

COMPREHENSIVE WATER CONSERVATION PLAN (120 DAY UPDATE)

Pasadena's Roadmap to Reduce Water Consumption by 10%, 20%, or 30%

January 22, 2009

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EXECUTIVE SUMMARY

This report outlines the Pasadena Water and Power (PWP) Comprehensive Water Conservation Plan, which includes six water conservation approaches, listed below, that will be used to meet the City's water conservation targets. Whereas past programs relied primarily on incentives for indoor efficiency, this plan reflects an emphasis on:

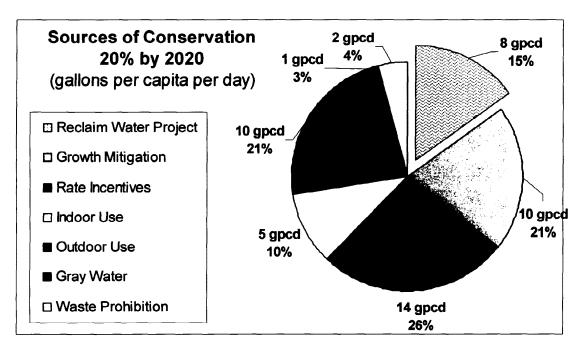
- Using price signals in rate design to encourage conservation;
- · Increased emphasis on outdoor water efficiency; and,
- Maximizing efficiencies related to new construction.

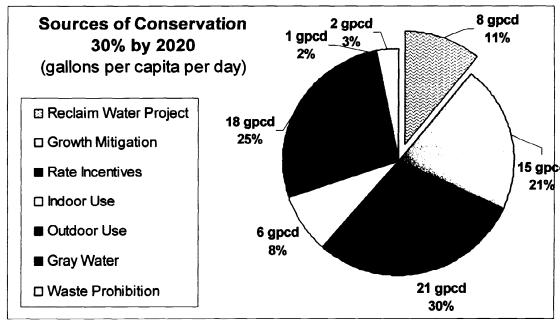
KEY WATER CONSERVATION APPROACHES

- 1. Implement Water Conservation Rate Design:
 - a. Modified block rate structure with higher cost tiers for high water use
 - b. Develop a budget-based water rate proposal
- 2. Adopt Sustainable Water Supply Ordinances:
 - a. Establish a Permanent Water Waste Prohibition Ordinance
 - b. Modify existing Water Shortage Ordinance
 - c. Adopt an Efficient Landscape Ordinance
 - d. Evaluate potential effectiveness of a Fixture Replacement on Resale Ordinance, and adopt if appropriate
 - e. Review the Gray Water Systems and Storm Water Capture Ordinances and update or modify as appropriate
 - f. Adopt appropriate water use limitations and mitigation measures associated with new development
- 3. Provide Incentives for Use of Water Efficient Technology and Practices:
 - a. Indoor fixture incentives
 - b. Irrigation technology incentives
 - c. Water-efficient landscape and turf replacement incentives
- 4. Provide Direct Installation and Distribution of Efficient Technologies
- 5. Provide Water Use Audits
- 6. Provide Water Use Information, Education, and Outreach:
 - a. Usage data on bills
 - b. Appropriate water use standards or guidelines
 - c. Efficient indoor and outdoor water use practices

PWP has proposed an initial target of reducing per-capita potable water consumption 10% by 2015 and 20% by 2020 consistent with state policy objectives and Pasadena's Urban Environmental Accords goals. PWP will further evaluate the feasibility and cost impacts of 10%, 20% and 30% water conservation goals as part of the Water Integrated Resource Plan (WIRP) study that PWP will undertake over the next twelve months. As part of this effort, three interdepartmental Water Issue Work Groups have been formed to evaluate (i) Rate Design; (ii) Landscape Efficiency; and, (iii) Building Codes and New Development. These Work Groups plan to develop recommendations by March 2009.

