

A Straight Flush- Commercial ULFT Replacement Program

Final Report

Prepared for:

**California
Department of
Water
Resources**



**CALFED
BAY-DELTA
PROGRAM**



**US Bureau of
Reclamation**



Prepared by:

**Contra Costa
Water District**



CII ULFT REPLACEMENT PROGRAM

INTRODUCTION

On September 27, 2001, a CALFED grant was awarded to the Contra Costa Water District (District) for *A Straight Flush-Commercial ULFT Replacement Program*. The program was administered by the California Department of Water Resources, Office of Water Use Efficiency. It was intended to provide an incentive to commercial, institutional and industrial (CII) customers to replace high volume conventional toilets with ultra low flow toilets (ULFTs), and cost effectively reduce water and sewer use.

The program was very successful in meeting its goals and objectives. In addition, data gathered from the results will provide valuable information for future programs. This report describes the program's design, objectives, conclusions, and offers recommendations to other water agencies implementing similar programs.

PROGRAM BACKGROUND

The Contra Costa Water District is both a retail and a wholesale water supplier for a population of 450,000. CCWD provides treated water to 230,000 residents in central Contra Costa County, including the cities of Concord, Clayton, Clyde, Pacheco, Port Costa, and parts of Pleasant Hill, Walnut Creek, and Martinez. CCWD provides raw (untreated) water to other retail water agencies serving 220,000 residents in Antioch, Pittsburg, Oakley, Bay Point, and Martinez. See Attachment 1 for a map of the District service area.

The District serves approximately 3,000 treated water Commercial, Institutional and Industrial (CII) customers, and wholesales water to other retail agencies, who serve another 3,000 CII customers. All customers are offered water conservation services to improve water use efficiency. The District assists customers by providing on-site water use evaluations, followed by a summary report listing the most cost effective measures to reduce water use. Rebates and other incentive programs are offered during the survey to encourage customers to install efficient devices and fixtures.

Although the District has provided CII ULFT rebates to its customers in the past, the program has had marginal response due to the high cost of commercial fixtures, and the perceived and/or real performance problems with ULFTs.

As a signatory to the Memorandum of Understanding regarding Water Conservation in California, the District is required to implement all cost effective Best Management Practices (BMPs). On July 1, 2001, an Agreement in Principle regarding CII ULFT implementation was adopted as an interim BMP. The interim BMP requires signatories to meet a water savings goal equal to 3% of the 10-year total maximum savings potential of all CII toilets in an agency's service area, or approximately 1,000 ULFTs over three years. The interim BMP for CII ULFT implementation would be evaluated after the three year period to determine the cost effectiveness of adopting the BMP on a long-term basis.

To meet the requirements of the interim BMP (approximately 1,000 ULFTs), the District needed to offer a sufficiently high rebate to encourage enough participation. To do so, the District

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applied for and was awarded a CALFED grant to help fund a new program, the **CCWD Commercial ULFT Replacement Program**. The grant funds made the program possible and successful. In addition, as part of the program, data was collected and will be provided to the CUWCC to assist in evaluating the interim BMP.

PROGRAM OBJECTIVES

The primary objective of the Commercial ULFT Replacement Program was to provide incentives to encourage the replacement of 1,000 commercial toilets. Furthermore, the goal was to replace toilets in those commercial sectors with the highest potential water savings, and to encourage customers to install the highest quality commercial ULFTs at the lowest cost.

PROGRAM DESCRIPTION

The CII ULFT Replacement Program offered customers a rebate incentive of 100% of the material cost (up to \$300) for the purchase of high-performing ULFTs to replace existing toilets. To ensure that the goals of the program were achieved, an extensive marketing plan was developed targeting the most cost-effective businesses for ULFT installation. A list of recommended, high-performing ULFTs was put together, and guaranteed prices were negotiated with local wholesale plumbers. The District also developed an application, marketing materials, a website page, and a database for tracking all customers' rebates.

Marketing Plan

The District implemented a series of marketing events and flyers aimed at maximizing participation by commercial customers with the highest potential water savings (Attachment 2). The District utilized the data from two studies to assist in marketing. The *CUWCC CII ULFT Savings Study, 2001*, lists the estimated ULFT savings potential for specific commercial business sectors. The District also utilized the *1992 U.S Economic Census Data and Toilet Coefficients by Whitcomb, 1999*, to estimate the number of potential toilets in each sector. **Table 1** lists, by business sector, the number of estimated conventional toilets and the estimated water savings per ULFT installed, in gallons per day (gpd).

