter Accts	40.89
ULVZ Urinal, Save A Buck Rebate	25.10
HET, Multi-family Direct Install	12.64
HET, Single Family Rebate IEUA Administered	12.35
HET (Tank) Rebate, Save A Buck Rebate	11.80
HET (Valve) Rebate, Save A Buck Rebate	11.80
High Efficiency Nozzles, SoCalWater\$mart Rebate	8.31
High Efficiency Nozzles, Save A Buck Rebate	8.31
WBIC (subscription) < 1 acre, SoCalWater\$mart Rebate	7.63
WBIC (no subscription) < 1 acre, SoCalWater\$mart Rebate	7.63
Cooling Tower, Evaluation & Incentive Program	5.39
WBIC + 100 Nozzles Direct Install, Dedicated Meters (3 acres/site)	4.87
High Efficiency Nozzle Direct Install	4.75
WBIC + 50 Nozzles Direct Install CII (1.5 acres/site)	4.63
WBIC, Save A Buck Rebate	4.27

Activity Ranking by IEUA Benefit-to-Cost Ratio

Water Efficiency Activity	IEUA Benefit-to-Cost Ratio
WBIC Direct Install + Nozzles, Single Family (1.5 acres/site)	4.23
High Efficiency Nozzles, Public Sector Rebate	3.02
WBIC + 20 Nozzles, Finance	2.80
WBIC, Public Sector Rebate	2.67
Turf Removal, Finance	2.09
HE Clothes Washer, SoCalWater\$mart Rebate	1.81
Landscape Evaluations, CII (2 acres/site)	1.46
HET (Valve) Direct Install, Comprehensive Restaurant	1.45
Turf Removal, MWD Administered	1.21
Turf Removal, IEUA Administered	0.80
Landscape Evaluation, SF (.5 acre)	0.69
Submetering, Incentive Pilot	0.52
Industrial Use, Evaluation & Incentive	0.12

Figure 41: Activity Ranking Listed by IEUA Benefit-to-Cost Ratio

As shown in the benefit-to-cost chart above:

- The program with the highest benefit to cost ratio was Water Budgets for Large Landscape at 40.89.
- Urinals and toilets showed well for all sector and activities with each one coming in over 11.
- Landscape measures such as high efficiency nozzles and WBIC incentives are estimated to be in the 7-8 B/C range.
- Turf removal, Single Family Landscape Evaluations, Multi-family Submetering and Industrial Process Water Evaluations & Incentives fell below 1.

It is important to also look at a measure’s benefit-to-cost ratio from the customer’s perspective. The per unit cost of the measure for the initial implementation and on-going costs are compared to the benefits of reduced water, gas, electricity and sewer costs.

The Participant Benefit-to-Cost Ratio chart below lists the water efficiency measures from highest cost-to-benefit ratio to lowest:

Activity Ranking by Participant Benefit-to-Cost Ratio

Water Efficiency Activity	Participant Benefit-to-Cost Ratio
Large Landscape Water Budgets, Dedicated Meter Accts	19.42
High Efficiency Nozzles, SoCalWaterSmart Rebate	19.37
HET, Multi-family Direct Installation	16.51
High Efficiency Nozzles, Save A Buck Rebate	15.74
HET (Tank) Rebate, Save A Buck Rebate	9.89
WBIC Direct Install + Nozzles, Single Family (1.5 acres/site)	7.79
ULVZ Urinal, Save A Buck Rebate	7.25
HET, IEUA Administered Single Family Rebate	6.53
WBIC+50 Nozzles Direct Install (1.5 acres/site), CII	6.33
WBIC + 100 Nozzles Direct Install Dedicated Meters (3 acres/site)	6.33
Cooling Tower Conductivity Controller, Save A Buck Rebate	3.17
Landscape Evaluations, CII (2 acres/site)	2.75
Vacuum Pumps, Save A Buck Rebate	2.43
HET (Valve) Rebate, Save A Buck Rebate	2.05
WBIC, Save A Buck Rebate	2.02
Cooling Tower, Evaluation & Incentive Program	1.89
Cooling Tower pH Controller, Save A Buck Rebate	1.87
Landscape Evaluation, Single Family (.5 acre)	1.62
Submetering, Incentive Pilot	1.07
WBIC (no subscription) < 1 acre, SoCalWaterSmart Rebate	0.88
HE Clothes Washer, SoCalWaterSmart Rebate only 4.0 or better	0.58
WBIC + 20 Nozzles, Finance	0.56
WBIC (subscription) < 1 acre, SoCalWaterSmart Rebate	0.45
WBIC, PSP Rebate	0.35
Turf Removal, IEUA Administered	0.19
Turf Removal, MWD Administered	0.19
Turf Removal, Finance	0.14
Industrial Use, Evaluation & Incentive	0.12

Figure 42: Activity Ranking Listed by Participant Benefit-to-Cost Ratio

Results of the customer cost to benefit analysis showed the following:

- The Large Landscape Water Budgets and High Efficiency Nozzle rebates prove extremely cost effective at over a 19 ratio.
- Multi-family HET Direct Installation Program due to the low per unit cost and the 20 year life of the savings were ranked third with a 16.51 ratio.
- WBIC Rebates, High Efficiency Clothes Washer Rebates, Turf Removal Programs and the Industrial Process Use Program were not cost effective with benefit-to-cost ratios below 1.

Program Selection

The Workgroup reconvened and based upon the evaluation results, six programs were eliminated from the list. These programs were:

Program	Reason for Elimination
IEUA Administered HET Incentive Program	Requires IEUA management. Does not focus on landscape. High market saturation. Decreases potential recycled water supply.
Multi-family Submetering Incentive Program	Utility per acre-foot costs are high. Participant cost and administrative (billing) requirements too high. Unknown life of savings. Decreases potential recycled water supply.
Comprehensive Restaurant Program	Per acre-foot costs are high. Does not focus on landscape.
Industrial Process & Cooling Tower Survey & Incentive Program	Does not focus on landscape. Low opportunity for process water use reduction in most areas. High initial survey costs thereby causing high cost per acre-foot.
Public Sector Program	In order to obtain participation, incentive levels must be high causing the cost per acre-foot to be high. Program also requires high level of follow up.
Turf Removal Program (Direct Incentive – not Finance Option)	Not cost effective. High participant costs. Many customers still desire turf areas.

Figure 43: Eliminated Programs and Reasons for Elimination

The end result yielded eight programs with quantifiable water saving and five selected education and outreach programs. The final program list, along with reasons for each selection is shown in the chart below.

<i>Final Selection for Programs with Quantifiable Water Savings</i>	<i>Reason for Final Selection</i>
High Efficiency Nozzle Direct Installation Program	Focuses on landscape. Cost effective. Has great water savings potential and is easily scalable to larger productivity if needed. Works for residential and commercial market.
GeoSmart Landscape Finance Programs	Focuses on landscape. Provides a more cost effective approach to turf replacement. Allows all size properties to participate in program.
Save A Buck Program	Takes advantage of MWD funding. IEUA will add additional incentives.
SoCalWater\$mart	Majority of funding from MWD. Ease of operation for IEUA. IEUA will add additional incentives.
Smart Controller Direct Installation Program	Targets largest water use in territory. High water savings per site. Does not impact recycled water supply. May need to modify production based upon budgetary needs.
Water Budget Program	Targets landscape market and aids market transformation. Educated customers will see opportunity for savings. Does not impact recycled water supply.
Landscape Evaluations	IEUA will be able to target highest water consuming landscape customers and motivate them to retrofit controllers and nozzles.
Multi-family HET Direct Installation Program	High cost effectiveness. Conduct until DWR grant and MWD funding is exhausted. Market saturation may be an issue with hitting goal.
<i>Final Selection for Education and Outreach Programs</i>	<i>Reason for Final Selection</i>
Inland Empire Landscape Alliance	Assist local agencies in implementation of water efficient landscape ordinances, in compliance with AB 1881.
Garden in Every School	Desirable for public relations purposes; implementation will be improved to increase impact

<i>Final Selection for Programs with Quantifiable Water Savings</i>	<i>Reason for Final Selection</i>
	on hard water savings.
National Theatre for Children	Very effective and popular education program, reaches large number of students, teachers and families.
Regional WUE Outreach	Regional outreach and messaging has shown reduction in water use.
No Water Waste Ordinance	With enforcement could provide low cost water savings.

Figure 44: Selected Programs and Reason for Final Selection

As shown above, the final list of programs predominantly focuses on the greatest water demand: outdoor water use with the exception of the direction installation of high efficiency toilets. With limited funding, it is critical that the programs effectively impact the landscape market and take advantage of available third party funding.

Several of the programs selected contain multiple activities. Below is chart showing each program and its respective activity or activities.

<i>Program</i>	<i>Activities</i>
High Efficiency Nozzle Direct Installation	<ul style="list-style-type: none"> • HE Nozzle Direct Install, SF, IEUA Administered
GeoSmart Landscape Finance	<ul style="list-style-type: none"> • Turf Removal, SF, IEUA Finance • WBIC + 20 Nozzles, SF, IEUA Finance
Save A Buck Program	<ul style="list-style-type: none"> • HET (Tank) Rebate, Save a Buck Rebate • HET (Valve) Rebate, Save a Buck Rebate • ULVZ Urinal, Save a Buck Rebate • HE Nozzles for Pop Ups, Save a Buck Rebate • WBIC, Save a Buck Rebate
SoCalWater\$mart	<ul style="list-style-type: none"> • HET (Tank) Rebate, Save a Buck Rebate • HET (Valve) Rebate, Save a Buck Rebate • ULVZ Urinal, Save a Buck Rebate • HE Nozzles for Pop Ups, Save a Buck Rebate • WBIC, Save a Buck Rebate
Smart Controller Direct Installation	<ul style="list-style-type: none"> • WBIC Direct Install + Nozzles (1.5 acres/site), IEUA • WBIC Direct Install + 100 Nozzles (3 acres/site), IEUA
Water Budget	<ul style="list-style-type: none"> • Large Landscape Water Budgets, IEUA • Single Family Water Budget, IEUA

<i>Program</i>	<i>Activities</i>
Landscape Evaluations	<ul style="list-style-type: none">• Landscape Evaluation, (.5 acre), IEUA• Landscape Evaluation, (2 acres/site), IEUA
Multi-family HET Direct Installation	<ul style="list-style-type: none">• HET Direct Install, MF, IEUA

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Section 8 - Five Year Action Plan

During the development of this document, the exact water savings goal to reach the per capita reduction of 20% by 2020 had not yet been determined. Due to this uncertainty, the business plan was modeled with three levels of budgets and productivity, designed to deliver varying amounts of water savings; **base, medium, and high levels**.

In the chart below are the five year, ten year and total lifetime savings for the differing model levels as well as their associated budgets.

- The Base Plan equates to \$187 per acre-foot saved,
- The Medium Level equates to \$155 per acre-foot saved,
- The High Level equates to \$144 per acre-foot saved.

Should IEUA need additional water use demand reduction, there will be a modest savings of \$37 per acre-foot for implementation of the High Level Plan vs. the Base Plan. Because the Base Plan is anticipated to meet the 20x2020 GPCD goal, IEUA and its member agencies selected the Base Plan. Comprehensive planning data for all three levels is available in electronic format and included in the back of the document. File names are:

- AWE Tracking Tool_IEUA_Base Budget
- AWE Tracking Tool_IEUA_Medium Budget
- AWE Tracking Tool_IEUA_High Budget

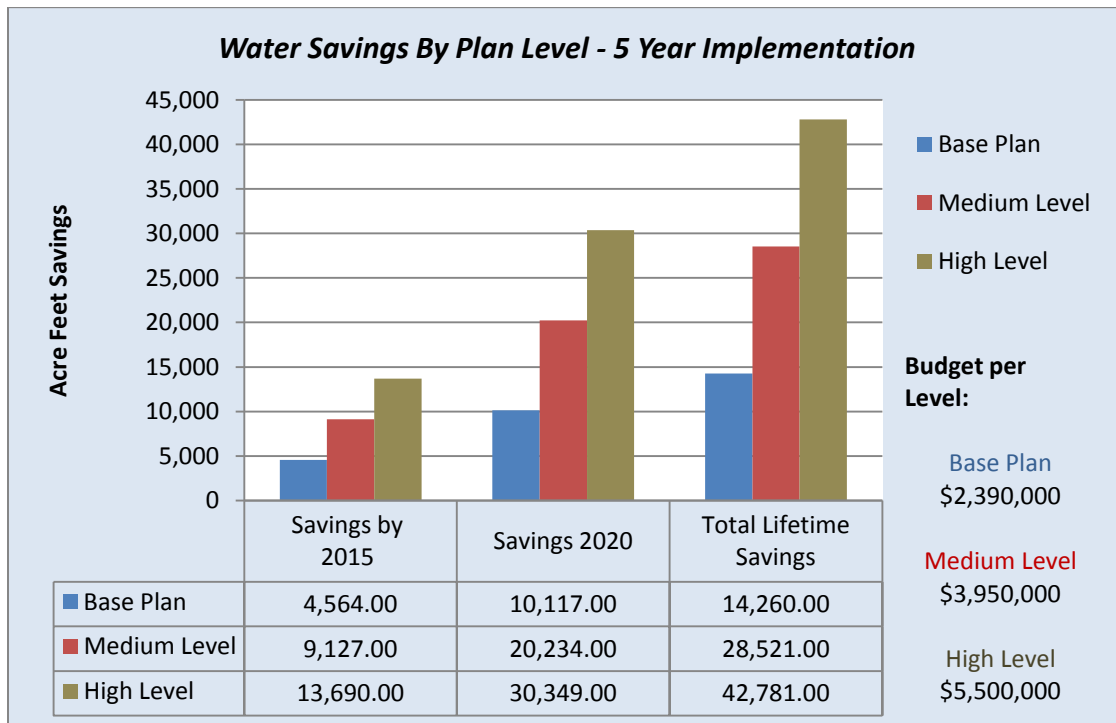


Figure 45: Graph of Water Savings by Plan Level

Highlights of the **base plan** are:

Base Plan Overview	
Cost per Acre-foot*	\$187 per acre-foot
Five Year Water Savings	4,563 acre-feet
Lifetime Water Savings	14,260 acre-feet
Avoided Costs	\$9,707,137
Average Annual Budget	\$480,000
Five Year Total Budget	\$2,390,000

**Includes education & outreach programs*

Figure 46: Base Plan Overview

Implementation Schedule

Budgets are fairly well determined for next year but, as circumstances shift over time, the years beyond are less certain. Program planning will always be a fluid process. On a regular and ongoing cycle, program plans and schedules will need to be revised and updated.