The following charts depict estimated cumulative sources of water conservation through the year 2020 to reduce the projected 2020 usage of 209 gallons per capita per day (gpcd) to 178 gpcd or 158 gpcd associated with 20% and 30% reductions from the 198 gpcd baseline consumption. The charts reflect staff's view that many approaches will be necessary, and that increased reliance on price signals through rates combined with outdoor conservation and growth mitigation will be of paramount importance as the reduction targets increase. **These water conservation estimates are preliminary in nature**, and will be further evaluated and quantified as part of the Comprehensive Water Conservation Plan and forthcoming WIRP process.





Milestone Schedule

A milestone schedule for evaluation and/or proposed adoption of these actions will be included in the final draft of the Comprehensive Water Consumption Plan.

Progress Reporting and Monitoring

Due to the significance of water supply issues to the Pasadena community, on-going reporting and monitoring of the water supply situation and Pasadena's progress towards achieving the conservation will be essential. Comprehensive annual reports on program results and expenses will be presented to the City Council, and periodic progress reports will be provided to the Municipal Services Committee and Environmental Advisory Commission.

INTRODUCTION

On November 3, 2008, staff presented an outline of its Comprehensive Water Supply Plan (Plan) and additional background information to the City Council. This report provided an overview of Pasadena's water supply and Water Fund financial situation as well as an outline of PWP's plan to ensure the long-term reliability of the water supply through a combination of alternative supply sources and water conservation efforts

Purpose of this Report Draft

Pasadena Water and Power (PWP) has prepared this report in response to the City Council's September 22, 2008 directive for staff to provide a comprehensive water conservation plan outline with conservation targets of 10%, 20% and 30% within 60 days, a status report on the plan within 120 days, and a complete plan within 180 days. This report is intended to support the 120 day update requested by City Council for the purposes of obtaining early review and feedback from City Council and Environmental Advisory Commission. For informational purposes, it outlines the goals, approaches and action plans contained in PWP's comprehensive water conservation program.

Goals of the Comprehensive Water Conservation Plan

The primary goal of the Plan is to achieve permanent reduction in water demand in Pasadena and to establish mechanisms to effectively manage short-term water emergencies as well. The Plan is designed to support effective short- and long-term water supply planning, assure the reasonable and beneficial use of water, prevent water waste, and maximize the efficient use of water within PWP's service territory.

Program Drivers

The following program drivers have significant influence on the Plan:

- Urban Environmental Accords Goals (10% per capita reduction by 2015)
- Legislative and State Policy Compliance
 - Statewide 20% reduction by 2020 (expected future legislation)
 - MWD Model Conservation Ordinance
 - State Model Water Efficient Landscape Ordinance
- Best Management Practices (BMP) compliance
- Near-Term Water Shortage
- Long-Term Supply Reliability/Sustainability

Background

Pasadena has long enjoyed the reputation among the community of water agencies as being a leader in conservation efforts, and plans to continue to be at the forefront of promoting and incentivizing efficient water use. By providing incentives for new water saving technology and education on efficient water use methods, PWP offers its

customers the tools they need to achieve water use reduction and support the Citywide goal of sustainability and environmental stewardship.

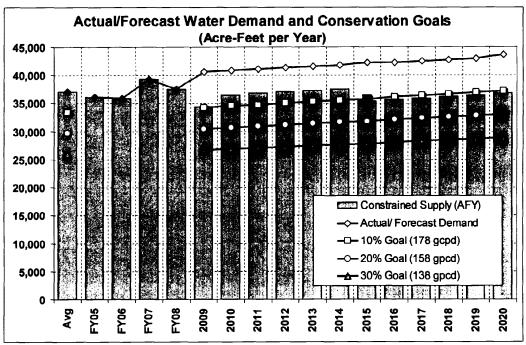
In 1991 PWP signed the Memorandum of Understanding (MOU) with the State of California, Department of Water Resources agreeing to implement the Best Management Practices (BMPs) and comply with the MOU. Signatories to the MOU submit bi-annual progress reports to the California Urban Water Conservation Council (CUWCC), which reports annually to the State Water Resources Control Board. The CUWCC is a consensus based partnership of agencies and organizations concerned with water supply and conservation of natural resources in California. BMP compliance is one of the key drivers for development of PWP's conservation program. The BMP's are listed in Attachment 1

