

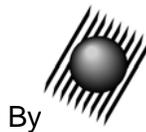
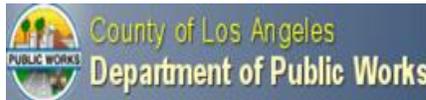
Final Draft

**Santa Clarita Valley
Water Use Efficiency Strategic Plan**

August 2008



Santa Clarita Valley Family of Water Suppliers



By

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TABLE OF CONTENTS

Table of Contents	2
Executive Summary	4
Chapter 1: Introduction	6
Purpose and Goal of the Plan.....	6
Santa Clarita Valley Family of Water Suppliers.....	6
Water Sources and Uses in the Valley	7
Chapter 2: Approach	10
Process to Develop the WUE Strategic Plan	10
Chapter 3: Customer Demand Profile	12
Water Use.....	12
Water Use by Supplier	13
Housing Units	16
Past Achieved Conservation	19
Conservation Device Saturation	19
Using Customer Demand Profiles for Conservation Planning	24
Chapter 4: Available Conservation Measures	25
Potential Conservation Measures.....	25
New Construction Building Code.....	28
Chapter 5: Potential Programs.....	33
Program Evaluation Criteria	33
Potential Program Concepts.....	34
Stakeholder Workshop #1.....	37
Development of Detailed Program Modules	37
Stakeholder Workshop #2.....	38
Chapter 6: Recommended Programs.....	41
Program Mix Considerations	41
Conservation Program Costs and Savings	42
Water Savings from Recommended Water Use Efficiency Programs	43
Recommended Conservation Program Details	48
Chapter 7: Implementation Plan.....	59
Facilitating Actions.....	59
Partnerships.....	59
Trade Organizations.....	59
Funding Opportunities	60
Program Life cycle.....	61
Appendix A.1: Conservation Measure Guide	65
Appendix A.2: Additional Programs/Modifications to Proposed Programs ...	66
Santa Clarita Valley Aggressive High Efficiency Toilet Rebate Program.....	67
Santa Clarita Valley Industrial Process Audits and Incentives Program.....	69
Appendix A.3: Conservation – Past Achievements.....	76
CLWA – Santa Clarita Water Division	76
Los Angeles County Waterworks District No. 36	77

Newhall County Water District	78
Valencia Water Company	80
Appendix B.1: Economics - Avoided Cost Analysis.....	83
Short-Run Avoided Costs	83
Long-Run Avoided Costs	84
Appendix B.2: Economics – Cost and Savings Assumptions.....	85
Global Assumptions.....	85
Recommended Active Programs.....	85
High Efficiency Toilets.....	85
Large Landscape Audit and Incentives.....	85
CII Audits and Customized Incentives	86
Landscape Contractor Certification	86
High Efficiency Clothes Washer Rebates.....	86
Joint Marketing – Valley Wide.....	87
Active Programs to Consider Further	87
Cash for Grass.....	87
Industrial Audits.....	88
High Efficiency Toilets, Aggressive Implementation	88
New Construction Code.....	89
HE Toilets	89
Residential Landscape	89
Faucet Aerators and Showerheads.....	89
High Efficiency Dish Washers.....	90
CII and Landscape Sectors.....	90
Passive Conservation	90
Appendix C.1: Stakeholder Meeting 1 Presentation	95
Appendix C.2: Stakeholder Meeting 2 Presentation	113
Appendix D: Water Rates and Conservation.....	134
Introduction.....	134
Linkages Between Rates and Water Use	134
Using Rates to Influence Customer Demand for Water	136
Conservation-Oriented Rate Designs.....	137
Increasing-Block Rates	137
Seasonal Rates	139
Budget-Based Rates	139
Drought Pricing.....	141
Hybrid Designs	141

EXECUTIVE SUMMARY

The Santa Clarita Valley Family of Water Suppliers (the Suppliers) has joined together to develop a plan to ensure the efficient use of water in our Valley. The Santa Clarita Valley Water Use Efficiency Strategic Plan (the Plan) includes programs and projects that will most effectively reduce the per capita water use in the Valley. The goal of the Plan is to achieve a long term reduction in water demand of at least 10% over the next 20 years.

This Plan is a tool that will generally guide the actions of the Suppliers by providing a broad perspective on a number of demand side management issues and opportunities. The Plan is described in seven chapters providing detailed information on the approach, data procurement and analysis, available water use efficiency (WUE) opportunities, defined potential program concepts, stakeholder process, recommended program mix, and funding opportunities.

Chapter 1 describes the purpose of the Plan and it provides an introduction to the Santa Clarita Valley Family of Water Suppliers:

- Wholesale Supplier
 - Castaic Lake Water Agency
- Retail Suppliers
 - Valencia Water Company
 - Santa Clarita Water Division
 - Newhall County Water District
 - Los Angeles County Waterworks District #36

Chapter 2 provides an overview of our process and approach to developing the Plan. The specific tasks were defined as follows:

- Gather end-user data and organize by sector
- Brainstorm potential water use efficiency program concepts
- Recommend viable programs
- Develop program modules
- Recommend a program mix and 5 year plan
- Finalize the WUE Strategic Plan
- Perform economic analysis

Chapter 3 provides an overview of the Customer Demand Profile—the data-intensive background work completed for the Plan. This chapter details information on data gathering methods, data content, data validation, and provides examples of some of these results. The sources of data include:

- Account level water consumption data
- The 2005 Urban Water Management Plan
- BMP Reports
- Other documents provided by agencies

Chapter 4 lists the specific WUE Measures that were identified as potentially viable for the Santa Clarita Valley. The project team cast a very wide net to identify all potentially relevant measures.

Chapter 5 describes the development of specific program concepts and their presentation to the stakeholder workshops. This constituted the next step in the process that specifically defined the optimal delivery method for each technology under consideration. Using a broad economic analysis, the program costs and benefits were projected for each program concept. This chapter also covers the stakeholder workshop inputs and outputs based on the presentations and stakeholder feedback.

Chapter 6 sets forth the Recommended Program Mix and economic analysis. The avoided supply costs are described, as well as program costs and savings.

Chapter 7 provides a 5 Year Implementation Plan that details the timing and resource requirements of the Recommended Programs. Also included are Facilitating Actions, such as potential partnerships, trade organizations, and funding opportunities.

Table E.1 - Five Year Implementation Plan: Budget and Savings

Program	2009	2010	2011	2012	2013
HET Rebates					
Savings (AFY)	15	31	46	61	76
Large Landscape Audits (w/ Incentives)					
Savings (AFY)	38	76	115	153	191
CII Audits and Customized Incentives					
Savings (AFY)	53	105	158	210	263
Landscape Contractor Certification (WBIC & Sprinklerheads)					
Savings (AFY)	50	151	301	502	753
HE Clothes Washer Rebates					
Savings (AFY)	5	11	16	21	26
New Construction Code					
Savings (AFY)	445	911	1,397	1,682	1,978
Total Annual Savings (AFY)¹	607	1,284	2,033	2,629	3,287
Total Annual Budget (in Thousand \$)	\$ 743	\$ 820	\$ 823	\$ 903	\$ 983

¹ Total Annual Savings are those produced in the first five years from program implementation over the first five years. Savings after five years continue due to device lifespans that exceed five years and due to future program implementation over the course of the planning period.

Appendices A.1 to A.3 provide an overview of the universe of water use efficiency measures and additional detail on water use efficiency programs. Appendices B.1 to B.2 describe the economic analysis. Appendices C.1 to C.2 contain materials from the stakeholder meetings. Appendix D provides an analysis of Water Rates and Conservation.

CHAPTER 1: INTRODUCTION

Purpose and Goal of the Plan

Water is a valuable natural resource in California, requiring efficient management to ensure the availability of sufficient supplies to meet both the state and local area's agricultural, domestic, industrial, and environmental needs. The increasing demand for water requires efficient use and elimination of waste as important strategies in the overall management of water resources. Efficient and effective management of the public's demand for water is also an important element in meeting the long term water needs of the state and locally in the Santa Clarita Valley. The public simply needs to be provided the tools and education so that they can use water efficiently.

The Santa Clarita Valley Family of Water Suppliers (the Suppliers) joined together to develop a plan to ensure the efficient use of water in our Valley. The Santa Clarita Valley Water Use Efficiency Strategic Plan (the Plan) includes programs and projects that will most effectively reduce the per capita water use in the Valley. The goal of the Plan is to achieve a long term reduction in water demand of at least 10% over the next 20 years.

This Plan is a planning tool that will generally guide the actions of the Suppliers. It provides the Suppliers with a broad perspective on a number of demand side management issues and opportunities. The identification of such opportunities, and the inclusion of those opportunities in this Plan, neither commits a supplier to pursue a particular water use efficiency opportunity, nor preclude a supplier from exploring water use efficiency opportunities not identified in the plan.

Funding and demographics will be key issues in how aggressively each Supplier can implement the water use efficiency (WUE) programs. Nonetheless, each Supplier is committed to implementing many of the water use efficiency programs in their respective service territories.

Santa Clarita Valley Family of Water Suppliers

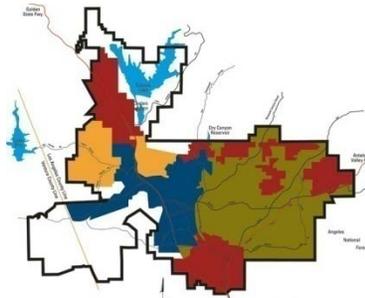
The Santa Clarita Valley is served by the following water suppliers:

- Wholesale Supplier
 - Castaic Lake Water Agency (CLWA)
- Retail Suppliers
 - Valencia Water Company (VWC)
 - Santa Clarita Water Division (SCWD) of CLWA
 - Newhall County Water District (NCWD)
 - Los Angeles County Waterworks District #36 (LACWWD #36)

CLWA is a public water agency that serves areas in Los Angeles and Ventura Counties. The Agency is a water wholesaler that provides more than half of the water used by Santa Clarita households and businesses. CLWA receives and treats surface (“imported”) water from the State Water Project. The Santa Clarita Valley’s four retail suppliers distribute the treated water.

The four retail suppliers provide water service to most residents of the Valley.

Figure 1.1 –Supplier Service Areas



LACWWD #36’s service area includes the Hasley Canyon area in the unincorporated community of Val Verde. During most years, the District obtains its water supply from CLWA.

NCWD’s service area includes portions of the City of Santa Clarita and unincorporated portions of Los Angeles County in the communities of Newhall, Canyon Country, Saugus, and Castaic. The District supplies water from local groundwater and CLWA imported water.

SCWD’s service area includes portions of the city of Santa Clarita and unincorporated portions of Los Angeles County in the communities of Canyon Country, Newhall, and Saugus. SCWD supplies water from local groundwater and CLWA imported water.

VWC’s service area includes a portion of the City of Santa Clarita and unincorporated portions of Los Angeles County in the communities of Castaic, Stevenson Ranch, and Valencia. VWC supplies water from local groundwater, CLWA imported water, and recycled water.

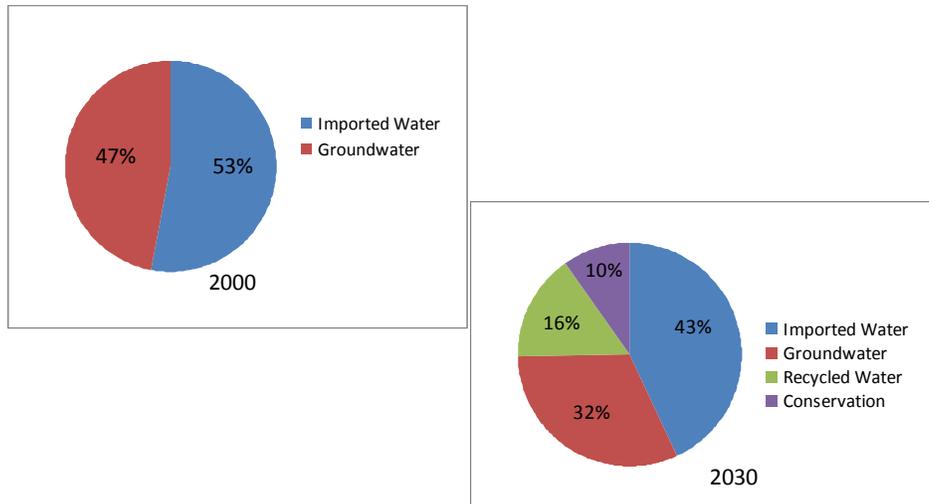
Water Sources and Uses in the Valley

The Santa Clarita Valley is a fast growing area located in Northwest Los Angeles County. The amenities of the Valley have attracted both residential and commercial customers. Water suppliers in the area rely on local groundwater supplies and, since 1980, on water imported from the State Water Project and other imported sources.

The water suppliers of the Santa Clarita Valley are at an important crossroads. The 2005 Urban Water Management Plan and the 2007 Santa Clarita Valley Water Report describe the reliance on ground water and imported supplies and the ongoing growth in demand. It indicates under current planning scenarios that water use practices must change in the Valley to reduce per capita water demand. This plan focuses its attention on water use efficiency in the Santa Clarita

Valley that provides not only an informed basis for additional investments but also the support and direction needed to secure funding for those water efficiency measures.

Figure 1.2 –Water Supply Sources



By implementing a portfolio of water use efficiency programs, Santa Clarita Valley and the water suppliers will benefit in a number of ways:

- **Cost avoidance for purchased water-** Although Santa Clarita Valley has projected adequate water supply for the near future, the cost of water has risen dramatically and is expected to continue to rise. The best way to avoid purchasing expensive imported water is to use less through efficiency. Programs are an effective efficiency mechanism.
- **Limited State Resources-** California's water resources are becoming increasingly stretched due to population, housing growth, and decreased water supply from state water projects. Agencies need to stretch water supplies and increase efficiencies.
- **Drought Preparedness-** It is inevitable that Southern California, as well as the state, will experience another drought. The big question is when and how severe the next one will be. One way to lessen the severity of a drought's effect on Santa Clarita Valley is to prepare in advance for this event by creating a community that operates at a high level of efficiency.
- **Environmental Sustainability-** As a signatory to the California Urban Water Conservation Council, Santa Clarita Valley and its suppliers undertook the obligation to implement the BMPs for water conservation.
- **Reduced Carbon Footprint-** The production and delivery of water requires a tremendous amount of energy on both a statewide and local level. The Santa Clarita Valley can do its part to reduce green house gases by becoming water efficient.

- **Reduced Waste Water Flows**- Sanitation plants and systems must be sized to meet historic and planned waste water flows. Increasing the efficient use of water will result in a reduction of waste water into the system.
- **Reduced Urban Runoff** – Achieving increased water use efficiency outdoors means less water running off landscaped areas into the streets, storm drains, and ultimately into the Santa Clara River. Education efforts and installation of efficient technologies will ensure that more of our valuable water is delivered to appropriate landscaping and less of it pollutes our communities as urban runoff.

To direct the preparation of the Plan, Santa Clarita Valley secured the services of A&N Technical Services (A&N), Maureen Erbeznik and Associates, Gary Fiske and Associates, David Mitchell of M. Cubed, and John Koeller and Associates.

With a commitment to achieve a water demand reduction of at least 10% over 20 years, Santa Clarita Valley has elected to strive for responsible environmental leadership. The WUE Strategic Plan forms the blueprint for implementation of this goal.

CHAPTER 2: APPROACH

In order to create the WUE Strategic Plan for Santa Clarita Valley, the project team deployed the following project tasks:

Process to Develop the WUE Strategic Plan

- ***Task 1-Specify Planning Goals.*** The SCV Family of Water Suppliers developed specific planning goals through the following steps:
 - A&N led initial meeting to elicit project goals from water supplier staff
 - Follow-up staff interviews to clarify ambiguities
 - Documented goals and objectives based on the initial meeting and interviews
 - Review at Stakeholder workshops
- ***Task 2 – Develop Customer Profile.*** A&N created a solid base of knowledge regarding existing conditions and opportunities by customer class and subclass as well as discovery regarding existing industry programs, technologies and ordinances that could benefit the Santa Clarita Valley.
- ***Task 3 – Develop Means of Measuring Savings.*** A & N Technical Services created a comprehensive tool demonstrating expected water use efficiency savings. Included in the Santa Clarita Valley WUE Strategic Plan are estimates of costs and savings to the year 2030.
- ***Task 4 – Identify Water Use Efficiency Measures.*** The consultant team researched a list of possible technologies, delivery mechanisms and programs. A set of Program Evaluation Criteria were developed in collaboration with water supplier staff. Each program was evaluated on a preliminary basis for cost-effectiveness, water savings potential, and ease of implementation and other key criteria of an effective program. The team then worked to refine program options and develop a short list of programs to be analyzed on a more in-depth basis.
- ***Task 5 – Analyze Cost and Benefits.*** The consultant team developed an avoided cost forecast using the AwwaRF Avoided Cost model.
- ***Task 6 – Select Water Use Efficiency Measures.*** The short list of programs was further expanded to include more program detail such as the marketing outreach, incentive format, potential program partners, preliminary budget and staffing requirements. Stakeholders and consultants eliminated low ranking programs and created a program package (the recommended package) showing the 5 year roll out plan. The plan was presented to the Santa Clarita Valley Family of Water Suppliers.

- Task 7- Develop WUE Strategic Plan.** Following review, the A&N team created this document, the Santa Clarita Valley WUE Strategic Plan, to be submitted for approval. The Plan delivers a balanced portfolio of cost-effective programs for Santa Clarita Valley Suppliers' end-use customers.

An overview of the WUE Strategic Plan process is depicted below:

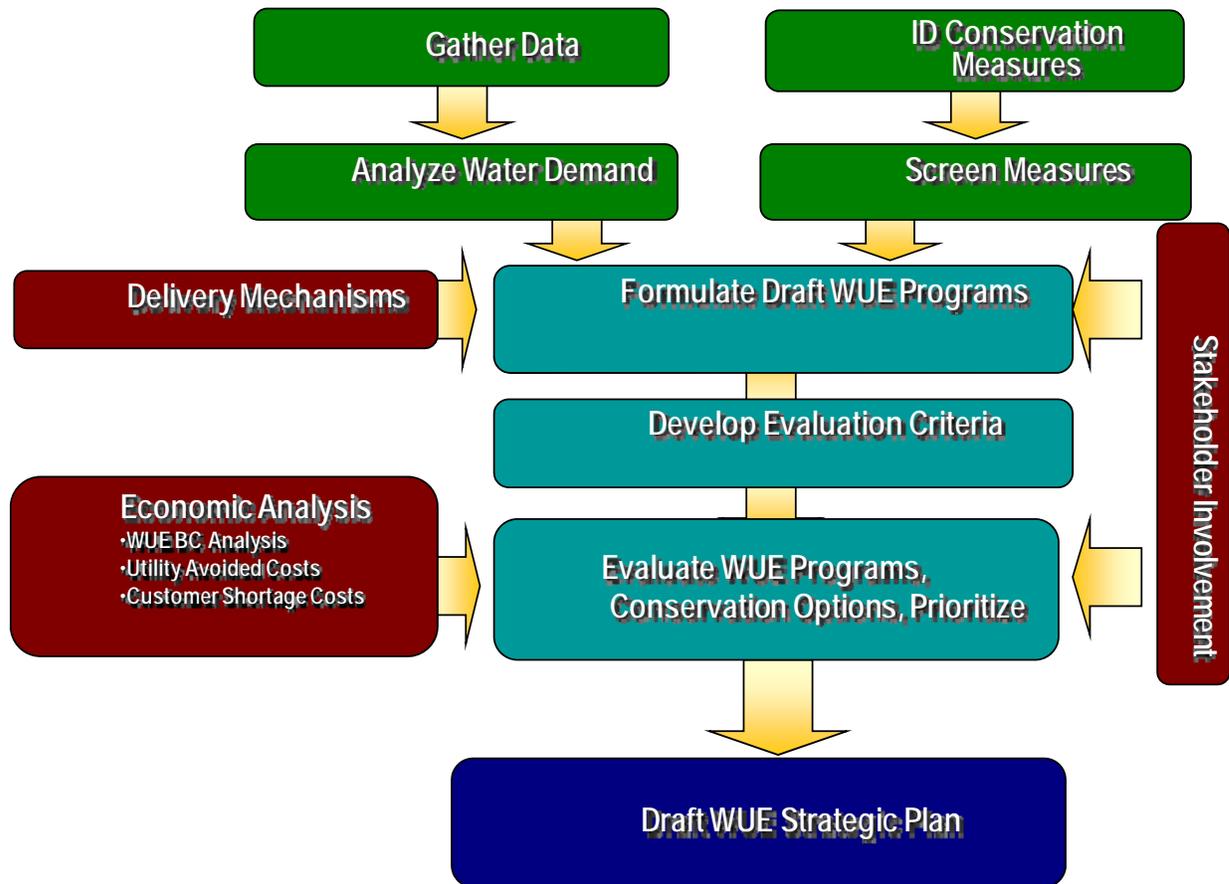


Figure 2.1 - WUE Strategic Plan Process

CHAPTER 3: CUSTOMER DEMAND PROFILE

The customer demand profile consists of the following components:

- Water Use Analysis
- Housing Units
- Past and Present Water Use Efficiency Programs
- WUE Device Saturation Analysis

Water Use

The next step in the process was to analyze water use tabulated into the following categories: 1) single-family residential, 2) multi-family residential, 3) dedicated landscape meters, 4) commercial, industrial, and, institutional (CII), 5) construction, and 6) recycled. This task was complicated (typically so) because each of the four retail water agencies have unique customer account data fields and formats. The water use analysis forms the foundation of the WUE Strategic Plan by first providing an understanding of water use by sector, supplier, and season, and by providing the foundation for designing programs to include in the Plan.

The process included data collection, category identification, validation, and tabulation. A & N Technical Services Inc. acquired the data by contacting the suppliers and requesting a data dump from their billing systems. A detailed data request was presented to each of the suppliers and each agency provided account level data for all customers for the most recent complete year (2006). The data included account number, account name, service address, account type, meter size and monthly volume reads. A&N ensured that all individual customer information was kept secure and confidential. Customer account identifiers and class categories were examined and each account was assigned one of the six common categories. All accounts that could be identified as dedicated landscape were grouped together because of the commonality of applicable WUE measures. Total water use was validated with existing sources such as the Urban Water Management Plan, BMP Reports, and other planning documents and data sources unique to each supplier.

As shown in Table 3.1, data on more than 66,000 accounts was collected, summing to over 30 million ccf (hundred cubic feet) per year. The single-family sector is the largest in terms of both number of customers and volume of water use.

Table 3.1 – Summary of Customers and 2006 Water Use

Customer Category	Number of Accounts	Water Use in 2006 (ccf)	Percent of Total Volume
Single Family	55,900	16,311,530	53.7%
Multi-Family (1)	5,374	3,174,067	10.4%
Dedicated Landscape	1,400	4,202,332	13.8%
Commercial, Industrial, and Institutional	3,155	5,736,791	18.9%
Construction	568	824,043	2.7%
Recycled	10	134,618	0.4%
Total	66,407	30,383,381	100.0%

(1) The total of 5374 multi-family accounts serves 28487 multi-family housing units.

Water Use by Supplier

Table 3.2 summarizes the number of accounts and water use for each of the suppliers in the Santa Clarita Valley Family of Water Suppliers.

Table 3.2 – Summary of Accounts and 2006 Water Use by Supplier

Valencia Water Company Category	Customer	Number of Accounts	Water Use in 2006 (ccf)	Mean Use per Account
Single Family		25,093	6,232,892	248
Multi Family (1)		333	595,528	1,788
Landscape		444	1,438,740	3,240
CII		1,910	4,351,654	2,278
Construction		135	397,440	2,944
Recycled		10	134,618	13,462
Total		27,925	13,150,872	471

(1) VVC has 333 accounts servicing 7827 multi-family housing units.

Santa Clarita Water Division Customer Category	Number of Accounts	Water Use in 2006 (ccf)	Mean Use per Account
Single Family	20,789	6,917,065	333
Multi Family (2)	4,671	1,884,470	403
Landscape	812	2,055,932	2,531
CII	790	862,362	1,092
Construction_Fire	331	333,005	1,005
Recycled	0	0	0
Total	27,393	12,052,834	440

(2) SCWD has 4671 accounts servicing 15574 multi-family housing units.

Newhall County Water District Customer Category	Number of Accounts	Water Use in 2006 (ccf)	Mean Use per Account
Single Family	8,723	2,713,350	311
Multi Family (3)	366	680,771	1,860
Landscape	139	698,424	5,025
CII	450	513,687	1,142
Construction	98	92,179	1,920
Recycled	0	0	0
Total	9,776	4,698,411	481

(3) NCWD has 366 accounts servicing 4967 multi-family housing units.

Los Angeles County Waterworks District No. 36 Customer Category	Number of Accounts	Water Use in 2006 (ccf)	Mean Use per Account
Single Family	1,295	448,223	346
Multi Family (4)	4	13,298	3,325
Landscape	5	9,236	1,847
CII	5	9,088	1,818
Construction	4	1,419	355
Recycled	0	0	0
Total	1,313	481,264	367

(4) LA36 has 4 accounts servicing 119 multi-family housing units.

Water Use by Season

For all of the suppliers, data were analyzed by month for each sector in a stacked area graph. To illustrate, Figure 3.1 shows water use by month using the 2006 account level data provided by the suppliers. The strong seasonal pattern reflects irrigation needs during the characteristic hot dry summers. Irrigation needs are apparent in all sectors except Construction. Notice also the non-zero winter irrigation needs shown in dedicated landscape accounts.