The launch dates for fiscal year 2010/2011 are documented below. As with the implementation plan, there may be some minor modifications as final details come to light:

Program	Start Date
Multi-family HET Direct Installation Program	Ongoing Program.
High Efficiency Nozzle Direct Installation Program	Solicit RFP for vendor in Fall 2010.
GeoSmart Landscape Finance Programs	Schedule to be determined based upon grant outcome.
Save A Buck Program	July 2010 – ongoing MWD program.
SoCalWater\$mart	July 2010 – ongoing MWD program.
Smart Controller Direct Installation Program	Schedule to be determined based upon grant outcome.
Water Budget	Timing to be decided based upon grant outcome.
Landscape Evaluations	July 2010 – ongoing operations.

Figure 47: Program Launch Schedule

Implementation details for each program including: program descriptions, measure(s) offered, target customer segments, marketing methods, delivery mechanisms, production numbers, program costs and economic evaluation results are included in the Program “cut sheets” in *Section 7: Potential Programs, Analyses and Final Program Selection*.

IEUA Role

Over the upcoming years, IEUA’s role is to act as liaison between MWD and IEUA member agencies. Since MWD funding is limited and often based on a first-come/first-serve basis, IEUA will need to be aggressively positioned with MWD to ensure placement in the funding queue. In order to maximize the success of MWD’s programs, IEUA will want to generate a list of prime customer targets and initiate regional marketing.

In addition, IEUA will administer all of the regional programs. This role will encompass several duties including:

- Securing outside funding through local, state and federal grants.
- Obtaining outside vendors when necessary.
- Developing operation plans, procedures and schedules for each program.
- Monitoring start up and on-going activities for each program.
- Tracking and reporting production and progress towards goals for each program.

Retail Agency Role

With the retail agencies carrying the responsibility to meet the 20x2020 per capita water use reduction, they have a vested interest in aggressively pushing forward with a plan that builds on IEUA’s regional plan. To bolster the success rate of the plan, retail agencies need to post programs on their website, print literature and promote the program vigorously. Additionally, developing targeted lists and direct marketing should be initiated to further increase program participation.

Program Implementation Strategy

Due to staffing limitations and specific expertise required for certain programs the following programs will be outsourced to industry vendors:

- High Efficiency Nozzle Direct Installation Program
- Smart Controller and High Efficiency Nozzle Direct Installation Program
- GeoSmart Landscape Finance Program
- Water Budget Program
- Landscape Evaluations – existing vendor Chino Basin Water Conservation District
- Multi-family HET Direct Installation Program – existing vendor Bottom Line Utility Solutions

Activities Implemented by Year

The projected number of activities to be implemented per year are shown below. Please note that many of the eight selected programs consist of multiple activities. For example the SoCalWaterSmart Program consists of HE clothes washers, HE nozzles, WBIC (subscription) and WBIC (no subscription). For conducting the cost and benefit analysis it is necessary to evaluate activities with different savings and costs separately. The list of programs and their associated activities can be found at the end of Section 7. As stated earlier, implementation volumes will be adjusted over time as industry changes occur.

Projected Number of Activities Implemented per Year

Class	Activity Name	2010	2011	2012	2013	2014	5 Year Total
Single Family	HE Clothes Washer, SoCalWaterSmart Rebate	1,500	1,500	1,500	1,500	1,500	7,500
Single Family	HE Nozzle Direct Install, IEUA Administered	15,000	15,000	15,000	15,000	15,000	75,000
Single Family	HE Nozzles, SoCalWaterSmart Rebate	1,500	1,500	1,500	1,500	1,500	7,500
Single Family	WBIC (subscription) < 1 acre, WaterSmart Rebate	5	5	5	5	5	25
Single Family	WBIC (no subscription) < 1 acre, WaterSmart Rebate	10	10	10	10	10	50
Single Family	WBIC Direct Install + Nozzles, (1.5 acres/site), IEUA	0	50	50	50	50	200
Single Family	Turf Removal, SF, IEUA Finance	70	70	70	70	70	350
Single Family	WBIC + 20 Nozzles, IEUA Finance	125	125	125	125	125	625
Multi-family	HET Direct Install, MF, IEUA	5000	0	0	0	0	5,000
Commercial	HET (Tank) Rebate, Save A Buck Rebate	100	0	0	0	0	100
Commercial	HET (Valve) Rebate, Save A Buck Rebate	50	50	50	0	0	150
Commercial	ULVZ Urinal, Save A Buck Rebate	100	100	100	100	100	500
Commercial	HE Nozzles for Pop Ups, Save A Buck Rebate	500	500	500	500	500	2,500
Commercial	WBIC, Save A Buck Rebate	10	10	10	10	10	50
Single Family	Landscape Evaluation, (.5 acre), IEUA	75	0	0	0	0	75
Commercial	Landscape Evaluation, (2 acres/site), IEUA	100	0	0	0	0	100
Irrigation	WBIC + 100 Nozzles Direct Install (3 acres/site), IEUA	40	40	40	40	40	200
Irrigation	Large Landscape Water Budgets, IEUA	50	50	50	50	50	250
Single Family	Single Family Water Budgets, IEUA	100	100	100	100	100	500

Figure 48: Projected Number of Activities Implemented per Year

Water Savings

The following chart depicts the annual savings for the five year implementation Fiscal Year 2010/11 – Fiscal Year 14/15.

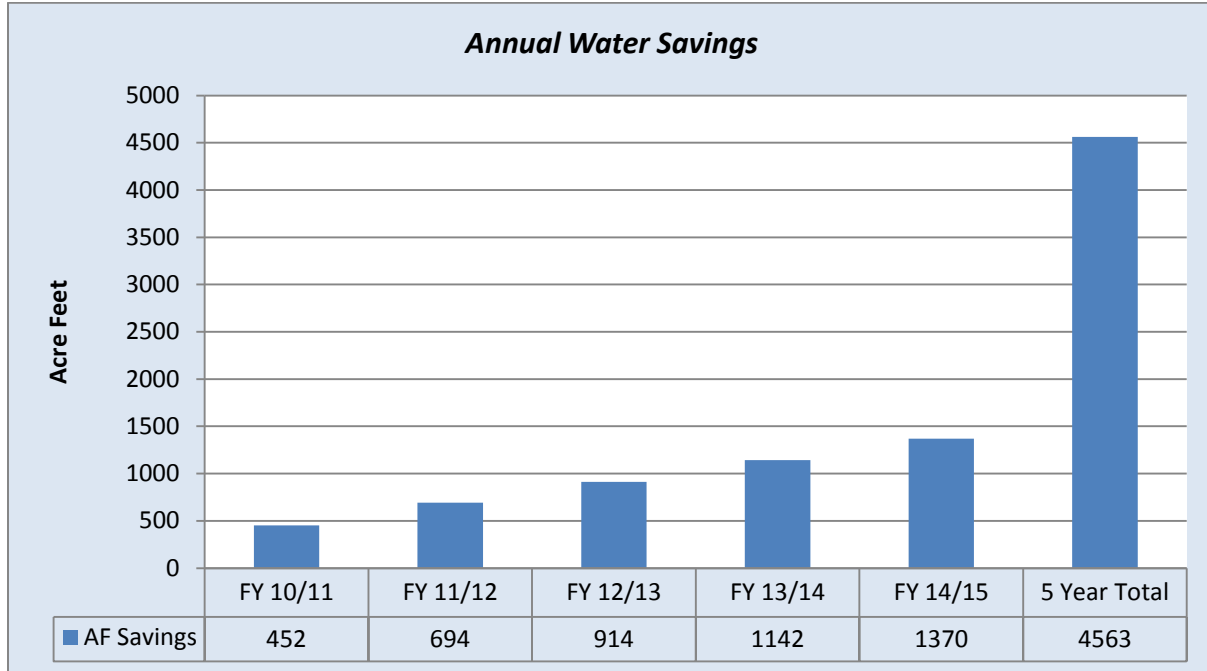


Figure 49: Base Model Annual Water Savings

The table below represents savings by 2015 and 2020 as well as lifetime savings.

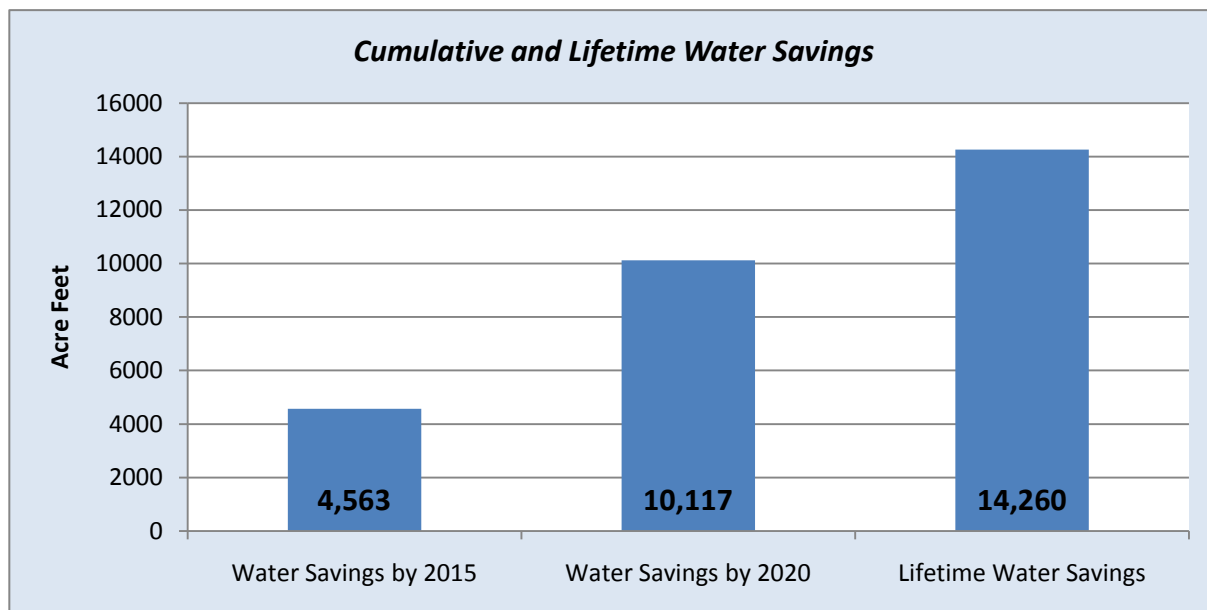


Figure 50: Base Plan Cumulative and Lifetime Water Savings

Water Savings by Sector

The tables below depict the water savings by sector. Forty four percent of the projected savings will be procured from the single family sector predominately through landscape measures. When you add the savings from programs targeted at dedicated irrigation customers, nearly 70% of the savings are derived from landscape measures.

Sector	Annual Water Savings (AF)					
	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	Total
Single Family	118.4	262.7	406.2	549.0	691.0	2,027.3
Multi-family	212.5	203.6	195.0	186.8	178.9	976.8
Commercial	44.7	64.1	83.3	100.4	117.5	410.0
Irrigation	76.6	153.2	229.9	306.5	383.1	1,149.3
Total	452.2	683.6	914.4	1,142.7	1,370.6	4,563.5

Figure 51: Breakdown of Annual Water Savings by Sector

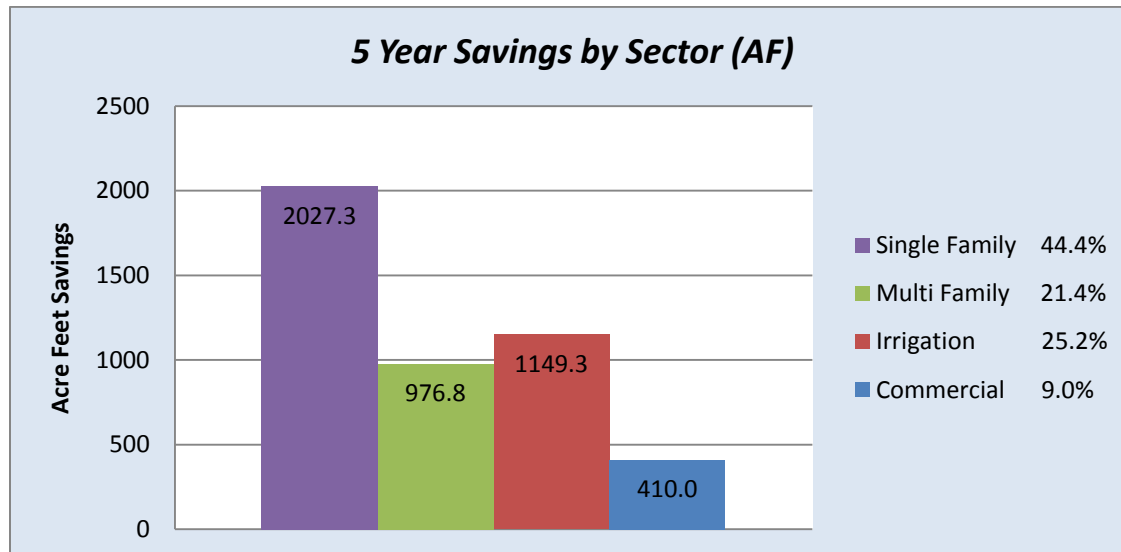


Figure 52: Graph of Five Year Acre-Feet Savings by Sector

Savings by Year by Activity

The tables below presents the acre-feet of water savings by activity for each year of the planning period. The High Efficiency Nozzle Direct Installation Program is clearly the highest water savings at 900 acre-feet over five years. The Multi-family HET Direct Installation Program is a close runner up at 798 acre-feet over the five year period.