Table 1

Business Sector	* Estimated No. of existing Non-ULFTs	Percent of Existing Toilets	** ULFT Water Savings, GPD
Office	12,376	35.09%	20
Wholesale/Retail	9,474	26.87%	37-57
Health Care	4,356	12.35%	21
Other	2,456	6.96%	29
Industrial	1,240	3.52%	23
Hotel/Motel	1,861	5.28%	16
Schools	1,203	3.41%	NA
Restaurant	924	2.62%	47

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Government	806	2.29%	NA
Religious	569	1.61%	28
TOTAL	35265	100.00%	

* 1992 US Economic Data and Toilet Coefficients

** CUWCC CII ULFT Savings Study, 2001

NA: Water savings figures for schools or government were not available

The restaurant industry was the first business sector targeted to receive program marketing. Restaurants have a combined water and sewer charge of \$6.37 per one-hundred cubic feet, use large quantities of water, and were estimated to have water savings of 47 gallons per day for each ULFT installed. Several marketing pieces were sent to all restaurants during the first months of the program. Although they represent a small number of conventional toilets (924), the water savings per ULFT installed is significant. In addition, wholesale/retail businesses were targeted for program participation due to high potential water savings, ranging from 37 to 57 gpd per ULFT installed, and the large number of conventional toilets (9,479) the business sector represented in the District service area.

After initially targeting restaurants and wholesale/retail business, commercial businesses using 2,000 gallons a day or more were targeted. Finally, in March 2002, program marketing was expanded to all businesses in the District. This multi-business marketing approach resulted in some businesses receiving several marketing pieces during the course of the program.

The marketing plan for the program included a kick-off event, promotional materials (flyers and brochures), business sector mailing lists, website information, plumbing seminars, and a recommended ULFT and price list from plumbing wholesalers. Mailing lists were developed from the following sources:

- County Health Department Permit for Food Service Providers
- www.qwestdex.com (Internet restaurant list)
- California Restaurant Association Membership
- Standard Industrial Code 5812 (Eating Establishments)
- District CII Customers Using Over 2,000 Gallons a Day
- Chamber of Commerce Membership
- Contra Costa County Certified Green Business
- Local plumbing wholesalers

The marketing plan was designed to use multiple approaches to reach targeted customers. One of the updated marketing letters mailed during the second half of the program may have had a greater effect than others. This particular letter encouraged customers to replace old toilets with “New” Ultra Low Flow Toilets. When customers called, several indicated interest in the ‘new’ ULFTs, not the “old” ULFTs, as they thought those did not work well (Attachment 3).

The recommended ULFT list was probably the best marketing item to encourage customer participation in the program. The recommended ULFT list acknowledged that performance and

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cost were issues with ULFTs, and addressed these issues by recommending a particular ULFT at a discounted price, thus giving participants a needed guarantee that the ULFTs would work.

Approximately 17, 000 marketing pieces were delivered to CII customers during the program. **Table 2** chronologically lists each of the marketing events throughout the program, beginning after the start date of September 27, 2001, through the abbreviated program end on June 1, 2003.

TABLE 2
Marketing Plan

Date	Marketing List	Marketing Item	Marketing Audience	Number
11/2001	Yellow Pages Plumbing Contractors	Program Kick Off Event Water and Energy Postcard	CII Customers, Contractors Wholesalers	100
11/2001	District Data Base	District CII ULFT Program Flier	District CII Customers with SIC 5812	200
01/2002	Restaurant site www.qwestdex.com	District CII ULFT Program Flier	District Restaurant Owners, Managers	2000
01/2002	District Bill Insert and Bill Message	District CII ULFT Program Insert	All District CII Customers	3000
03/2002	County Health Department Mailing List	District CII ULFT Program Flier	All Food Service Businesses in the District	1000
03/2002	Chamber of Commerce Mailing List	District CII ULFT Program Flier	All Chamber Member Businesses	3000
06/2002	Contra Costa Green Business Program Mailing List	District CII ULFT Program Flier	All Businesses in the District	1000
08/2002	California Restaurant Mailing List	District CII ULFT Program Flier	All Restaurants in the District	300
08/2002	District Data Base	District CII ULFT Program Flier	District Customers >2000 gpd	600
11/2002	District Data Base	District Flushometer Workshop	CII Customers Contractors, Wholesalers	200
04/2003	Chamber of Commerce Mailing List	District CII ULFT Program Flier	All Chamber Member Businesses in the District	3000
04/2003	District and City of Antioch Data Base	District CII ULFT Program Flier	Antioch and District CII Customers	2000
04/2003	County Health Department Mailing List	District CII ULFT Program Flier	All Food Service Businesses in the District	1000
TOTAL				17,400

Application Process

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CII customers calling to participate in the program were first scheduled for a site survey to evaluate their water use and to determine the number of ULFT rebates they were qualified to receive. Upon completion of the survey, a rebate application was sent with a list of plumbing wholesaler-recommended ULFTs at guaranteed prices, and with a cover letter outlining the requirements of the program (Attachment 4).