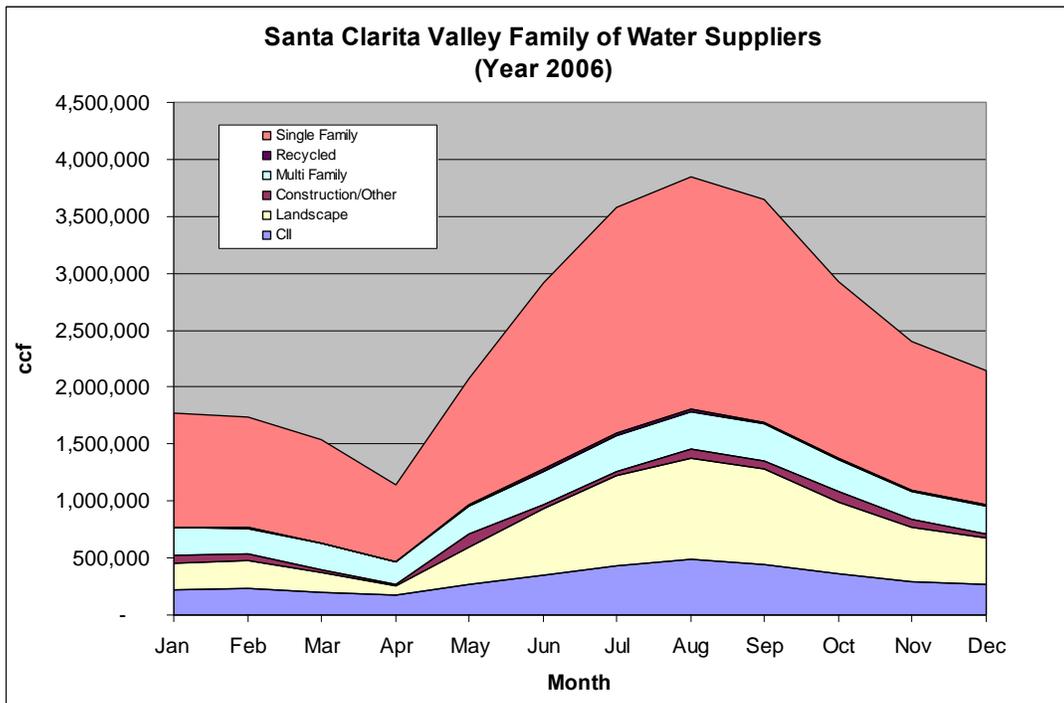


Figure 3.1 – Seasonal Pattern of Water Use

Water Use Distribution

Figures 3.2 and 3.3 show the distribution of annual water use for the single family and landscape sectors. Notice the single family distribution is the characteristic bell curve distribution, largely symmetric but with a long tail to the right indicating decreasing numbers of accounts with large water use. This graph is truncated at the extreme right tail which includes another 791 customers with use between 1,000 and 12,400 ccf per year. The purpose of displaying this distribution is to determine the similarity in use among single family customers. For example, the tall narrow shape shows a large share of the accounts fall between 100 and 500 ccf per year. A minority consume much more water (the right tail). This shape is characteristic of residential water use. In contrast, observe the distribution of dedicated landscape accounts in Figure 3.3 (also with truncated right tail). In this sector, the asymmetric distribution reflects the mix of site types including everything from large parks and schools down to small commercial strips and residential accounts.

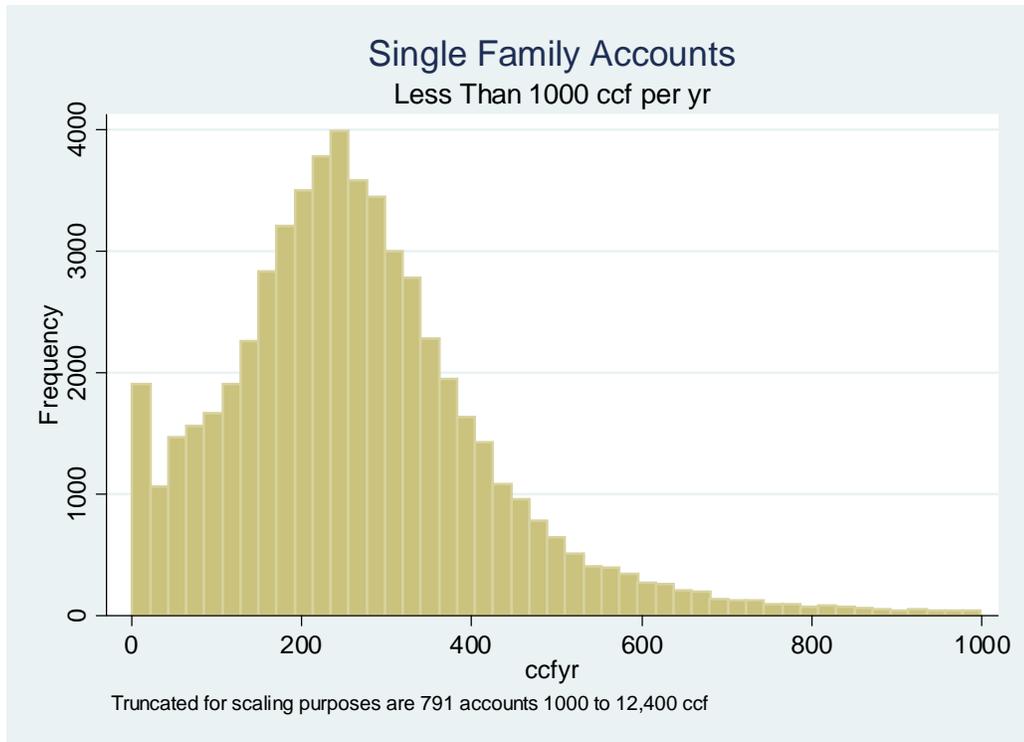


Figure 3.2 – Single Family Water Use Distribution

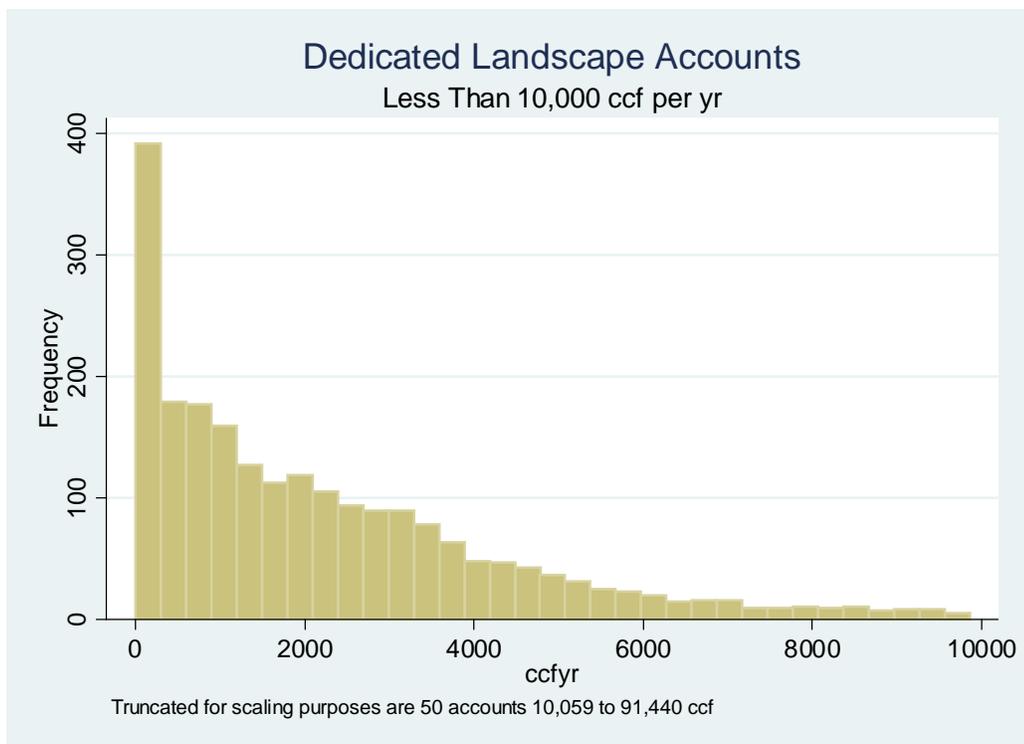


Figure 3.3 – Landscape Accounts Water Use Distribution

Housing Units

Figures 3.4, 3.5, 3.6 and 3.7 show the growth in single-family and multi-family housing units from 1991 to 2030. The data for these graphs was drawn from several sources including the 2005 Urban Water Management Plan, BMP Reports, and other planning documents provided by the suppliers. For the period 1990 to 2006, the BMP Reports provided a source for the number of housing units in 1990 and in recent years. Housing units in Years 1990 to 2006 are inferred in some cases. For future projections, the Urban Water Management Plan is the primary source. There is a close correlation between single family accounts and housing units. However, for the multi-family sector, the number of units per account can be highly variable. For conservation planning, it is important to understand the number of multi-family units in order to develop a plumbing fixture inventory. Water use summaries by residential unit and account were developed.

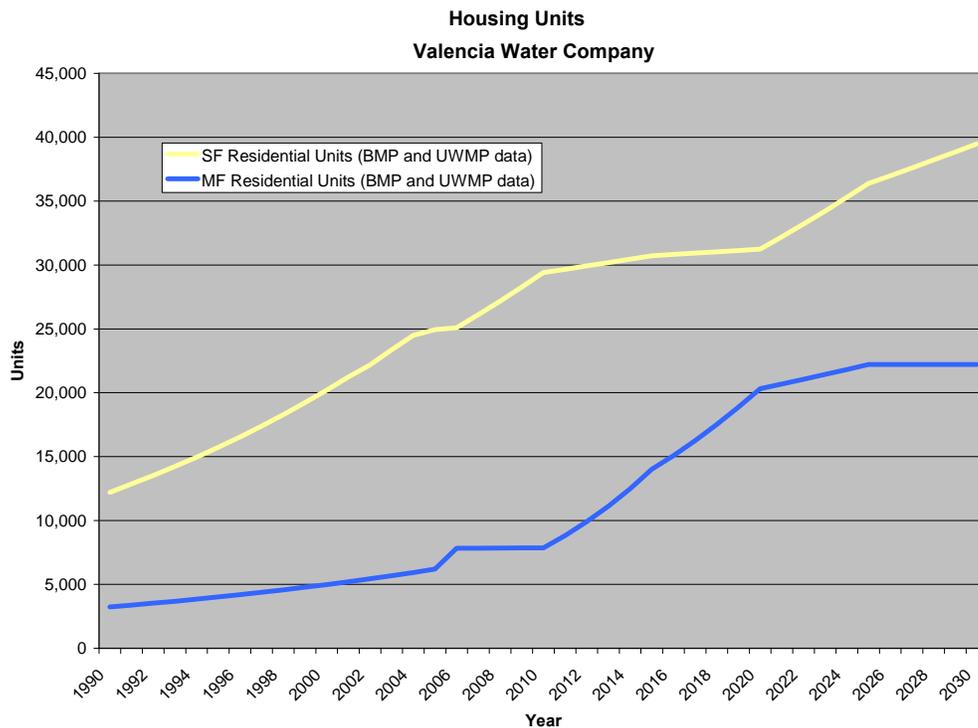


Figure 3.4 Valencia Water Company Housing Units

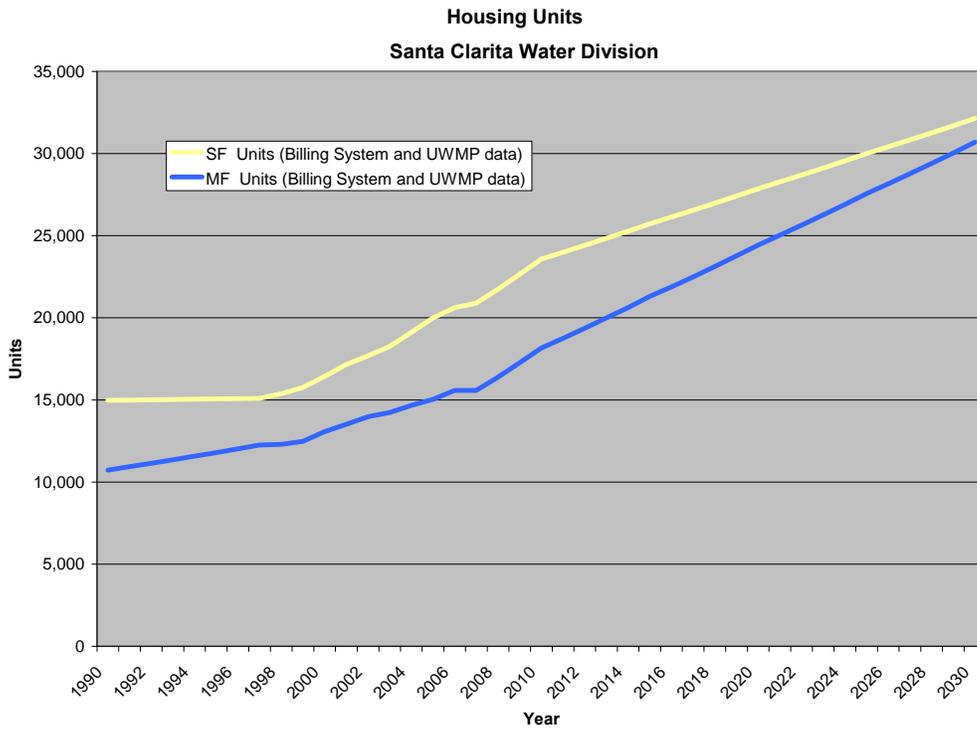


Figure 3.5 Santa Clarita Water Division Housing Units

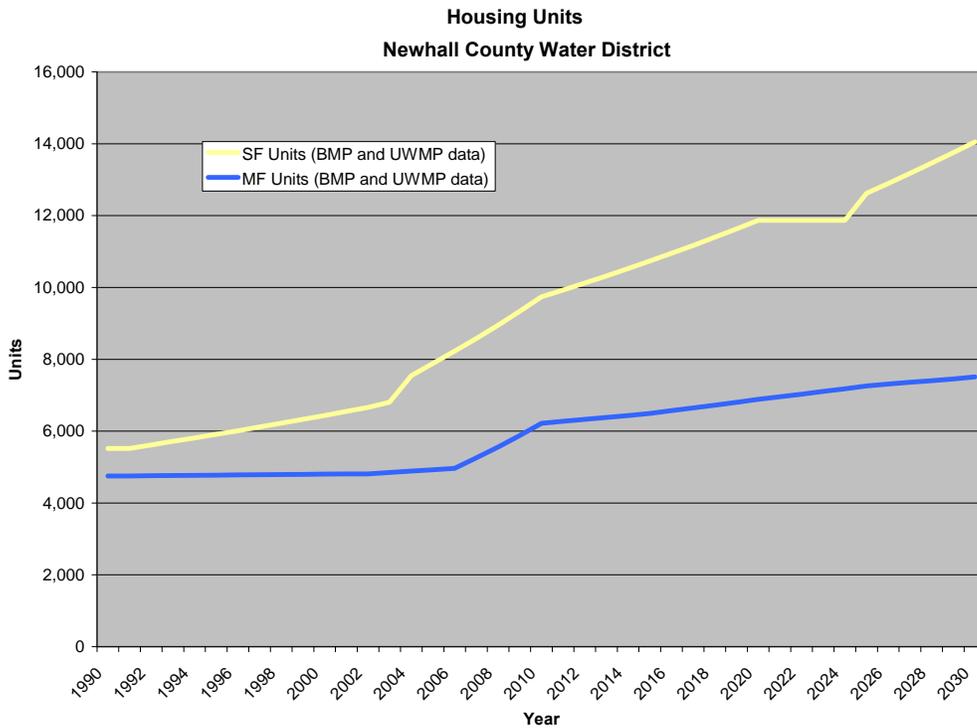


Figure 3.6 Newhall County Water District Housing Units

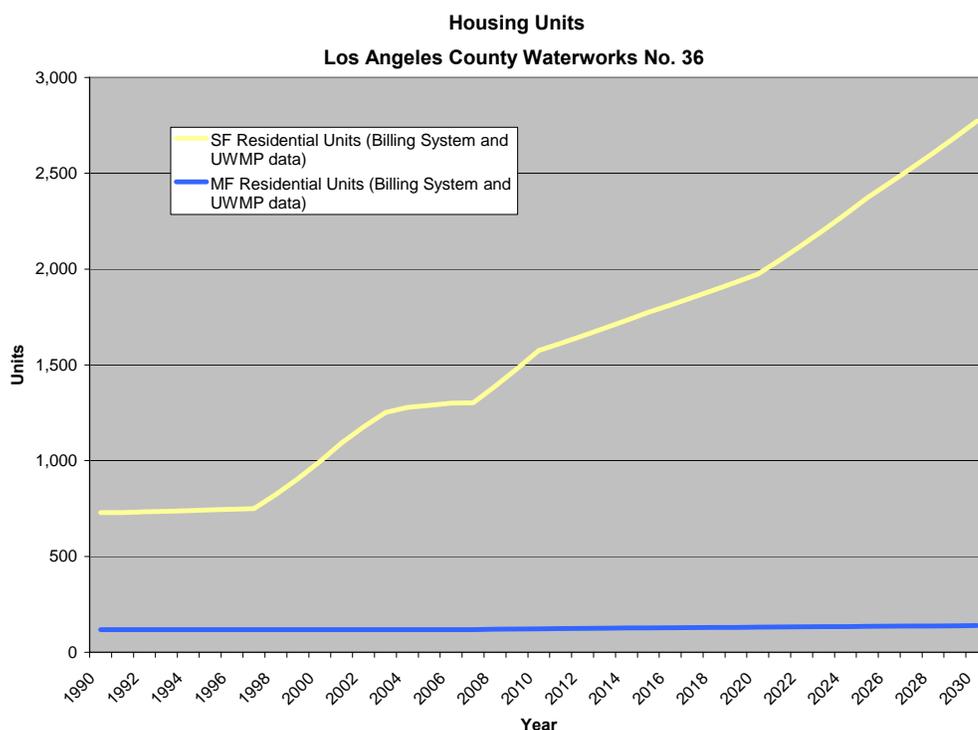


Figure 3.7 Los Angeles County Waterworks No. 36

Table 3.3 summarizes housing in 1991, the year before Ultra Low Flush Toilet plumbing code was enacted, 2007, and the projection for 2030. Because of the growth in housing units since 1991 40 percent of single family units were built post-1991 by 2007, and by 2030, 61 percent of single family units will be post-1991 construction. Post-1991 construction varies between retail service area and between single-family and multi-family sectors.

Table 3.3 Housing Units

	Single-Family Housing Units				
	1991 Housing Units	2007 Housing Units	2030 Housing Units	Percent Post-1991 Units in 2007	Percent Post-1991 Units in 2030
Valencia Water Company	12,871	26,108	39,484	51%	67%
Santa Clarita Water Division	14,992	20,899	32,135	28%	53%
Newhall County Water District	5,522	8,580	14,050	36%	61%
Los Angeles County Waterworks District No. 36	729	1,302	2,772	44%	74%
Total	34,114	56,889	88,441	40%	61%

	Multi-Family Housing Units				
	1991 Housing Units	2007 Housing Units	2030 Housing Units	Percent Post-1991 Units in 2007	Percent Post-1991 Units in 2030
Valencia Water Company	3,382	7,837	22,213	57%	85%
Santa Clarita Water Division	10,933	15,569	30,690	30%	64%
Newhall County Water District	4,756	5,254	7,508	9%	37%
Los Angeles County Waterworks District No. 36	119	119	140	0%	15%
Total	19,190	28,779	60,551	33%	68%

Past Achieved Conservation

For each of the suppliers, data from the BMP reports and other sources was collected to summarize past achieved conservation due to active conservation programs. For each supplier, the number of devices installed or measures completed was compiled, and for Castaic Lake Water Agency, the wholesaler, dollar amounts were summarized. These past achievements were incorporated into the WUE Strategic Plan

Conservation Device Saturation

To plan conservation programs it is important to know the number of target devices/fixtures, the level of past active conservation programs, and the effects of plumbing code on passive conservation. Passive conservation is the installation of conservation devices due to natural replacement, remodeling, or demolition in the presence of water efficiency plumbing code.

Combining the number of housing units with estimates of fixtures per household, an inventory of plumbing fixtures was developed. Figures 3.8 to 3.11 show how conservation devices' saturation will grow through 2030 for each water supplier. The saturation analysis allows the Plan to target its programs to achieve savings beyond what would be achieved without the Plan. Figure 3.12 shows the savings achieved by the type of passive conservation depicted in Figures 3.8 to 3.11 across all included water suppliers for single- and multi-family sectors.

As an example, consider the effects of passive conservation from ULF toilets, which is modeled using a rate of natural replacement whereby pre-1992 fixtures are replaced by ULF toilets at the end of their life span. In addition, conservation devices from active programs add to the number of conserving devices in the inventory. Table 3.4 shows the current saturation rates for single- and multi-family sectors by supplier and overall. For the pre-1992 housing stock approximately 47 percent of the toilets are already ULF toilets, driven largely by natural replacement and the past ULF toilet programs run by the SCV water agencies.¹ Over all single family housing units, 67 percent of the toilets are ULF toilets—a higher saturation because all units new since 1992 were required to have ULF toilets due to plumbing code.

¹ A natural replacement rate of 4 percent was applied for toilets. Due to the earthquake and high level of remodeling, this common planning assumption may understate device saturation for the Santa Clarita Valley due to the 1994 earthquake. A full set of assumptions in the saturation model is found in Appendix B-2.

Table 3.4 Saturation of Ultra Low Flush Toilets (ULFT) by Residential Sector

Retailer	Single-Family			Multi-Family		
	ULFT Saturation: Pre-1992 Inventory	ULFT Saturation: Total Inventory	Remaining Pre-1992 Toilets	ULFT Saturation: Pre-1992 Inventory	ULFT Saturation: Total Inventory	Remaining Pre-1992 Toilets
VWC	47%	73%	13,725	46%	77%	9,001
SCWD	47%	62%	15,813	46%	62%	19,310
NCWD	47%	65%	7,291	46%	48%	2,871
LA36	46%	70%	790	46%	46%	82
Total	47%	67%	37,619	46%	64%	31,263

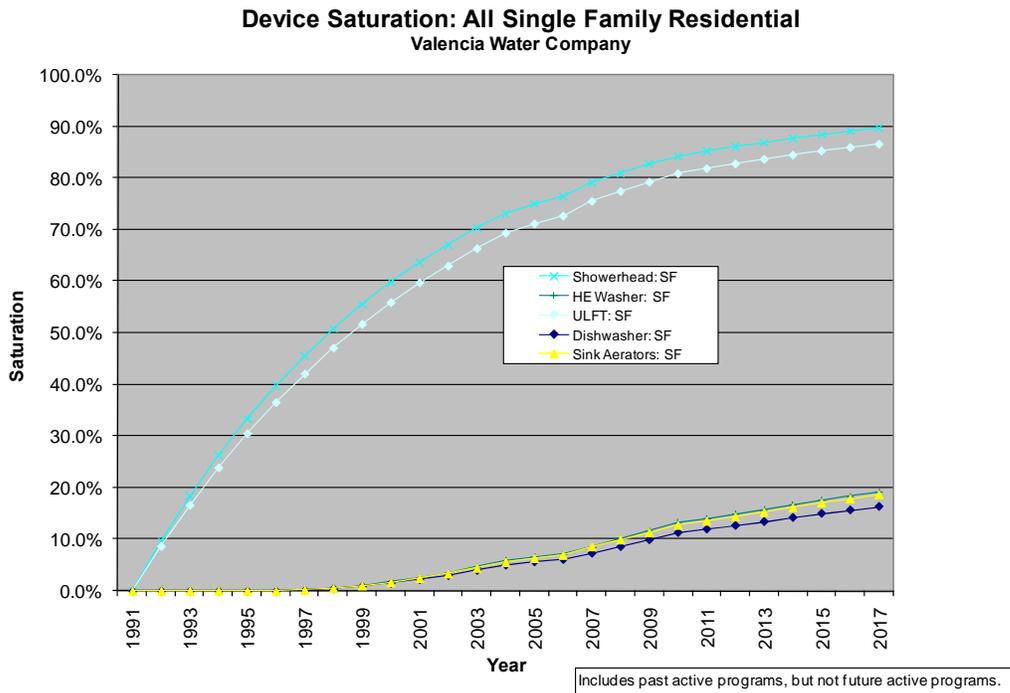


Figure 3.8 Device Saturation: Valencia Water Company Single Family Customers

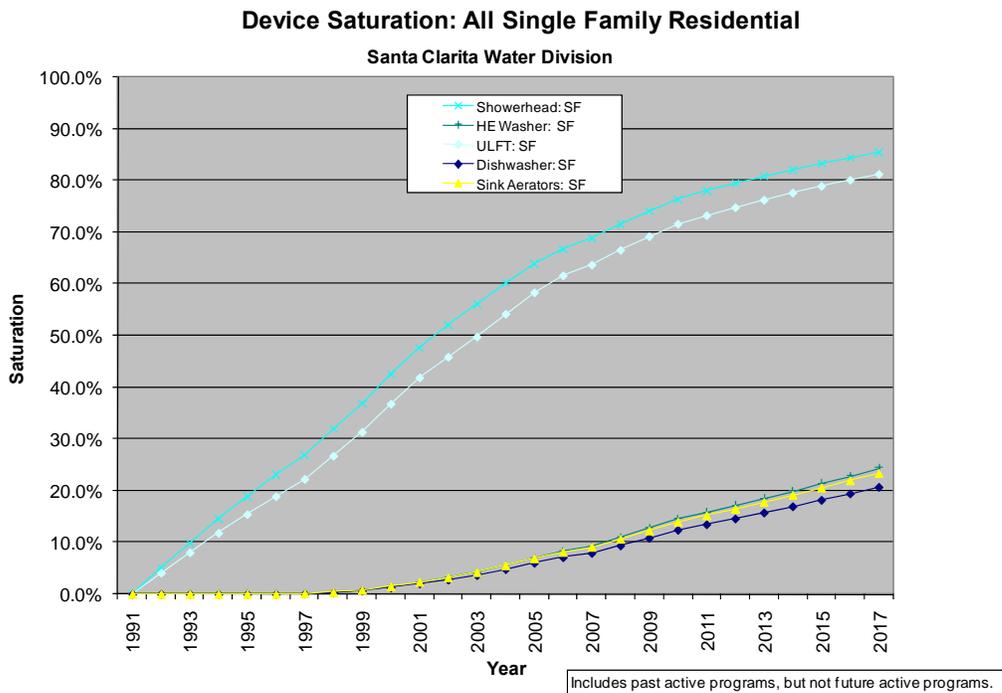


Figure 3.9 - Device Saturation: Santa Clarita Water Division Single Family Customers

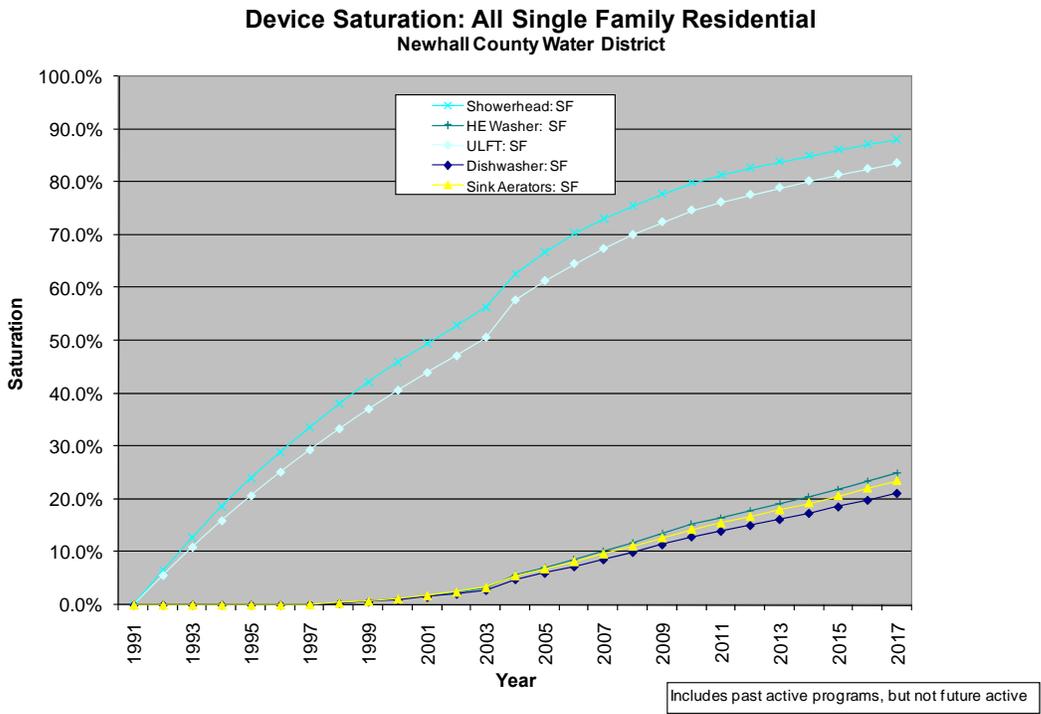


Figure 3.10 - Device Saturation: Newhall County Water District Single Family Customers