Annual Water Savings by Activity by Year

Activity Name	Annual Water Savings (acre-feet)					
	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	Total 5 Year Savings
HE Clothes Washer, SoCalWaterSmart Rebate	23.5	46.1	68.0	89.1	109.4	336
HE Nozzle Direct Install, IEUA Administered	60.0	120.0	180.0	240.0	300.0	900
HE Nozzles, SoCalWaterSmart Rebate	6.0	12.0	18.0	24.0	30.0	90
WBIC (subscription) < 1 acre, WaterSmart Rebate	0.2	0.4	0.6	0.8	1.0	3
WBIC (no subscription) < 1 acre, WaterSmart Rebate	0.4	0.8	1.2	1.7	2.1	6
WBIC Direct Install + Nozzles, (1.5 acres/site), IEUA	0.0	29.4	58.8	88.1	117.5	294
Turf Removal, SF, IEUA Finance	5.1	10.3	15.4	20.5	25.6	77
WBIC + 20 Nozzles, IEUA Finance	10.2	20.4	30.5	40.7	50.9	153
HET Direct Install, MF, IEUA	212.5	203.6	195.0	186.8	178.9	797.9
HET (Tank) Rebate, Save A Buck Rebate	4.3	4.1	4.0	3.9	3.8	20.1
HET (Valve) Rebate, Save A Buck Rebate	2.1	4.2	6.2	6.0	5.9	24.4
ULVZ Urinal, Save A Buck Rebate	12.3	24.5	36.8	49.1	61.4	184
HE Nozzles for Pop Ups, Save A Buck Rebate	2.0	4.0	6.0	8.0	10.0	30
WBIC, Save A Buck Rebate	3.1	6.2	9.3	12.4	15.5	47
Landscape Evaluation, (.5 acre), IEUA	2.5	2.5	2.5	2.5	2.5	13
Landscape Evaluation, (2 acres/site), IEUA	21.0	21.0	21.0	21.0	21.0	105
WBIC + 100 Nozzles Direct Install (3 acres/site), IEUA	47.0	94.0	141.0	188.0	235.0	705
Large Landscape Water Budgets, IEUA	29.6	59.2	88.9	118.5	148.1	444
Single Family Water Budgets, IEUA	10.4	20.8	31.2	41.6	52.0	156
Total	452.2	683.6	914.4	1,142.7	1,370.6	4,564

Figure 53: Annual Water Savings by Activity by Year

The graph on the following page depicts the total five year water savings for each activity in acre-feet saved:

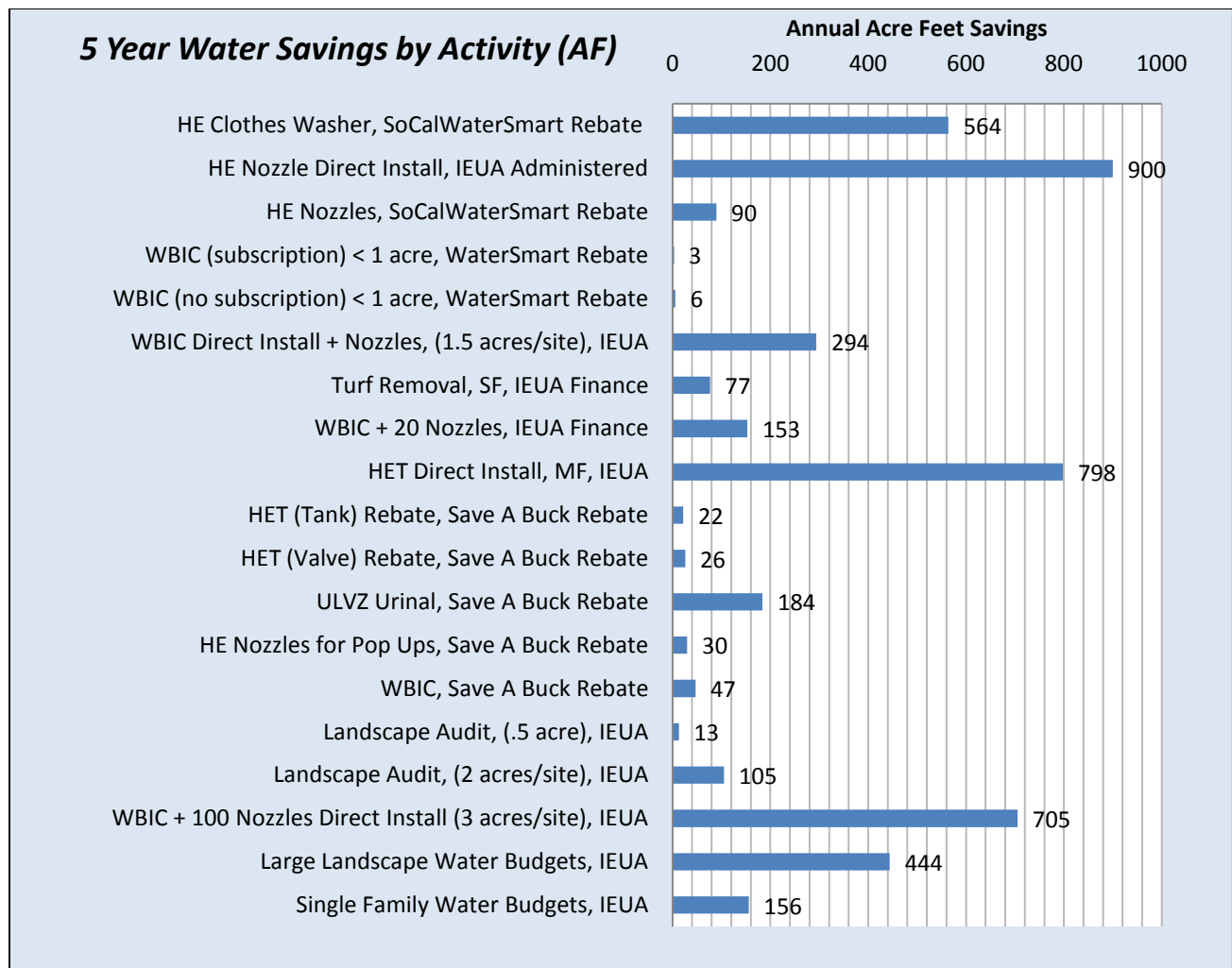


Figure 54: Five Year Water Savings per Activity Graph

Programmatic Savings

As stated earlier, programs often consist of multiple activities. The table below presents the estimated savings rolled up for the selected eight programs.

Annual Water Savings for Selected Programs

Activity Name	Annual Water Savings (acre-feet)					Total 5 Year Savings
	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	
High Efficiency Nozzle Direct Installation Program	60.0	120.0	180.0	240.0	300.0	900
GeoSmart Landscape Finance Programs	15.3	30.6	45.9	61.2	76.5	230
Save A Buck Program	23.8	43.0	62.3	79.4	96.6	305

Annual Water Savings for Selected Programs

Activity Name	Annual Water Savings (acre-feet)					Total 5 Year Savings
	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15	
SoCalWater\$mart	30.1	59.3	87.8	115.6	142.5	435
Smart Controller Direct Installation Program	47.0	123.4	199.8	276.1	352.5	999
Water Budget Program	40.0	80.0	120.1	160.1	200.1	600
Landscape Evaluations	23.5	23.5	23.5	23.5	23.5	117
Multi-family HET Direct Installation Program	212.5	203.6	195.0	186.8	178.9	977
					Total	4,564

Figure 55: Annual Water Savings for Selected Programs

Passive vs. Active Savings Assumptions

Some of the most significant water savings measures in California have come, not from local active program efforts, but rather from state or national updates to plumbing and building codes. These changes are referred to as “passive,” simply because they require no active program efforts from local agencies. For example, code requirements such as flush volumes for toilets, first adopted nationally in 1992, re-shaped the residential and commercial plumbing industry and encouraged the development of new technologies at a pace not seen in decades. The following are some of the most impactful codes, responsible for significant passive water savings:

- The United States Energy Policy Act specifies maximum flow rates for many plumbing devices, including toilets, showerheads and faucets.
- United States Environmental Protection Agency Energy Star® Program certifies individual devices for water and energy efficiency standards.
- The California Energy Commission establishes water efficiency standards for clothes washers
- Effective January 1, 2014, California Assembly Bill 715 requires the installation of high-efficiency toilets and urinals in all new residential construction.

IEUA’s current demand forecasts already takes into account savings from the Energy Policy Act of 1992. However it is necessary to calculate the passive savings from other activities, specifically AB715 and the natural replacement rate of clothes washer with high efficiency models. For the purposes of this plan, passive savings were calculated for the following measures:

- Single Family High Efficiency Toilets (HETs)
- Multi-Family HETs
- Single Family High Efficiency Washers (HEWs)
- Multi-Family HEWs
- Commercial HETs

Below is the estimated passive and active water savings to be achieved over the next five years.

Passive and Active Water Savings	Annual Water Savings (acre-feet)				
	FY 10/11	FY 11/12	FY 12/13	FY 13/14	FY 14/15
Passive Water Savings	--	111	215	425	911
Active Water Savings	452	684	914	1,143	1,371
Total Water Savings	452	795	1129	1,568	2,282

Figure 56: Passive and Active Water Savings

Historical and Projected Water Savings

Below is a graph showing past water savings combined with projected future water savings for active programs. Savings decline over time due to the end of the measure life (i.e. the savings from a high efficiency toilet installed in 2003 will terminate in 2023).

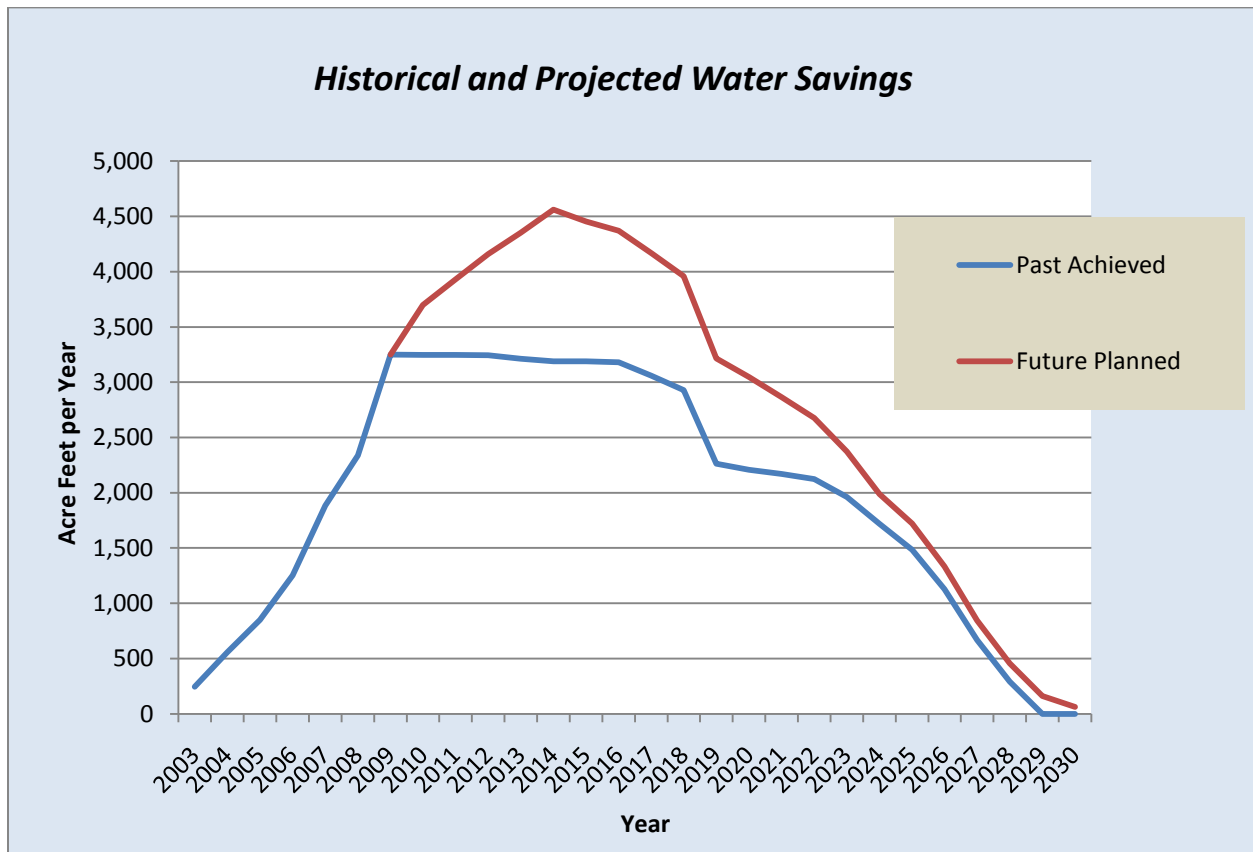


Figure 57: Historical and Projected Water Savings for Base, Medium and High Level Plans

Budget by Year

IEUA prepares annual budgets with line items dedicated to water conservation activities. The annual budget for each year of the five-year planning period, based upon the plan, is below. The budget amounts shown reflect the financial commitment only of IEUA and are exclusive of MWD or other financial contributions.