In June 2007, the Mayor of Pasadena called for a citywide reduction in water use of at least 10% in response to water supply pumping restrictions and chronic drought conditions. As of November 2007 the goal of 10% reduction had not been reached, and on December 17, 2007 the City Council issued a public proclamation that a potential water shortage exists and invoked the City's Water Shortage Ordinance Plan I. As a means of supporting the ordinance, PWP established a dedicated water waste hotline for reporting instances of water waste. To date, PWP has received over 700 reports and has responded with written reminders mailed to customers and in person visits when staff is available. Code Compliance staff is assisting Water and Power in distributing information regarding the current Water Shortage Ordinance during their field inspections.

Pasadena's current Water Shortage Procedures Ordinance, included as Attachment 2, consists of three progressively restrictive plans. Plan I prohibits nine specific water waste actions and urges all citizens to adhere to the ordinance. Plan II would make compliance with these water waste prohibitions mandatory and impose penalties for non-compliance. Plan III includes provisions for water rationing.

WATER DEMAND AND CONSERVATION GOALS

The following chart depicts historical and forecast water consumption, in acre-feet per year (AFY), along with lines depicting the water consumption corresponding to 10%, 20%, and 30% reductions from the City's Urban Environmental Accords (UEA) Base Year consumption of 198 gallons per capita per day (GPCD). The 10% by 2015 and 20% by 2020 targets are highlighted with solid bullets. The corresponding consumption goals are 178, 158, and 138 GPCD. Also, a forecast of "constrained water supply" is shown as vertical bars, reflecting the projected availability of local groundwater and MWD imports under a 10% curtailment requirement. In the event that MWD initiates such import restrictions, PWP will rely upon the Water Shortage Procedures Ordinance to reduce demand and will be subject to penalty charges for imports from MWD to meet demands in excess of those shown.



Source: RMC 2008 Urban Water Management Plan Update and PWP Population growth is estimated at an average 0.8% per year

Water Measurement Conversions:

1 Acre Foot = 435 HCF

Hundred Cubic Feet (HCF) = 1 Billing Unit (BU)

1 HFC = 748 gallons/.00230 Acre Feet

Acre Foot = 325,800 gallons

PWP has proposed an initial long term conservation target of 20% per capita reduction in potable water consumption by 2020, with an interim goal of 10% per capita reduction by 2015 in accordance with UEA Action Plan 21. These goals will be reviewed and refined as part of an integrated resource planning process, and implemented with a multi-faceted conservation approach outlined in this report.

WATER CONSERVATION APPROACHES

Whereas past programs relied primarily on incentives for indoor efficiency, this plan places an increased emphasis on:

- Using price signals in rate design to encourage conservation;
- Outdoor water efficiency; and,
- Maximizing opportunities related to new construction.

PWP has developed a set of six water conservation approaches that will be used to meet the City's water conservation targets as follows:

- 1. Implement Water Conservation Rate Design
- 2. Adopt or Modify Sustainable Water Supply Ordinances
- 3. Provide Incentives for Use of Water Efficient Technology and Practices
- 4. Provide Direct Installation and Distribution of Efficient Technologies
- 5. Provide Water Use Audits
- 6. Provide Water Use Information, Education, and Outreach

These are the key components to a successful conservation program, and each of these elements is crucial to meet the overall conservation goals. The approaches include both existing activities and planned strategies, and strategies are not listed in order of importance. For example, the following table shows illustrative measures that a residential water customer might employ to meet various water conservation targets. These measures could be encouraged through a combination of rate design, rebates, ordinance requirements, and educational awareness.