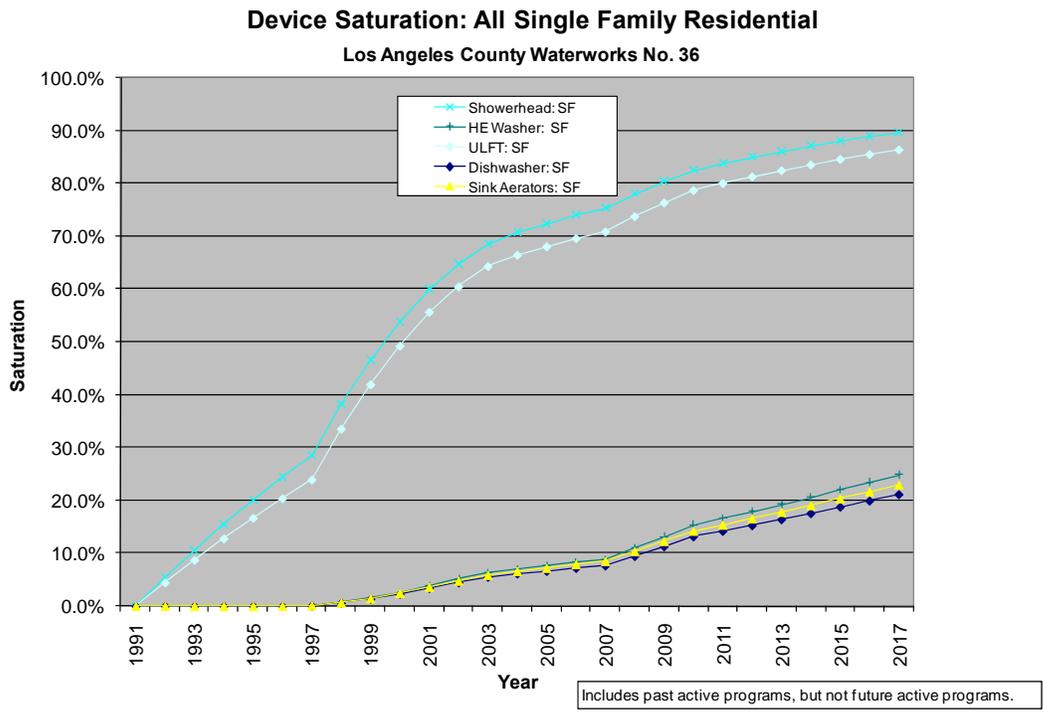


Figure 3.11 - Device Saturation: LA County Waterworks No. 36 Single Family Customers

**Passive Conservation
Valley Wide, Residential Sector
(Does not include New Construction Building Code proposed in this Plan)**

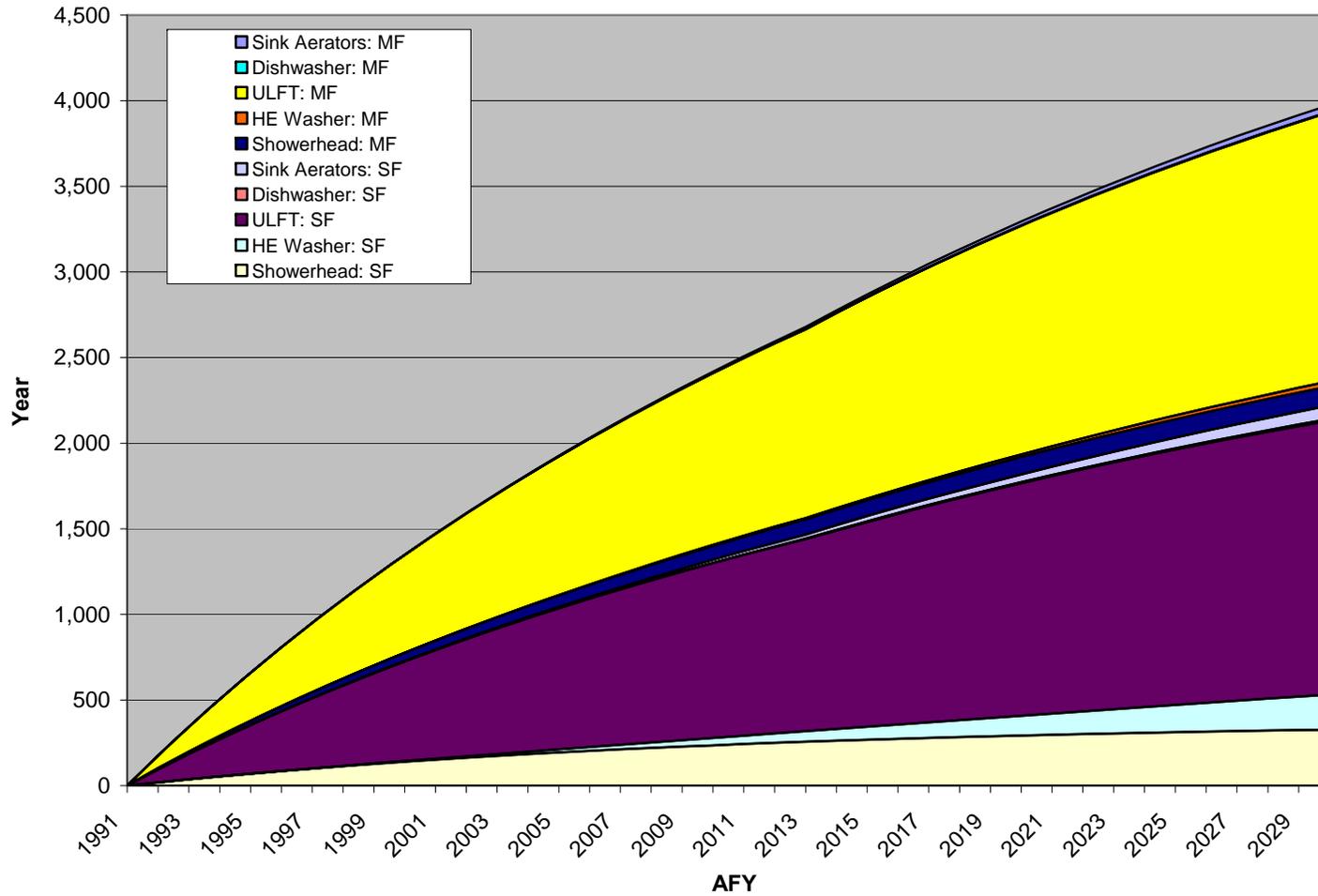


Figure 3.12 – Passive Conservation in the Valley, Residential

(Note: “ULFT” includes high efficiency toilets after 2014 due to the planned change in plumbing code.)

Using Customer Demand Profiles for Conservation Planning

In conclusion, the project team first analyzed water use and device saturation in order to develop programs that achieve savings above what would be achieved otherwise. The water use analysis lays the foundation for estimating the potential water savings and cost-effectiveness of alternative WUE programs—a necessary ingredient for a defensible and sensible WUE Strategic Plan

CHAPTER 4: AVAILABLE CONSERVATION MEASURES

After completing the data collection process, the project team conducted analyses of water conservation measures that might present opportunities for the Santa Clarita Valley Family of Water Suppliers. The objective was to identify opportunities for future water savings that might be achieved either through active conservation programs or new construction building code.

- Maureen Erbeznik summarized and analyzed a broad set of conservation measures that have been successful in the past in many types of active conservation programs (Conservation Measures Guide).
- John Koeller summarized several existing water conserving building codes from around the country and he provided commentary on a range of new technologies.

Potential Conservation Measures

In order to determine the optimum prospects for Santa Clarita Valley, the project team assembled a list of conservation technologies and practices (measures) that are currently available in the industry. Many of the measures have extensive performance histories while other options are emerging technologies with a shorter record of performance.

For the first Stakeholder Meeting, the project team distributed a *Conservation Measure Guide* providing an overview of conservation technologies for consideration. The list of measures was broadly cast to include the important conservation technologies with either a track record of performance, or strong potential for future conservation. The *Conservation Measure Guide* is provided in Appendix A.

Note that the listed products are presented independent of any particular conservation “program”. Conservation programs are a more inclusive concept that specifies not only the conservation measure or measures but also a delivery mechanism—how can customers be induced to enact water efficiency measures? Figure 4.1 presents a range of delivery mechanisms from providing information, to incentives, to direct installation, to legal requirements. Conservation programs can include multiple products with overlapping administrative requirements, marketing, delivery, and verification mechanisms. Conservation programs are the topic of the following chapter.



Figure 4.1 - Delivery Mechanism for Conservation Measures

The *Conservation Measure Guide* focused on water use efficiency measures and did not directly address supply-side efficiency measures such as distribution system loss control programs or system pressure control programs. The reader should note that BMP 3—that addresses system delivery efficiency—has been undergoing revision in the last year.

Similarly, water rate reform—though not separately itemized on the Measures Guide—can play an important part in providing incentives for customers to participate in conservation programs. Water rates and conservation (tiered rates, water budget-based rates, and drought pricing) are addressed in Appendix D. An example of the cost and savings attributable to a water budget-based tier rate was also conducted.

The project team made informed decisions about which of the conservation measures might be applicable to the Santa Clarita Valley using: 1) stakeholder input; 2) data about the market described in Chapter 3; and 3) professional experience developing, implementing, and evaluating conservation programs. In general, the measures were not selected for further consideration if: 1) they did not have a relevant application to Santa Clarita Valley’s territory; 2) they did not have the potential to deliver a meaningful volume of water savings; or 3) they had little chance of being cost-effective.

Tables 4.1 and 4.2 summarize the conservation measures considered and not considered for further inclusion in the Plan.

Table 4.1 - Measures Selected for Further Consideration

Measure	Action Taken
Showerheads (less than 2.5 gpm)	Added into proposed new building code
Aerators (less than 1.5 gpm)	Added into proposed new building code
High Efficiency Toilets	Recommended measure for active program and building code. Above code technology. Target pre-1992 buildings. Ideal for rebate program design. Savings based upon moving from non-ULF to high efficiency fixture.
High Efficiency, Zero Consumption and Ultra Low Flush Urinals	Above code technology. Recommend adding measure in Customized Incentive Program.
Cooling Tower Conductivity and pH Controllers	Not enough volume to support stand-alone program therefore recommend inclusion as a measure in Customized Incentive Program
Connectionless Food Steamers	Not enough volume to support stand-alone program therefore recommend inclusion as a

	measure in Customized Incentive Program
Water Efficiency Ice Makers	Still need to substantiate savings and market conditions. Not enough volume to support stand-alone program therefore recommend for inclusion as a measure in Customized Incentive Program
Residential Efficient Dishwashers	Added into proposed new building code
Commercial Efficient Dishwashers	Not enough volume to support stand-alone program therefore recommend for inclusion as a measure in Customized Incentive Program
Steam Sterilizers	Not enough volume to support stand-alone program therefore included as a measure in the Customized Incentive Program
Water Brooms	Not enough volume to support stand-alone program therefore included as a measure in the Customized Incentive Program
Industrial Process Water Use Improvement	Limited number of customers due to small market but high savings per customer therefore recommended as a customized incentive program.
Wet Cleaning	Included as part of Industrial Process Water Use recommendations. (See the CII Audit Program.)
Weather Based Irrigation Controllers (WBICs)	Selected measure. Volume of savings for both residential and commercial is significant – a large opportunity in the Valley. Recommendations for New Construction Standards include WBICs.
Car Wash Reclaim Water Systems	Many customers already implemented on their own. Screen customers and include as part of the industrial program. Note that Car Washes are covered within the CII Audit Program
Hot Water Distribution or Recirculation Systems	Per unit savings too low to justify retrofit program. Consider for building code.
Pool covers	Per unit savings too low to justify program. Consider for building code.
Drip or Low Precipitation Irrigation System	Customer education included in overall marketing and audit program. Retrofit costs too high (and required program costs) to justify its own program. Consider for building code.
Turf Buy Back	Volume of technical potential water savings was significant and Stakeholder expressed strong interest Economic savings potential is limited due to cost. (See Cash for Grass.)
Artificial Turf	Initially selected measure. Volume of savings significant and strong Stakeholder interest (see

	Cash for Grass).
Residential High Efficiency Clothes Washers	Selected measure due to customer demand.
Industrial Laundries	Selected measure. Covered by Industrial Audit Program.

Table 4.2 - Measures Not Selected for Further Consideration

Measure	Rationale
Low Flow Showerheads (2.5 gpm)	Code since 1992
Low Flow Aerators (1.5 gpm)	Code since 1992
ULF Toilets (1.6 gallons per flush)	Code since 1992 Over 40 percent of housing units built post 1992
ULF Urinals(1 gallon or less per flush)	Code since 1992
Pre-rinse Spray Valves	Code since 2006. High saturation from CUWCC installation program.
X-ray Film Processing Recycling Systems	Health care facilities moving to digital. Cannot justify lifetime savings.
Commercial High Efficiency Clothes Washers	Code
Water Softeners	New self-regenerating units banned in SCV since 2003. Rebate to voluntarily remove in place since 2005 by LA County Sanitation Districts.

New Construction Building Code

John Koeller, an expert on water conservation standards presented a review of alternative standards for new construction to the SCV water suppliers on August 27, 2007. This informational presentation addressed recent conservation related developments in building standards in California and the country, and concluded with a question and answer period.

Table 4.3 details 2 tiers of possible recommendations and future considerations for new construction based on the Smart from the Start program being developed by CUWCC.

Among single-family and multi-family residential items in table 4.3, kitchen faucets, lavatory faucets, showerheads, High Efficiency (HE, 1.2 gpf) toilets, and dishwashers are explicitly modeled in the saving calculations for New Construction Building Code. Savings from the landscape recommendations are included in the savings calculations as a percent reduction based on the assumption that a set of devices is implemented. Further detail is provided in Appendix B.2. Clothes washers are not included in New Construction Code because they

generally are not included with new housing.

All of the recommendations that apply to the CII sectors are included in the savings calculations as a percent reduction based on the assumption that a set of devices is implemented pursuant to the New Construction Code. Further detail is provided in Appendix B.2.

Table 4.3 - Recommendations for New Construction Building Standards

	TIER 1 - "SMART"	TIER 2 - "GENIUS"	FOR FUTURE CONSIDERATION
INDOOR - PLUMBING			
Kitchen Faucets	≤ 2.2gpm (EPAAct 92 maximum)	≤ 2.2gpm (EPAAct 92 maximum)	
Lavatory Faucets	Bathroom lavatory faucets: Maximum flow rate of 1.5-gpm. No minimum flow rate.	Bathroom lavatory faucets: Maximum flow rate of 1.0-gpm. No minimum flow rate.	Need to determine how to specify WaterSense-certified products while, at the same time, allowing for faucets with flow rates below the 0.8-gpm WaterSense minimum.
Showerheads & Shower Systems	Showerhead is defined as including the following types of emitters: a traditional showerhead, rain system, waterfall, bodyspray, bodyspa, or jet. Maximum flow rate is 2.5 gallons per minute for each.	Showerhead is defined as including the following types of emitters: a traditional showerhead, rain system, waterfall, bodyspray, bodyspa, or jet. Maximum flow rate is 2.0 gallons per minute for each. Systems or heads with a total flow rate below 2.0-gallons per minute shall include a thermostatic mixing valve matched and certified to the specific flow rate of that showerhead and/or system.	Waiting for WaterSense specification, which may not be available until late 2008 due to difficulty with defining satisfactory performance in a specification and test protocol.
Shower Stalls	Residential shower compartment (stall) in dwelling units: The total allowable flow rate from all flowing showerheads at any given time, including rain systems, waterfalls, bodysprays, bodyspas, and jets, shall be limited to the allowable showerhead flow rate as specified above (2.5-gpm) per shower compartment, where the floor area of the shower compartment is less than 2,500 sq.in. For each increment of 2,500 sq.in. of floor area thereafter or part thereof, an additional showerhead with total allowable flow rate from all flowing devices equal to or less than the allowable flow rate as specified above shall be allowed. Exception: Showers that emit recirculated non-potable water originating from within the shower compartment while operating are allowed to exceed the maximum as long as the total potable water flow does not exceed the flow rate as specified above.	Residential shower compartment (stall) in dwelling units: The total allowable flow rate from all flowing showerheads at any given time, including rain systems, waterfalls, bodysprays, bodyspas, and jets, shall be limited to the allowable showerhead flow rate as specified above (2.0-gpm) per shower compartment, where the floor area of the shower compartment is less than 2,500 sq.in. For each increment of 2,500 sq.in. of floor area thereafter or part thereof, an additional showerhead with total allowable flow rate from all flowing devices equal to or less than the allowable flow rate as specified above shall be allowed. Exception: Showers that emit recirculated non-potable water originating from within the shower compartment while operating are allowed to exceed the maximum as long as the total potable water flow does not exceed the flow rate as specified above.	
Toilets	WaterSense HET (provides for effective flush volume maximum of 1.28-gpf or less)	WaterSense HET <u>AND</u> effective flush volume maximum of 1.00-gpf or less	
Urinals	High-Efficiency Urinal (HEU): Maximum flush volume of 0.5 gallons	High-Efficiency Urinal (HEU): Maximum flush volume of 0.25 gallons	Waiting for WaterSense specification for HEUs.
Indoor Water Pressure (line pressure)	50 psi maximum (static)	50 psi maximum (static)	Note that this maximum applies <u>only</u> to indoor plumbing.
INDOOR - APPLIANCES			
Dishwashers	Where an automatic dishwasher is provided, it shall be Energy Star labeled <u>AND</u> have a maximum water use of 5.8 gallons per full wash and rinse cycle.	Where an automatic dishwasher is provided, it shall be Energy Star labeled <u>AND</u> have a maximum water use of 5.0 gallons per full wash and rinse cycle.	Need to make water consumption data for each dishwasher model more readily available to builders and consumers. Currently, Energy Star Canada is the only known publicly available source. Average water consumption is on the decline; will have to update these requirements periodically.
Clothes Washers	Where a clothes washing appliance is provided, it shall be Energy Star labeled <u>AND</u> be listed at CEE Tier 2 or better (i.e., maximum water factor of 6.0 or better)	Where a clothes washing appliance is provided, it shall be Energy Star labeled <u>AND</u> be listed at CEE Tier 3 or better (i.e., maximum water factor of 4.5 or better)	Average water consumption is on the decline; will have to update these requirements periodically.

Table 4.3 - Recommendations for New Construction Building Standards, continued

	TIER 1 - "SMART"	TIER 2 - "GENIUS"	FOR FUTURE CONSIDERATION
INDOOR - HOT WATER			
Recirculating System	Engineered Parallel Piping system (central manifold): WITHOUT recirc loop	Structured plumbing system: trunk line >3/4" diameter, with on demand circulation pump; twig lines <1/2" diameter, within 15' and 3 cups pipe	Needs further work to define requirements
Central Manifold System			
Specified Distance to Water Heater	Trunk line from water heater to central manifold ≤5' all twigs ≤4 cups of pipe		
Insulation	<p>Insulate hot water pipes from water heater to kitchen R4</p> <p>Insulate all hot water pipes R4 (required for all of the plumbing layouts; includes both above and beneath slab where applicable; beneath slab hot water pipes to be contained within a chaseway)</p>	<p>Insulate hot water pipes from water heater to kitchen R4</p> <p>Insulate all hot water pipes R4 (required for all of the plumbing layouts; includes both above and beneath slab where applicable; beneath slab hot water pipes to be contained within a chaseway)</p>	Insulation requirement for water heater to kitchen will be a California requirement by 2009.
INDOOR - OTHER			
Direct and Indirect Evaporative Coolers	<p>1) Maximum water use shall be 6 gallons per ton-hour of cooling, as tested and listed at CEC Title 20 design conditions of 97.5F / 68.5F (drybulb/wetbulb). 2) Bleed systems are NOT allowed; must use a pump-out system to replace water in reservoir. 3) Water discharge must be based on time of operation, or measured TDS level in reservoir water. 4) System must use rigid media and Title 20 listed saturation (or cooling) efficiency of 75% or greater. 5) Water inlet line connecting to the reservoir shall not exceed 3/8" diameter. 6) Sump overflow line shall terminate at a location that is easily visible to building occupants, not connected directly to a wastewater pipe.</p>	<p>1) Maximum water use shall be 5 gallons per ton-hour of cooling, as tested and listed at CEC Title 20 design conditions of 97.5F / 68.5F (drybulb/wetbulb). 2) Bleed systems are NOT allowed; must use a pump-out system to replace water in reservoir. 3) Water discharge must be based on time of operation, or measured TDS level in reservoir water. 4) System must use rigid media and Title 20 listed saturation (or cooling) efficiency of 75% or greater. 5) Water inlet line connecting to the reservoir shall not exceed 1/4" diameter. 6) Sump overflow line shall terminate at a location that is easily visible to building occupants, not connected directly to a wastewater pipe. 7) Discharged water shall be used beneficially, such as watering landscape or added to a gray water system.</p>	
Evaporative Cooled Central Air Conditioners	<p>1) Maximum water use shall be 5 gallons per ton-hour of cooling, as tested and listed at CEC Title 20 design conditions of 97.5F / 68.5F (drybulb/wetbulb). 2) Bleed systems are NOT allowed; must use a pump-out system to replace water in reservoir. 3) Water discharge must be based on time of operation, or measured TDS level in reservoir water. 4) Water inlet line connecting to the reservoir shall not exceed 3/8" diameter. 5) Sump overflow line shall terminate at a location that is easily visible to building occupants, not connected directly to a wastewater pipe. 6) Condensate water from AC evaporation coils must be routed to the water reservoir for the evaporative cooling.</p>	<p>1) Maximum water use shall be 4 gallons per ton-hour of cooling, as tested and listed at CEC Title 20 design conditions of 97.5F / 68.5F (drybulb/wetbulb). 2) Bleed systems are NOT allowed; must use a pump-out system to replace water in reservoir. 3) Water discharge must be based on time of operation, or measured TDS level in reservoir water. 4) Water inlet line connecting to the reservoir shall not exceed 1/4" diameter. 5) Sump overflow line shall terminate at a location that is easily visible to building occupants, not connected directly to a wastewater pipe. 6) Discharged water shall be used beneficially, such as watering landscape or added to a gray water system. 7) Condensate water from AC evaporation coils must be routed to the water reservoir for the evaporative cooling.</p>	
Water Softeners	If a water softener is installed, shall not use sodium as a basis for regeneration; demand-based regeneration required.	If a water softener is installed, shall not use sodium as a basis for regeneration; demand-based regeneration required.	Restrict the installation of water softeners to areas where water supply exceeds some justifiable, scientific level of need (e.g. 400 TDS).
Drinking Water Systems	NA	NA	Include reverse osmosis filter guidelines (efficiency = yield percentage). Guidelines on other types of equipment allowed & its efficiency etc. Limitations on quantity and placement of the RO taps.

Table 4.3 - Recommendations for New Construction Building Standards, continued

	TIER 1 - "SMART"	TIER 2 - "GENIUS"	FOR FUTURE CONSIDERATION
OUTDOOR - LANDSCAPING			
Sub-metering of Landscape Irrigation System	Dedicated irrigation meter for 10,000 sq ft or more of irrigated landscape.	Dedicated irrigation meter for 5,000 sq ft or more of irrigated landscape.	
Weather-Based Irrigation Controllers and System Efficiency	Weather-based irrigation controllers required for automated systems.	Weather-based irrigation controllers required for automated systems.	Irrigation system efficiency standards and periodic inspections
OUTDOOR - OTHER			
Swimming Pools	Where a pool or spa is provided, a pool/spa cover is required.	Where a pool or spa is provided, a pool/spa cover is required. Filter backwash water shall be treated to a quality level suitable for landscape application; system shall be in place for distributing such water to the on-site landscape.	Dedicated sub-meter for each pool/spa to identify water use and leaks.
ALTERNATE SOURCES OF WATER			
Cooling Condensate Reuse	Condensate from comfort (cooling) systems shall be captured for reuse and application to the landscape.	Condensate from comfort (cooling) systems shall be captured for reuse and application to the landscape.	
Greywater Reuse	Plumb for greywater capture and reuse (at a minimum, greywater source shall include the clothes washer/laundry room regardless of whether the builder provides the clothes washer appliance)	Plumb for greywater capture and reuse (at a minimum, plumbed potential greywater source shall include the clothes washer/laundry room regardless of whether the builder provides the clothes washer appliance) Install an operational greywater capture, treatment and reuse system	
MUNICIPAL WATER SOURCE			
Municipally Reclaimed Water	Plumb the property for the distribution and use of municipally reclaimed water where such water is available within 500 feet of the dwelling. Uses shall include landscape irrigation and other interior uses as permitted by prevailing plumbing and health codes.	Plumb the property and dwelling for the distribution and use of municipally reclaimed water where such water is available within 1,500 feet of the dwelling. Uses shall include landscape irrigation and other interior uses as permitted by prevailing plumbing and health codes.	

CHAPTER 5: POTENTIAL PROGRAMS

Program Evaluation Criteria

The next step in the evaluation process was to determine the criteria that defined a successful program. Once defined, each of the potential programs would be screened and ranked according to these criteria.

During the Kickoff Meeting, representatives from all of the Santa Clarita Valley Water Suppliers collectively defined and prioritized a list of program evaluation criteria. Definitions were developed for each criterion. Each one was given a point value showing its relative importance in relation to the other listed criteria. The most sought-after characteristics were scored the highest with 5 points. The least received a score of 1 point.

The result of this process was the list of Program Evaluation Criteria found below.

Program Evaluation Criteria

5 points Reduces Water Use – The quantified water savings potential within a service area in terms of potential acre-feet saved per year and potential participation (number of existing customers, devices, retrofit opportunities, etc.).