Program Year	Annual Program Budget (\$/Yr)
2010	\$417,100
2011	\$482,315
2012	\$490,223
2013	\$498,328
2014	\$506,637
5 Year Total	\$2,394,603

Figure 58: Budget by Year over Five Years

IEUA Costs and Benefits

The Plan is estimated to save over 14,260 acre-feet of water at a cost to IEUA of \$187 per acre-foot. This falls well below IEUA’s avoided cost to purchase water from MWD of \$594 per acre-foot. The avoided purchases equate to \$9.7 Million. The overall benefit to cost ratio is 6.97. Although these results are lower than the historical \$57 per acre-foot program costs, they are still highly advantageous to IEUA and its member agencies. The reasons that costs have gone up is that the “easy hits” such ULFTs and HETs have achieved high saturation levels. Moving forwards, the landscape market requires more complex products and services and therefore cost more. However the economic portfolio is still extremely favorable. On the following pages are details of the economic analysis.

Below is a graph showing the cost per acre-foot per activity:

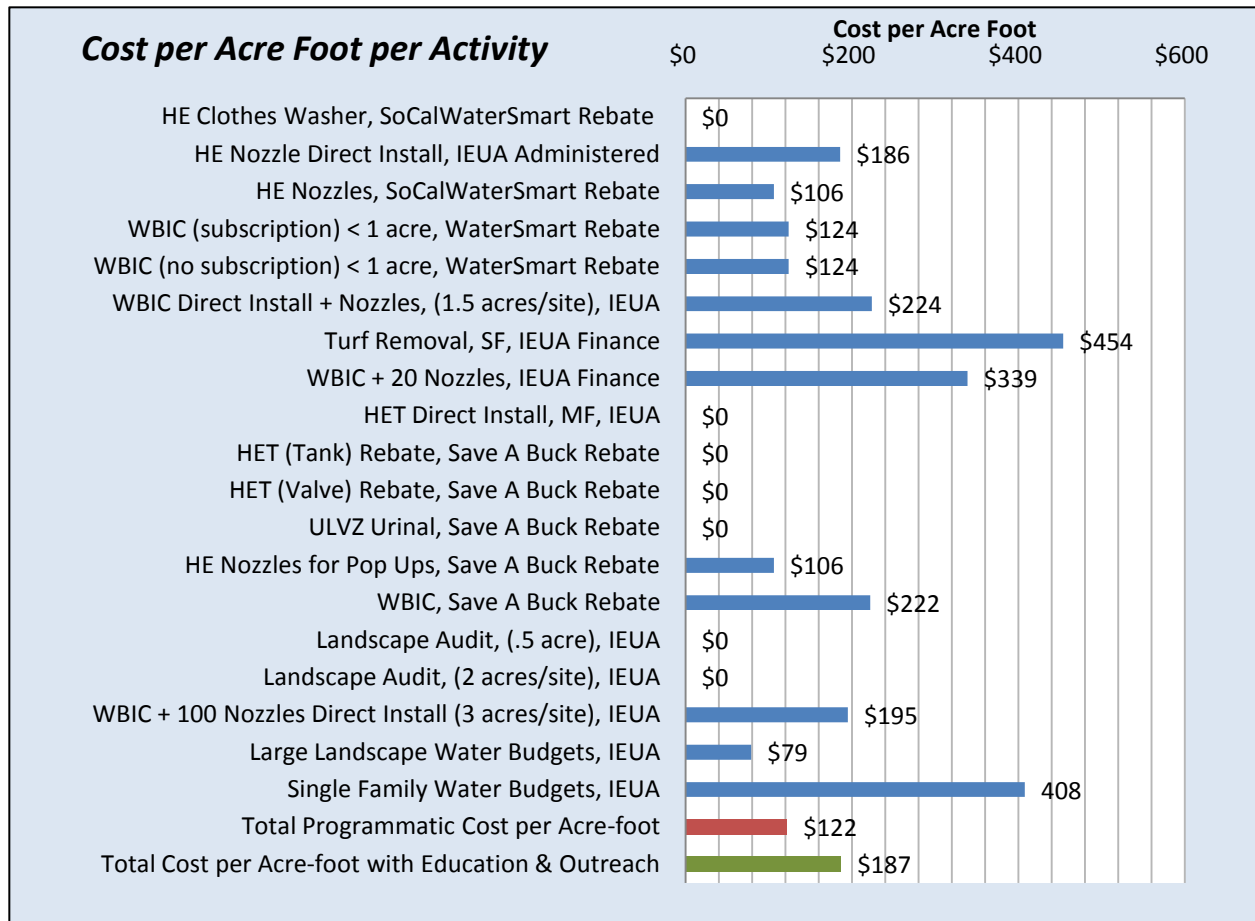


Figure 59: Cost per Acre-Foot per Activity

As shown in the above graph, there are a number of **zero-cost** water saving activities for IEUA. These are:

- 1) High Efficiency Clothes Washers – SoCalWaterSmart Rebate
- 2) High Efficiency Toilets – Direct Installation for Multi-family sites – IEUA Administered
- 3) High Efficiency Tank Toilet Rebates – Save A Buck Rebates
- 4) High Efficiency Valve Toilet Rebates – Save A Buck Rebates
- 5) Ultra Low Volume Zero Urinals – Save A Buck Rebates
- 6) Landscape Evaluations – .5 Acres per Site – IEUA Administered
- 7) Landscape Evaluations – 2 Acres per Site – IEUA Administered

The three **highest-cost water savings activities** are:

- | | |
|------------------------------------------------------|---------------------|
| 1) Turf Removal – Single Family – IEUA Administered | \$454 per Acre-foot |
| 2) Water Budgets – Single Family – IEUA Administered | \$408 per Acre-foot |
| 3) WBICs plus 20 Nozzles per site – IEUA Financed | \$339 per Acre-foot |

The table below documents the avoided costs and benefit to cost ratio per activity. Activities listed with an “N/A” require no funding from IEUA therefore are not calculated. All of the activities have a respectable benefit to cost ratios, with the lowest being 1.99 (Single Family Water Budgets) and the highest performer being 10.25 (Large Landscape Water Budgets).

The active programs total \$9,707,137 in avoided costs and have a benefit-to-cost ratio of 6.97. When you add in the Education and Outreach costs the benefit ratio drops to 4.54. It is important to note that an activity with an extremely high benefit-to-cost ratio yet a low avoided cost is due to a lower market potential and volume of water savings.

<i>Avoided Cost and Benefit-to-Cost Ratio per Activity</i>		
Activity	Avoided Cost	Benefit to Cost Ratio
HE Clothes Washer, SoCalWaterSmart Rebate	\$936,258	N/A
HE Nozzle Direct Install, IEUA Administered	\$956,484	3.87
HE Nozzles, SoCalWaterSmart Rebate	\$95,648	6.78
WBIC (subscription) < 1 acre, WaterSmart Rebate	\$6,910	6.53
WBIC (no subscription) < 1 acre, WaterSmart Rebate	\$13,821	6.53
WBIC Direct Install + Nozzles, (1.5 acres/site), IEUA	\$790,481	3.71
Turf Removal, SF, IEUA Finance	\$171,044	1.79
WBIC + 20 Nozzles, IEUA Finance	\$339,495	2.40
HET Direct Install, MF, IEUA	\$1,995,905	N/A
HET (Tank) Rebate, Save A Buck Rebate	\$46,959	N/A
HET (Valve) Rebate, Save A Buck Rebate	\$69,859	N/A
ULVZ Urinal, Save A Buck Rebate	\$1,174,944	N/A
HE Nozzles for Pop Ups, Save A Buck Rebate	\$31,883	6.78
WBIC, Save A Buck Rebate	\$103,242	3.66
Landscape Evaluation, (.5 acre), IEUA	\$7,699	N/A
Landscape Evaluation, (2 acres/site), IEUA	\$64,645	N/A
WBIC + 100 Nozzles Direct Install (3 acres/site), IEUA	\$1,567,312	4.17
Large Landscape Water Budgets, IEUA	\$987,738	10.25
Single Family Water Budgets, IEUA	\$346,809	1.99
Total Program Alone	\$9,707,137	6.97
Total with Education & Outreach		4.54

Figure 60: Avoided Cost and Benefit-to-Cost Ratio per Activity

Customer Costs and Benefits

To better understand the value that may be perceived by the customer in relation to the planned programs, the customer benefit-to-cost calculations are shown in the chart below. For the purposes of this evaluation, regional rates for water, sewer, electricity and gas were used.

Customer Avoided Utility Bills and Benefit to Cost Ratio per Activity		
Activity	Avoided Utility Bills	Benefit to Cost Ratio
HE Clothes Washer, SoCalWaterSmart Rebate	\$2,548,535	0.51
HE Nozzle Direct Install, IEUA Administered	\$1,365,956	N/A
HE Nozzles, SoCalWaterSmart Rebate	\$136,596	19.37
WBIC (subscription) < 1 acre, WaterSmart Rebate	\$8,960	0.45
WBIC (no subscription) < 1 acre, WaterSmart Rebate	\$17,919	0.88
WBIC Direct Install + Nozzles, (1.5 acres/site), IEUA	\$1,005,119	7.83
Turf Removal, SF, IEUA Finance	\$221,764	0.14
WBIC + 20 Nozzles, IEUA Finance	\$440,166	0.56
HET Direct Install, MF, IEUA	\$1,981,605	16.51
HET (Tank) Rebate, Save A Buck Rebate	\$84,448	6.50
HET (Valve) Rebate, Save A Buck Rebate	\$121,732	1.84
ULVZ Urinal, Save A Buck Rebate	\$1,703,667	7.25
HE Nozzles for Pop Ups, Save A Buck Rebate	\$36,995	15.74
WBIC, Save A Buck Rebate	\$108,759	2.02
Landscape Evaluation, (.5 acre), IEUA	\$11,882	1.58
Landscape Evaluation, (2 acres/site), IEUA	\$81,057	2.70
WBIC + 100 Nozzles Direct Install (3 acres/site), IEUA	\$1,651,057	6.33
Large Landscape Water Budgets, IEUA	\$1,040,516	5.23
Single Family Water Budgets, IEUA	\$449,650	2.26
Total	\$13,016,381	1.48

Figure 61: Customer Avoided Utility Bills and Benefit to Cost Ratio per Activity

Key points from the customer cost benefit analysis:

- Activities with a benefit-to-cost ratio below 1 such as HEW Rebates, WBICs with subscriptions, and the Turf Removal Finance option require a significant customer co-payment. Although these measures are not cost effective many customers elect to do them for other reasons.
- Because the HE Nozzle Direct Installation Program is free to the customer the benefit-to-cost ratio is not calculated.
- A modest investment by multi-family unit owners of \$120,000 over the next five years will achieve savings estimated at \$1,981,605

- Commercial customers installing ULVZ urinals via the Save A Buck Program will spend only \$235,099 to save \$1,703,667 in water costs.
- The Dedicated Irrigation sector accounts can take advantage of the WBIC+100 Nozzles Direct Installation Program for sites with 3 acres or more to save \$1,651,057 after an initial investment of \$260,836.
- By IEUA's performance of the Large Landscape Water Budgets for Dedicated Meter accounts, customers in this sector can spend \$198,808 to accrue \$1,040,516 in water savings.

Outside Funding Opportunities

Outside funding sources have provided critical financial support to local water conservation programs for several decades. Regional, state and federal agencies have a long history of making funds available to local water agencies for the implementation of prioritized programs. In the form of incentives, grants and loans, these financial mechanisms underscore the shared goals of water conservation and efficiency within California's water industry. IEUA has a long history of success in accessing these funds to support implementation of its numerous programs. Between 2003-2009, IEUA successfully secured over \$9 million in outside funding. IEUA will continue to pursue all grants and financial incentives through the planning period and expects to offset a significant portion of program costs.

As the state and national economies continue in a recovery phase into the foreseeable future, the availability of outside funding will likely be less consistent and more competitive. Therefore, it is important that IEUA have a clear understanding of the outside funding possibilities that includes realistic expectations of their availability. This section provides a description of current outside funding sources as well as brief projections as to their availability in the near future.

Metropolitan Water District

MWD has been a consistent source of outside program funding to its member agencies for many years. Their support has come in numerous forms and IEUA has consistently utilized these funds for program implementation. For Fiscal Year 10/11, MWD offers the following financial support opportunities to local agencies.