Residential Conservation Measures Illustrative Means for Customers to Achieve Goals

Customer	10% Goal	20% Goal	30% Goal
Efficient User <12 Billing Units per Month	Reduce watering by one day per week 30% Outdoor	Re-landscape: Turf Reduction Install WBIC*	Likely not feasible
Typical User 12-36 BU/mo	Reduce watering by two days per week 50% Outdoor	Water 2 day/wk Replace Indoor Fixtures Install WBIC	Re-landscape: Turf Reduction
Large User > 36 BU/mo	Reduce watering by three days per week 70% Outdoor	Water 2 day/wk Replace Indoor Fixtures Install WBIC	Re-landscape: Turf Reduction

^{*}Weather-based irrigation controller

Conservation Approach 1: Implement Water Conservation Rate Design

A critical element of PWP's water conservation plan will be evaluating and implementing a water rate design that provides financial motivations for customers to conserve water while equitably apportioning costs among customers and maintaining the Water Fund's fiscal health. An equitable water conservation rate design would reward efficient users and those who have invested in conservation fixtures and appliances, while providing appropriate price signals and incentives for others to conserve water. In addition, the costs of procuring incremental water supplies would ideally be borne by those causing the increased demand rather than the entire community. Such rates are intended to help reduce water demands for the entire system and can be designed to reduce demand during peak times or seasons and recover surcharge costs as necessary during periods of shortages and MWD allocations. This enables the utility to manage costs and meet revenue requirements while maintaining pricing equity for all users.

Water Fund Health

Even with recent rate hikes, water rates are generally not perceived as high enough to encourage conservation. In addition, overall revenues are insufficient to support ongoing operations, and the capital improvement fund will not fully support the infrastructure improvements contemplated under the Water System Master Plan, along with added debt service costs associated with additional long term borrowing.

The financial condition of Pasadena's Water Fund has deteriorated in recent years since rate increases have not kept pace with rising costs. The Water Fund's reserves have been depleted since current revenues are insufficient to meet operating costs and planned capital investment. Based on recent analysis, revenues will need to increase in Fiscal Years 2010 and 2011 to restore the fund's health.

Impacts of 10%, 20%, 30% Conservation

Achieving the goal of reducing water consumption by 10%, 20%, or 30% will place additional upward pressure on water rates. Analysis of the revenue requirement and rate impacts associated with achieving these goals is underway. The final report will include this information.

Alternative Rate Design

PWP is developing a rate proposal to address current funding gaps and encourage conservation, ideally in a phased approach to revising rates. PWP is evaluating the impacts of resizing existing tier allocations and adding additional rate tiers as appropriate to reflect reduced local supply and provide additional conservation price signals. PWP will complete analyses of current customer data to effectively categorize customers by usage characteristics, including single family residential, multi-family residential, and various commercial classifications, and develop a water budget based rate proposal for the Council's consideration as an alternative to the current tier structure.

The evaluation of potential changes to the rate structure will include an analysis of existing capital and service delivery programs to identify options for efficiency improvements. Rate requirements will be based on programs that are prioritized to deliver maximum value to PWP's customers at reasonable costs.

Drought Surcharge

During times of severe shortages, PWP may incur additional costs associated with imported water that exceeds Pasadena's allocations from MWD. Also, PWP's revenues will decrease as additional water use restrictions are imposed on its customers. PWP will therefore propose a drought-surcharge rate to pass-through MWD drought surcharges and recover revenue loss due to reduced sales volume.

Low Income Assistance

Finally, PWP recognizes that water conservation rate designs may have a significant impact on some customer's water bills. PWP will develop proposals to mitigate impacts of water rate increases on low income customers to the extent feasible and allowed by Proposition 218 restrictions. For example, PWP will study and propose, if feasible, a "Public Benefits Charge" for water that will provide funding for water conservation incentive programs and low income rate assistance programs. However, Proposition 218 expressly provides that water rates are property related and must be designed to recover the cost to provide water service to a parcel. As a result, rate design and potential funding for low income assistance programs must be compliant with Proposition 218 requirements.