5 points Cost Effective – (Cost/Yield, \$/AF) – Santa Clarita Valley’s cost to operate the program (administration, marketing, incentives and implementation) divided by the projected or actual water savings in acre-feet. Ideally, programs should cost less than the utilities’ marginal cost of water.

5 points Stakeholder Support – The programs should be developed to encourage stakeholders in the Santa Clarita Valley to support the programs.

4 points Easy for Customers to Participate In (Implement-ability) - The offer must incentivize the customer to participate. It also must have a customer-easy process, a proactive marketing strategy, a well developed plan with goals, quality operations and stakeholder acceptability and commitment.

3 points Changes Long Term Behavior – Program services, technologies or pricing mechanisms have documented successes and measurements for water savings showing long term change in conservation behavior.

2 points Good Public Relations – Program provides heightened awareness and good will towards wholesale and retail water agencies and/or water conservation.

2 points Environmentally Sensitive (peak reduction, reduced wastewater discharges and urban runoffs) – Program delivers benefits beyond water savings that are of benefit to Santa Clarita Valley’s residents.

1 point Easy to Explain to Customers – Programs must be easy to explain to customers so the message of conservation and program participation is focused and effective.

1 point Encourages Partnerships – Program is eligible for grant monies, shared program costs or other outside funding sources in order to lower program costs and increase cost effectiveness.

Potential Program Concepts

A conservation program, in its basic form, is the selection of a technology in combination with an outreach delivery system. Logically the next step in the process was to identify the optimal delivery method for each technology under consideration.

Program delivery types include the following:

- Rebates
- Direct Installation
- Give-Away Events
- Provide Training and/or Education Materials
- Public Media
- Ordinance and Legislation

The project team packaged conservation measures from the *Conservation Measures Guide* with the Delivery Mechanisms listed above into a set of Programs. These programs, along with existing programs, were evaluated using the Program Evaluation Criteria and presented at Stakeholder Workshop #1 for feedback.

Table 5.1 shows the conservation programs that were developed and it provides summary description of the program’s elements.

Table 5.1 Overview of Conservation Programs

PROGRAM NAME	STATUS	TECHNOLOGY	CUSTOMER OFFER	TARGET MARKET	SERVICES PROVIDED	OTHER BENEFITS
Recommended Programs						
High Efficiency Toilet Rebates	New/ Modified	High Efficiency Toilet	Single- and Multi-Family Rebates (\$100)	Single family, Multi-family, and mobile homes.	Rebate administration.	Wastewater reduction
Large Landscape Audits with Incentives	New/ Modified	Audits, incentives for conservation equipment and measures.	Comprehensive landscape audit; \$300/AF rebate for savings	Dedicated Landscape Meters, especially Large sites.	Customer contact, audits, incentive administration.	Peak-Season Savings; Runoff reduction
CII Audits and Customized Incentives	New / Modified	Audits, process improvements, conservation equipment incentives.	Audits and \$300/AF rebate for savings	Commercial, Industrial, and Institutional Customers	Extensive customer contacts, scoping audit, comprehensive audits; rebate administration.	Peak-Season Savings; Runoff reduction ; Wastewater reduction
Landscape Contractor Certification	Modified	Weather-Based Irrigation Controllers; Conserving Sprinkler heads	Landscape contractor training; free WBICs and Sprinkler heads	Residential, Commercial, Institutional, and Large Landscape Customers	Training landscape contractors, equipment provision, verification and inspections.	Peak-Season Savings; Runoff reduction
High Efficiency Clothes Washer Rebates	New	High Efficiency Clothes Washers	Rebate \$65/ HE Clothes Washer	Residential	Rebate administration, site inspections	Wastewater Reduction
New Construction Building Code	New	HE Toilets, landscape conservation, faucet aerators, showerheads, HE dishwashers	Required in new construction	All	Consistent new construction requirements; coordination with County.	Peak-Season Savings; Runoff reduction; wastewater reduction.

Table 5.1 Overview of Conservation Programs

PROGRAM NAME	STATUS	TECHNOLOGY	CUSTOMER OFFER	TARGET MARKET	SERVICES PROVIDED	OTHER BENEFITS
Programs to Consider Further						
Cash for Grass	New	Turf replacement	\$0.45 per sq.ft. incentive to customer	Residential, Commercial, and Institutional Sectors	Pre- and post-inspection, rebate administration	Peak-Season Savings; Runoff reduction
Industrial Process Audits and Incentives	New/ Modified	Audits, incentives for conservation equipment and measures.	Comprehensive audit; \$300/AF rebate for savings	Commercial and Industrial	Customer contact, audits, incentive administration.	Wastewater reduction; Peak-Season Savings; Runoff reduction
HET Rebates, Aggressive Implementation	New/ Modified	High Efficiency Toilet	Single Family Rebates (\$150), Multi-family and Mobile home rebate (\$200)	Single family, Multi-family, and mobile homes, Non-ULFT households (pre-1992)	Rebate administration; phone support to identify pre-1992 fixtures; spot checks	Wastewater reduction

Stakeholder Workshop #1

With the criteria developed and list of preliminary program concepts completed, the next step was to hold the first of two scheduled Stakeholder Workshops. The primary goal of the Workshop was to secure feedback on the overall Master Plan process, the Conservation Measures Guide, and the programs as preliminary concepts. Stakeholder Workshop #1 was held on September 18, 2007. Invitations to attend were sent to Santa Clarita Valley customer groups, environmental groups, water conservation vendors, and local and state agencies.

At the workshop, Santa Clarita Valley staff along with the A&N consultant team walked attendees through a PowerPoint presentation that detailed the reasons for a Master Conservation Plan; the process to develop the Plan; promising markets and technologies; and preliminary program concepts. The presentation can be found in Appendix C.

At the end of the meeting, stakeholders were given the Stakeholder Feedback Form and asked to rank the top three programs and provide additional input as to programs that they believed were important to include in the master plan and reasons why.

In their feedback, attendees ranked the top seven programs as priorities:

1. High Efficiency Toilet Rebate Program
2. Large Landscape Audit & Customized Incentive Program
3. Landscape Contractor Certification and WBIC Distribution Program
4. CII Audit & Customized Incentive Program
5. Mandatory Indoor/Outdoor Efficiency Standards
6. Cash for Grass
7. Water Budgets

Attendees also provided comments on each of the above programs as well as general comments.

Development of Detailed Program Modules

Based upon the feedback gained during Stakeholder Workshop #1, the preliminary selection of seven programs was validated and the list remained intact. The project team undertook the next step to develop a comprehensive overview and evaluation of every one of the recommended programs. Each program overview was expanded to include specific details regarding market potential, productivity levels, annual and lifecycle water savings, costs per unit and overall budget.

Stakeholder Workshop #2

Stakeholder Meeting #2 was held December 11, 2007. The primary objectives of the meeting were to:

1. Review the additional information for each preliminary program concept
2. Perform a final evaluation and ranking of the list of programs
3. Provide any additional feedback

The project team, with the aid of a PowerPoint presentation, walked stakeholders through the details for each of the recommended programs. Following the presentation, an open forum discussion was held to solicit feedback and concerns from attendees.

Table 5.2 depicts the Stakeholder Feedback Form used in this meeting to elicit feedback on the Conservation Programs.

Table 5.3 shows the how the programs were scored using the Stakeholder Criteria defined above. The column labeled Stakeholder Feedback is the average of the stakeholder scores collected with the Stakeholder Feedback Forms (adjusted to be commensurate with the 5 point scale).

Table 5.2 Stakeholder Feedback Form

Santa Clarita Valley Family of Water Suppliers Water Conservation Strategic Plan		
Ranking of New Proposed Programs		
Program	Ranking 1-7 7 being best	Comments
High Efficiency Toilet Rebate Program		
Large Landscape Audit & Customized Incentive Program		
Landscape Contractor Certification and WBIC Distribution Program		
CII Audit & Customized Incentive Program		
Mandatory Indoor/Outdoor Efficiency Standards		
Cash for Grass		
Water Budgets		
<p>Additionally we would like to hear about other products or programs you are interested in, please write down any of your ideas.</p> <hr/> <hr/> <hr/> <hr/>		

Note: It was explained verbally that Mandatory Efficiency Standards would be implemented through standards for New Construction.

Table 5.3 – Program Evaluation Matrix

Program	Reduces Water Use (Certainty of Savings)	Reduces Water Use (Volume of New Potential Savings)	Cost Effective (Cost/Yield \$/AF)	Stakeholder Support	Easy for Customers to Participate	Changes Long Term Behavior	Good Public Relations	Environmentally Sensitive	Easy to Explain to Customers	Encourages Partnerships	Weighted Point Score
Programs ↓	Weights → Points ↘	5	5	5	4	3	2	2	1	1	
Recommended New Programs											
HET Rebates, Single Family	5	3	3	3	5	5	5	3	4	2	11.9
HET Rebates, Multi-Family	5	2	4	3	5	5	5	3	4	2	12.2
Large Landscape Audits (w/ Incentives)	4	5	3	4	3	3	4	4	3	3	10.9
CII Audits and Customized Incentives	4	3	3	3	3	4	4	3	3	3	10.1
Landscape Contractor Certification (WBIC & Sprinklerheads)	4	4	4	3	5	3	5	4	3	3	11.7
HE Clothes Washer Program (1)	5	2	2	3	5	5	5	4	5	3	11.5
Building Code for New Construction (1)	5	5	5	3	3	5	3	4	3	3	12.4
Programs to Consider Further											
Cash for Grass	5	5	1	2	3	4	5	4	5	3	10.2
Industrial Process Audits and Incentives (1)	5	2	3	3	2	5	3	4	4	3	10.2
HET Rebates, Aggressive Implementation	5	3	3	3	5	5	5	3	4	2	11.9
Water Budgets	3	5	3	3	2	4	4	2	2	1	9.3
Programs Considered, but Not Recommended											
Untargeted ULFT Rebate Program (1)	5	1	2	3	5	5	5	3	4	2	10.8
Untargeted HET Rebate Program (1)	5	2	3	3	5	5	5	3	4	2	11.6
Toilet Give-Away Programs (1)	5	1	2	3	4	5	5	3	3	3	10.3
Toilet Direct Install Program (1)	5	2	2	3	5	5	5	3	3	2	10.9
Residential Audit Program (1)	3	1	1	3	3	1	5	2	3	2	7.1
Existing Programs											
HET Rebate (1)	5	1	2	3	5	5	5	3	4	2	10.8
Free Residential Audit (VWC) (1)	3	1	1	3	3	1	5	2	3	2	7.1
Retrofit Devices (1)	5	2	3	3	4	3	5	3	4	2	10.5
WBICs (1)	4	5	4	3	3	4	5	4	2	3	11.5
Education and Schools (1)	2	3	3	3	5	5	5	3	5	2	11.2
Media Partnership (1)	1	3	3	3	5	3	5	3	5	2	10.2
CII Audits (1)	3	1	1	3	3	1	5	2	3	2	7.1
Pre-Rinse Spray Nozzles (1)	5	1	4	3	5	4	5	4	4	3	11.9
Landscape Training (1)	3	4	3	3	3	3	4	4	3	3	10.1
Demonstration Garden (1)	2	2	3	3	3	4	5	4	4	3	9.9

(1) Not used in original stakeholder elicitation. Average Stakeholder support is assumed.

CHAPTER 6: RECOMMENDED PROGRAMS

Program Mix Considerations

In addition to the elements of effective programs discussed in Chapter 5 and tabulated in Table 5.3, there were additional considerations that went beyond the boundaries of the program impacting the quality of the overall portfolio. Staff identified the following three additional portfolio considerations:

Program Mix Considerations

- 1. Integrates into the Long Term Water Resources Plan-** Program neatly fits into the long term objectives of the water resource plan.
- 2. Adds to the Overall Technology Mix of Programs.** Program expands the list of programs in various lifecycle stages (R&D, feasibility, pilot program, innovative technology, full scale)
- 3. Contributes to the Goal of a Comprehensive Portfolio of Programs Targeting All Market Segments Including Hard-to-Reach Markets** – Program fills a desired “niche” in the overall portfolio that otherwise would not be addressed.

With final stakeholder input and program ranking completed, the project team then factored in practical aspects of program implementation. Elements that were considered in the final program review were:

- Budget implications
- Staffing requirements
- Variety in portfolio
- Transitioning existing program

The final selection of programs is listed below.

- **HET Rebates (Single and Multi-Family)**
- **Large Landscape Audits (w/incentives)**
- **CII Audits and Customized Incentives**
- **Landscape Contractor Certification (WBIC & Sprinkler-heads)**
- **HE Clothes Washer Rebates**
- **New Construction Building Code**
- **Valley-Wide Marketing**

Table 6.1 provides the Five Year Implementation Plan for the proposed conservation programs including the required budget and programs savings.

Table 6.1 - Five Year Implementation Plan: Savings and Annual Budget

Program	2009	2010	2011	2012	2013
HET Rebates					
Savings (AFY)	15	31	46	61	76
Large Landscape Audits (w/ Incentives)					
Savings (AFY)	38	76	115	153	191
CII Audits and Customized Incentives					
Savings (AFY)	53	105	158	210	263
Landscape Contractor Certification (WBIC & Sprinklerheads)					
Savings (AFY)	50	151	301	502	753
HE Clothes Washer Rebates					
Savings (AFY)	5	11	16	21	26
New Construction Code					
Savings (AFY)	445	911	1,397	1,682	1,978
Total Annual Savings (AFY)¹	607	1,284	2,033	2,629	3,287
Total Annual Budget (in Thousand \$)	\$ 743	\$ 820	\$ 823	\$ 903	\$ 983

¹ Total Annual Savings are those produced in the first five years from program implementation over the first five years. Savings after five years continue due to device lifespans that exceed five years and due to future program implementation over the course of the planning period.

Conservation Program Costs and Savings

The conservation program cost benefit analysis is provided in Table 6.2 below.

Table 6.2 – Active WUE Program Costs and Savings

Program	Total Costs, Present Value	Lifetime Savings (AF)	Total Benefits, Present Value	Net Benefit (Benefit - Costs)	Benefits/Costs
HET Rebates, Single Family	\$ 399,406	1,364	\$ 703,415	\$ 304,009	1.8
HET Rebates, Multi-Family	\$ 470,981	2,859	\$ 1,474,335	\$ 1,003,354	3.1
Large Landscape Audits (w/ Incentives)	\$ 2,621,163	8,400	\$ 4,499,900	\$ 1,878,737	1.7
CII Audits and Customized Incentives	\$ 4,499,560	11,563	\$ 6,194,075	\$ 1,694,515	1.4
Landscape Contractor Certification	\$ 3,202,176	26,596	\$ 14,543,471	\$ 11,341,294	4.5
HE Clothes Washer Rebates	\$ 313,765	632	\$ 351,542	\$ 37,777	1.1
Valley-Wide Marketing Costs	\$ 278,751				
Total Costs, Active Programs	\$ 11,785,802				
Total Benefits, Active Programs		51,414	\$ 27,766,737		
Benefit Cost Analysis				\$ 15,980,935	2.4
New Construction Code		87,348			
Total w/ Marketing and New Construction Code		138,762			

Note: For active programs, total unit cost (Present Value Costs divided by Present Value Savings) = \$354 /AF

Below are definitions of the terms listed above:

Total Costs, Present Value:	The present value of all direct program costs
Lifetime Savings (AF):	Cumulative water savings over all estimated participants
Total Benefits, Present Value:	The present value of program benefits, taken over the lifetime savings.
Net Benefits:	The difference between benefits and costs.
Benefit Cost Ratio:	Benefits divided by costs.

Water Savings from Recommended Water Use Efficiency Programs

Figures 6.1 to 6.4 provide depictions of the future water savings through time of

- Active Conservation Programs
- New Construction Building Code
- Price-Induce Conservation
- All Savings Combined of the WUE Strategic Plan

**Added Savings: Future Active Programs
Santa Clarita Valley Wide**

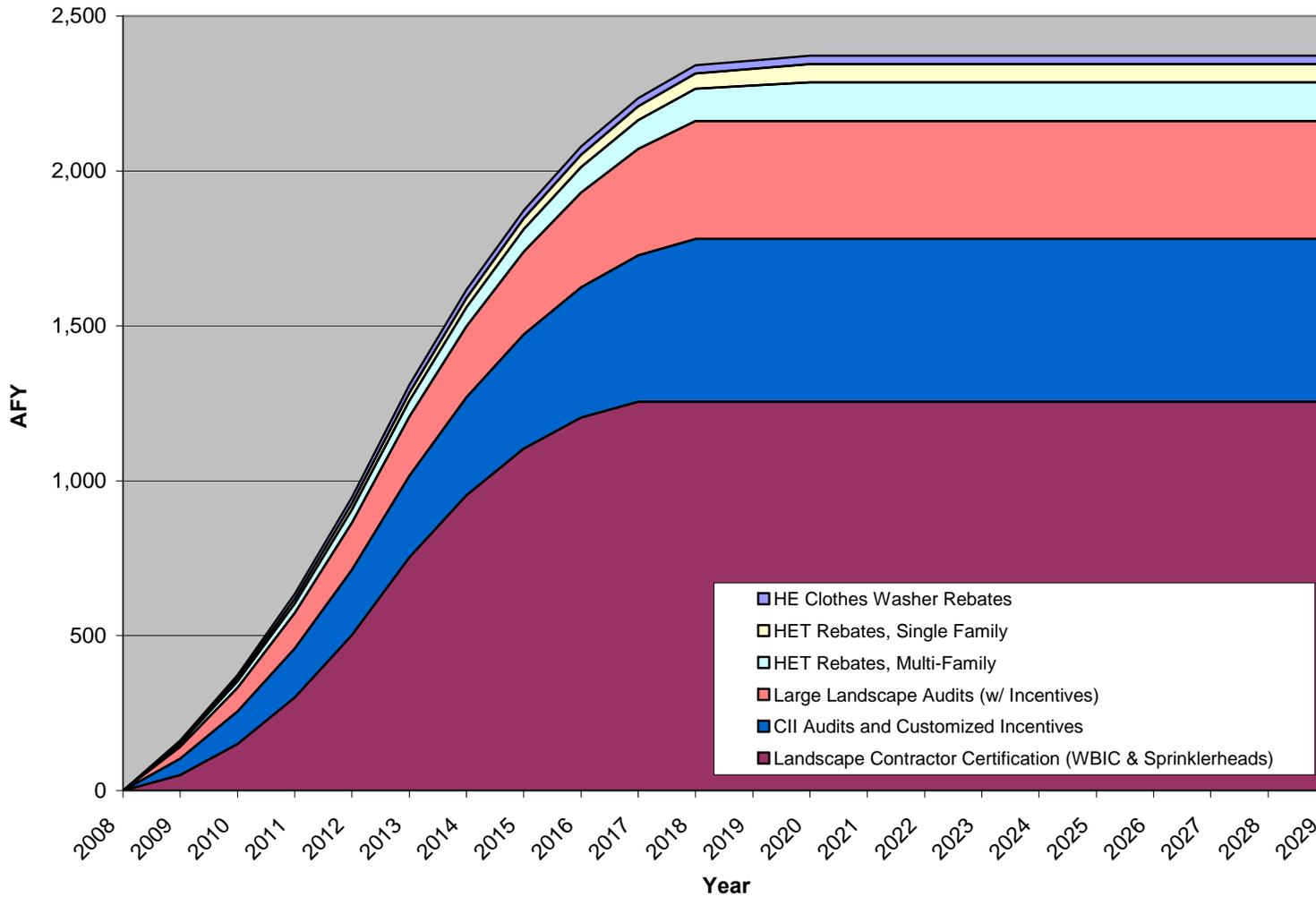


Figure 6.1 – Recommended Active Conservation Program Future Savings

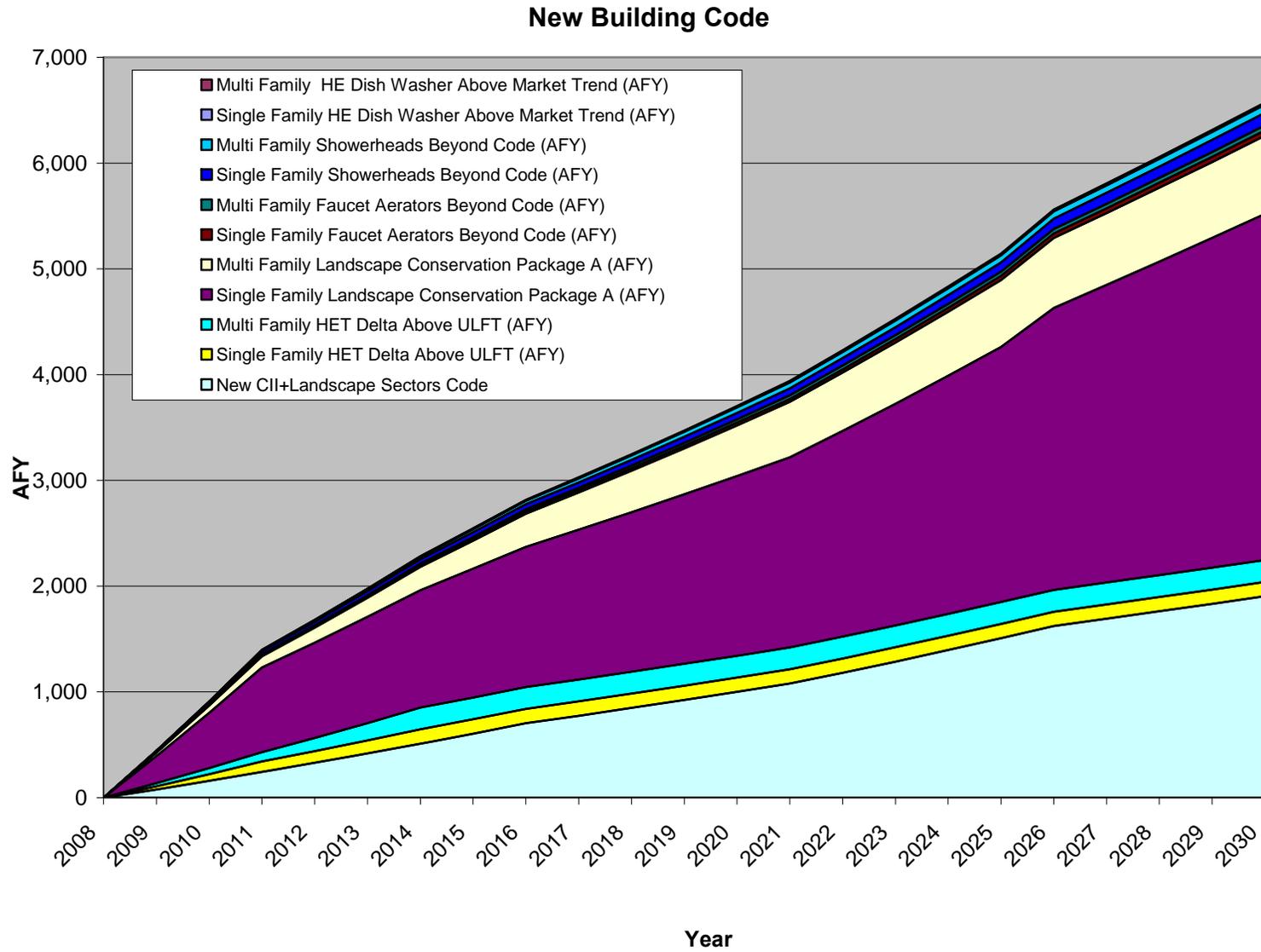


Figure 6.2 – Recommended New Construction Building Code Future Savings

Savings from Increasing Real Retail Rates

(Since 2004, Assumes 1% Inflation Adjusted Increase per Year and -.1 Price Elasticity of Demand)