The application was in triplicate, numbered sequentially for the purposes of rebate check accounting, customer tracking, and database entry. Prior to being sent, applications were dated, and the business name, address, city, and the number of ULFT rebates the site qualified for was written in. The application was valid for 30 days (Attachment 5).

The customer was instructed to purchase and install a recommended ULFT(s) after receiving a ULFT application. After installation, the application and receipts were returned to the District for processing. A final post-site inspection was scheduled upon receipt of the rebate application and receipts. A rebate check covering 100% of the material cost of the ULFT(s), up to a maximum of \$300 per unit, was mailed to the applicant four to six weeks following the ULFT post-inspection.

Recommended ULFT List

The goal of the program was not just to encourage ULFT installation, but the installation of *high-quality* ULFTs. The District negotiated with local wholesale plumbing suppliers for a list of recommended high performing ULFT(s) at guaranteed prices. The list was intended to encourage the purchase of higher quality models by making them available at discount prices. (Attachment 6). The list addressed cost and performance barriers some commercial customers had regarding ULFTs, and resulted in greater program participation. By encouraging customers to purchase higher quality toilets at a discounted price, the District believed long-term savings would be more reliable, making the program more cost effective.

The plumbing wholesaler list included CII ULFTs for all types, such as flushometer-valve, gravity, and air assist toilets, as well as for various ULFT installations including, floor mount-floor outlet, floor mount-wall outlet, and wall mount-wall outlet. In addition, an ADA (handicap) ULFT model was included for each of the recommended ULFTs.

PROGRAM RESULTS

Participation

During the 2-year period of the program, 1,081 ULFTs were installed at 133 commercial sites. Over 300 businesses called to participate in the program, and over 3,000 ULFT rebates were qualified for participation. However, despite the program's marketing efforts, the primary targeted businesses, which were restaurants and wholesale/retail business, did not participate in the program at the level we had projected. Consequently, the water savings for the program was lower than anticipated. **Table 3** summarizes the estimated number of non-ULFTs, the number of approved sites, the ULFTs they qualified for, the number of installed ULFTs, and the percentage of the estimated existing non-ULFTs that were replaced.

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TABLE 3

Business Sectors Priority list	* Estimated No. of existing Non-ULFTs	** Estimated ULFT Water Savings GPD	Number of Approved Sites	Number of Approved ULFTs	Number of CII ULFTs Installed	Percent of existing Non-ULFT Replaced
Restaurants	924	47	52	106	57	6.17%
Wholesale/Retail	9474	57-37	74	135	33	0.35%
Multiple Use	2456	29	12	164	92	3.75%
Religious	569	28	14	94	73	12.83%
Health Care	4356	21	32	192	154	3.54%
Office	12376	20	63	502	382	3.09%
Miscellaneous	NA	17	26	132	42	-
Hotel/Motel	1861	16	20	725	248	13.33%
Manufacturing	1240	23	2	0	0	0.00%
Government	806	NA	7	195	0	0.00%
Schools	1203	NA	17	775	0	0.00%
TOTAL	35265		319	3020	1081	3.07%

* 1992 US Economic Data and Toilet Coefficients

** CUWCC CII ULFT Savings Study, 2001

NA: Water savings figures for schools or government were not available

The Health Care, Office and Hotel/Motel business sectors accounted for the majority of ULFTs installed. Of the toilets replaced through the program, 784, or 72%, were in these three sectors. However, these sectors have an estimated savings of only 21, 20 and 16 gpd, respectively. Therefore, the average savings for program participants was only 21.86 gpd.

Several factors may have accounted for the low participation of restaurants in the program. Restaurants had relatively few existing non-ULFTs in the business sector (924). Some restaurants did not qualify for the program, having already installed ULFTs; others did not participate due to perceived CII ULFT performance issues. Finally, the September 11, 2001 terrorist attacks caused economic uncertainty in the restaurant industry.

Restaurants represent a small though significant business sector for water savings. Restaurants replaced 57 toilets with ULFTs, representing 6% of the estimated remaining non-ULFTs (924) in the business sector. Restaurant participation in the program was projected at a much higher level based on the high cost effectiveness ULFTs represent. During our pre-site survey, we discovered many restaurants had already installed one or more ULFT. These restaurants either did not qualify for program participation, or they were so dissatisfied with the performance of previously installed ULFTs that they decided not to participate in the program. Since September

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11, the hospitality industry has experienced a major economic decline, and many of these businesses are not participating in any non-essential items for their economic survival.