- **SoCalWater\$mart:** provides direct rebates to single family and multi-family residential customers for the installation of high efficiency toilets, high efficiency clothes washers, smart landscape controllers, and high efficiency nozzles.
- **Save A Buck:** provides direct rebates to commercial, industrial and institutional customers for a menu of water savings devices.
- **Agency Administered Programs:** Each MWD member agency will be allocated a specific budget for locally implemented programs. It is anticipated that MWD's contribution to IEUA's conservation programs next year, which are not related to MWD's menu of programs will be an estimated \$250,000.

In regards to the future, MWD has recently indicated that they anticipate reducing funding support for their regional conservation programs. As recently as last year, an estimated \$60 million was expended by MWD for conservation programs across the region. For fiscal year 2010/11, they have made -\$19.1 million available to fund both regional urban and agricultural programs. Funding levels for fiscal year 2011/12 and beyond are uncertain.

California Department of Water Resources

In recent years, the State's primary funding contribution to conservation programs has come from Proposition 50, the Water Security, Clean Drinking Water, and Coastal & Beach Protection Act of 2002. Although both MWD and IEUA were awarded grants from Prop 50's Water Use Efficiency Grant Program in 2008 (MWD was awarded \$2 million for a turf removal program and IEUA was awarded \$1 million for Recycled water irrigation retrofits), the funds have generally not been disbursed to the grantees due to the State's current financial crisis (unless significant progress and expenditures had been made on the programs). Given the slow pace of the economic recovery in California, it is unknown whether Prop 50 funds will be available in the foreseeable future. Other State agencies, which focus on water, such as the California State Water Resources Control Board offer grant programs, which focus primarily on water quality and storm water issues and are not directly relevant to conservation. At this time, it is advisable to develop local conservation plans for the next two years absent expectations of any significant state financial contribution.

United States Bureau of Reclamation

Federal financial contributions to local agency water conservation programs have come primarily from the United States Bureau of Reclamation (USBR). USBR currently offers two water conservation grant opportunities under the WaterSMART program: the Challenge Grant and Water and Energy Efficiency Grants. IEUA is applying this year for a Challenge Grant for a GeoSmart Program and the Water and Energy Efficiency Grant for both GeoSmart and the Smart Controller Direct Installation program. The grant applications have been submitted and awards will be announced in the summer of 2010.

Other Federal Sources

The American Recovery and Reinvestment Act of 2009 has recently made over \$35 million dollars available in California for energy and water conservation rebates. The Cash for Appliances component of the ARRA is offering a supplemental rebate in the amount of \$100 for qualifying HE clothes washers. At this time, the rebate offer extends for a very short period of time (April, 2010 to May 2010). It is not known at this time whether the program will be extended.

The United States Environmental Protection Agency currently offers financial assistance to local agencies for watershed, water quality and water distribution/treatment systems upgrades. At this time, financial support is not available for water conservation/efficiency programming.

Plan Updates

The business plan is a working document and, as such, must be modified and updated as changes occur and program years roll out. IEUA and the member agencies will need to regularly review the plan and make adjustments accordingly.

Changes and/or reviews of the business plan should take place in line with the following conditions:

- When programs are added, subtracted or modified
- As grants are received, put on hold or denied
- On a yearly basis in order to meet the annual reporting requirements
- Every 5 years to meet the Urban Water Management Plan report cycle

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Appendix 1: Measure Guide

Water Conservation Measure Guide

Device	Description	Savings Assumption
Toilets		
High Efficiency Toilets – HETs Residential	<p>1.28 gallons per flush or less</p> <p>The standard toilet uses 1.6 – 3.5 gallons per flush or more. The current Energy Policy Act mandates a maximum flush rate of 1.6 gpf for product manufactured in the United States on or after January 1, 1994. California recently passed AB 715 which requires all new construction install high-efficiency toilets. Beginning in 2010 the legislation requires 50% of all toilets sold in California meet the new flush standards, ramping up to 100% in 2014.</p> <p>Residential toilets installed in single family and multi-family properties are typically tank type toilets. They can be gravity fed or pressure-assisted. HETs also include dual flush models which use either a 1-gallon (or less) flush for liquid waste and a 1.6-gallon flush for solid waste.</p>	<p>AWE Library Estimate: 0.036 AFY (SF); 0.073 AFY (MF) NRR=4%</p> <p>CW Estimate (for IEUA): 0.0425 AFY (SF); 0.0526 AFY (MF). NRR=4%</p> <p>MWD: 0.0425 AFY 20 year life</p>
High Efficiency Toilets HETs Commercial	<p>1.28 gallons per flush or less</p> <p>For flush valve toilets, the Energy Policy Act mandates a maximum flush rate of 1.6 gpf for product manufactured in the United States since 1997. California recently passed AB 715 which requires all new construction install high-efficiency toilets. Beginning in 2010 the legislation requires 50% of all toilets sold in California meet the new flush standards, ramping up to 100% in 2014.</p> <p>Commercial toilets can either be tank type or valve type. Flush valves have a chrome valve and handle on the top of the toilet bowl. They tend to be installed in locations that receive high use. The dual flush version of the valve type toilet operates the amount of the flush by either pulling up on the handle for the lesser flush or down on the handle for the increased flush volume.</p>	<p>AWE Library Estimate: 0.036 AFY NRR=4%</p> <p>CW Estimate: 0.042 AFY NRR=4%</p> <p>MWD: 0.0425 AFY 20 year life</p>
Urinals		
High Efficiency Urinals HEUs	<p>0 - .5 gallons per flush</p> <p>There are three types of high efficiency urinals:</p> <ul style="list-style-type: none"> • High efficiency urinals use .5 gallons per flush • Ultra low volume urinals use .25 (one pint) gallons per flush • Zero consumptions urinals use no water <p>A standard urinal uses between 1.0 – 3.0 gallons per flush. The current Energy Policy Act mandates a maximum flush rate of 1.0 gpf for urinals manufactured in the United States since 1997. Like a flush valve toilet, standard urinals have a chrome and valve handle.</p> <p>Zero consumption urinals do not have a valve and therefore do not require a water supply. These</p>	<p>AWE Library Estimate: 0.019 AFY (0.5gpf); 25 year life</p> <p>CW Estimate: 0.081 AFY (0.25gpf); 0.068 AFY (0.5gpf) 0.092 AFY, (0gpf)</p> <p>MWD: 0.1227 AFY (0-0.25gpf); 0.0615 AFY (0.5gpf)</p>

Device	Description	Savings Assumption
	<p>fixtures are designed to receive and convey only liquid waste through a trap seal and into the gravity system without the use of water. The fixtures have an integral or removal trap with a liquid seal. These seals require periodic replacement or maintenance.</p>	
Showers and Faucets		
Showerheads	<p>1.5 – 2.0 gallons per minute</p> <p>The Energy Policy Act of 1992 mandates a maximum flow rate of 2.5 gallons per minutes for all showerheads manufactured in the United States.</p> <p>Currently there are models in the market that use 1.5 – 2.0 gpm.</p> <p>New research suggests that many new homes and hotels are being built with multiple showerheads per compartment. Limiting the number of heads in compartments designed for single individuals to one showerhead will reduce water use.</p>	<p>AWE Library Estimate: 0.0063 AFY/Yr (SF) 0.0058 AFY/Yr (MF) NRR=12%</p>
Kitchen Faucet Aerators	<p>1.0 – 1.5 gallon per minute</p> <p>In 1998, the Department of Energy adopted a maximum flow rate of 2.2 gpm for all faucets.</p> <p>Efficient models available in the market today use 1.0-1.5 gpm.</p>	<p>BMP Costs & Savings: 0.0017 AFY/faucet. No distinction between kitchen and bathroom. Error margin +/- 0.0029 AFY</p>
Bathroom Faucet Aerators	<p>.5 – 1.5 gallons per minute</p> <p>In 1998, the Department of Energy adopted a maximum flow rate of 2.2 gpm for all faucets.</p> <p>Bathroom faucet flow rates can go as low as 0.5 gpm which may be acceptable for residential and low use commercial applications. A higher flow rate may be necessary for higher use commercial sites such as restaurants and public parks.</p>	<p>BMP Costs & Savings: 0.0017 AFY/faucet. No distinction between kitchen and bathroom. Error margin +/- 0.0029 AFY</p>
Sensor-Operated And Self-closing Faucets	<p>Sensor-operated or self-closing faucets, automatically turn on and off when they sense a person's hands under the faucet.</p> <p>Manufacturers publicize savings of up to 70%, however these savings have not been validated.</p>	<p>BMP Costs & Savings: 0.011-0.018 AFY/Faucet depending on building type. Confidence in estimate is low.</p>
Hot Water Delivery Systems		
Insulating Hot Water Piping	<p>Insulate pipes with a minimum of R4 insulation</p> <p>The intent of requiring water efficient hot water delivery systems is to reduce water waste by using technologies that provide hot water at the tap with a minimal wait time. An average American household wastes over 10,000 gallons of water each year while waiting for hot water to get to the fixture.</p> <p>Insulating hot water piping reduces the amount of water wasted while waiting for hot water by</p>	<p>Savings not available.</p>

Device	Description	Savings Assumption
	<p>keeping the water hotter and getting hot water to the point of use quicker. Insulating hot water piping also reduces energy losses as hot water moves through the lines to the point of use and when hot water sits in the lines between draws. Insulation can keep the water temperature 2°F to 4°F hotter compared to uninsulated pipes, allowing for a lower water heater temperature setting.</p>	
Re-circulating Hot Water	<p>Re-circulating hot water delivery systems reduce water wasted while waiting for hot water by circulating the water in the pipes through the water heater until a specified temperature is reached. Demand-initiated re-circulating systems save energy by not circulating hot water through the piping system continuously. Whole house manifold systems can use smaller diameter piping for some fixtures which allows hot water to arrive at fixtures faster, and less hot water is left standing in pipes after a draw, reducing both water and energy use. Core plumbing systems can reduce the total amount of plumbing pipe installed; the amount of conductive heat loss from the pipe; the amount of time it takes for hot water to reach baths, laundry areas, and the kitchen; and the amount of hot water left standing in pipes after a draw.</p>	<p>Koeller (2007) estimated 0.011 AFY/SF Household 25 year life</p>
Point of Use	<p>Point of use hot water distribution systems provide hot water on demand to the most remote fixtures from the water heater. The device is typically installed under the furthest. When activated cool water that would normally go down the drain is circulated back to the after heater through the cool water line. At the same time, the system fills the hot water line with hot water from the water heater. When hot water reaches the system, the zone valve closes and the pump shuts off.</p>	<p>Assume same are recirculating hot water at 0.011 AFY/SF</p>
Graywater		
Graywater Systems	<p>Graywater (also know as grey water) is washwater. That is, all wastewater excepting toilet waste and food wastes derived from garbage grinders. This includes water from faucets, showers, and clothes washing. There are significant distinctions between gray water and toilet wastewater (called "blackwater").</p> <p>California may adopt a more lenient gray water code as early as August 2009. Under the new code, a clothes washer or other single-fixture, residential gray water system, such as a shower, could be installed or altered without a construction permit. That's a complete reversal of the present state requirement that homeowners installing systems to recycle the waste water from their sinks, showers, bathtubs and laundry machines conform to Appendix G of the California plumbing code, which requires that gray water systems not only be permitted by the appropriate administrative authority but installed underground with extensive filtering apparatus.</p> <p>Appendix G went into effect in 1992 at the end of a five-year drought. Its update was required by Senate Bill 1258 requiring the state's Department of Housing and Community Development to revise the code in an effort "to conserve water by facilitating greater reuse of gray water in California." The code's revision was scheduled to take effect Jan. 1, 2011, but in response to the state's continuing drought, representatives from Housing and Community Development submitted the new code to the state's Building Standards Commission for emergency adoption. If approved, as expected, the new code would take effect August 4, 2009.</p>	<p>Typical SF residential home may generate between 0.077 and 0.107 AFY of graywater (Aquacraft, Inc. 1999, 2004, 2008). Graywater can be used for toilet flushing and landscape irrigation.</p>

Device	Description	Savings Assumption
	<p>The new graywater standards divide residential gray water systems into three types: a clothes washer and/or single-fixture system, a simple system, and a complex system. According to the Express Terms for Proposed Emergency Building Standards, clothes washer systems use only a single washing machine in a one- or two-family dwelling, while single-fixture systems collect gray water from one plumbing fixture or drain, also in a one- or two-family home; both require homeowners to follow 12 guidelines but neither require permits to install. Simple systems, which exceed a clothes washer and or single-fixture system but discharge less than 250 gallons per day, and complex systems, which discharge more than 250 gallons per day, each require construction permits, unless exempted by that area’s administrative authority.</p>	
Dishwashers		
ENERGY STAR® Labeled Dishwasher Residential	<p>The use of a dishwasher in a typical residential setting has been declining. ENERGY STAR® qualified dishwashers use at least 41% less energy than the federal minimum standard and much less water. DOE data shows that an average of 200 uses per year. Water use varies from 5 to 10 gallons per normal cycle. DOE declined to set a water factor even though it is clear that there is a close correlation between energy and water use. There is some survey data that indicates that pre-rinsing dishes in the sink can use up to 15 gallons per load.</p>	Savings not available.
Dishwashers Commercial	<p>1 gallon or less per rack</p> <p>Food service dishwashers (restaurants and commercial kitchens) are a potential source of significant water savings, due to heavy usage of these machines. Most restaurants owners/operators lease these machines from companies providing chemicals to use in the dishwashing operation. These machines can costs from \$10,000 - \$100,000.</p> <p>There are many types from under-counter types, similar to those used in single family residential applications, to the flight type, used in the highest volume establishments, such as institutional kitchens, cafeterias, etc. The measure of throughput and efficiency is the standard 20-inch by 20-inch dishwashing “rack”. While efficient machines use water at the rate as low as 1.0 gallons per rack, the industry standard of 1.20-gallons per rack is still a good benchmark. The less-than- efficient dishwashers are rated at 2.5 gallons per rack and above.</p>	<p>AWE Library Estimate: 0.177 AFY 20 year life</p>
Water Softeners		
Water Softeners	<p>Require water softeners installed be certified to meet the NSF/ANSI 44 standard and have demand-initiated regeneration. If the water softener uses an ion exchange technology, it shall be capable of using potassium rather than sodium salt. Water softeners that use auto- initiated regeneration (fixed schedule) do not meet this specification.</p> <p>NSF/ANSI 44 standard is a third party certification that confirms the performance of the water softener. Demand-initiated systems measure water usage with a water meter and regenerate only when the meter counts down to zero. These systems do a better job of providing treated water than</p>	