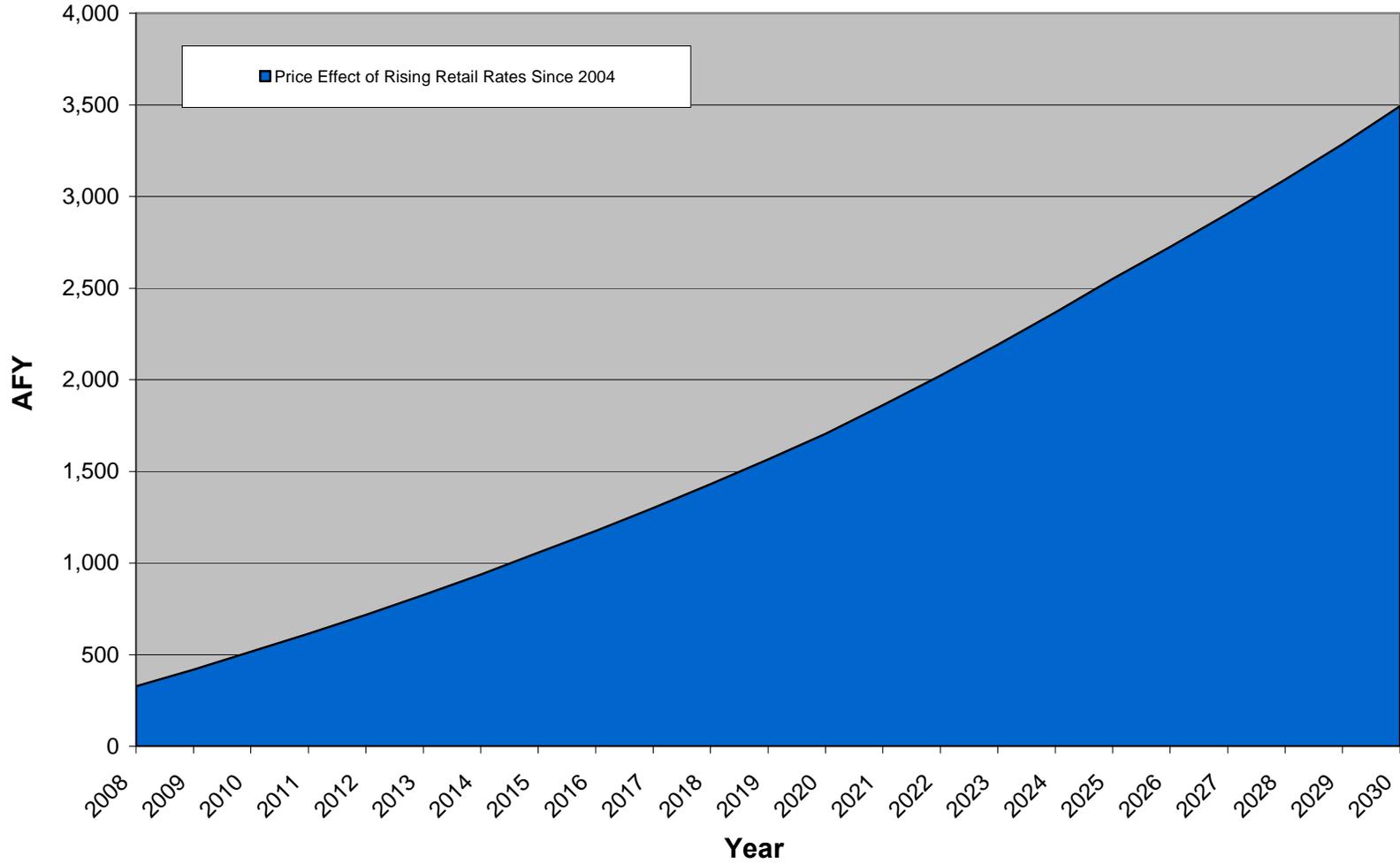


Figure 6.3 – Effect of Price-Induced Conservation Savings

Conservation in Strategic Plan Compared to Conservation in UWMP

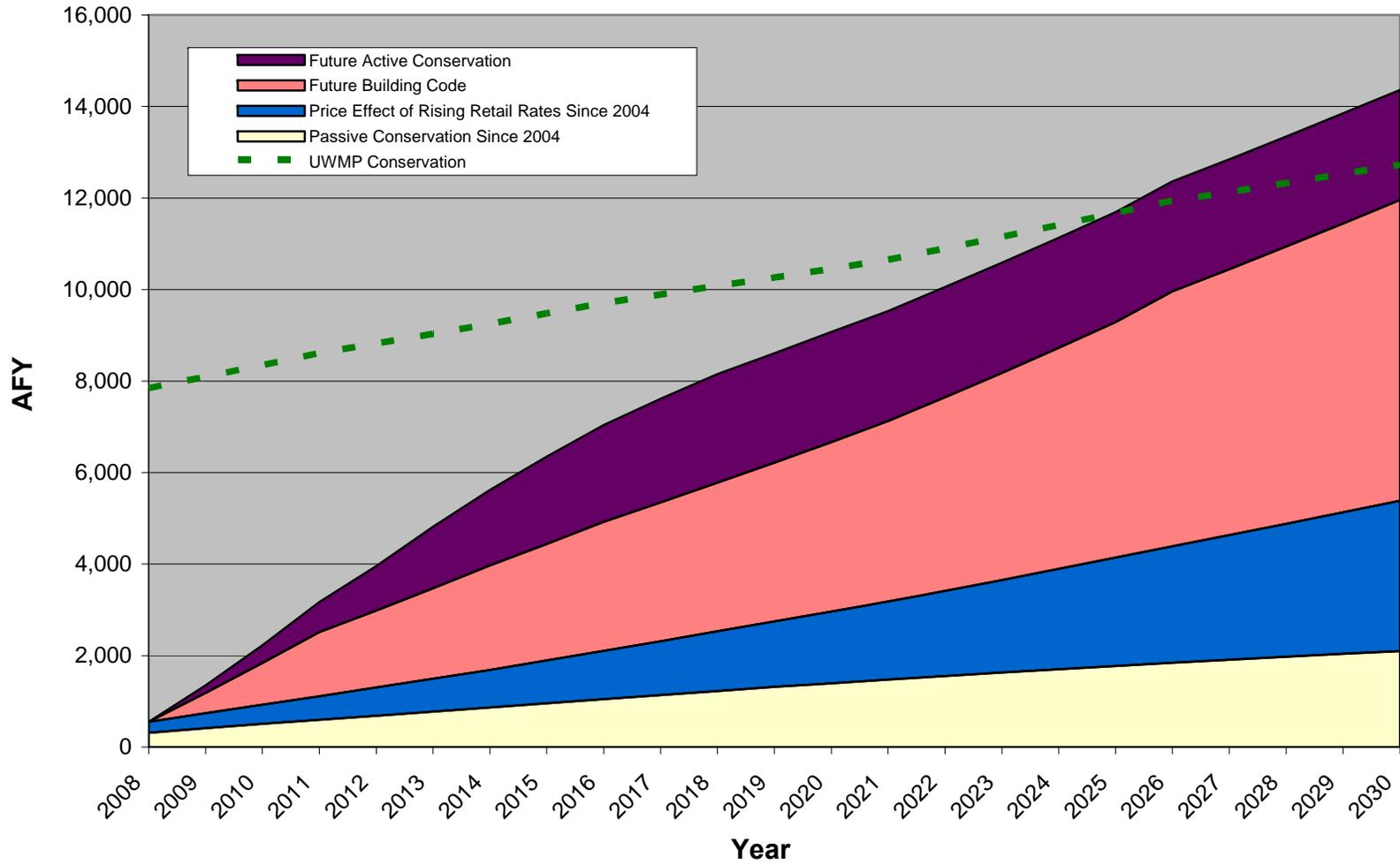


Figure 6.4 – Savings from the WUE Strategic Plan

Recommended Conservation Program Details

On the following pages are conservation program overviews with information regarding market opportunity, measure and program water savings and costs. Additionally there is information regarding program design and implementation requirements.



*Solution for
BMP 2*

Santa Clarita Valley High Efficiency Toilet Rebate Program

Why Offer This Program?

Although the Santa Clarita Valley has an estimated 66 percent saturation rate for water efficient toilets (67 percent of single family toilets and 64 percent of multi-family toilets), there is significant opportunity for water savings in targeting the remaining old toilets, and saving even more water by promoting new “High Efficiency Toilets” throughout the service area.

Since 1992, only ULF toilets can be sold in the United States. Although this was a major advancement in residential water efficiency, there is still more that can be achieved. It is time to “raise the bar” and promote the newer high efficiency toilet (HET) technology which saves even more water.

The Santa Clarita Valley has a high percentage of new housing stock with 40 percent of single family and 33 percent of multi-family housing units built after 1992. As a result, these homes already utilize water saving ULF toilets. The savings opportunity lies within older residential sites that are utilizing non-ULF toilets.

Program Design

This is an open rebate program for residential customers, budgeted at approximately 500 rebates per year. Customers will be offered the following incentives for replacing a non-ULFT with an HET:

- Single family = **\$100** rebate
- Multi-family and mobile home = **\$100** rebate for HET replacement

Customers would be able to download program application form from utility website. Once new product is purchased and installed, customer completes application form and attaches original receipts. Then, the customer would be sent a rebate check or get a credit on their water bill.

New or Existing?

Modified Program

Technology

High Efficiency Toilets

Target Market

Single, Multi, Mobile home
Non-ULFT households

Market Data

Pre 1992 Toilets: Single Family					
	Total Toilets	Remaining non-ULF Toilets	Percent Remaining of Pre-1992	All Toilets	Remaining Potential Savings AFY
VWC	50,186	13,725	47%	73%	307
SCWD	41,238	15,813	47%	62%	354
NCWD	20,565	7,291	47%	65%	163
LA36	2,600	790	46%	70%	18
Total SF	114,589	37,619	47%	67%	843

Pre 1992 Toilets: Multi-Family					
	Total Toilets	Remaining non-ULF Toilets	Percent Remaining	All Toilets	Remaining Potential Savings AFY
VWC	11,741	2,740	46%	77%	61
SCWD	31,148	11,838	46%	62%	265
NCWD	5,960	3,090	46%	48%	69
LA36	179	97	46%	46%	2
Total MF	49,027	17,764	46%	64%	398
Grand Total	163,616	55,383	46.5%	66.2%	1,241

Program Production

HET Rebates: Single-Family						
	2009	2010	2011	2012	2013	5-Year Total
VWC	105	105	105	105	105	524
SCWD	104	104	104	104	104	522
NCWD	37	37	37	37	37	185
LA36	5	5	5	5	5	25
Total	251	251	251	251	251	1,256

HET Rebates: Multi-Family						
	2009	2010	2011	2012	2013	5-Year Total
VWC	105	105	105	105	105	524
SCWD	104	104	104	104	104	522
NCWD	37	37	37	37	37	185
LA36	5	5	5	5	5	25
Total	251	251	251	251	251	1,256

Program Savings

A total of 2,512 HETs would be installed in the first five years of the program. A total of 6,030 HETs with the ongoing program of 500 per year until 2019 will save a total of **4,223 acre-feet** of water over the life of the product.

Program Costs

HET Rebate Program Cost per Acre Foot =

\$475/acre-foot Single Family

\$267/acre-foot Multi-Family



Santa Clarita Valley Large Landscape Audit & Incentive Program

Solution for BMP 5

Why Offer This Program?

In the Santa Clarita Valley, a high percentage of water is used for outdoor irrigation. Despite this high water use customers have little understanding of ways to alleviate excessive watering while still maintaining the health of their plants and turf.

Large landscape sites can be categorized into two types: public and private sector. Private sector customers, both property owners and Homeowner's Associations, typically pay landscape professionals to keep their grass green. They do not control the irrigation, the landscape companies do. On the flip side the landscape companies do not pay the water bill and have no incentive to reduce water use. To achieve success we must get both the landscape professional and the property owner engaged.

Public sector sites such as parks are typically maintained by city staff and require a somewhat different approach than private sector. The program must obtain support from multiple departments and staff levels.

Program Design

The program will offer water audits, minor repairs, equipment incentives, and water budgeting to public and private sector large landscape sites with high water use. At the onset the key targets will be the City of Santa Clarita Landscape Maintenance Districts, Los Angeles County Parks and Homeowner's Associations.

Targeted customers, both public and private sector, will be contacted via phone to solicit participation. Private sector customers will be asked to invite their landscape service company to the audit whereas public sector customers will be asked to invite the on-site maintenance staff and their respective supervisors.

During the audit process, the field auditor will assess the efficiency of the irrigation system and identify leaks and repair opportunities. Minor repair of problems such as broken sprinkler lines and faulty spray heads will be performed.

Following the site visit, an analysis of the irrigation system's efficiency will be conducted to determine the proper watering schedule for the landscape. In addition a water budget will be developed based upon the size of their landscape. Using the information from the site visit and the analysis, a report will be generated with upgrade recommendations, available incentives, new irrigation schedules, a water budget and a cost/benefit analysis. If possible the report will be delivered in person to further educate the customer. In addition customer will be provided with regular communication regarding their performance to budget.

Included in the report will be an application for available incentives. The available incentives include: high efficiency nozzles and weather based irrigation controllers. In order to maximum the incentive it is

recommended that the incentive be customized based upon the customer’s site and paid at a per acre foot saved valve. Using the report as back up documentation the customer would submit the application for incentive reimbursement. Then, the customer would be sent a rebate check or get a credit on their water bill.

<i>New or Existing?</i>	<i>Technology and/or Service</i>	<i>Target Market</i>
New program (existing pilot with the City of Santa Clarita)	<ul style="list-style-type: none"> ▪ Audit ▪ Installation of efficient spray nozzles and weather based irrigation controllers ▪ Irrigation system minor repairs ▪ Water budgeting 	Residential & commercial customers with 2 or more acres of irrigated landscape.

Program Production

Production	2009	2010	2011	2012	2013	5 Year Total
Initial Contact	140	140	140	140	140	700
Audited Sites	28	28	28	28	28	140

Program Savings

The 140 landscape audits in the first five years of the program, and another 140 in the second five years, will result in **8,400 acre-feet** in a program that sustains constant savings through 2030.²

Program Costs

Large Landscape Audit and Incentive Cost per Acre Foot = **\$486/acre-foot**

² Lifetime savings result from 280 audits in the first ten years, and a total of 615 audits in a program that replicates at the end of savings life to sustain constant savings through 2030.



Santa Clarita Valley CII Audit & Customized Incentive Program

Solution for BMP 9

Why Offer This Program?

Approximately 19% of Santa Clarita Valley water is consumed by Commercial and Industrial customers. Unlike the residential market, commercial and industrial sites vary widely in their functionality and water consuming equipment.

As a result, water efficiency programs need to go beyond the menu-based programs to also allow customized incentives for site-specific opportunities. Because this is a smaller customer segment for Santa Clarita it is all the more important for the program to be tailored to the customer to identify the best opportunities.

Program Design

The program will offer comprehensive water audits and reporting of cost effective recommendations in a clear and concise format with a focus on payback. Recommendations will include both the site-specific opportunities such as waterbrooms at Magic Mountain or cooling tower modifications at the College of the Canyons. Customers will then be offered a per acre-foot saved incentive based upon the findings of the audit.

The program will target high opportunity customers. These customers include: amusements parks, colleges and universities, hotels, hospitals and other customers identified by the retail water agencies. The key decision maker will be identified and contacted via phone to enlist participation.

If possible the audit report will be delivered in person and fully explained to customer. The staff person delivering the report would be able to answers questions and motivate and aid the customer in accomplishing the recommended retrofits.

If the customer moves forward with the conservation measures they will be required to submit an application to the water agency. The application will be compared against the report and then the customer would be sent a rebate check or get a credit on their water bill.

A number of water audits have already been performed by Valencia Water Company and others. For sites that already have audits, the program will focus on achieving recommended conservation actions.

New or Existing?

Modified program

Technology and/or Service

- Audit
- Customized incentive for equipment retrofits

Target Market

Commercial and Industrial water users

Targeted equipment

- High efficiency toilets and urinals
- Waterbrooms
- Commercial/coin op HEWs
- Cooling tower conductivity controller
- Sub-meters for landscape

Market Data

Supplier	Freq.	Sum(ccfy)	Mean(ccfy)
VWC	1,910	4,351,654	2,278
SCWD	790	862,362	1,092
NCWD	450	513,687	1,142
LA36	5	9,088	1,818
	3,155	5,736,791	1,819

Program Production

Production	2009	2010	2011	2012	2013	5 Year Total
Initial Contact	316	316	316	316	316	1,578
Audited Sites	63	63	63	63	63	316

Program Savings

The 316 audits over the first five years of the program, and another 316 over the second five years will save **11,563 acre-feet** of water in a program that sustains constant savings through 2030.³

Program Costs

CII Audit and Customized Incentive Cost per Acre Foot = **\$606/acre-foot**

³ Lifetime savings result from 632 audits over ten years, and a total of 1,387 audits in a program that replicates at the end of savings life to sustain constant savings through 2030.



Solution for BMP 5

Santa Clarita Valley Landscape Contractor Certification and Weather-based Irrigation Controller Program

Why Offer This Program?

A large portion of Santa Clarita Valley water consumption is for residential outdoor water use. A new technology that is proving to save a tremendous amount of water savings is weather-based irrigation controllers (WBIC) or smart controllers. This is ideal for large lot sizes with excessive watering, WBICs save water by changing irrigation schedules much more frequently and more accurately than controllers that are manually set. WBICs follow either average historical data or real-time evapotranspiration (ET) through a radio frequency signal or on-site weather sensor.

Since WBICs are an emerging technology, they have limited availability on suppliers' shelves. The product is best obtained directly from manufacturers. Adding to the limited product availability, most customers do not know how to install and operate WBICs. To make things more complex typical landscape contractors and maintenance companies may not have sufficient incentive to install water efficient technology. They are paid to keep the customer's landscape green and do not pay the water bill. There can also be language issues to overcome.

These barriers have greatly impacted the quantity of WBICs being moved in the market. Water agencies, therefore, must rethink how WBICs can most effectively be introduced in the market. Because landscape service providers are the key influencer in the market chain it makes sense to leverage these companies.

It will be necessary to educate landscape service providers on the value of WBICs and installation guidelines as well as incentivize them to install them at customer sites. In addition to WBICs, replacement of high flow sprinkler nozzles with water efficient models will further reduce excessive water flows and increase spray quality for the residential homeowner. This measure will be offered under the program, as well.

Program Design

The Program would target all landscape contractors and maintenance companies in the Santa Clarita Valley. These companies would be invited to water efficiency training workshops where their staff would be trained in the classroom and in the field on the importance of general water use efficiency, properly installed WBICs, hydro-zoning, and high distribution uniformity. Each staff person as well as the landscape company would receive an official certification for attending the workshop and committing to implementing water use efficiency at their customer's sites. Proactive contractors would be encouraged to sign up for the California Landscape Contractors Association (CLCA) Water Manager Certification Program [<http://www.clca.org>].

End use customers would be marketed via their landscape contractors. A list of landscape contractors will be developed through local business licenses. These companies will be sent a direct mail piece inviting them to a water use efficiency workshop. The mailer will also highlight the benefits of the training &

certification and free WBICs.

The one day workshop consists of basic irrigation principles, irrigation scheduling, the value of WBICs and guidelines to proper installation. Classes should be taught in English and Spanish and offered at least every year. Every participant would receive a certificate for attending training. This certificate would allow them to install the Free WBIC or supervise installations.

After attending the training and receiving certification, landscape contractor would be eligible to receive Free WBICs and Free high efficiency nozzles. The contractors would receive one WBIC and one set of nozzles after the initial training. They would be required to install them at a customer's site within a participating Santa Clarita Valley water agency. The installation must be inspected and installed properly before they were eligible to receive additional product. As contractors need additional product they would submit an application to the utility or their program vendor and the product would be picked up at the water supplier's office. The first two – four installations for each installer would be required to have an inspection. Regular customers (not landscape contractors) would also be able to participate and attend the classes, but they get the equipment only for their home.

<i>New or Existing?</i>	<i>Technology and/or Service</i>	<i>Target Market</i>
NEW program	<ul style="list-style-type: none"> ▪ Landscaper training and certification ▪ Weather based irrigation controllers ▪ HE spray nozzles 	Customers of landscape service providers receiving certification

Program Production

Production	2009	2010	2011	2012	2013	5 Year Total
Initial Contacts	5	5	5	5	5	25
Personnel completing tr:	25	25	25	25	25	126
Sites Retrofitted	301	603	904	1,206	1,507	4,522
Controllers	301	603	904	1,206	1,507	4,522
Sprinklerheads	6,030	12,059	18,089	24,119	30,149	90,446
Inspections	30	60	90	121	151	452

Program Savings

The 4,500 WBICs and 90,500 high efficiency nozzles installed over the five year program will save **26,596 acre-feet** of water in a program that replicates over time to sustain constant savings through 2030.

Program Costs

Landscape Contractor Certification/WBIC Program Cost per Acre Foot = **\$184/acre-foot**.



*Solution for
BMP 6*

Santa Clarita Valley Residential High Efficiency Clothes Washer Rebate Program

Why Offer This Program?

Residential High Efficiency Washers cut water and sewer flows by 60% and energy use by 50% per machine. HEWs with a water factor of 6.0 or less save an estimated 5,085 gallons per year. With a 12 year life, the savings per machine are substantial.

Currently it is estimated that the saturation rate of residential HEWs is less than 10% in Santa Clarita Valley.

Unfortunately, many customers are still resistant to purchase HEWs due to the higher price tag. Standard clothes washers are still \$200 - \$500 less expensive than high efficiency models. Because this is a large ticket item for most customers the program can only leverage the annual replacement sales. Getting customers to replace their clothes washer without already needing to is extremely challenging.

HEW customer incentives reduce this differential, therefore overcoming the product's major barrier to sale. Currently the Southern California Gas Company offers an instant or point of purchase incentive of \$35 for 2008 Energy Star Qualified HEWs. Although the water savings does not justify a large incentive even a \$65 incentive coupled with the Gas Company's incentive will help the customer make a purchasing decision.

Program Design

The program would target single family and multi-family residential customer purchasing a new clothes washer. Because this is a large ticket item for most customers the program can only leverage the annual replacement sales. Getting customers to replace their clothes washer without already needing to is extremely challenging.

The program would offer an incentive of \$65 for the replacement of a non-efficient washer with a high efficiency model. The model must be a qualified Energy Star model with a water factor of 6.0 or less and an energy factor of 1.72 or greater.

The program would be advertised through point of purchase materials displayed at local appliance stores, hardware stores and big box retailers and websites of water suppliers.

Customers would be able to download program application form from utility website. Once new product is purchased and installed, customer completes application form and attaches original receipts. Then, the customer would be sent a rebate check or get a credit on their water bill.

New or Existing?***Technology******Target Market***

Modified Program

High Efficiency Clothes Washers

Single family and Multi-Family

Market Data

There are approximately 58,200 single and multi-family residences with clothes washers in the Santa Clarita Valley, of which perhaps 4,600 are high efficiency. High efficiency clothes washers currently represent approximately 30 percent of new sales.

Program Production

Proposed production is 1 percent of total (single and multi-family) residential units per year for five years.

Production	2009	2010	2011	2012	2013	Total
Administration (per Rebate)	422	422	422	422	422	2,110
Rebates	422	422	422	422	422	2,110

Program Savings

The 2,110 high efficiency washers installed over the five year program will save 632 **acre-feet** of water in a program that sustains constant savings through 2030.⁴

Program Costs

HEW Rebate Program Cost per Acre Foot \$740/**AF**.

⁴ Lifetime savings result from 2,110 units installed in the first five years, and a total of 4,219 units in a program that replicates at the end of savings life to sustain constant savings through 2030.

CHAPTER 7: IMPLEMENTATION PLAN

Facilitating Actions

The programs described in the previous chapter do not describe all the needed work from Santa Clarita Valley Family of Water Suppliers to implement conservation in the area. There are additional non-programmatic actions—to be performed by the water suppliers—that are needed to facilitate implementation of cost-effective programs. These include:

- Pursuit of local and state-wide changes to building code;
- Pursuit of local ordinances supporting water use efficiency and water recycling;
- Local, state, and federal legislative advocacy on conservation-related issues;
- Active participation in trade groups and policy forums such as the California Urban Water Conservation Council working groups;
- Support of research and studies on new technologies and approaches to water use efficiency;
- Education and training within communities on water use efficiency and conservation practices;
- Outreach and marketing to cities, agencies, consumers, and other stakeholders, either directly or through partnerships with other agencies and entities; and
- Identification of outside funding possibilities and coordination of partnering agencies.

Partnerships

Santa Clarita Valley is fortunate to have a number of capable organizations and coalitions with which to join forces on programs and water efficiency initiatives. Organizations that may share interests and want to develop partnerships include the utilities and agencies that provide electricity, natural gas, wastewater collection and treatment, surface runoff mitigation, and other conservation and planning activities.

Trade Organizations

There are a number of trade organizations that actively drive changes and advancements within the state of California. Santa Clarita Valley suppliers actively participate in these organizations and derive many benefits including:

- Energy/water policy
- Efficiency Standards
- Legislation for water efficiency

CUWCC is the lead organization in California, affecting much positive change in the industry over the past ten years. Santa Clarita Valley could also benefit from the recent water/energy collaborative policy processes under way. Santa Clarita Valley will continue to support these efforts.

Funding Opportunities

By securing outside funding, the Santa Clarita Valley Family of Water Suppliers will be able to leverage its funding and increase the cost effectiveness of programs.

- United States Bureau of Reclamation
- Department of Water Resources
- Partnerships with other local utilities (electric, gas, sanitation) and customer agencies.

Department of Water Resources

DWR issues grants under Prop 50, formerly issued under Prop 13. Funding is issued for a two year cycle. Based upon a DWR-issued timetable, agencies can download RFP requirements from the DWR website and submit their grant proposal(s) for programs. DWR funding is appropriated for programs that are innovative in marketing outreach or technology. Generally, DWR supports newer technologies as long as there is some record of product performance.

United States Bureau of Reclamation

USBR provides a smaller pool of grant money than DWR, but is worth pursuing none the less. USBR creates an annual time calendar for grant submittals and posts the RFP and response template on their website. Programs receiving grant awards are innovative in design or meet the needs for a niche market.

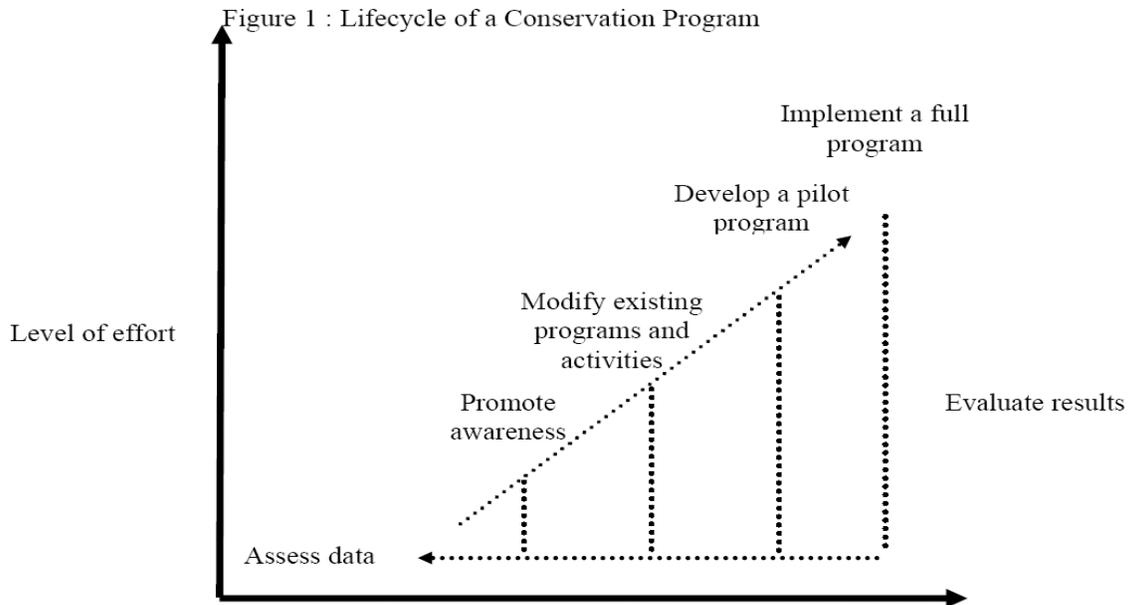
Energy Utilities- Southern California's energy utilities are becoming an ever more viable program resource for water suppliers. Presently there are four general categories of program opportunities for water agencies to pursue:

- **Internally-operated utility programs-**Water suppliers can often piggyback energy programs, adding a water measure, audit, or service onto the site visit. The water agency typically pays only an incremental cost for their portion of the program.
- **Programs awarded through a competitive bid-**Water suppliers can submit bids to the energy utility to provide shared services for a program.
- **Partnership Programs-**Programs such as Rinse & Save are partnership programs that are funded by a number of organizations in order to operate the program on a larger and more cost effective basis.

Santa Clarita Valley suppliers are keeping track of the various funding entities and timetables in order to gain maximum benefit from these organizations.