Wholesale/retail businesses replaced 33 toilets, or 0.35%, of the estimated existing non-ULFTs (9,474) in the business sector. The business sector was qualified for 74 sites to participate in the program, representing 135 ULFTs; however, only 33 toilets were actually replaced. The wholesale/retail sector had some of the same issues restaurants had in participating in the program, including issues with past experience with poor performing ULFTs, and poor economic conditions. In addition, retail and wholesale businesses often rent their business properties. Therefore, they are often reluctant to pay for toilet replacement. Property owners who rent to businesses often do not pay the water bill, and, therefore, have less incentive to invest in plumbing upgrades that save the tenant water/sewer costs.

Conversely, businesses such as offices, health care facilities, hotels/motels, and churches, were found to have few, if any, previously installed ULFTs during the pre-site qualifying survey. They may have been less affected by the economic downturn after September 11, 2001, and had a greater vested interest in reducing their water and sewer utility bills. These businesses not only qualified for the program in greater numbers, but were also anxious to participate in the program, having had no prior negative experience with ULFTs.

Savings

This report does not evaluate the water savings from the program, nor does it evaluate the cost effectiveness of the program. However, the report does provide estimates of the costs and savings based on specific assumptions. **Table 4** provides the estimated gallons per day savings for the program, the cost per rebate, and the simple cost per acre-foot of savings. The gallons-per-day savings estimate is derived by calculating the weighted average of the installed ULFTs for each sector. The savings per sector is based on the *CUWCC CII Savings Study, 2001*, which can be found in **Table 3**. The average gallons-per-day savings from program-installed ULFTs is 21.86 gpd. This lower than expected number is primarily due to the higher number of office, health care, and hotels/motel participants (16 to 21 gpd), and the low number of restaurant and wholesale/retail participants (37 to 57 gpd).

The estimated cumulative savings is derived by multiplying the average gallons per day savings (21.86 gpd) by the estimated life of the toilets, assumed to be 20 years. This results in an estimated cumulative savings per ULFT of 0.49 acre-feet.

Note: a thorough and rigorous savings study would need to be conducted to determine a more accurate estimate of the water savings the CII ULFTs achieved

Costs

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A total of \$255,618 was provided in rebate funding. Program labor, administration and marketing materials cost were approximately \$68,942, for a total program cost of \$330,572.

The average rebate for the 1,081 ULFTs was \$236. This was lower than expected primarily due to several large motel/hotel/ and health care sites that purchased tank-style toilets at low volume discounted prices. The maximum rebate per toilet was capped at \$300 per ULFT.

Administrative and marketing costs for the program were relatively high, at \$64 per rebate. All applicants were pre-inspected, and a survey of the interior water uses was generally conducted. During the program period, 3,020 toilets were pre-inspected; however, only 1,081 toilets were replaced. This added considerably to the labor cost for the program. Nearly 1,000 toilets were pre-inspected at school and government sites. However, all of these sites declined to participate primarily due to budget constraints.

Although the cost of inspecting non-participants adds to the cost of the program, these sites may participate in the future and would not require another pre-inspection. Each participating site was also post-inspected to verify ULFT installation and to ensure the ULFTs were working properly. Although the post-inspection adds to the overall cost, by verifying proper installation, long-term savings are more reliable. Therefore, the average total cost for each ULFT rebate was \$300 (\$236 + \$64).

The estimated cost per acre-foot saved is derived by dividing the average cost of each rebate (\$300) by the average cumulative savings of each ULFT (0.49 AF). Therefore, the estimated cost per acre-foot saved is \$612.

Note: a thorough and rigorous savings study would need to be conducted to determine a more accurate estimate of the water savings and therefore the cost per acre-foot saved.

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TABLE 4

a	B	$c = b * 365 / 325851$	D	$e = c * d$	f	g	$H = f + g$	$i = h / e$	$j = f/2 + g$	$k = j / e$
Device	Average Savings (gpd)	Annual Savings AF/ year	Years of Savings	Life Savings (AF)	Average Rebate Amount	Admin/ marketing cost per unit	Total Cost per unit	Cost per AF Saved	CCWD Cost (after DWR grant)	CCWD Cost per AF Saved
CII ULFT Rebate	21.86	0.0245	20	0.49	\$236	\$64	\$300	\$612	\$182	\$371

B: Weighted average of installed ULFTs based on per-sector savings from CUWCC CII ULFT savings study.