Device	Description	Savings Assumption
	<p>auto initiated systems because they regenerate more closely to the time they need to and do not waste water during unnecessary regenerations.</p> <p>Potassium chloride is as effective as sodium chloride for water softening in both residential and commercial processes. Plus, using potassium chloride has several benefits: it reduces the amount of sodium in drinking water; the treated water contributes potassium to people’s diets; and it eliminates the addition of sodium from water softeners into a household’s septic system tank and drainfield. Potassium is an essential mineral for plants; whereas, sodium can damage plant tissues. Because sodium is replaced by potassium, this diluted wastewater is beneficial to a grass covered drain field.</p>	
Clothes Washers		
<p>High Efficiency Washers</p> <p>HEWs</p> <p>Residential</p>	<p>4.0 water factor – 4 gallons per wash cycle</p> <p>High efficiency washers utilize technological advancements to deliver excellent washer performance while saving water and energy. Efficient machines use 35-50% less water. This reduction in water use means less energy needed to heat the water (approximately 50% less energy). Over 100 models of residential and commercial high efficiency washers are on the market today. Typically residential HEWs cost on average \$400 more than standard models.</p> <p>On February 4, 2004, the California Energy Commission adopted water efficiency standards for residential washers. It is a tiered standard based on the “water factor” of the washer, which is the number of gallons per cubic foot of washload (gallons per wash cycle). The lower the water factor rating, the more water efficient the clothes washer. The Energy Star maximum rate is 7.5.</p> <p>Many utilities use the Consortium for Energy Efficiency http://www.cee1.org/resid/seha/rwsh/rwsh-main.php3 Qualifying Product List of clothes washer to determine those eligible for incentives. There are three tiers with lowering water factors.</p> <p>Currently MWD’s maximum allowed for residential incentives is 4.0.</p>	<p>AWE Library Estimate: 0.022 AFY 12 year life NRR=8.3%</p> <p>CW Estimate: 0.024 AFY</p> <p>MWD: 0.015682 AFY 15 year life</p>
<p>High Efficiency Washers</p> <p>HEWs</p> <p>Commercial</p>	<p>4.0 water factor – 4 gallons per wash cycle</p> <p>Standard commercial HEWs are virtually the same as residential models, however most are coin-operated and located in laundromats or multi-family common area laundry. Because of their increased use they save more water.</p> <p>In February of 2003, the California Energy Commission adopted a 9.5 water factor standard for commercial clothes washers beginning in 2007. MWD only offers incentives for washers with a water factor of 4.0 or below.</p> <p>Multi-load washers, 30-80 pound capacity, can save additional water through the replacement of single</p>	<p>AWE Library Estimate: 0.096 AFY 9 year life</p> <p>CW Estimate: 0.117 AFY 10 year life</p> <p>MWD: 0.1075 (commercial) 0.0311 (MF)</p>

Device	Description	Savings Assumption
Industrial Laundries	<p>load washers with high efficiency multi-load models.</p> <p>Commercial and institutional laundry facilities include those that wash linens, uniforms and other items for hotels and motels, hospitals, nursing homes, diaper service, restaurants and businesses requiring uniforms. Laundry facilities often consume large quantities of water for operations that include the wash and rinse cycles of washing machines, steam heated dryers, steam pressing equipment and reclamation of dry cleaning solvent.</p> <p>Conventional washer extractors used by most laundry facilities operate with a rotating drum that agitates the laundry during wash and rinse cycles then spins at high speeds to extract the water. Water-extractors and most other conventional large scale washing machines use freshwater for each wash and rinse cycle; there is not internal recycling. The capacity of the washer-extractors range from 25-400 dry points per load. They use 2.5-3.5 gallons of water per point of laundry, the equivalent of 1,000 to 1,400 gallons of water per 400 pound load.</p> <p>Water efficient laundering equipment, such as continuous batch (usually called tunnel) washers and water reclamation systems, can reduce water use by as much as 80% at commercial and institutional facilities equipped with conventional washer extractors. For example, a commercial laundry in the Boston area saved more than 25 mg by installing a continuous batch washer. The cost of the new laundry system was \$1 million, but with a \$500,000 reduction in annual water and operating costs, the new system paid for itself in less than two years.</p>	<p>Washer Extractors: Riesenberger and Koeller(2005), detailed savings estimates for 3 conservation technologies, ranging from .22 to 2.7 gal per lb of laundry. 15 to 20 year useful life.</p> <p>Tunnel washers generally deemed water efficient.</p>
Pre-rinse Spray Valves		
Pre-rinse Spray Valves	<p>1.2 gallons per minute</p> <p>A pre-rinse spray valve is a handheld device that uses a spray of water to remove food waste from dishes prior to cleaning in a commercial dishwasher. They are usually placed at the entrance to a commercial dishwasher and can also be located over a sink, in conjunction with a faucet fixture.</p> <p>A national standard requires all pre-rinse spray valves manufactured after January 1, 2006, to have a maximum flow rate of 1.6 gallons per minute (gpm).</p> <p>Newer models can use a little as .64 gpm, however none of the models at this rate have passed the performance standards developed by the Food Service Technology Center in San Ramon California. Models using 1.2 gpm have proven to use less water and pass the cleanability test.</p>	<p>AWE Library Estimate: 0.087 AFY NRR=10%</p> <p>MWD: 0.153 5 year life</p>
Food Steamers		
Connectionless Food Steamers	<p>No connection to water and sewer line</p> <p>Food steamers are used by restaurants and commercial kitchens to cook, warm and hold food. Boiler-based steamers employ once-through cooling, dumping raw steam condensate down the drain. However, code restrictions limit the temperature of discharges into the drain to 140 degrees F. As</p>	<p>AWE Library Estimate: 0.25 AFY 15 year life</p> <p>CW Estimate: 0.25 AFY</p>

Device	Description	Savings Assumption
	<p>such, boiler-based steamers use tap water to temper the discharges bringing them in compliance with the code. Boiler-based steamers typically send up to 30 gallons per hour of water into the drain to waste.</p> <p>Connectionless food steamers (alternatively known as boilerless food steamers) have a heated water reservoir in the bottom of the cooking compartment in lieu of a dedicated boiler or steam generator. What differentiates the connectionless from its boiler-based counterpart is that in connectionless steamers, the steam that condenses on the food product and compartment walls remains within the cavity and returns to the reservoir as opposed to being rejected to an open condensate drain. Since the hot condensate returned to the reservoir is recycled, the overall consumption of steam is reduced. Furthermore, since there is no steam rejected to the drain, there is no requirement for condensate cooling water, which represents a lot of the water used in boiler-based steamers. The absence of water and drain connections also simplifies the installation and reduces the associated costs.</p>	<p>10 year life</p> <p>MWD: 0.25 AFY 10 year life</p> <p>Savings per steamer compartment</p>
Ice Machines		
Efficient Ice Machines	<p>ENERGY STAR® rated using 20 gallons per 100 lbs. of ice CEE Tier III</p> <p>Ice makers use more water than just the water contained in the ice. This equipment can often be very inefficient in water use. The typical icemaker uses 2 or 3 times more water than needed to make the ice we consume. These water using machines can be found everywhere including: hospitals, hotels, restaurants, retail outlets, schools, office and grocery stores.</p> <p>There are two basic equipment designs: air-cooled refrigeration units and water cooled refrigeration units. The air-cooled units are usually more water efficient; while the water cooled units are usually more energy efficient. Both types vary greatly in water efficiency, even within its own design type. The water efficiency is measured by the industry in “gallons of water per 100 lbs (45.36 kg) of ice”. Perfect water efficiency would equate to 11.97 gallons (45.3 L) of water to produce 100 lbs (45.36 kg) of ice. Most ice makers’ water use ranges between 18 to 200 gallons (68 L to 756.9 L) of water per 100 lbs (45.36 kg) of ice. This represents a water efficiency range of 66% to only 5%. Thus, 34% to 95% of the water used is dumped down the drain. The water varies for several reasons.</p> <p>Water cooled ice makers are often the most inefficient in water use, although sometimes providing significant energy savings at the point of use. It is important to note that there are many air-cooled ice machines more energy efficient than some water-cooled ice machines. Water cooled machines generally use potable water to remove heat from the refrigeration equipment. In years past, most of these machines used single-pass cooling – dumping the water into the sewer as it exited the machine. Fortunately, many manufacturers are started to abandon this wasteful design. Some newer designs re-circulate the water after it passes through a cooling tower or heat exchanger, but these still require large amounts of make up water. While air-cooled machines generally have a water efficiency</p>	<p>CW Estimate: 0.835 AFY 10 year life</p> <p>MWD: 0.154 AFY 10 year life</p>

Device	Description	Savings Assumption
	<p>of 40% to 66%, water cooled machines are usually less than 15% water efficient. The water efficiency of most makes and models can be obtained by downloading “Certified Automatic Commercial Ice Makers Directory from the Air-conditioning and Refrigeration Institute at www.aridirectory.org.</p>	
Cooling Towers		
<p>Standard Conductivity Controllers for Cooling Towers</p>	<p>3 – 5 cycles of concentration</p> <p>Cooling towers are normally part of the air conditioning system of large commercial buildings or manufacturing sites. These towers are used to remove heat from the system through evaporation.</p> <p>Up to 75 to 80% of the water used by a cooling tower is evaporated to remove heat and the remainder is lost due to “blowdown”. Blowdown is water intentionally removed from the cooling tower to control the buildup of dissolved solids resulting from evaporation. Blowdown is usually controlled by a conductivity meter/controller using a timer or by manual adjustment.</p> <p>As water evaporates from a cooling tower, the dissolved solids concentrate in the re-circulating water creating a high amount of TDS (Total Dissolved Solids). If these solids are not removed, their concentrations will increase to levels that can cause damage to the cooling tower system. In most systems, these solids are removed by adding chemicals and discharging a portion of the re-circulating water. Make-up water is then added to replace water lost to evaporation and blowdown.</p> <p>From a water efficiency standpoint, it is desirable to maximize the number of cycles of concentration, which will minimize the blowdown water quantity, and reduce make-up water demand. However, this can only be done within the constraints of the make-up water and cooling tower water chemistry. As cycles of concentration increase, the dissolved solids increase, which can cause scale and corrosion problems if they are not carefully controlled.</p> <p>The relationship between quantities of make-up water and blowdown can be expressed in terms of the concentration ratio, or the cycles of concentration (COCs). The concentration ratio can be thought of as an indicator of the number of times water is used in the cooling tower before it is discharged.</p> <p>Typically systems without routine maintenance or an efficiency model are at 1-2 cycles. A standard conductivity controller can be used to monitor the water chemistry and reduce the amount of blowdown and make-up water. Installing a new conductivity controller and increasing the cycles of concentration to 3 to 3.5 cycles can save a significant amount of water. A standard controller costs between \$400 to \$800.</p>	<p>AWE Library Estimate: 1.140 AFY 10 year life</p> <p>CW Estimate: 1.032 AFY 5 year life</p> <p>MWD: 0.6440 AFY 5 year life</p>
<p>pH or Alkalinity Controllers for Cooling Towers</p>	<p>4 -7 cycles of concentration</p> <p>A pH controller is a more sophisticated type of controller that monitors the pH of the water. The pH</p>	<p>CW Estimate: 3.982 AFY 5 year life</p>