Program Life cycle

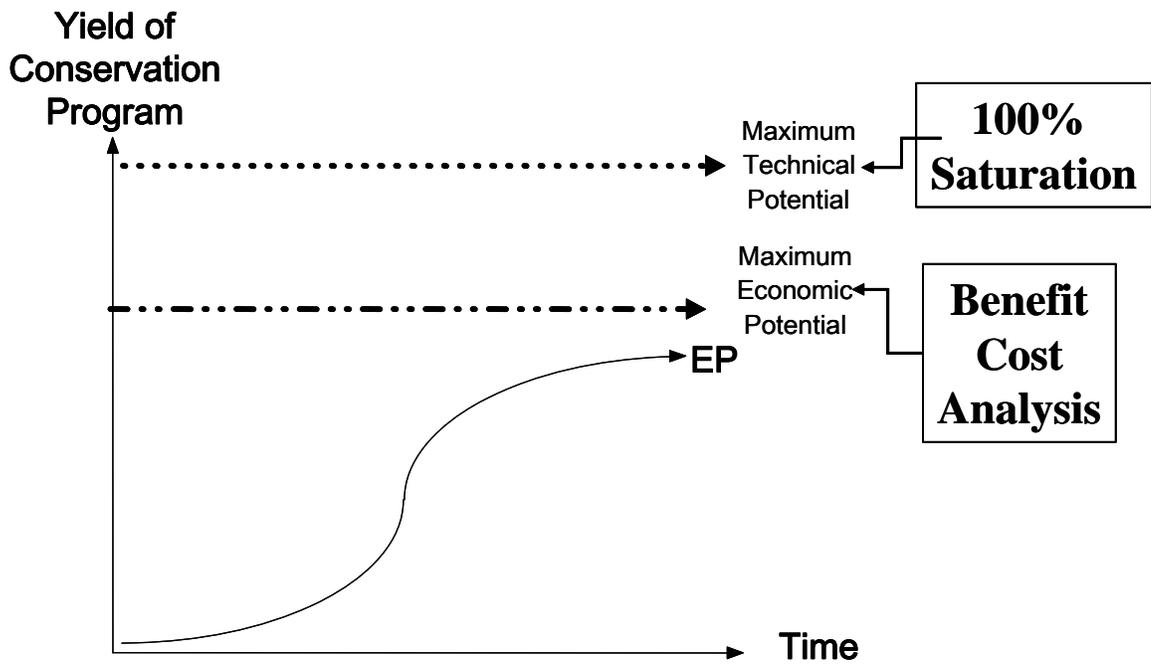
As additional funding opportunities appear and as successful programs prove themselves, it is intended that this master plan be periodically updated. Figure 7.1 below depicts the first stages in the Lifecycle of a Conservation Program. Much of the data assessment has been performed in the process of creating this master plan, but the remaining stages can vary from program to program.



Source: *Socioeconomic Impacts of Conservation*, AwwaRF 2001.

Figure 7.1: Lifecycle of a Typical Conservation Program

Even fully functioning programs will, however, face decreasing returns to scale as the market for the particular water efficient technology or measure becomes saturated. Figure 7.2, on the following page, depicts a typical S-shaped technology diffusion curve that describes the adoption and diffusion of new technologies. Thus, today's most attractive conservation program opportunities will, if correctly implemented, become less attractive at some point in the future.



Source: Authors' Construct

Figure 7.2: Expansion Path (EP) of a Typical Conservation Program

The relationship between cost and yield from conservation programs can be summarized in a “supply curve”. Figure 7.3 depicts this economic relationship between conservation supply and cost based on estimates provided in the economic analyses conducted in this study.

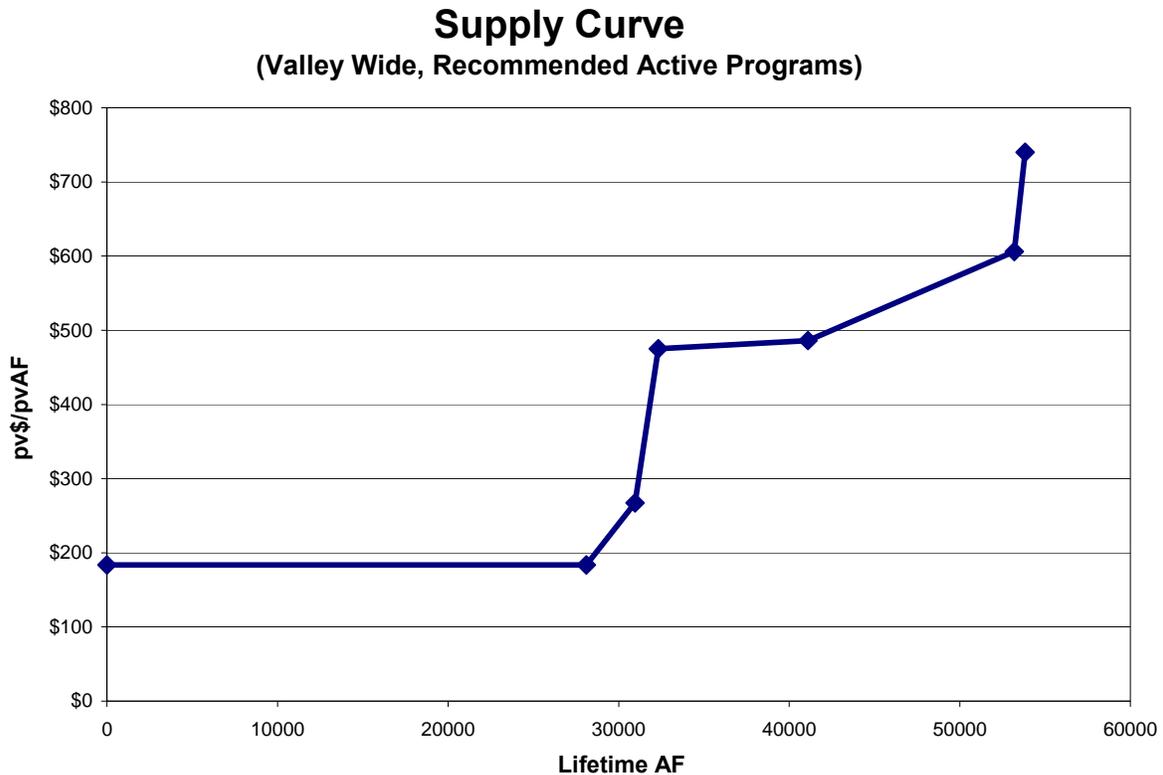


Figure 7.3: Supply Curve of Active Conservation Programs

The reader should note that the estimated supply curve from conservation is based upon prospective data estimates of expected costs and yield from conservation programs. Each implemented program saves water over their life of their respective installed devices. Figures 6.1 to 6.4 displayed in the previous chapter depict the estimated “yield” from conservation programs over time. Note this Plan was designed so that active conservation savings do not decay over time (Figure 6.1). To achieve this, the Plan includes replicating programs at the end of their savings life

Updates to the Plan

The current implementation plan has positive net benefits for Santa Clarita Valley and the region. The adopted 5-year implementation plan represents a significant commitment from Santa Clarita Valley, beyond its direct economic costs. The implementation hurdles that need to be addressed include marketing challenges, negotiations with potential co-funding partners, support for enabling building codes and legislation, and facilitating political support. If the current comprehensive set of conservation programs can be implemented feasibly and cost-effectively, the suppliers can be expected to expand the scale of the effect programs. On the other hand, if some conservation programs cannot be effectively implemented, the suppliers can and should scale these programs back. This WUE Strategic Plan is

designed to be a living document that adapts as the District learns more about delivering conservation programs.

Santa Clarita Valley suppliers will need to revisit and revise this WUE Strategic Plan on an on-going basis to reflect changing outside funding, learning of what works with existing opportunities, and new market opportunities.

APPENDIX A.1: CONSERVATION MEASURE GUIDE

This appendix contains the Conservation Measure Guide.

APPENDIX A.2: ADDITIONAL PROGRAMS/MODIFICATIONS TO PROPOSED PROGRAMS

This appendix contains the program description sheets that are not part of the recommended programs for one of two reasons:

1. Alternative WUE Programs that depend on local conditions for implementation:
 - a. Santa Clarita Valley Cash for Grass Rebate Program – The Santa Clarita Valley Family of Water Suppliers has decided to suspend immediate implementation of a “Cash for Grass” program due to a recent Center for Disease Control (CDC) health advisory that cited concerns about lead levels found in certain kinds of artificial turf recently tested in New Jersey.
[\[http://www2a.cdc.gov/HAN/ArchiveSys/ViewMsgV.asp?AlertNum=00275\]](http://www2a.cdc.gov/HAN/ArchiveSys/ViewMsgV.asp?AlertNum=00275)
 - b. Santa Clarita Valley Industrial Process Audits and Incentives Program—this would replace part of the CII Audit Program with a specialized program for large industrial customers.
2. Aggressive implementation of WUE Programs that are contingent on additional funding:
 - a. Aggressive HET Program – This program, contingent on additional funding, would attempt to accomplish 50% of the HET replacements within a 5-year time frame.

It is important for the WUE Strategic Plan to be flexible and adaptable. The programs in this appendix could be used if outside funding can be obtained or if more aggressive implementation is desired.



*Solution for
BMP 2*

Santa Clarita Valley Aggressive High Efficiency Toilet Rebate Program

Why Offer This Program?

Although the Santa Clarita Valley has an estimated 66 percent saturation rate for water efficient toilets (67 percent of single family toilets and 64 percent of multi-family toilets), there is significant opportunity for water savings in targeting the remaining old toilets, and saving even more water by promoting new “High Efficiency Toilets” throughout the service area.

Since 1992, only ULF toilets can be sold in the United States. Although this was a major advancement in residential water efficiency, there is still more that can be achieved. It is time to “raise the bar” and promote the newer high efficiency toilet (HET) technology which saves even more water. The Santa Clarita Valley has a high percentage of new housing stock with 40 percent of single family and 33 percent of multi-family housing units built after 1992. As a result, these homes already utilize water saving ULF toilets. The savings opportunity lies within older residential sites that are utilizing non-ULF toilets.

Program Design

For this program, staff will target the market comprised of older residential housing stock that carries a high likelihood for existing non-ULF toilets. Bill stuffers and direct mail would be utilized to target the older residential housing stock. Previous rebate program participants would be removed from the mailings. The main objective is to replace non-ULF toilets. Customers will be offered the following incentives for replacing a non-ULFT with an HET:

- Single family = **\$150** rebate
- Multi-family and mobile home = **\$200** rebate for HET replacement

Multi-family and mobile home customers are offered a higher rebate due to the higher density of people per home and therefore higher water savings. Customers would be able to download program application form from utility website. Once new product is purchased and installed, customer completes application form and attaches original receipts. Then, the customer would be sent a rebate check or get a credit on their water bill.

New or Existing?

Modified Program

Technology

High Efficiency Toilets

Target Market

Single, Multi, Mobile home
Non-ULFT households

Market Data

Pre 1992 Toilets: Single Family					
	Total Toilets	Remaining non-ULF Toilets	Percent Remaining of Pre-1992	All Toilets	Remaining Potential Savings AFY
VWC	50,186	13,725	47%	73%	307
SCWD	41,238	15,813	47%	62%	354
NCWD	20,565	7,291	47%	65%	163
LA36	2,600	790	46%	70%	18
Total SF	114,589	37,619	47%	67%	843
Pre 1992 Toilets: Multi-Family					
	Total Toilets	Remaining non-ULF Toilets	Percent Remaining	All Toilets	Remaining Potential Savings AFY
VWC	11,741	2,740	46%	77%	61
SCWD	31,148	11,838	46%	62%	265
NCWD	5,960	3,090	46%	48%	69
LA36	179	97	46%	46%	2
Total MF	49,027	17,764	46%	64%	398
Grand Total	163,616	55,383	46.5%	66.2%	1,241

Program Production

HET Rebates: Single-Family						
	2009	2010	2011	2012	2013	Total
VWC	1,372	1,372	1,372	1,372	1,372	6,862
SCWD	1,581	1,581	1,581	1,581	1,581	7,907
NCWD	729	729	729	729	729	3,645
LA36	79	79	79	79	79	395
Total	3,762	3,762	3,762	3,762	3,762	18,809
HET Rebates: Multi-Family						
	2009	2010	2011	2012	2013	Total
VWC	274	274	274	274	274	1,370
SCWD	1,184	1,184	1,184	1,184	1,184	5,919
NCWD	309	309	309	309	309	1,545
LA36	10	10	10	10	10	49
Total	1,776	1,776	1,776	1,776	1,776	8,882
Grand Total	5,538	5,538	5,538	5,538	5,538	27,692

Program Savings

The 27,692 toilets will save **24,022 acre-feet** of water over the life of the product.

Program Costs

HET Rebate Program Cost per Acre Foot =

\$385/acre-foot Single Family, \$231/acre-foot Multi-Family



Santa Clarita Valley Industrial Process Audits and Incentives Program

Why Offer This Program?

In the Santa Clarita Valley, industrial customers consume approximately 23% of all CII use. However, few if any, water conservation programs have been directed at industrial customers, many of which use “process water” for which there are often conservation opportunities.

Five industry sectors offer the most promising opportunities for water efficiency improvements in industrial processes:

- food processing
- textiles
- fabricated metals
- electronics
- industrial laundries

Program Design

Commercial and industrial survey and incentive programs are known to have low participation greatly due to poor marketing, customer support and minimal customer follow through with the retrofit process. The Santa Clarita Valley Program will be initiated to break through these traditional barriers.

The program will overcome these obstacles by providing superior customer support to aid the customer with education and assistance through each step of the retrofit process.

Traditional programs attempt to identify every opportunity for savings; allowing the customer to pick through the report and likely select the easy retrofit, such as toilets. The Santa Clarita Valley Program will focus on the process upgrade, the value of the retrofit, how to make it happen and available incentive monies.

The Survey Process

The survey will not include all retrofits possible for the site. The engineer will focus on the best bang-for-the-buck for the customer and the program. For this reason, the program

will include two levels of surveys, the Focused Survey and the Comprehensive Survey.

The Focused Survey will include a limited number of measures; those most likely to be implemented by the customer. The engineer will determine which measures to include, balancing between the customer's interest and those which save the most water. The Focused Survey might include only one building or one major process. The engineer will provide diagrams and photos to clearly illustrate their recommendations. The overall goal is to give the customer a template so they learn how to secure the incentives; how to retrofit and how to incorporate water reduction and reuse into their everyday business.

The Comprehensive Survey will be used for customers who express a strong interest in a wide-ranging list of retrofits as well as motivation to implement the retrofits. The engineer will spend up to three days on-site measuring flows to determine equipment design ranges; identifying reduction, recycling and reuse opportunities. The engineer will diagram system modifications including before and after water balance, take supporting photos and detail a thorough list of measures for the site. It is anticipated that 20% of all surveys will be Comprehensive Surveys and that 80% will be Focused Surveys.

The Survey Report

Typical survey reports, with all their technical detail, say little to the customer on how the upgrades can benefit their business. The report is often stuffed with technical terminology yet fails to roll up the recommendations for the customer in a summary page. As importantly, there is no practical next step information that would aid the customer in retrofitting their facility.

The survey report for this program will be clear and concise, with heavy use of photographs and diagrams. The report will focus on water saving opportunities that have the highest potential for retrofit, not every savings opportunity.

The reports created for both the Focused and the Comprehensive Survey will be customer friendly and provide a guide to retrofitting their facility.

The report will include:

- Use of color and photos
- A summary page listing all recommended retrofits with costs, savings and payback information
- A water use summary page
- Information that is customized to their specific industry
- Next steps page telling the customer how to make the retrofits happen

Report Delivery

The next step in the process is to deliver the report to the customer. This will be done in person and target attendees should include: program sales person, the engineer that

conducted the audit and if possible the customer's technical staff as well as the decision maker. In the meeting the technical information will be overviewed as well as the benefits to making the retrofits and the retrofit process.

Application Submittal

Once the customer has agreed to perform the retrofits, it will be necessary for the program staff to assist the customer in completing all program paperwork.

Customer Support through Retrofit Process

Traditional programs have failed to support the customer once the survey is delivered. Once the report is delivered, a technical trained program staff person will follow up with the customer on a continuous basis. The job of the staff member is to provide solutions, facilitate contact with vendors and answer questions.

Focus on the Money

Every step of the program, starting with front-end marketing, will emphasize the financial benefits to the customer. The sales team, the auditor/field engineer, the printed report, and the follow-up customer support team will all incorporate the financial benefits when delivering information to the customer.

The customers' incentive package with program rebates will provide strong financial motivation to complete the retrofit process. The amount of the incentive will be based upon the water savings and calculated at \$9.20 per thousand gallons per year saved (\$300/AF, 10 year savings). The incentive will be based upon total water saved and will be given to the customer at the onset of the project. The Program will not end with delivery of the customer report. Program staff will stay connected to the customer and gently push them and support them through each step.

New or Existing?

This will be a new program

Technology

Process water use reduction and reuse technologies

Target Industrial Processes

- food processing
- textiles
- fabricated metals
- electronics
- industrial laundries

The table below shows the full set of customers identified as industrial in the Santa Clarita Valley. Of these, we propose to include 32 with 10 AFY or more (20.1AFY mean savings).

Industrial Customers			
VWC	433	775,353	1,791
SCWD	19	55,243	2,908
NCWD	7	30,122	4,303
LA36	0	0	0
Total	459	860,718	1,875

Note: These customers are included in the CII Audit Program and cut sheet elsewhere in this document

Program Savings

The program will result in 1,004 acre-feet of water saved.

Program Costs

The program will cost \$715/AF.



Santa Clarita Valley Cash for Grass Rebate Program

The Santa Clarita Valley Family of Water Suppliers has decided to suspend immediate implementation of a “Cash for Grass” program due to a recent Center for Disease Control (CDC) health advisory that cited concerns about lead levels found in certain kinds of artificial turf recently tested in New Jersey.

[\[http://www2a.cdc.gov/HAN/ArchiveSys/ViewMsgV.asp?AlertNum=00275\]](http://www2a.cdc.gov/HAN/ArchiveSys/ViewMsgV.asp?AlertNum=00275)

Limited testing by New Jersey health officials of artificial turf playing fields has indicated several artificial turf products made of nylon or nylon-blended fibers contain levels of lead that may pose a potential health concern. According to the advisory, the fields found to have high lead levels in New Jersey were weathered and dusty, used frequently, and the turf fibers were abraded, broken, or faded.

The CDC advisory indicated the risk of harmful lead exposure is low from fields that are new or in good condition and it will continue to monitor the situation in coordination with other agencies.

The Santa Clarita Valley Family of Water Suppliers will hold off implementing this program as a precautionary measure until more definitive information and a recommendation on the safety of artificial turf is made available by the CDC or other proper public health and consumer product regulatory agencies.

The original program description follows.

Why Offer This Program?

A large portion of Santa Clarita Valley water consumption is for residential and business outdoor water use. A significant amount of that water is used to irrigate water-thirsty turf grasses.

In recent years water agencies, including Las Vegas Valley Water District, Southern Nevada Water Authority and the City of Scottsdale have had success with turf removal programs. Southern Nevada Water District, for example, states that their customers have removed and replace over 90 million square feet of grass with water efficient landscape saving over 5 billion gallons per day.

Program Design

For this program, Santa Clarita Valley customers would be offered an incentive of \$.45 per square foot for the removal of turf and replacement with low water using landscape and efficient irrigation. Synthetic turf would be allowed as a replacement option. \$.45 would pay for roughly 9% of the average cost to remove turf and replace it with low water using plant material and an efficient irrigation system which averages \$5.00 per square foot. This may not achieve a high volume of customers but stays within the cost effectiveness threshold and provides a complete menu of water conservation measures.

Staff will promote the program during water audits and on the supplier web sites.

Customers would be able to download a program application and guidelines from the utility website. Preliminary site inspection by program staff will take place, prior to turf modifications, in order to confirm customer eligibility. Exposed soil where turf has been removed must be covered with mulch, rock, synthetic turf, or approved low water use plant material. When the landscape renovation is finished, a final inspection is required. Upon final approval, the customer would be sent a rebate check or get a credit on their water bill.

The program would be offered to single and multi-family customers, HOAs, and commercial and industrial customers in the first two years as a stand-alone program. Thereafter, it will be offered through the CII and Large Landscape Audits. This design would allow interested customers to receive an incentive without an audit in order to jump start the market. Then customers would be targeted through the audit programs.

<i>New or Existing?</i>	<i>Technology and/or Service</i>	<i>Target Market</i>
NEW Program	<ul style="list-style-type: none"> ▪ Turf removal ▪ Low water using plants ▪ Synthetic turf ▪ Efficient irrigation 	Residential, commercial, and industrial sites with inefficient turf usage

Program Production

Production	2009	2010	2011	2012	2013	5 Year Total
Administration & Inspection (per Rebate)	41	41	41	41	41	205
Sq. Ft. Replaced: Comm. And Industrial	41,000	41,000	41,000	41,000	41,000	205,000
Sq. Ft. Replaced: Residential Sector	41,000	41,000	41,000	41,000	41,000	205,000
Total Sq. Ft	82,000	82,000	82,000	82,000	82,000	410,000

Program Savings

The 410,000 square feet of turf replace in the five year program will result in 846 **acre-feet** in a program that sustains constant savings through 2030.⁵

Program Costs

⁵ Lifetime savings result from 410,000 sq. ft. replaced turf in the first five years, and a total of 984,000 sq. ft. in a program that replicates at the end of savings life to sustain constant savings through 2030.

Turf Removal Program Cost per Acre Foot = **\$707/acre-foot.**

APPENDIX A.3: CONSERVATION – PAST ACHIEVEMENTS

This appendix contains a summary of past conservation achieved by the Santa Clarita Valley Family of Water Suppliers.

CLWA – Santa Clarita Water Division

BMP 1, Residential Survey - None reported.

BMP 2, Residential Plumbing Retrofit

- Showerheads distributed to SF and MF residential (1.3-6). Advertise in newspaper, flyers, newsletters, and distribution events.
- All funding provided by CLWA in 2003 report. (1.3).
- Track which address get LF devices.
- City of Santa Clarita requires low flow BMP 2 plumbing fixtures during drought (NCWD 6).

BMP 3, System Audits and Leak Detection

- No pre-screening system audit reported in BMP reports.
- Visual inspections and responses to customer. (1.3).

BMP 4, Metering and Commodity Rates

- All connections metered (1.3)

BMP 5, Large Landscape

- Information and training provided by CLWA. Irrigated water at SCWD has dedicated meters. (1.4).

BMP 6, High-Efficiency Washers

- No existing program. (1.3)
- Los Angeles County Sanitation District has program for reduced rates if a customer makes a 20% reduction in sewer discharge. (NCWD 6)

BMP 7, Public Information

- CLWA runs public information program for SCWD. Bills show last year's usage. (1.4)

BMP 8, School Education

- CLWA runs public information program for SCWD. (1.4)
- See CLWA reports for specifics.

BMP 9, CII Conservation

- SCWD has identified and ranked CII accounts (1.6)

BMP 11, Conservation Pricing

- Uniform rates (1.6)

BMP 12, Conservation Coordinator

- Yes, 10% FTE (1.6), provided by CLWA.

BMP 13, Water Waste Prohibition

- Non-recirculating car washes and new decorative fountains are prohibited under City of Santa Clarita and LACSD ordinances. (1.6).
- Agency supported LACSD water softener ban ordinance adopted in 2003.

BMP 14, Residential ULF Toilets

- Residential Rebate Program. CLWA has run the residential ULFT rebate program for all suppliers in the SCV since 2003. Rebates for pre-1992 toilets start June 1. Rebate is \$50 for single family and \$60 for multi-family. \$20,000 total for all four suppliers is split up based on population/eligible residents. (2)
- No retrofit on resale ordinances apply to SCV. (2)

ET Controller Program - None reported.

Sources

(1.1 - 1.6) Santa Clarita Water Division, BMP Report, 2001-2006

(2) Santa Clarita Water Division, BMP Coverage Report, 2005-06

Los Angeles County Waterworks District No. 36

BMP 1, Residential Survey - None reported.

BMP 2, Residential Plumbing Retrofit - None reported.

BMP 3, System Audits and Leak Detection

- Pre-screening completed 2001-2006. (2.6)
- Leak detection conducted by consultant throughout the year. Leaks reported by personnel in the field. Main replacements made with street repairs. (1.4)
- Full scale audit completed. (1.2)

BMP 4, Metering and Commodity Rates

- All connections metered. (3)

BMP 5, Large Landscape

- None reported.

BMP 6, High-Efficiency Washers

- No existing program. (1.3)
- Los Angeles County Sanitation District has program for reduced rates if a customer makes a 20% reduction in sewer discharge. (NCWD 6)

BMP 7, Public Information

- “Three full time staff dedicated to water conservation practices – newsletter, bill inserts, Web site, radio PSA’s, outreach materials at public counter and at public events, planned BMP program for next year.” (1.4)

BMP 8, School Education

BMP 9, CII Conservation

- LA36 has identified and ranked CII accounts. (2.6)

BMP 11, Conservation Pricing

- Uniform rates. (1.6)

BMP 12, Conservation Coordinator

- Yes, 4% FTE. (1.6) Reported to be 20% in 2004. (1.4)

BMP 13, Water Waste Prohibition

- On March 21, 1991, the County Board of Supervisors adopted Ordinance No. 91-0046U that called for "No Water Wasting" in only unincorporated areas of the County. They include the following measures: * Washing down paved surfaces is prohibited unless required for health or safety * Landscape watering is prohibited between 10:00 a.m. and 5:00 p.m. * Excessive landscape watering that results in runoff into adjoining streets, parking lots or alleys is prohibited * Plumbing leaks must be repaired as soon as practical * Washing of vehicles is prohibited excepted at a commercial carwash or with a hand-held bucket or hose equipped with an automatic shutoff nozzle * Serving drinking water at public eating places is prohibited unless requested by customers * Water used in decorative fountains must flow through a recycling system." "These measures could have resulted in fines up to \$500. However, this Ordinance was active from March 1991 to January 1993. Currently, there is no water wasting ordinance in effect in the District. Two cities within our service have a similar ordinance implemented." (1.4)

BMP 14, Residential ULF Toilets

- Residential Rebate Program. CLWA has run the residential ULFT rebate program for all suppliers in the SCV since 2003. Rebates for pre-1992 toilets start June 1. Rebate is \$50 for single family and \$60 for multi-family. \$20,000 total for all four suppliers is split up based on population/eligible residents. (2)
- No retrofit on resale ordinances apply
- County Ordinance No. 91-0097U requires all new buildings to use ULF toilets and urinals. (1.2)

●

Sources

- (1.1 - 1.6) Los Angeles County Waterworks No. 36, BMP Report, 2001-2006
- (2.4 and 2.6) Los Angeles County Waterworks No. 36, BMP Coverage Reports, 2003-04 and 2005-06.
- (3) Los Angeles County Waterworks No. 36, BMP Base Year Data
- (NCWD 6) Newhall County Water District, BMP Report, 2003

Newhall County Water District

BMP 1, Residential Survey

- Survey program started in 2003. (2)
- Self report survey with \$5 bill credit for completion (3).
- Conservation packets with self audit info distributed in 2002-03. Created tracking database (6)

BMP 2, Residential Plumbing Retrofit

- Showerheads distributed to SF and MF residential (2)
- City of Santa Clarita requires low flow BMP 2 plumbing fixtures during drought (6)

BMP 3, System Audits and Leak Detection

- Pre-screen audits completed in 2003, 2005, and 2006. Full audit in 2004.(2)
- District compares production and sales with monthly records (6)

BMP 4, Metering and Commodity Rates

- On track to meet 100% metering. (2)
- All customers metered and billed based on usage. Water rate study conducted about 2004-05. (6)
- Dedicated irrigation meters already on appropriate CII sites (6)

BMP 5, Large Landscape

- Surveys offered for mixed-use CII accounts, none reported completed (2)

BMP 6, High-Efficiency Washers

- No existing program. (1, 2)
- Los Angeles County Sanitation District has program for reduced rates if a customer makes a 20% reduction in sewer discharge. (6)

BMP 7, Public Information

- NCWD has had a public information program since at least 1999. (2)
- Comprehensive program for public education for SF and MF customers that includes public events and newsletters. (6)

BMP 8, School Education

- NCWD has had a public information program since at least 2003. (2)
- Education program has been provided by CLWA since 1993 for K through 6th grades. (6)

BMP 9, CII Conservation

- NCWD has identified and ranked CII accounts (2)
- Some informal surveys in the context of customer service (6)

BMP 11, Conservation Pricing

- Tiered rates, 12 billing cycles per year (1). Conserving sewer rate structure reported in 2003 and 2004, but not 2005 and 2006 (2).
- Tiered rate structured was adopted in July 2005 and effective January 2005. Rate structure was previously a uniform rate. (7)

BMP 12, Conservation Coordinator

- Yes, 50% FTE (1). Since 2002 (2).