Water Conservation Rate Development Action Plan

Short Term Activities (to be completed by July 1, 2009)

- Propose overall rate revenue increase to maintain fund health
- Propose modified rate block structure to encourage conservation through pricing
- Propose drought-surcharge rate to pass-through of MWD drought surcharges and recover revenue loss due to reduced sales volume
- Improve water usage data on bills, potentially including historic usage data, graphs, baseline computations and water budget and allocation data
- Complete classification of water customers (business, residential)

Mid Term Activities (within 18 months)

- Propose additional revenue increase
- Evaluate impact and effectiveness of initial rate modifications
- Develop proposal for and implement water budget-based rate alternatives
- Propose Water Public Benefits Charge (if allowed under Proposition 218 restrictions)

Conservation Approach 2: Adopt Sustainable Water Supply Ordinances

This section consists of required or potential changes to several sections of the Pasadena Municipal Code, potentially including any or all of the following areas:

- Establish Permanent Water Waste Prohibitions, modeled after the Metropolitan Water District (MWD) model ordinance and coordinated with other local cities
- Adopt a Water Efficient Landscape Ordinance, consistent with the State Model Water Efficient Landscape Ordinance
- Evaluate potential effectiveness of a Fixture Replacement on Resale Ordinance and adopt if appropriate
- Adopt or modify ordinances as necessary and appropriate to facilitates gray water and storm water capture and use
- Adopt appropriate water use limitations and mitigation measures associated with new development

Water Waste Prohibition Ordinance

In compliance with Best Management Practice (BMP) 13, staff will develop a proposal for a new Water Waste Prohibition and Shortage Plan Ordinance to replace the existing Water Shortage Procedures Ordinance that was adopted in 1992. The proposed new ordinance will include year-round water waste prohibitions as well as additional prohibitions and rate conservation tiers that are phased in as water supply scenarios become increasingly severe.

To the extent feasible and appropriate for Pasadena, the ordinance would be consistent with the MWD Model Water Conservation Ordinance, summarized in Attachment 3, as well as those to be adopted by Burbank and Glendale. The MWD Model Conservation Ordinance is a guideline for agencies to use as a template for their local permanent water conservation ordinances. Adoption of the MWD's Model Ordinance or a similar version is a prerequisite to participating in MWD's Public Sector, Turf Removal and Enhanced Conservation programs. Because many of our customers hear the same advertising and have businesses in each of the citys' service territories, Pasadena, Burbank & Glendale formed a Water Shortage Task Force in order to explore common challenges and to work towards developing and adopting similar water restrictions and ordinance provisions.

Pasadena's current Water Shortage Procedures Ordinance, consists of three progressively restrictive Water Shortage Plans. The City is currently in Plan I which includes voluntary conservation activities that request customers to refrain from nine water wasting activities.

The new ordinance would continue to prohibit certain water-waste activities, but these prohibitions would become a permanent reminder to encourage customers to use water efficiently at all time, not just during a declared water shortage. The ordinance would be designed such that obvious water waste activities such as allowing water to run off

landscapes, irrigating daily, etc. would be restricted at all times and subject to penalty. Other activities would be restricted if a water shortage is declared and the restrictions would ramp up as the water shortage became more severe. The MWD model ordinance suggests that drought surcharges or other price signals be included to encourage conservation during water shortages, and PWP anticipates that these will be included in either the rate ordinance or water waste ordinance, as appropriate.

Changing habits in this area will not impact indoor household consumption or basic hygiene but rather focuses on eliminating wasteful practices. All customers and property owners would be charged with the task of reducing water waste by adopting the water conservation measures within the ordinance.

The Water Waste Prohibitions will be designed to fairly allocate the obligation to reduce consumption without being punitive. Usage thresholds for applicability of prohibitions, consideration of special circumstances, and an appeals process will be incorporated in the ordinance. Nothing in the ordinance would be intended to apply to situations where water is required to eliminate conditions that threaten public health, safety, or welfare.