Device	Description	Savings Assumption
	controller combined with acid-based chemical treatment can push the cycles of concentration to 5 to 7 cycles. This upgrade, although higher in initial costs than Category 1, typically yields much higher savings. The costs of a pH controller range from \$2,400 to \$4,000.	MWD: 1.944 AFY 5 year life
Water Softeners for Cooling Towers	6 – 20 cycles of concentration Softened water can be used as the makeup water and increase the cycles of concentration from 6 to 20 cycles. Due to the high corrosivity of highly cycled soft water, very specialized chemistry is required for corrosion control.	Savings vary dramatically based upon size and use of system.
Recycled Water for Cooling Towers	<p>Recycled water from the local water retailer may be available if there is a recycled water infrastructure in existence. If so, this cost of this water is much less expensive than the traditional potable water supply and can readily be used for cooling tower systems. In some instances, water from other equipment within a facility can be recycled and reused for cooling tower make-up with little or no pre-treatment, including the following:</p> <ul style="list-style-type: none"> • Air handler condensate (water that collects when warm, moist air passes over the cooling coils in air handler units) • Water used in a once-through cooling system • Pretreated effluent from other industrial processes, provided that any chemicals used are compatible with the cooling tower system 	Savings vary dramatically based upon size and use of system.
Steam Sterilizers		
Condensate Drain Water Modification	<p>Steam sterilizers are utilized to disinfect surgical operating instruments. Low-pressure steam is injected into the sterilization chamber to render bacteria and other microbial organisms harmless. Many hospitals run their units 24 hours per day.</p> <p>There are two configurations, the vacuum type and gravity type. The vacuum system with the water pump and ejector is an equipment used for exhausting air or vapor out of the chamber. It enhances sterilization and drying effect with a strong vacuum force and minimizes noise and malfunction. During standby mode, the sterilizer is kept at an elevated temperature by periodically injecting steam into the chamber to keep it sterile so that it can be utilized at a moment's notice. The steam eventually condenses and flows to the trap drain. For both types, the water from the steam trap must be cooled to below 140 degrees F before being discharged to the sewer according to code. The old way still found on a very large percent of sterilizers is to have water run down the drain 24/7, at rates between 0.5 – 3+ gpm. New sterilizers have water tempering devices that only run water when the steam trap operates. For older systems, kits such as the Water-Mizer are available that accomplish the same thing. These tempering devices reduce water use by 600 to 1000 gallons a day.</p>	<p>CW Estimate: 1.538 AFY 20 year life</p> <p>MWD: 1.3 AFY 15 year life</p> <p>Estimate does not distinguish between drain and ejector water modification</p>
Ejector Water Modification	For vacuum systems, the vacuum is typically created by a venturi ejector. It uses as much as 100 gallons per cycle. Both mechanical vacuum systems and water recirculation systems that circulate	CW Estimate: 1.538 AFY 20 year life

Device	Description	Savings Assumption
	<p>water through the venture and a large holding reservoir. When the water becomes too warm cold water is added until it is cool enough. The Water-Mizer Plus is an example of this technology vacuum seal in the sterilization chamber. Water passes through the ejector one time and flows to the drain. The modification takes a portion of that water and channels it into a small tank where it is used again.</p>	<p>MWD: 1.3 AFY 15 year life</p> <p>Estimate does not distinguish between drain and ejector water modification</p>
Vacuum Pump		
<p>Dry Vacuum Pump</p>	<p>Liquid ring vacuum pumps use large quantities of water as a liquid seal to create the vacuum. Unlike steam jet ejectors and liquid ring vacuum pumps, dry vacuum pumps do not require any working fluids to create a vacuum. They operate by either gas compression, or a combination of gas compression and mechanical compression.</p> <p>Vacuum pumps are used in many business and manufacturing facilities including dental and medical applications and many types of manufacturing applications. Dry Vacuum Pumps have additional benefits in that they reduce energy use and also eliminate the need for the installation and annual inspection of reduced pressure zone backflow preventers. They also eliminate venturi aspirator vacuum systems.</p>	<p>CW Estimate: 0.640 AFY 7 year life</p> <p>MWD: 0.0916 AFY 7 year life</p>
X-ray / Film Processors		
<p>X-ray or Film Processor Recycling Systems</p>	<p>Standard X-ray or film processors use a constant flow of water to cool the machine and develop the film (from .25 to 2.5 gpm)</p> <p>The recycling system captures the water in larger processors and re-circulates it back through the unit. The system includes a reservoir, pump and an algaecide dispenser.</p> <p>Many medical facilities are moving to digital x-rays which would eliminate any water use at all. This should be considered when implementing programs.</p>	<p>BMP Costs & Savings: 3.136-4.033 AFY for large developers running 24/7. 5 year life. Digital is replacing film x-ray technology. These savings will occur through natural replacement.</p> <p>MWD: 3.2 AFY 5 year life</p>
Pavement Cleaning		
<p>Pressurized Water Brooms</p>	<p>The water saving technology cleans and removes dirt from concrete, asphalt, aggregate or any other composition surface using a combination of air and water pressure.</p> <p>Replaces using a hose, nozzle or high pressure water broom (powerwasher) that typically use 8 – 18 gpm with an low flow model that uses 2.0 or less gpm.</p>	<p>CW Estimate: 0.153 AFY 5 year life</p> <p>MWD: 0.1534 AFY</p>

Device	Description	Savings Assumption
		5 year life
Industrial Process Water Use		
Industrial Process Water Use Improvement	<p>Process water in the commercial and industrial sectors is used primarily to clean products, remove or transport ingredients, contaminants, or products and to control pollution or dispose waste. Some of the more common uses of process water are for washing and rinsing, materials transfer, photographic film and x-ray processing, and pulp, paper, and packaging production. The quantities of water used for processing vary according to use and are usually site specific.</p> <p>Process washing and rinsing are water intensive but necessary operations for a number of industries, particularly metal finishing and computer chip manufacturers. Water in a rinse bath may be static, constantly flowing or flowing in a countercurrent pattern. A static rinse bath is a tank filled water and process chemicals. Products are dipped in the bath to remove contaminants and extraneous material, and the tank is regularly drained and refilled with freshwater for process that requires multiple rinses. Constant overflow rinse baths or running rinses have water continuously flowing into the tank and an overflow connected to a discharge drain. Some constant-flow rinse baths are operated continually even though they are used only occasionally. Each rinse bath is usually an essential part of the manufacturing methods and may involve delicate processes and chemical interactions. Thus rinse baths should be carefully evaluated before water-efficiency modifications are made.</p> <p>In the electronics and metal finishing industries, product components are often rinsed with ultrapure deionized water to remove the chemical residue accumulated during manufacture. Deionized water is produced from public or private sources using treatment techniques such as filtration, ion exchange, reverse osmosis, carbon absorption, or ultraviolet radiation. Because deionized water is relatively expensive to produce, reducing its use will also cut down on the cost of its production. In some cases deionized water can be treated and reused.</p> <p>Silicon Valley Study = Ten electronics firm in the study. The amount of water savings ranged from 2 to 365 million gallons annually and water use typically reduced from 20 to 40%. Annual cost savings ranged from \$28,000 to \$153,000. Paybacks were less than one year.</p>	Savings vary dramatically based upon size and use of systems.
Car Washes		
Car Wash Reclamation System	<p>Car washes can reduce their water use by 80% by reclaiming their water. The Clean Water Act legislates that car washes capture their wastewater and governs the disposal of this waste. Also, the US Environmental Protection Agency has banned the construction of new drains connected to motor vehicle disposal wells. Once this ban is enacted, more carwashes will be forced to look into reclaim systems.</p> <p>Self-service wash This is the most demanding process to address due the uncontrolled use of water in the typical self-</p>	Savings vary dramatically based upon size and use of systems. See Brown (2006).

Device	Description	Savings Assumption
	<p>service application. Successful operation requires some wash equipment modification. The first requirement for this application is to change the wand nozzle from 5 gpm-tips to 2.5- gpm tips. The second requirement will be to install a bypass circuit for the fresh-water rinse function to drop the water pressure from a standard 1,000 pounds per square inch (psi) to approximately 600 psi. Vehicle rinsing will still be efficient, but customers will be discouraged from rinsing only with fresh water, which is prevalent in a self- service environment. Water for all wash functions in this application, with the exception of fresh water rinse, can be generated by reclaim equipment. A closed- loop system can be installed due to the high amount of vehicle carry-off and evaporation found in this application. That's because the carry-off in the self-service application is greatly impacted by the absence of automated air-drying equipment.</p> <p>In-bay automatic high-pressure wash The typical in-bay automatic will use reclaim water for all wash functions except the last pass of fresh water. Here a pass is defined as one movement of the carwash equipment. Normally, reclaimed water will be used during the first pass of rinse and changed over to fresh water just before the pass is completed. This early purging is the means to clear any reclaim water from the existing lines prior to the final fresh-water rinse pass. One modification used in closed-loop environments is to make the undercarriage wash a standard feature - instead of an optional service - to ensure a high amount of vehicle carry- off. Many in-bay au</p> <p>Tunnel wash applications The typical tunnel application, depending on size and volume, will use either a single or double reclaim unit system. In a double-unit system, one unit is dedicated to reusing wash water while the second unit is dedicated to rinse water. The carwash conveyor will contain a dam, which will separate the two types of water. The wash-side unit will provide treated water for prep guns, cool down, presoak, tire blaster and high-pressure wash. The other unit will provide high-pressure rinse with a final application of fresh water to spray off any remaining reclaim rinse water. The typical tunnel application operating in a closed-loop environment sometimes will use a tank level control system, which consists of a float sensor on the wash side of the tunnel. This level control system is the mechanism used to transfer water carried over the conveyor dam from wash to rinse. The water transfer is accomplished by interconnection of the reclaim equipment. Short- length tunnels more often will use a single reclaim unit. Here, one unit will provide all water for the washing equipment up to the last high- pressure, low- volume fresh water rinse.</p>	
Landscape & Irrigation		
Drip or Low Precipitation Irrigation System	Drip, micro, low volume or low precipitation irrigation is the slow application of water to a plant's root zone. This delivery reduces evaporation and eliminates overspray. Plants thrive on the optimum balance of oxygen and moisture around their roots.	Savings not available.
Weather Based Irrigation Controller	Weather based, ET or "smart" controllers use local weather and landscape conditions to tailor irrigation schedules to actual conditions on the site or historical weather data. Instead of irrigating	AWE Library Estimate Residential - 0.041 AFY

Device	Description	Savings Assumption
	<p>according to a preset schedule, advanced irrigation controllers allow irrigation to more closely match the water requirements of plants. The controllers automatically adjust the schedule. The weather based controllers on the market today derive irrigation schedules from either average historical or real-time evapotranspiration (ET) data, which is a function of weather conditions and plant type.</p>	<p>Commercial - 0.895 AFY 10 year life</p> <p>MWD: Residential – 0.04145 AFY/Controller Commercial - 0.325 AFY/Acre 10 year life</p>
<p>Central Irrigation Controllers</p>	<p>Central irrigation control enables the programming, monitoring, and operation of many irrigation system components from a single location. Central control systems are designed to allow a user to control one site, or a set of sites, from a single computer. The central control software allows staff to automatically communicate to the field (or satellite) controllers, which in turn operate the irrigation valves as commanded.</p> <p>Irrigation schedules and other data can be sent by the central computer to the field controllers through a variety of ways; via telephone lines, cellular telephone, hardwire, or point to point radio signal. The control unit acts as the system’s middle manager and communicates to the individual field satellites in order to manage the water application of each area according to their needs.</p> <p>Some of the unique features of central control include the ability to:</p> <ul style="list-style-type: none"> • Operate multiple sites and controllers from one location • Adjust the irrigation schedule automatically based on local weather conditions • Locate excessive flow problems, pipe breaks or leaks • Remotely turn off controllers due to flow problems, breaks or leaks • Generate site specific water budgets and adjust remotely 	<p>MWD: 0.325 AFY/Acre; 10 year life</p>
<p>High Efficiency Nozzles for Pop-Up Spray Heads</p>	<p>Standard pop-up spray heads are retrofitted with a rotating nozzle. The multi-trajectory, rotating streams of the rotating nozzles apply water slower and in a more uniform pattern than traditional sprays and rotors. By adjusting the arc and radius of the spray pattern, even more savings can be gained. Additional water-saving advantages include better wind resistance, less misting and virtually no run-off.</p> <p>MWD currently requires the head or valve be pressure regulated in order to be eligible for the incentive.</p>	<p>MWD: 0.004 AFY/Nozzle 5 year life</p>
<p>High Efficiency Nozzles for Large Rotary Nozzles</p>	<p>The metal replacement nozzles are resistant to wear and provide better uniformity of water distribution than traditional sprinkler heads. This allows for shorter watering times. These nozzles are mostly used for open landscape areas for long range and close-in watering. The high efficiency nozzles provide a healthier and greener turf that also saves water and energy.</p>	<p>MWD: 0.018 AFY/Nozzle 5 year life</p>
<p>Synthetic Turf</p>	<p>Artificial or synthetic turf is a natural grass replica. Its intended purpose is to replace natural grass in</p>	<p>MWD:</p>

Device	Description	Savings Assumption
	<p>areas where it is hard to grow grass and where water efficiency is promoted as a way of life. The product is applicable for both commercial and residential sites and eliminates the need for watering, mowing and poisonous chemicals for fertilization. Additionally, synthetic turf eliminates runoff due to over watering. These benefits translate to decreased pollution in the air and groundwater and oceans. Artificial turf or AstroTurf has been used as a sport surfacing material used by NFL teams and other agencies for over 38 years. The product currently costs \$6.00 - \$7.00 per square foot installed.</p>	<p>0.00014 AFY/square foot 10 year life</p>
Turf Removal	<p>A Turf Buy Back Program would offer customers an incentive to remove their existing lawn and install drip or low precipitation rate irrigation for remaining or new plants. Although a large scale program has been extremely successful in southern Nevada it is still to be determined if a turf buy back program can be cost effective in California.</p>	<p>AWE Library Estimate: Residential – 0.134 AFY Commercial – 5.404 AFY 10 year life</p>
Drought Tolerant/Native/Regional Plants	<p>Native species of trees, grasses, and other plants are well adapted to regional climates, soils and pests. Because of this, they require less water, fertilizer and pesticides.</p>	<p>Savings not available.</p>
Landscape Design	<p>To minimize water use and maintenance in landscape, the design needs to be done well. This includes: identifying existing conditions and putting plants in the right place, grouping plants according to their watering needs, planning for appropriate lawn area, designing an efficiency watering system, choosing a good controller, incorporating hardscape and knowing local weather and microclimate in order to select the best plants.</p>	<p>Savings would vary significantly depending on adopted design.</p>
Other Outdoor Water Use		
Rainwater Catchment	<p>Rainwater catchment is an age-old method of catching rain from a surface (generally, a rooftop) and transporting it through a conveyance system (usually gutters and downspouts) to a storage container. This water can be used for domestic supplies, agriculture, landscape, water features (like fountains), public supply, or storm runoff control.</p> <p>At the moment, two types of systems are generally used. These include do-it-yourself and commercial systems. Both of these systems are known under the term water harvesters and require only a limited amount of knowledge to set up (if basic systems are used). In both cases, the system consists of a storage tank to store the water and piping (to guide the water in). Additionally, extra pressuring equipment such as pressure vessels, inline pump controllers or pressure sensitive pumps may also be required. Finally, water purifying equipment such as water-purifying plants, UV-lights or distillation equipment are sometimes (depending on local conditions added to purify the collected water).</p> <p>The system is then called a graywater treatment system. Graywater systems are usually preferred over regular water harvesters as they allow the system to not only treat the rainwater, but water from other sources as well. Depending on local circumstances, a gravity-fed system may already be enough to have a pressured water collection system. In the latter case, no pumps/pressure vessels are thus required to have a pressured system. In practice, gravity-controlled systems are usually created by</p>	<p>Savings would equal the fraction of captured rainwater that displaces conventional irrigation or used for toilet flushing.</p>