BMP 13, Water Waste Prohibition

- Water Conservation Ordinance, Adopted 1/1991, rev. 7/2005 (1). Ordinance 112 amended Ordinance 101. Includes irrigation hours and schedules, inspect and repair leaks, vehicle washing, fountains, serving water in restaurants.
- State of California, County of Los Angeles, and City of Santa Clarita ordinances apply. State urban runoff and county health codes prohibit gutter flooding.
- Supports DIR water softeners, provides information

BMP 14, Residential ULF Toilets

- Residential Rebate Program. CLWA coordinated residential ULFT rebate program for all suppliers in the SCV. Rebates for pre-1992 toilets start June 1. Rebate is \$50 for single family and \$60 for multi-family. \$20,000 total for all four suppliers is split up based on population/eligible residents. (2)

ET Controller Program

- Rebate of \$40 per valve up to \$480 per residence for an ET controller. (4)
- Rebate was lower before May 2007; they raised it increase participation. (5)

Sources

- (1) Newhall County Water District, BMP Report, 2006
- (2) Newhall County Water District, BMP Coverage Report, 2005-06
- (3) Residential Water Survey flyer
- (4) ET Controller letter and application
- (5) NCWD staff
- (6) Newhall County Water District, BMP Report, 2003
- (7) www.ncwd.org, printout provided by NCWD staff

Valencia Water Company

BMP 1, Residential Survey

- Free Residential Water Audit Program implemented by a contractor (Water Wise Consulting). Contact highest water users and low income users and offer indoor / outdoor survey and monetary incentives to replace devices such as toilets and irrigation controllers. Started February 2007 with the intent to survey 300 homes per year. (4)
- School Education and Retrofit Kits. Local schools with VWC contractor Resource Action Programs provides kits to 6th grade students. Intends to reach 2000 homes per year. (4)

BMP 2, Residential Plumbing Retrofit

- LF showerheads, toilet displacement devices, leak detection dues, and aerators are installed through the Free Residential water Audit program during surveys. (4)
- Weather-based Irrigation Controller give away program is also integrated into the Free Residential Water Audit Program. (4)

BMP 3, System Audits and Leak Detection

- Annual review of water purchases and sales. Leak detection capability also used in its radio meters. (4)
- Aggressive meter replacement program in 2006 (replaced 2000 meters). (4)
- Pre-screening completed 2001-2006. (2.6)
- Leak detection conducted by consultant throughout the year. Leaks reported by personnel in the field. Main replacements made with street repairs. (1.4)
- Full scale audit completed. (1.2)

BMP 4, Metering and Commodity Rates

- All connections metered. (3) (4)

BMP 5, Large Landscape

- VWC contracts with Resource Management Corporation to contact large CII customers to offer and conduct water audits. The program conducted 87 mixed use surveys since 2003. (4)

- Starting in 2008, AB 1881 requires separate irrigation meters for new service for non single family landscape areas greater than 5,000 sq. ft. (4)

BMP 6, High-Efficiency Washers

- No existing program. (1.3)

BMP 7, Public Information

- VWC participates via newsletter, bill inserts, Web site, radio PSA's, outreach materials at public counter and at public events, planned BMP programs for next year. (1.4)
- CLWA offers classroom and garden setting classes through their Landscape Education Program. They also have a 7 acre demonstration garden. (4)

BMP 8, School Education

- School retrofit kits (see BMP 1)
- VWC administers an extensive school education program that provides interactive activities regarding water conservation.

BMP 9, CII Conservation

- VWC contracts with Resource Management Corporation to provide free water audits to CII customers, including restaurants, schools, hotels, and manufacturing companies. Recommendations have included pre-rinse spray nozzles, toilets, urinals, cooling tower conductivity controllers, HE washers, irrigation clock management and drought tolerant plants. VWC has done 89 since 2003. (4)

BMP 11, Conservation Pricing

- Uniform rates. (1.6)

BMP 12, Conservation Coordinator

- Yes, full time beginning in 2006.

BMP 13, Water Waste Prohibition

- "VWC includes wastewater prohibitions in its tariffs. The voluntary provisions are encouraged at all times; however mandatory restrictions are enforced only during drought conditions." (4)

BMP 14, Residential ULF Toilets

- ULF Toilet Rebate Program. In cooperation with CLWA, VWC offers a rebate program during its "Water Awareness Month." The program has provided over 300 rebates and it is funded by CLWA. (4)
- The Free Residential Water Audit program offers Ultra Low Flow (ULF is a 1.6 gallon per flush) and High Efficiency (HE is a 1.2 gallon per flush) toilet rebates that supplement the program during Water Awareness Month. The program started in February 2007.
- No retrofit on resale ordinances apply

ET Controller Pilot Study

- VWC has funded and is conducting a pilot study to assess savings and customer acceptance of ET controllers. The pilot and analysis will be conducted in 2008 with the intent to use the results to refine a give away program. (4)

Sources

- (1.1 - 1.6) Valencia Water Company, BMP Reports, 2001-2006
- (2.4 and 2.6) Valencia Water Company, BMP Coverage Reports, 2003-04 and 2005-06.
- (3) Valencia Water Company, BMP Base Year Data
- (4) "2006 Annual Report Valencia Water Company," to the Public Utilities Commission for the year ended December 31, 2006.
- (5) "Valencia Water Company Results of Operations, Revenue Requirement, and Rate Design Test Years 2007-2008 and 2008-2009," before the Public Utilities Commission of the State of California, June 2006.

APPENDIX B.1: ECONOMICS - AVOIDED COST ANALYSIS

This appendix contains Gary Fiske's Avoided Cost memo.

Each unit of water conservation provides an economic benefit to Santa Clarita Valley by allowing the Castaic Lake Water Agency (CLWA) to avoid certain supply and/or infrastructure costs. To estimate these costs, we used the CUWCC/AwwaRF Avoided Cost Model. The model estimates the costs that CLWA will avoid as a result of additional conserved water. There are two types of avoided costs that are estimated, so-called short run and long run costs.

Following are descriptions of the manner in which each of these was estimated for the Valley.

Short-Run Avoided Costs

As water conservation programs reduce demand, less water must be purchased, produced, pumped, and/or treated. These reduced variable operating costs constitute the so-called 'short-run' avoided costs. They are typically expressed in dollars per acre-foot.

To estimate the short-run avoided costs, it must be determined which supplies will be cut back and/or for which facilities the utilization will be reduced in response to conservation-induced demand reductions. In the case of CLWA, it was determined that the 'marginal' supply is currently the water being purchased from the Buena Vista Water District in Kern County. Moreover, it was assumed that this supply will continue to be the marginal supply through the planning period.

There are three cost components associated with this supply that are avoidable:

- Cost of water. The current purchase cost of this supply is \$589/AF.
- Wheeling. CLWA pays \$117/AF to wheel the Buena Vista water to its service territory.
- Treatment. For each acre-foot of water, it is estimated that about \$22 of power and chemical costs is avoided.

The total short-run cost that is avoided as a result of not having to purchase, wheel, and treat this supply is thus \$728 per acre-foot. In addition, we must account for system losses, which are estimated at 8%. That is to say, for each acre-foot of water produced at the treatment plant, approximately 0.92 acre-foot is actually consumed and paid for by end-users. Thus, the total avoided cost per acre-foot of demand reduction is approximately \$790/AF.

It is assumed that these costs will stay constant in real terms (i.e. they will increase at the overall rate of inflation).

Long-Run Avoided Costs

In addition to the immediate reduction on variable operating costs, peak-season demand reductions may, in the long run, also enable the water supplier to defer or downsize planned future capital investments in supply or infrastructure capacity. For CLWA, two such projects were identified:

- The Rio Vista Treatment Plant expansion, scheduled to become operational in 2015. The cost of this investment, expressed in 2007 dollars, is assumed to be \$20 million, with fixed annual operating and maintenance costs of \$500,000.
- A recycled water plant scheduled to become operational in 2020. The cost of this investment, also in 2007 dollars, is assumed to be \$20 million, with fixed annual O&M costs of \$100,000.

The long-run avoided costs associated with each of these projects begin in each project's on-line year (2015 and 2020 respectively). Thus, beginning in 2015, and based on the annualized costs of these projects, the peak-season avoided costs include both long-run and short-run components.

Table B.1.1 shows the forecasted avoided supply costs in real (2007) dollars through 2030.

Table B.1.1

Total Direct Utility Avoided Costs: 2007 Dollars						
(\$/AF)						
Year	Peak Season			Off-Peak Season		
	Short-Run	Long-Run	Total	Short-Run	Long-Run	Total
2007	\$790	\$0	\$790	\$790	\$0	\$790
2008	\$790	\$0	\$790	\$790	\$0	\$790
2009	\$790	\$0	\$790	\$790	\$0	\$790
2010	\$790	\$0	\$790	\$790	\$0	\$790
2011	\$790	\$0	\$790	\$790	\$0	\$790
2012	\$790	\$0	\$790	\$790	\$0	\$790
2013	\$790	\$0	\$790	\$790	\$0	\$790
2014	\$790	\$0	\$790	\$790	\$0	\$790
2015	\$790	\$86	\$876	\$790	\$0	\$790
2016	\$790	\$85	\$875	\$790	\$0	\$790
2017	\$790	\$84	\$874	\$790	\$0	\$790
2018	\$790	\$83	\$872	\$790	\$0	\$790
2019	\$790	\$82	\$871	\$790	\$0	\$790
2020	\$790	\$130	\$919	\$790	\$0	\$790
2021	\$790	\$128	\$917	\$790	\$0	\$790
2022	\$790	\$126	\$915	\$790	\$0	\$790
2023	\$790	\$124	\$914	\$790	\$0	\$790
2024	\$790	\$122	\$912	\$790	\$0	\$790
2025	\$790	\$120	\$910	\$790	\$0	\$790
2026	\$790	\$118	\$908	\$790	\$0	\$790
2027	\$790	\$117	\$906	\$790	\$0	\$790
2028	\$790	\$115	\$905	\$790	\$0	\$790
2029	\$790	\$113	\$903	\$790	\$0	\$790
2030	\$790	\$111	\$901	\$790	\$0	\$790

APPENDIX B.2: ECONOMICS – COST AND SAVINGS ASSUMPTIONS

This appendix contains cost and savings assumptions used in the cost benefit analysis.

Global Assumptions

- Dollars are real 2007 dollars (a.k.a. constant dollars \$2007)
- One year time increments; end of year accounting; present is Year 0.
- Year 1 of the plan is 2008

Recommended Active Programs

High Efficiency Toilets

Program

- Open program, single- and multi-family.
- 500 rebates per year, ongoing until the Year 2019, which is 5 years after plumbing code requires HETs.
- A contractor will administer rebates.

Costs

- Administration (per Rebate) \$30
- Rebates \$100

Savings

- CMHC 2004 and Aquacraft 2000 reported in AWWARF 2007 indicate savings from HETs are approx. 24%-26% greater than savings from ULFTs.
- Percent replacing pre-1992 toilets is assumed to be 50% replace ULFTs and 50% replace pre-ULF fixtures--based on un-targeted program.
- Savings life assumed to be 23 years after which replacement savings are include in passive savings.
- Assume single family homes have 2 toilets and multi-family units have 1.5 for pre-1992 homes for VWC and LA36 per BMP Report Base Year Data. Likewise, assume 2.5 SF and 1.2 MF for NCWD, and 2 SF and 2 MF for SCWD per BMP Report Base Year Data.

Large Landscape Audit and Incentives

Program

- Agency outreach to enough customers to get 10% to respond each year for 10 years. Of those 10% each year that respond, 20% agree to participate. After 10 years the program has audited 20% of the total.
- Includes all dedicated landscape meters in all sectors.
- Target existing accounts; new construction accounts will be covered under New Construction Code.

Costs

- Initial Contact \$50 per responsive customer.
- Audited Sites \$1,500
- Rebate \$/AF Saved, Lifetime Savings (AF) \$300

Savings

- Savings assumed to be 20% of current use.
- Life span of savings assumed 10yrs.
- Savings after end of life span continued by replication of program costs and savings.

CII Audits and Customized Incentives

Program

- Agency outreach to all customers in this class. Successfully contact 10% per year for 10 years.
- Of those responding, 20% participate each year, so after 10 years you have audited 20%.
- Assume you can get 20% savings.
- Incentive is \$/AF at the time the conservation measures are put in place.

Costs

- Initial Contact \$50 per customer who responds.
- Audited Sites \$1,700
- Rebate \$/AF Saved, Savings (AF) \$300

Savings

- Savings assumed to be 20% of current use.
- Life span of savings assumed 10yrs.
- Savings after end of life span continued by replication of program costs and savings.

Landscape Contractor Certification

Program

- 5 large contractors recruited for the program
- Each contractor sends 5 employees for training each of the five years
- 12 sites retrofitted per trained person per year
- 1 WBICs per site on average
- 20 sprinkler heads per site on average
- 10% of sites inspected

Costs

- Initial Contact per contractor \$50
- Personnel completing training \$200
- Controllers \$150 with rain sensor
- Sprinkler heads \$5
- Inspections \$150

Savings

- Residential Sprinkler head. Assume 10% of ET savings. Assume 80 sprinkler heads per acre (1 new per 2 replaced old on average for MP Rotators) for single family or small CII sites. Works out to 4.6 gpd per sprinkler head.
- ET Controller: 37 gallons per day.
- Life span of savings assumed 10yrs.
- Savings after end of life span continued by replication of program costs and savings.

High Efficiency Clothes Washer Rebates

Program

- Contractor administer rebates; spot check on site installations; document installation receipts
 - .5% of residential units get rebates each year for 5 program years.
- Costs
- Administration (per Rebate) \$30
 - Rebates \$65
- Savings
- Savings of 5085.6 gpy from literature (gross savings). If we assume 20% free riders, this converts to 11.1 gallons per day. Savings life span is assumed to be 12 years.
 - Savings after end of life span continued by replication of program costs and savings.

Joint Marketing – Valley Wide

Program

- Two bill stuffers in the first year, then one per year for the remaining 4 years of the 5 year program.
- 50 Radio ads per year for Years 1-3, then 10 per year for Years 4-5
- 36 Radio ads per year for Years 1-3, then 3 per year for Years 4-5
- 5 Radio ads per year for Years 1-3, then 3 per year for Years 4-5

Costs

- Stuffers \$0.05 per stuffer
- Radio Ads \$1,000 per ad
- Newspaper Ads \$1,000 per ad
- Public Events \$3,000 per event
- Cost share to suppliers based on total number of accounts.

Active Programs to Consider Further

Cash for Grass

Program

- Assume 410,000 square ft. replaced over a five year program life.⁶
- Assume program is enacted at 205 sites with 2,000 sq ft each.
- Sites distributed across suppliers based on percent of total accounts in SCV.
- Administration includes pre- and post-inspection as well as rebate forms and distribution.

Costs

- Administration & Inspection (per Rebate) \$100
- Sq. Ft. Replaced: CII Sector .45c
- Sq. Ft. Replaced: Residential Sector .45c

Savings

- Savings assumed to be 80% of ETo. Assume ETo requirement of 60 inches per year. Sovocol and Rosales 2001 report that conventional landscape uses 4 to 5 times that of xeriscape).
- Savings assumed to last 10 years.

⁶•As base of comparison, Las Vegas did 90 million sq. ft. 2,000 was typical of rebates in Las Vegas program. An important difference is that the ETo in Las Vegas is 90 inches and they get 4" of rain.

- Savings after end of life span continued by replication of program costs and savings.

Industrial Audits

Note that the Industrial Audit Program is an option for consideration that would replace part of the CII Audit Program with a specialized program for large industrial customers. This program is not on the list of recommended programs at this time; however, the industrial customers that would participate are included in the CII Audit Program on the list.

Program

- Applies to sites with 10 AFY or more (n=32)
- Intensive marketing to recruit for program.
- Sites that participate in Scoping Audit: 50% of n
- Sites that participate in Full Audit: 25% of n
- Sites that implement Full Audit recommendations: 20% of n

Costs

- Marketing (Sites) \$500
- Scoping Audit (Sites) \$2,000
- Full Audit (Sites) \$10,000
- Rebate is \$300/AF savings

Savings

- 30% savings
- Savings life: 10 years

High Efficiency Toilets, Aggressive Implementation

Program

- Bill stuffers will be sent to all pre-1992 units in Years 1 and 3.
- A contractor will administer rebates, providing phone support for identifying pre-1992 fixtures and spot check installations.
- 10% of pre-1992 toilets get rebates each year for five years.

Costs

- Direct Mail to Pre-1992 Housing Units \$0.50 each
- Administration (per Rebate) \$30
- Rebates \$100
- Aggressive Rebates \$150 SFU
\$200 MFU

Savings

- CMHC 2004 and Aquacraft 2000 reported in AWWARF 2007 indicate savings from HETs are approx. 24%-26% greater than savings from ULFTs.
- Percent replacing pre-1992 toilets is assumed to be 20% replace ULFTs and 80% replace pre-ULF fixtures--based on a program design with targeted direct mail and phone support to identify pre-1992 fixtures and spot checking.
- Savings life assumed to be 23 years after which replacement savings are include in passive savings.

New Construction Code

HE Toilets

Code Requirements

- New construction code for toilets could require all new fixtures meet the standards for High Efficiency Toilets.

Savings

- Savings from New Construction Code is defined as the additional increment of savings above ULFT savings required in Plumbing Code.
- Savings are estimated at 24% above ULFT savings (CMHC 2004 and Aquacraft 2000 reported in AWWARF 2007). ULFT savings are calculated based on persons per household according to the method in CUWCC Cost and Savings Study. Savings are calculated separately for single family and multi family.
- Added savings from new units are attributed to new construction code only until 2014 when plumbing code requires all new fixtures meet HET standards. Savings from devices installed before that date continue to be attributed to New Construction Code. (If period of analysis is extended beyond 2030, need to add lifespan to savings because savings would then be counted in passive savings.)

Residential Landscape

Code Requirements

- New construction landscape code could include limits on square footage of new irrigated area in new sites, requirements for very low water need vegetation, efficient irrigation equipment and practices (weather-based “Smart” irrigation controllers, high efficiency sprinklers, hydro zones, smart edgescapes), or combinations thereof. Since new construction often includes only front-yard landscaping, code would need to apply to subsequent landscape work at new sites.

Savings

- Savings in the SF and MF residential sectors due to New Construction Code include an ambitious package of these water efficiency measures mentioned above that achieve 30% savings using 2006 mean outdoor use per unit.
- Outdoor use for SCV is estimated roughly to be 53% of annual use for SF and 34% of annual use for MF – using a simple ratio method.

Faucet Aerators and Showerheads

Code Requirements

- New Construction Code for sink aerators and showerheads can include requirements for savings beyond required in plumbing code.

Savings

- For sink aerators, the model assumes a move from 2.2 gpm to an aerator with an unspecified lower flow rate that achieves in practice .5 gallons per day savings. Kitchen models would have toggle for fast filling and variable spray control to improve device retention..
- For showerheads, 1.6gpm flow rates are 36% less than 2.5 gpm. Typical savings from empirical savings of 2.5gpm showerheads is 5.5gpd, so we assume that each 1.6gpm fixture due to the new building code saves an additional 1.98gpd (5.5gpd *.36).

High Efficiency Dish Washers

Code Requirements

- New Construction Code for dish washers could require the installation of high efficiency machines in all new units.

Savings

- The model assumes 1.2 gallons per day savings per machine by moving from an average of 9.5 to 7.5 gallons per cycle, 215 cycles per year.
- Prevalence of dish washers is assumed to be 65% for single family and 48% for multi family as midpoints found between two empirical studies on this issue (EBMUD 2002, Market Penetration Study, OC Saturation Study 2002). Arguments can be made for higher or other rates depending on the style of new planned construction.

CII and Landscape Sectors

Code Requirements

- Savings would come from: 1) landscape accounts with dedicated meters and master meters and 2) industrial process efficiency improvements for new industrial customers.
- New construction landscape code could include limits on square footage of new irrigated area in new CII sites, requirements for very low water need vegetation, efficient irrigation equipment and practices, or combinations thereof.
- New construction industrial code could include requirements for rinse water recycling where feasible, high efficiency water consuming equipment (e.g., industrial clothes washers, dishwashers, food processors and steamers, car washes, cooling towers, film processing, etc.). Also included are code measures listed in the residential sector that apply (e.g., toilets).

Savings

- Assume savings of 10% of all new deliveries projected for CII and Landscape in the UWMP. Savings due to code are from 2008-2030. These actions would work toward the objectives of AB 1881.

Passive Conservation

Passive Conservation is that which would occur without programs implemented by agencies. One reason it is important to identify passive conservation is to understand full extent of conservation. Another reason is to assure that savings attributed to Active Conservation are only the additional increment of savings beyond passive savings. Since you are spending hard earned dollars on Active Conservation, you want to be sure to know what you are getting for your money and not to spend money on conservation that would be achieved without the Active Program.

Assumptions:

- Passive conservation is driven by growth in number of housing units and plumbing code.
- Housing units growth summarized in Chapter 3.
- Devices per housing unit summarized in Table B.2.1.
- Natural replacement Rate summarized in Table B.2.2.
- Existence/Adoption Rates summarized in Table B.2.3.
- Savings per device summarized in Table B.2.4.

Table B.2.1 - Conservation Device Saturation Parameters

Parameters	SCWD	LA36	NCWD	VWC	Source
SF Toilets per structure pre-92	2	2	2.5	2	BMP Report Base Year Data
SF Toilets per structure >= 92	2	2	2.5	2	BMP Report Base Year Data
SF Showers per HH	1.8	1.8	1.8	1.8	EBMUD 2002, Market Penetration Study
SF Persons per HH	3.30	2.93	3.35	3.00	BMP Report Base Year Data
SF Pct HH with Clothes Washer	93%	93%	93%	93%	EBMUD 2002 Market Penetration Study (90%); OC Saturation Study 2002 (96.5%)
SF Pct HH with Dishwasher	65%	65%	65%	65%	EBMUD 2002, Market Penetration Study (60%), OC Saturation Study 2002 (83.0%)
MF Toilets per structure pre-92	2	1.5	1.2	1.5	BMP Report Base Year Data
MF Toilets per structure >= 92	2	1.5	1.2	1.5	BMP Report Base Year Data
MF Showers per HH	1.1	1.1	1.1	1.1	EBMUD 2002, Market Penetration Study
MF Persons per HH	3.30	2.93	2.51	3.00	BMP Report Base Year Data
MF Pct HH with Clothes Washer*	26%	15.0%	15.0%	26.0%	EBMUD 2002, Market Penetration Study (15%), OC Saturation Study 2002 (25.6%)
MF Pct HH with Dishwasher**	48%	30.0%	30.0%	48%	EBMUD 2002, Market Penetration Study (30%), OC Saturation Study 2002 (65.8%)

* If multi-family is mostly apartments, use EBMUD Study because multi-family were only apartments in that study.

** If multi-family is mix of apartments and condos use mean of both studies because OC Study included many condos.

Table B.2.2 - Replacement/Remodel Rate* Assumptions for Passive Conservation Model

	SCWD	LA36	NCWD	VWC
Showerhead: SF	5.0%	5.0%	5.0%	5.0%
HE Washer: SF	3.0%	3.0%	3.0%	3.0%
ULFT: SF	4.0%	4.0%	4.0%	4.0%
Dishwasher: SF	3.0%	3.0%	3.0%	3.0%
Sink Aerators: SF	4.0%	4.0%	4.0%	4.0%
Showerhead: MF	5.0%	5.0%	5.0%	5.0%
HE Washer: MF	3.0%	3.0%	3.0%	3.0%
ULFT: MF	4.0%	4.0%	4.0%	4.0%
Dishwasher: MF	3.0%	3.0%	3.0%	3.0%
Sink Aerators: MF	4.0%	4.0%	4.0%	4.0%

*This is the rate at which the existing stock of devices gets replaced either due to repair OR remodel OR demolition.