Water Efficient Landscape Ordinance

In accordance Assembly Bill 1881 (2006), Pasadena must adopt the State Model Water Efficient Landscape Ordinance no later than December 2009. The ordinance applies to all new construction landscape projects and renovations of landscape areas equal to or greater than 2,500 square feet. The ordinance requires a permitting process, plan check and design review to ensure that projects comply with the mandated efficiency standards as prescribed by the State of California Department of Water Resources. The ordinance will be adopted by the State in January 2009 and Pasadena's adoption will become mandatory by January 1, 2010.

A more detailed schedule will be included in the final draft.

Fixture Replacement on Resale

In accordance with Action 1 of the Urban Environmental Accords, the Planning and Development Department and PWP are conducting a pilot field study to determine the current inventory of pre-1992 toilets. Reports on PWP's fixture replacement programs conducted since 1991 suggest that the City has achieved a saturation rate of approximately 90% for toilet and showerhead replacement. To validate the saturation rates, staff has initiated a field inventory of fixtures through existing Occupancy Inspection (for sale houses) and Quadrennial Inspection (multi-family units) programs for a period of six months. During this time it is estimated that 800 single family homes and 2,500 multi-family units will be inspected.

The following is a list of action items to be initiated or completed by July 2009:

1. Planning and Development Department staff will initiate an inventory of residential water fixtures in residential units through the existing Occupancy

- Inspection Program and Quadrennial Inspection Program for a period of six months, and will forward the inspection results to PWP.
- 2. PWP will perform a cost/effectiveness analysis of the inventory findings to be incorporated in the updated Water Integrated Resource Plan.
- 3. If PWP determines substantial water savings can be achieved through a cost effective mandatory fixture replacement program, Planning and Development staff will partner with PWP in crafting the program requirements.
- 4. PWP will perform a cost/effectiveness analysis to determine if the existing residential water and energy audit programs can be expanded and identify the best approach for targeting high water and energy using customers.
- 5. PWP will enhance the water rebate programs to include fixtures that exceed code requirements, budget permitting.
- 6. PWP will develop a packet on water and energy conservation programs, rebate information, and educational materials for distribution to new residents and business customers at application of utility service.
- 7. PWP and Planning and Development will develop a strategy for reducing landscape related water usage for existing residential properties.

Gray Water and Storm Water Capture

Additional details will be included in the final draft.

New Development

Additional details will be included in the final draft.

Conservation Approach 3: Incentives for Efficient Technology and Practices

PWP has provided a successful water conservation program for the past decade. The result of PWP's aggressive conservation efforts is an estimated aggregate water savings of 59,620 acre feet (program to date) as reported to the CUWCC and the Department of Water Resources.

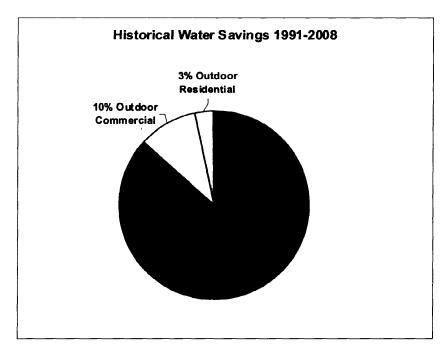
Research and experience prove that cash incentives are an extremely effective means to encourage changes in customer's technology selections and behavior. PWP is one of the few utilities of its size that supplements MWD's rebates. PWP's high participation rate in rebate programs is a direct result of enhanced rebates.

PWP's targets for supplementing rebates are; new technologies, fixtures that exceed

existing efficiency code requirements and devices that historically have not had a high level of participation.

The figure on the right depicts PWP's historical sources of water savings.

With PWP's focus now shifted to outdoor water use, a much higher percentage of future water savings is expected to result from irrigation and landscaping retrofits.



During the period of July 2008 through December 2008, PWP has saved an additional estimated 274 acre-feet as a result of the following rebate activity:

Residential Rebates		Com	Commercial and Multi-Family Rebates		
438	High Efficiency Toilets	118	High Efficiency Toilets		
219	High Efficiency Washers	21	High Efficiency Washers		
4	Weather Based Irrigation	5	Weather Based Irrigation		
	Controllers		Controllers		
10	Rotating Nozzles	263	Rotating Nozzles		
	5	10	Zero Water Urinals		
		303	Ultra Low Flow Toilets		
		1	Pre-rinse Spray Head		
		3	Cooling Tower Conductivity		
			Controllers		
		1	Waterbroom		
		1 .	Synthetic Turf		

All water savings estimates are based upon industry standards set for each measure. The State Department of Water Resources and Metropolitan Water District use these standards for calculating estimated water savings.