Device	Description	Savings Assumption
Pool Covers	<p>placing the water harvester on an elevation (eg rooftops).</p> <p>Pool covers prevent water evaporation, keeps water clean so back washing can be less frequent and therefore can reduce the requirement for make up water by 30-50%. If a pool is heated, the heat loss can be reduced by 50-70%. Less evaporation means the customer will reduce their chemical usage by 35-40%. The savings are realized predominately during summer peak demand periods, when evaporation is the highest. Backwash water can also be recovered for used on landscape. The main issue is will customers use the cover during the months when they use the pool the most.</p> <p>There are several different kinds of covers: bubble, vinyl and insulated vinyl. In order to achieved significant water evaporation reduction it is recommended the thickness by at least 12 millimeters. Covers cost from \$75 without a wheel to \$120+ with a wheel.</p>	Koeller (2004): 0.028 AFY. Useful life of 5 yrs.
Pond and Water Feature Recycling	Water features such as fountains, ponds, lakes or water displays recycles water as opposed to once-through use.	Savings would be based on size of pond or water feature
Utility Programs		
Service Pressure		
Service Pressure Reduction	Flow rate is related to pressure, therefore the maximum water flow from a fixture operating on a fixed setting can be reduced if the water pressure is reduced. For example, a reduction in pressure from 100 psi to 50 psi at an outlet can result in water flow reduction of about one-third. Water pressure reductions can also save water by reducing the likelihood of leaking water pipes, leaking water heaters, dripping faucets, and burst pipes. As study in Denver, Colorado demonstrated an annual water savings of about 6 percent per home.	Savings not available.
Metering		
Submetering Multi-family	<p>Utility submetering is the implementation of a system that allows a landlord, property management firm, condominium association, homeowners association, or other multi-tenant property to bill tenants for individual measured utility usage. This is common for electric and gas utilities but not with water.</p> <p>Without submetering, many landlords either include the utility cost in the bulk price of the rent or lease, or divide the utility usage among the tenants in some way such as equally, by square footage, or some other means. Without a meter to measure individual usage, there is less incentive to conserve or stop water leaks, since the other tenants or landlord may pay all or part of those costs. Submetering creates awareness of water conservation since the tenant will pay for all of their usage and any leaks they allow to remain unrepaired. Conservation also allows property owners to keep the cost of rent reasonable and fair for all units regardless of how much water they consume.</p> <p>A submetering system typically includes a "master meter", which is owned by the utility supplying the water with overall usage billed directly to the property owner. The property owner or manager then places their own private meters on individual tenant spaces to determine individual usage levels and bill each tenant for their share. In some cases, the landlord might add the usage cost to the regular rent or lease bill. In other cases, a third party might read, bill, and possibly even collect for the service.</p>	National Submetering and Allocation Billing Program Study (2004): Average reduction of 15.3% +/- 9.3% -- about 0.025 AFY/dwelling unit

Device	Description	Savings Assumption
	<p>Some of these companies also install and maintain meters and reading systems.</p> <p>A study done by the Santa Clara Valley Water District has shown savings of up to 20% when submeters were installed.</p>	
Dedicated Irrigation Meters	<p>A dedicated irrigation meter is a water meter that exclusively meters water used for outdoor watering and irrigation. For many years utilities installed these meters for parks, medians, and playing fields, but more recently it has become common practice to install a separate meter for indoor and outdoor uses at many large sites with a significant irrigation demand. Even for residential properties, there is a movement to use dedicated irrigation meters.</p> <p>From the utility perspective, a separate meter just for irrigation provides the following benefits:</p> <ul style="list-style-type: none"> • Accurate independent measurement of outdoor (and consequently indoor) use. • Better ability to manage peak demands driving by irrigation. • Ability to offer alternative pricing structures for domestic and irrigation water use. • Improved price signaling for outdoor water use. • Additional drought management tool. <p>From the customer perspective, a separate irrigation meter provides the following benefits:</p> <ul style="list-style-type: none"> • Accurate measurement of outdoor water use. • Reduced wastewater bills as in most case volumetric wastewater charges only apply to indoor usage. • Separate shutoff for the irrigation system. <p>The only real negative associated with dedicated irrigation meters is the additional cost required for purchase of the meter and installation.</p> <p>In general dedicated irrigation meters are a great benefit both to water utilities and to their customers and should be encouraged.</p>	
Water Budgets	<p>A water budget is the calculated amount of water a customer needs for their site for a specific month.</p> <p>Each customer’s water budget is unique and based on the number of persons per home, the lot size and the local weather. Water budgets will vary monthly based on seasonal outdoor watering needs.</p> <p>A water budget can be an educational tool where customers are given information on their water needs and their performance to that budget. The budget can also be part of a rate structure.</p> <p>This budget or allocation is used to bill the customer based upon a tiered rate structure. The higher the water usage; the higher the billing rate. If a customer stays within their water budget, then they are</p>	<p>AWE Library: Large Landscape – 1.763 AFY 10 year life</p> <p>Estimates of 20% reduction per site.</p>

Device	Description	Savings Assumption
	<p>billed at a low per unit rate. As their usage escalates over their budget the price increases with the top tier being the most costly.</p> <p>The water budget, in combination with the tiered billing rate structure, is an equitable method for customer billing. Customers are given an allotment that is based upon their needs and, if they stay within that budget, they will be able to keep their bill down.</p> <p>This structure puts the control in the hands of the customer by providing a target use that is unique to their circumstances. As designed, this structure encourages conservation by providing an incentive to use water wisely.</p>	
System Leak Detection and Loss Control	<p>Unaccounted for or non revenue water is water that has been produced and is “lost” before it reaches the customer. Losses can be real losses (through leaks, sometimes also referred to as physical losses) or apparent losses (for example through theft or metering inaccuracies). High levels of unaccounted for water are detrimental to the financial viability of water utilities, as well to the quality of water itself. Unaccounted for water is typically measured as the volume of water "lost" as a share of net water produced. A standard goal is to keep this number under 10%.</p> <p>Leak detection, or the systematic search for leaks within a utility distribution system, helps identify where potential losses are in the infrastructure itself. While many leaks are detected when utility personnel or citizens observe water flowing out of the ground, an effective leak detection program uses electronic equipment to identify leak sounds and to pinpoint the precise locations of underground leaks. Because leaks can develop at any time, detection must be an ongoing program rather than a one-time project. Then a utility can prioritize repairs and replacements in the system.</p>	Savings potential should be based on results of the water balance and economic level of leakage analysis.

Other Measures to Consider:

- Wet Cleaning
- Clean In Place Technology (Industrial Process)
- Filter Upgrades
- Waterless Wok
- Central Flush Systems
- Composting Toilets

Appendix 2: Saturation Data and Spreadsheet Calculator

The Device Saturation Calculator used for this report calculates the number of devices (inventory) and the percentage of the inventory that are conserving devices. Enclosed in the disk provided in the back of this document is the electronic version of the calculator titled “IEUA Residential Device Saturation 08_2010.”

The following section provides background and calculation methodology for the Device Saturation Calculator.

The devices are defined below:

Conservation Device Definitions

Conservation Device	Market	Definition
Ultra Low Flush Toilet (ULFT)	Single Family	1.6 gallons per flush – code since 1992
Ultra Low Flush Toilet (ULFT)	Multi-Family	1.6 gallons per flush – code since 1992
High Efficiency Toilet (HET)	Single Family	1.28 gallons per flush – will be code in 2014
High Efficiency Toilet (HET)	Multi-Family	1.28 gallons per flush – will be code in 2014
Low Flow Showerhead	Single Family	2.5 gallons per minute – code since 1992
Low Flow Showerhead	Multi-Family	2.5 gallons per minute– code since 1992
High Efficiency Clothes Washer	Single Family	4.0 water factor – 4 gallons per wash cycle per ft ³
High Efficiency Clothes Washer (in residence not common area)	Multi-Family	4.0 water factor – 4 gallons per wash cycle per ft ³
ENERGY STAR® Dishwasher	Single Family	Energy Star labeled 5 – 10 gallons per cycle
ENERGY STAR® Dishwasher	Multi-Family	Energy Star labeled 5 – 10 gallons per cycle

Figure 62: Conservation Device Definitions

Below is an overview of the methodology used for the saturation calculations as well as the corresponding data sources.

Data Parameters for Saturation Calculations

Data were collected from IEUA’s member agencies, the California Urban Water Conservation Council, and from the California Department of Finance. Collected data included housing units, conservation activities, growth rates and other relevant items.

Past active conservation (devices previously installed or distributed through active programs) was collected from IEUA and MWD regional programs.

The table below shows parameters drawn from either 1) the member agency's BMP Base Year data or 2) from empirical studies when not available otherwise.

Parameters	Value	Source
Single Family Showers per Household	1.8	EBMUD 2002, Market Penetration Study
Single Family Percentage of Households with Clothes Washers	93.0%	EBMUD 2002 Market Penetration Study (90%); OC Saturation Study 2002 (96.5%)
Single Family Toilets per Structure	3	BMP Base Year Data
Single Family Percentage of Households with Dishwashers	65.0%	EBMUD 2002, Market Penetration Study (60%), OC Saturation Study 2002 (83.0%)
Multi-family Showers per Households	1.1	EBMUD 2002, Market Penetration Study
Multi-family Percentage Households with Clothes Washers	26.0%	OC Saturation Study 2002 (25.6%)
Multi-family Toilets per Structure	2	BMP Base Year Data
Multi-family Percentage of Households with Dishwashers	48.0%	EBMUD 2002, Market Penetration Study (30%), OC Saturation Study 2002 (65.8%)

Figure 63: Data Parameters Used for Saturation Modeling

The table below shows the assumed rates of natural replacement for each of the water consuming devices. These figures show assumptions that are based on expected product life spans.

Natural Replacement Rates per Measure

Measure	Market	Natural Replacement Rate
High Efficiency Toilets	Single and Multi-family	4%
Ultra Low Flush Toilets	Single and Multi-family	4%
High Efficiency Washers	Single and Multi-family	3%
Low Flow Showerheads	Single and Multi-family	5%
ENERGY STAR® Dishwashers	Single and Multi-family	3%
Low Flow Faucets	Single and Multi-family	4%

Figure 64: Assumed Rates of Natural Replacement per Measure

The category entitled **Existence/Adoption/Compliance Rate** refers to the percent of conserving devices chosen or mandated at the time of replacement or new construction. For example, if the plumbing code requires conserving devices, 100 percent of the devices installed are assumed to be conserving devices whether replacing existing fixtures or new construction.

Measure	Market	Existence/Adoption/Compliance Rate
High Efficiency	Single and Multi-	The use of HETs is assumed to be 0 percent until 2001 when 2

Toilets	family	percent of toilets are HETs, increasing by 4% linear per year until 2014 when 100% of toilets replaced or in new construction are required to be HETs.
Ultra Low Flush Toilets	Single and Multi-family	100% from 1992 to 2001 when it is assumed that 2 percent were HETs rather than ULFTs, and decreasing by 4 percent per year until 2014. In 2014 it is 0 percent because HETs will be required.
High Efficiency Washers	Single and Multi-family	Starting at 2 percent in 1997, the market share is assumed to increase by 2.5 percent per year.
Low Flow Showerheads	Single and Multi-family	100% from 1992 to present.
ENERGY STAR® Dishwashers	Single and Multi-family	Starting in 1997 at 2% of market share and increasing by 2.5 percent of market share thereafter.
Low Flow Faucets	Single and Multi-family	Starting in 1997 at 2% of market share and increasing by 2.5 percent of market share thereafter.

Figure 65: Existence/Adoption/Compliance Rates per Measure

Saturation Calculation Methodology

The saturation calculation takes the number of housing units for single family and multi-family sectors and multiplies them by the number of devices per household. The end result is the inventory of devices for the entire sector from the base period starting in 1991 and running to the end of the planning period.

Using the rates of natural replacement and the total inventory, the model then calculates the number of existing fixtures that are replaced each year. The model separately calculates the number of fixtures from new construction to determine the number of conservation devices that are required by plumbing code in new construction.