Table B.2.3 – Existence / Adoption Rates

Existence/Adoption/Compliance Rate

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Showerhead: SF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
HE Washer: SF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	5.0%	8.0%	11.0%	14.0%	17.0%	20.0%	23.0%
ULFT: SF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Dishwasher: SF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	4.5%	7.0%	9.5%	12.0%	14.5%	17.0%	19.5%
Sink Aerators: SF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	4.5%	7.0%	9.5%	12.0%	14.5%	17.0%	19.5%
Showerhead: MF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
HE Washer: MF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	5.0%	8.0%	11.0%	14.0%	17.0%	20.0%	23.0%
ULFT: MF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Dishwasher: MF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	4.5%	7.0%	9.5%	12.0%	14.5%	17.0%	19.5%
Sink Aerators: MF	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.0%	4.5%	7.0%	9.5%	12.0%	14.5%	17.0%	19.5%
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Showerhead: SF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
HE Washer: SF	26.0%	29.0%	32.0%	35.0%	38.0%	41.0%	44.0%	47.0%	50.0%	53.0%	56.0%	59.0%	62.0%	65.0%
ULFT: SF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Dishwasher: SF	22.0%	24.5%	27.0%	29.5%	32.0%	34.5%	37.0%	39.5%	42.0%	44.5%	47.0%	49.5%	52.0%	54.5%
Sink Aerators: SF	22.0%	24.5%	27.0%	29.5%	32.0%	34.5%	37.0%	39.5%	42.0%	44.5%	47.0%	49.5%	52.0%	54.5%
Showerhead: MF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
HE Washer: MF	26.0%	29.0%	32.0%	35.0%	38.0%	41.0%	44.0%	47.0%	50.0%	53.0%	56.0%	59.0%	62.0%	65.0%
ULFT: MF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Dishwasher: MF	22.0%	24.5%	27.0%	29.5%	32.0%	34.5%	37.0%	39.5%	42.0%	44.5%	47.0%	49.5%	52.0%	54.5%
Sink Aerators: MF	22.0%	24.5%	27.0%	29.5%	32.0%	34.5%	37.0%	39.5%	42.0%	44.5%	47.0%	49.5%	52.0%	54.5%
	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030		
Showerhead: SF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
HE Washer: SF	68.0%	71.0%	74.0%	77.0%	80.0%	83.0%	86.0%	89.0%	92.0%	95.0%	98.0%	100.0%		
ULFT: SF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
Dishwasher: SF	57.0%	59.5%	62.0%	64.5%	67.0%	69.5%	72.0%	74.5%	77.0%	79.5%	82.0%	84.5%		
Sink Aerators: SF	57.0%	59.5%	62.0%	64.5%	67.0%	69.5%	72.0%	74.5%	77.0%	79.5%	82.0%	84.5%		
Showerhead: MF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
HE Washer: MF	68.0%	71.0%	74.0%	77.0%	80.0%	83.0%	86.0%	89.0%	92.0%	95.0%	98.0%	100.0%		
ULFT: MF	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%		
Dishwasher: MF	57.0%	59.5%	62.0%	64.5%	67.0%	69.5%	72.0%	74.5%	77.0%	79.5%	82.0%	84.5%		
Sink Aerators: MF	57.0%	59.5%	62.0%	64.5%	67.0%	69.5%	72.0%	74.5%	77.0%	79.5%	82.0%	84.5%		

Notes: If there is code, this is compliance rate.

If there is no code, this is the adoption rate.

If the conserving technology is not on the market yet, this value is zero.

Table B.2.4 - Passive Conservation Savings Inputs by Measure

Measures	Gallons per Day	Days Per Yr	Days Per Yr
Showerhead: SF	5.5	365	See AWWARF 2007 p 140
HE Washer: SF	13.9	365	See AWWARF 2007 p 122
ULFT: SF	23.1	365	See AWWARF 2007 pp 149-154
Dishwasher: SF	1.2	365	See CUWCC Potential PBMP p 10
Showerhead: MF	5.5	365	See AWWARF 2007 p 140
HE Washer: MF	13.9	365	See AWWARF 2007 p 122
ULFT: MF	49.1	365	See AWWARF 2007 pp 149-154
Dishwasher: MF	1.2	365	See CUWCC Potential PBMP p 10

Note: ULFT savings are calculated in this table using localized estimates of persons per household. Savings were calculated separately for each agency.

AWWARF 2007 refers to "Water Efficiency Programs for Integrated Water Management," American Water Works Research Foundation, 2007, Appendix C, "Compendium of WUE Savings and Cost Assumptions."

CUWCC Potential PBMP p 10 refers to "Potential Best Management Practices: Year 3 Report," January 2007, prepared for CUWCC by John Koeller

APPENDIX C.1: STAKEHOLDER MEETING 1 PRESENTATION

APPENDIX C.2: STAKEHOLDER MEETING 2 PRESENTATION

APPENDIX D: WATER RATES AND CONSERVATION

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Introduction

This appendix provides a discussion of water rate structures and conservation, sometimes referred to as “conservation pricing”. It addresses 1) the theoretical and empirical underpinnings for viewing rate structure design as a key tool for promoting efficient water use decisions, 2) alternative conservation-oriented water rate structures, and 3) cost-of-service considerations of rate design.

Linkages Between Rates and Water Use

Analysts have pointed out that water rates can be an extremely valuable public policy tool. Water rates can be more than a means of meeting utility revenue requirements. Water rates can be used to communicate to water users the private and social costs of water development. Water users can then base their consumption decisions on a more accurate accounting of the benefits and costs of using more or less water. If done correctly, the pricing of water can be a powerful means of signaling the cost and scarcity of the resource to water users, most of whom experience very little connection between their water usage and their total bill. In an era in which customer water demands are increasing while water supplies are constant or diminishing, it is important to apply economic tools to communicate the true value of fresh water.

The “Law of Demand” underpins the ability of conservation-oriented rate structures to promote water conservation. The “Law of Demand” derives from the empirical fact that, all else equal, as the price of a good or service increases, the quantity demanded tends to decrease.⁷ This relationship is why graphical depictions of demand curves are usually presented as downward sloping.

To be sure, some goods and services exhibit this tendency to a greater degree than others. Economists use the concept of “price elasticity” to measure the extent to which the demand for a good or service is sensitive to changes in its price. Price elasticity tells you the percentage change in demand for a one percent change in price. For example, if a good has an elasticity of magnitude 1.0, then a 10% increase in its price will produce a 10% decrease in its demand.⁸ If instead, the good had an elasticity of magnitude 0.5, then the same 10% increase in price would produce only a 5% decrease in demand. A good or service with an elasticity of magnitude less

⁷ Economists have noted rare exceptions to this “Law”; these exceptions include some luxury goods and heroin. Presumably, potable water supply is not included in this subset of goods immune to the “Law of Demand”.

⁸ Price elasticity actually has a negative sign because price and quantity demanded move in opposite directions. To keep the discussion simple, we are presenting elasticity as a positive parameter. Technically, what we actually are presenting is the absolute value of the elasticity parameter.

than 1.0 is termed “inelastic,”⁹ which means the percentage change in demand will be less than the percentage change in price. Conversely, an “elastic” demand is one with a price elasticity magnitude greater than 1.0. For an elastic demand, the percentage change in demand is greater than the percentage change in price.

Over the historic range of prices and consumption, urban demand for water has been relatively inelastic – generally the percentage change in customer water demand has been smaller than the percentage increase in water price. A large body of empirical research over the last 30 years has demonstrated this conclusively.¹⁰ While the demand for water in urban settings is inelastic, its elasticity is not zero, as has been sometimes assumed by most water planning studies done over the past several decades. This distinction is crucial. If demand for water exhibited zero elasticity, what economist’s term “perfect inelasticity,” water rates would have no relevance to consumer decisions about water use, and rate structure would prove an ineffective policy instrument for encouraging water conservation. But customer demand for water is not perfectly inelastic. It is relatively inelastic, yes, but not perfectly inelastic. This means that rates can be used strategically to influence the level of demand.

Comprehensive reviews of the empirical evidence have suggested the following regarding the price elasticity of residential customers demand for water:¹¹

- The majority of empirical studies have found the long-term residential price elasticity to range between 0.2 and 0.6. After reviewing the evidence, Griffin (2006) concluded that price elasticity for annual residential water use is likely to lie in the range of 0.35 to 0.45, meaning a 10% rate increase may produce a 3.5% to 4.5% reduction in demand over time.¹²
- Outdoor residential demand is more elastic than indoor residential demand. All else equal, residential water users will reduce outdoor consumption more readily than indoor consumption. The corollary of this finding is that summer demand tends to be more elastic than winter demand, because most outdoor use occurs during the summer.
- Residential customer demand for water is more responsive to price over the long-term than over the short-term. Another way of stating this is that it takes time for price changes to fully influence the demand for water. Right after a price increase, consumers are mostly locked into their water using appliances and landscaping. While they can modify their water using behavior in response to the price increase or change in rate structure, they may not be able to adjust their stock of water using capital, at least not right away. Over time, as this stock of capital wears out and is replaced, improvements in the efficiency of the capital can be realized. Thus, long-run demand tends to be less inelastic than short-run demand. Griffin (2006) estimates that long-run demand elasticity

⁹ Note that many often read the label of “inelasticity” to mean “no elasticity”. The authors are unaware how the label of “inelasticity” was chosen to mean “limited elasticity”. Economists refer to a complete lack of demand responsiveness to price as “perfectly inelastic”. This subtlety has been a longstanding and unfortunate source for misunderstanding between economists studying water demand and non-economists.

¹⁰ Renzetti, Steven (2002). *The Economics of Water Demands*, Kluwer Academic Publishers, Boston.

¹¹ Epsey, M., J. Epsey, and W. Shaw (1997). *Price Elasticity of Residential Demand for Water: A Meta-Analysis*. *Water Resources Research* 33 (June) 1369-1374. Also see Dalhuisen, J., et. al. (2003). *Price and Income Elasticities of Residential Demand: A Meta-Analysis*. *Land Economics* 79 (May): 292-308.

¹² Griffin, Ronald C. (2006). *Water Resource Economics: The Analysis of Scarcity, Policies, and Projects*. The MIT Press, Cambridge, MA.

is typically on the order of 0.2 points higher than short-run elasticity (e.g. if long-run elasticity is 0.4, then short-run elasticity is probably around 0.2). These are broad generalizations, however. Demand responses are often specific to the time and circumstances in which the price adjustment occurs, and therefore can significantly vary by region and time period.

Far fewer studies have been completed for commercial and industrial customer demand for water than for residential customers and the heterogeneity of commercial and industrial water uses can make generalizations more difficult. Some industrial uses, such as flow through cooling, have been found to be very elastic – probably because of the relatively low cost involved in switching to more water efficient cooling practices once cost for water begins to increase. Process water uses are generally less elastic than cooling uses. Commercial and office uses, which are primarily related to sanitation, space cooling, and landscape irrigation, also have been shown to be relatively inelastic. The empirical evidence suggests the following about commercial and industrial price elasticity:

- Industrial demand tends to be less price inelastic than commercial demand, though demand for certain industrial processes requiring very high quality water can be very inelastic.
- Commercial demand tends to be inelastic, though empirical estimates span a wide range. Commercial water demand studies reviewed by Renzetti (2002) reported price elasticity's ranging from 0.1 to 0.9. Elasticity varied considerably by commercial sector.
- As with residential customer demand for water, commercial and industrial demands are less inelastic in the long-run than in the short-run.

Using Rates to Influence Customer Demand for Water

Different rate structures have different types of effects on customer demand for water. Water agencies use rates to help manage water demand—throughout the year, during periods of seasonal peak demand, or in specific geographical zones.

Goal 1 - Reduce average system load. Conservation rates can reduce total annual water use, that is, reduce average day demand. This goal may be particularly appropriate if the agency faces a supply source constraint that could necessitate the importing or purchasing relatively costly supplies. Demand management through pricing can help utilities avoid these costs.

Goal 2 - Reduce peak system load. A related goal for a water agency in implementing conservation rates can be to reduce seasonal water demand. This objective may be particularly appropriate for agencies facing costly capacity expansion. Again, these costs may be avoidable through effective demand management.

Goal 3 - Reduce system diseconomies. Finally, agencies may want to ensure that customers in expensive-to-serve areas absorb the cost of this capacity through rates.

Agencies should also recognize, however, that customers willing to pay more for expensive types of water service are communicating a willingness to pay for additional investments to

provide additional water service. Rather than a failing of conservation pricing, customer preferences for additional water service should be viewed as a form of desirable two-way price signaling.

The evidence on how residential, commercial, and industrial customer demand for water typically responds to changes in the cost of water can be used to structure rates to promote conservation. Before discussing the advantages and limitations of specific conservation-oriented rate designs, some general principals are presented. These are as follows:

- Conservation-oriented rates are likely to have the most impact on outdoor water uses because these uses are more responsive to price than indoor uses. Thus, rate structure can play an important role in promoting efficient landscape water use. As we will see in the case study section, combining a well-designed rate structure with landscape budgets or other landscape conservation programs can be particularly effective.
- Because customer demand for water exhibits strong seasonality, as do many water system costs, differentiating rates by season can both promote more efficient outdoor water use and more equitably allocate water system costs among water users.
- Water rates can influence the choice of landscaping, water-using appliances, fixtures, and processes. These are decisions that can affect regional water demands for many years into the future. Rate structures can be designed to promote water efficient capital investments. They can also be paired with conservation programs promoting replacement of inefficient water using appliances, irrigation systems, and landscaping materials.
- Water agencies need rates primarily to recover the costs of providing water service, not just to promote conservation. Sometimes the concern is expressed that using rates to promote conservation will result in lower water sales and jeopardize the financial integrity of the utility. As a factual matter, the evidence strongly suggests that this concern is misplaced. When customer demand for a good is inelastic, as is the case for urban water uses, the positive effect on revenue of the higher price will outweigh the negative effect of lower sales. The net effect will be an increase, not a decrease, in sales revenue.¹³

Conservation-Oriented Rate Designs

Water rates have been designed in a variety of ways to promote water conservation. Three of the most commonly employed designs are: (1) increasing-block rates, (2) seasonally adjusted rates, and (3) budget-based rates. This section describes each of these approaches as well as how they can be combined to further refine the price signal or meet other policy or financial objectives.

Increasing-Block Rates

With an increasing-block rate, the price of water increases with the quantity of water consumed. The rate structure defines two or more consumption blocks (or tiers) and the price for water in each block. For example, a 3-block structure might define the first block as monthly consumption between 0 and 6 CCF; the second block as monthly consumption between 6 and 10 CCF; and the third block as anything more than 10 CCF. A customer consuming 7 CCF in a

¹³ Because rate increases sometimes follow periods of mandatory, non-price rationing during droughts, the effect on utility revenues of the non-price rationing and the rate increase are sometimes confused. Non-price rationing results in lower water use and lower system revenue. Price rationing, on the other hand, results in lower water use but higher system revenue.

month would pay the lower first block price for the first six CCF and the higher second block price for the seventh. A customer consuming 12 CCF would pay the first block price for the first six CCF, the second block price for the next four CCF, and the third block price for the last two CCF.

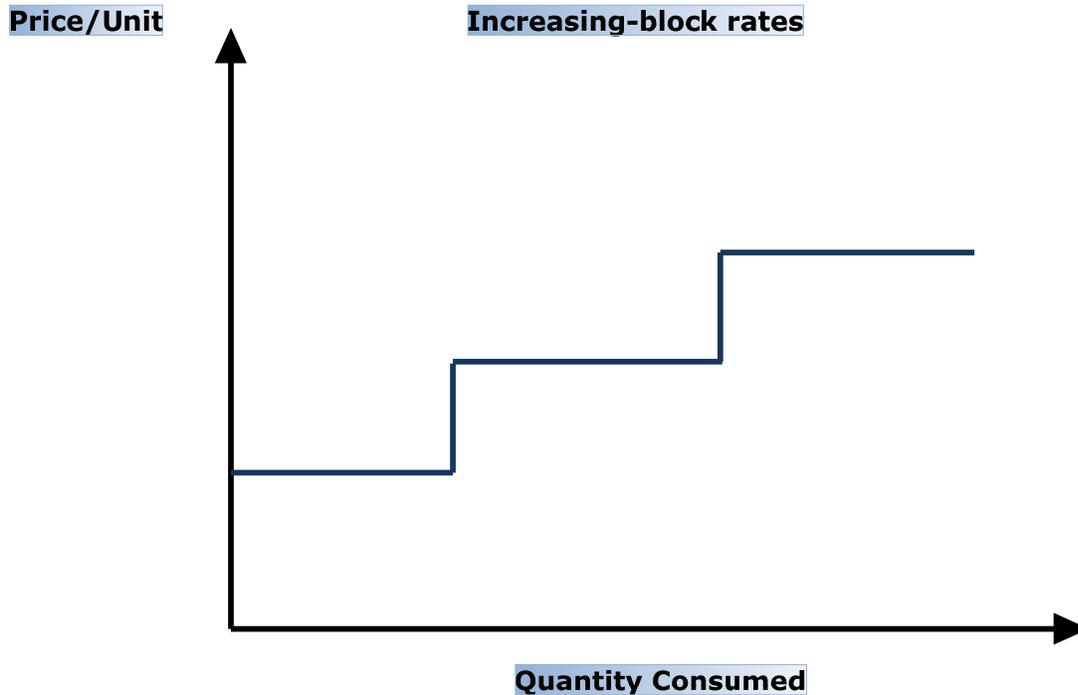


Figure 1 Increasing-block Rates

Water agencies typically use increasing-block rate designs to send a price signal to their customers that higher amounts of consumption require the agency to acquire, treat, and distribute more expensive water supplies. Ideally this is done by setting the price for water equal to the marginal cost of supply. Doing this, however, can result in the water agency collecting too much revenue. Agencies can use a block-rate design to avoid over collecting revenue. The upper-block rates are set to approximate the marginal cost of water supply. The lower-block rates are set so the agency does not exceed its revenue requirement.

The effectiveness of increasing block-rates as a conservation tool depends on the design of the blocks and block-prices. As previously noted, upper-block prices should reflect long-run system marginal costs. The blocks should be such that transitions between blocks are attainable through reasonable modifications in water using behavior and capital. For example, designing a block-rate so the top 25% of residential water users fall within the upper block and could through modest to moderate investments in water use efficiency move into the lower block would be more effective than a block-rate structure where 75% of residential water users fall into the upper-block and only a small percentage would be expected to move into the lower block through moderate to extraordinary investments in water use efficiency. In all cases, designing a good block-rate structure requires thoughtful analysis of customer water usage patterns and water system costs.

Seasonal Rates

Seasonal rates can be used to reflect temporal differences in the cost of providing water service. For many water agencies, costs increase during the summer months because of the need for extra capacity to serve increased outdoor demand. Some water agencies may also have to increase their reliance on more expensive sources of water during summer periods. A seasonal rate design can be used to signal to water users that the resource they are demanding costs more to provide in some periods than others. This is a type of peak-load pricing; a pricing structure commonly used in the electricity, gas, communication, and transportation industries.

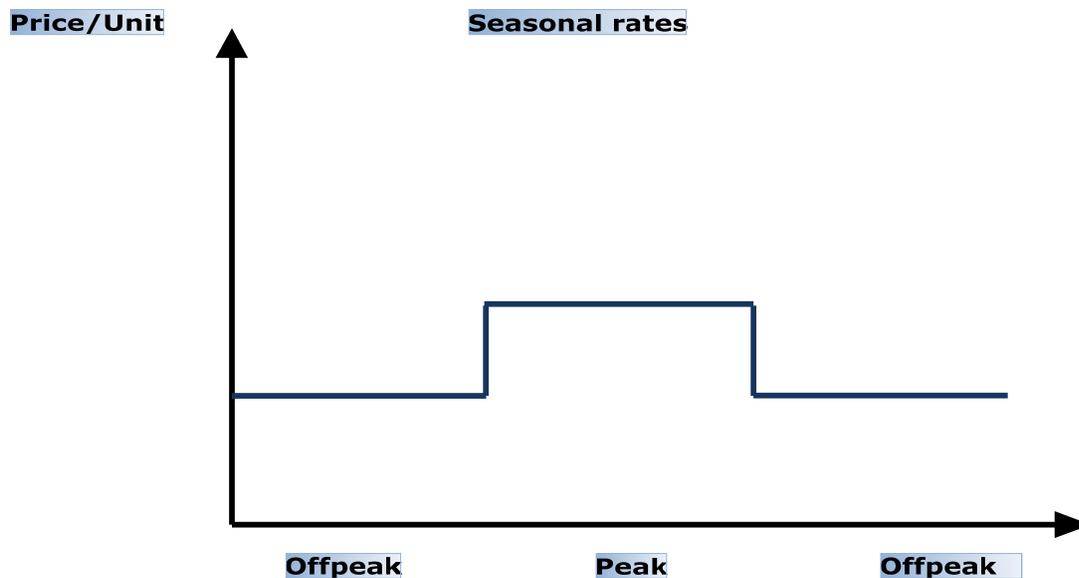


Figure 2 Seasonal Rates

Seasonal pricing can be especially effective in promoting outdoor water conservation. As discussed previously, empirical studies have shown outdoor water use tends to be more responsive to rates. Partly this is because at historic prices water users have not placed much emphasis on landscape water use efficiency. As price rises, relatively easy changes in irrigation scheduling and maintenance can result in significant changes in water use. Also, a seasonal rate increase provides water users with a bigger financial incentive to fix outdoor leaks. Given that outdoor water uses typically account for almost two-thirds of residential water demand, using a rate structure that signals to customers the full cost of meeting these demands is a good way to promote more efficient water use. Seasonal rate designs can be an effective way to do this.

Budget-Based Rates

Budget-based rates combine a water use budget (typically for landscape-only water uses) with a schedule of rates. Rates are tiered to provide a financial incentive to stay within the water use budget. Exceeding the budget results in a higher rate or surcharge. Charges for exceeding the budget can be on a sliding scale, increasing as the amount the budget is exceeded increases. Budget-based rates are a requirement of BMP 5 for accounts with dedicated landscape meters.

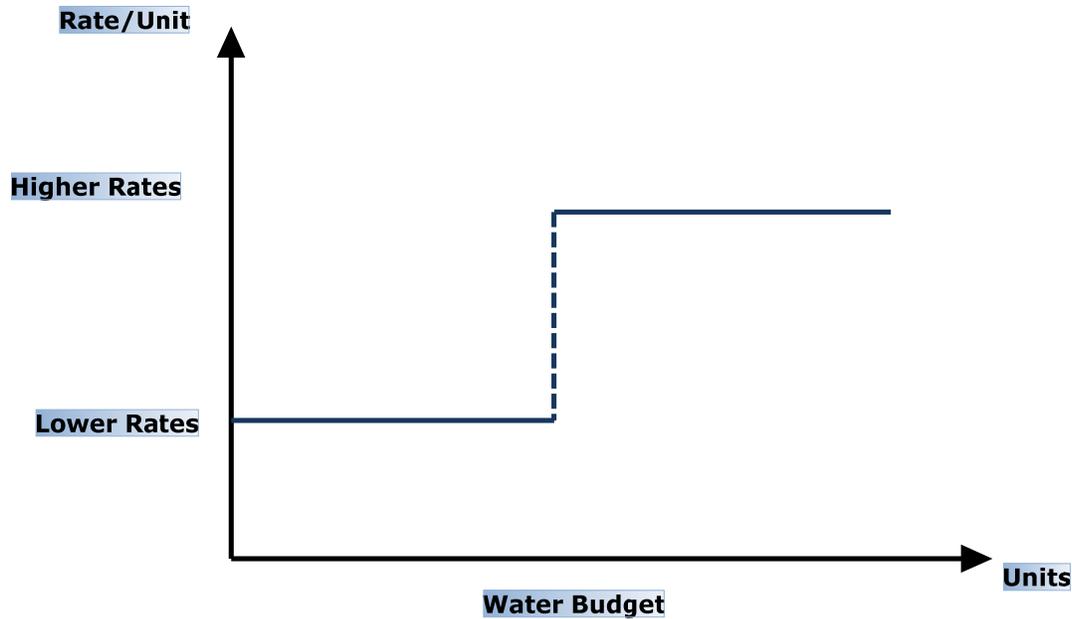


Figure 3 Water Budget Based Rates

Budget-based rates have several key advantages for promoting landscape water use efficiency. First, they establish for customers the correct amount of landscape water usage designed to keep both landscape healthy and water use reasonable. This is important because a surprisingly large proportion of water users really have no idea how much water their landscape requires to stay healthy and vibrant. Given this lack of knowledge, many water users adopt a “more is better” approach to watering. Second, the budget allows the water agency to identify customers with excessive outdoor water usage and provide direct assistance to them to become more water efficient. Third, the budget provides information about whether landscape water usage is excessive to the person responsible for paying the water bill. This is useful because for accounts with large landscaped areas it is frequently the case that the person responsible for paying the water bill is not the same as the person managing the landscape. In these cases, the person paying the bill learns whether they are using too much water for landscape and need to work with their landscape manager to curb usage.

A study of four southern California water agencies with budget-based rates found they reduced landscape water use by about 20%.¹⁴ The study also found that the rates were effective at reducing seasonal peak demand and that customers became more responsive to information about evapotranspiration and plant water needs.¹⁵

¹⁴ A&N Technical Services (1997), “Landscape Water Conservation Programs: Evaluation of Water Budget Based Rate Structures,” prepared for the Metropolitan Water District of Southern California, September.

¹⁵ Budget-based rates have been criticized as less than perfectly conservation-oriented because they primarily aim to improve water use efficiency of current landscape (short run efficiency). Budget-based rates may provide insufficient incentive to change to a more efficient landscape mix (long run efficiency). These rates represent an informative tradeoff that communities have made between administrative costs, equity of water shortage allocations, and short and long run water efficiencies.

Drought Pricing

The concept of drought pricing is to incorporate water rates into drought/shortage planning. Water agencies in California currently develop drought management plans (refer to USBR Drought Management Planning Guidelines) that call for coordinated response to water shortages. Part of the coordination needs to include planning for water rates. The AWWA M1 Manual of Rates includes a section on Drought Pricing. The basic idea is as follows: when a water agency declares a shortage emergency and requests voluntary or mandatory customer curtailment of water use a corresponding change in water rates for the duration of the drought emergency will accomplish several things:

- Customers are sent a higher price signal to indicate the scarcity value of water during a drought emergency.
- Water agencies avoid the inevitable “unexpected” revenue shortfall that follows a successful citizen response to calls for curtailed water use.
- Water agencies can avoid the political backlash if water rates are increased after customers have heeded the call to perform a civic duty by curtailing use.

Hybrid Designs

Different rate designs can be combined to better tailor the price signal to specific policy objectives. Seasonally differentiated rates, for example, can also incorporate block- or budget-based components. Existing rates can be combined with excess use surcharges or discounts to discourage wasteful water uses and reward efficient practices. In San Francisco, for example, customers that retrofit their homes or businesses with low water using fixtures are eligible for a lower rate than those that do not. Water budgets have been very successfully married to drought pricing in areas that have experience severe water shortages.¹⁶

Cost-of-Service Considerations

It is practically a truism to say that higher water rates will result in lower water use. One could thus conclude that in terms of promoting water conservation, the higher the rate the better. But this would be wrong. Rates should be designed to accurately transmit to water users the cost of providing water service. This is a fundamental requirement for economically efficient pricing policies and also a legal requirement in California.¹⁷ A detailed cost-of-service study should be at the core of every rate design. Rates should be designed to allocate and recover system costs in a way that closely approximates the causation of those costs. Simple rates based on average system costs often fail to do this because they ignore important temporal, spatial, and volume differences in daily, monthly, and annual demands that drive system capacity and operating requirements. More sophisticated rate designs that reflect long-run marginal costs and include seasonality can do a better job at equitably and efficiently allocating system costs while simultaneously helping to meet an agency’s water conservation policy objectives.

¹⁶ See the recent AwwaRF study by Mayer, DeOreo, Chesnutt, Pekelney, and Summers, *Water Budgets and Rate Structures– Innovative Management Tools*, 2007.

¹⁷ The passage of Proposition 218 in 1996 amended the California Constitution to require a strong nexus between cost-of-service and the fees charged to property owners for a property-related service. A recent decision by the California Supreme Court (*Bighorn-Desert View Water Agency v. Beringson*) affirmed that water service is subject to these requirements.