Pasadena's current FY2009 water conservation programs and incentives are shown in Attachment 4. In addition to these existing programs, PWP is investigating the potential to promote and incentivize additional innovative water efficient devices including:

- Rain Harvesting systems
- Rain shut-off controls for existing irrigation systems
- Rebates for drip irrigation systems
- Soil moisture sensors
- Flow restrictors indoor faucets (PWP is sponsoring two pilot programs currently one at Huntington Memorial Hospital and the Rose Bowl).
- Pool covers to avoid excess evaporation
- Packaged Gray Water systems

As MWD researches and adds new products to their rebate menu annually, PWP will participate and consider adding funding to encourage participation where cost effective and appropriate.

Conservation Approach 4: Direct Installation and Distribution

PWP targets specific market sectors for direct install and distribution programs, which overcome economic obstacles for market sectors such as small businesses and low income housing by providing retrofits at little or no cost to the customer. This approach facilitates retrofit activity in market sectors where there is historically a low participation rate in rebate programs. Distribution of low flow showerheads, aerators and leak detection tablets at community events is an effective method to achieve a wide scale placement of efficient devices throughout PWP's service territory and comply with BMP 2. Direct installation and distribution by PWP includes:

- Commercial, Industrial, Institutional (CII)
 - Waterbrooms
 - Rotating Sprinkler Nozzles
 - o Pre-rinse spray heads
 - Leak detection tablets
 - o Table Cards Food Service
 - Linen Cards Hospitality
- Residential & Multi-family
 - Ultra low flow showerheads 2.0 gpm (current plumbing standard is 2.5 gpm)
 - o Aerators
 - o Shower timers
 - o Leak detection tablets
 - Hose shut off devices
 - o Soil Probes

As with the cash incentive programs, PWP will continue to review new technologies as potential candidates for including in the direct install program.

Conservation Approach 5: Water Use Audits

PWP will seek funding to expand its use of audits to identify cost-effective water conservation technologies and practices at customer facilities. Audits consist of the following activities:

- Assessment of current irrigation system
- Alternative irrigation methods i.e. drip
- Alternative plant palettes recommended
- Optimum watering schedule
- Water budget provided
- Leak detection
- Retrofit recommendations with water savings and payback analysis
- Summary of potential rebate information

In May 2008, PWP launched a pilot landscaping audit program. Two certified landscape professionals were hired to conduct outdoor water audits at no cost to the customer. The first phase of the program targeted the top 100 largest water commercial consumers. Of the 40 commercial properties and 3 residential customers contacted as of December 2008, 36 surveys have been completed. Recommended efficiency measures were implemented or are in progress at 29 of the participating sites. Water savings to date are estimated to be in the range of 245 – 255 acre feet annually. Multifamily and large residential properties over 1 acre are targeted in phase 2 of the program, an invitation to participate in the program was mailed to to 250 property managers and homeowners associations during the week of January 17, 2009.

Residential audits, which currently focus primarily on indoor use, are provided upon request or due to a high bill complaint. These audits consist of:

- Assessment/inventory of fixtures/appliances
- Leak detection
- Showerhead and aerator distribution as budget permits
- Summary of potential rebate information

PWP will evaluate the potential expansion of residential audits and the feasibility of including landscaping review and/or information.

Conservation Approach 6: Water Use Information, Education & Outreach

Provide Water Usage Data

PWP is currently working to provide water usage history on customers' bills. Due to challenges of billing multiple services and desire to provide more timely information to customers, PWP will evaluate potential alternatives, such as web-based systems, to provide water usage graphs, baseline computations, and usage comparisons to customers.