F. Average cost of rebate for program

G. Costs include: program admin., pre, post inspect, rebate processing, and marketing

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CONCLUSIONS AND RECOMMENDATIONS

Conclusions

The marketing plan for the program was very successful. A total of 319 business sites, representing over 3000 ULFT rebates, responded and qualified for the program. However, less than half (133) of the business sites, and less than half the ULFTs (1081 ULFTs) actually completed and installed ULFTs through the program. The business sectors completing the program were predominantly office, health care and religious sectors, comprising 72% of the ULFTs installed in the program. Unfortunately, these businesses are estimated to have low water savings per ULFT installed. Barriers to businesses completing the program included: economic uncertainty, perceptions regarding ULFT performance, budgeting issues, and installation time and costs.

The estimated water savings for the program was 21.86 gallons per day, per ULFT installed, much less than the 36 gallon per day projected at the start of the program. The low water savings per ULFT installed was due to low participation by the restaurant and wholesale /retail business sectors, and high participation by office, health care and hotels/ motel business sectors. This occurred even with marketing targeted specifically to the restaurant and wholesale/retail business sectors.

Restaurants and wholesale/retailers business sectors may not be as viable for ULFT replacement as offices, health care, and hotel and motels, even with extensive marketing to restaurants and wholesale/retail businesses. However, the low water savings per ULFT installed for office, health care and hotel motel businesses, which represented 53% of our existing conventional toilets, may affect the cost effectiveness of ULFT replacement programs.

Recommendations

Recommendations regarding implementing a cost effective ULFT replacement program for agencies are listed below. In addition, the economic conditions during the program period may have had an impact on participation by businesses, and, ultimately, the results of the program. Although water savings was not part of the scope of our program, further evaluation is needed in developing CII ULFT water savings for many businesses, as well as estimating the potential water savings of conventional toilets in the business sectors, which are both integral parts of the cost effectiveness of a ULFT replacement program.

- **Target businesses with the highest water savings per ULFT installed.** Businesses with the highest water savings per ULFT installed should be targeted for participation to achieve the greatest water savings. Although we had a low percentage of targeted wholesale/retail and restaurant businesses actually participating, we believe the economy was the main reason behind the low rate.
- **Develop more reliable ULFT water savings estimates.** CII ULFT replacements are highly variable, ranging from 16 to 57 gallons a day per ULFT installed. Many businesses have no statistically significant ULFT savings estimates developed and

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currently fall into “miscellaneous,” “government,” and “other” categories. The following business sectors need accurate and reliable savings estimates developed:

Beauty Salons/Barber Shops
Theaters
Parks/Schools

Health Clubs
Bowling Alleys
Dry Cleaners/Laundromats

- **Estimate program participation by using estimates of existing conventional toilets in each business sector.** Participation levels for some business sectors correlated closely to the percentage of non-ULFTs in that sector. For example, there are 12,376 non-ULFTs in office buildings, which make up 35% of the total non-ULFTs in the District. Office buildings replaced 382 toilets out of 1,081 toilets replaced, or 35%. A similarly close percentage occurred in the health care and hotel/motel sectors. When designing a program, utilize the *1992 US Economic Census Data and Toilet Coefficients* (Whitcomb 1999) to estimate participation levels. For example, if hotels/motels constitute 30% of the non-ULFTs in a service area, it can be anticipated that 30% of the program participants will be from that sector. Note, other factors will affect this, such as sector-specific budget constraints and marketing levels in each sector. To increase participation in sectors representing high water savings, programs can be designed specifically for those business sectors.
- **Provide a recommended ULFT list to customers.** Both business owners and plumbers have negative perceptions of commercial ULFT performance. Poorly performing residential ULFTs are being used to replace troublesome, existing conventional commercial toilets, thus confirming and continuing these opinions. Using a recommended or approved ULFT list to encourage the selection of quality ULFTs will increase the number of high performing ULFTs installed in ULFT replacement programs.
- **Offer a high incentive for replacing ULFTs.** High performing ULFTs can cost more than poorly performing ULFTs. A high incentive can encourage the purchase of higher quality ULFTs, if coupled with a recommended ULFT list. Many participants will purchase ULFTs up to the maximum rebate level. To ensure participants get a high quality ULFT at a guaranteed price, negotiate a price for the recommended ULFTs from local plumbing wholesalers.
- **Provide a short time period for program participation.** Applicants should be given a short but reasonable amount of time to replace their toilets. The District found two to four weeks to be appropriate. If given too much time, applicants delay decisions necessary to complete the program, and lose interest or forget about it. Giving a shorter window to complete the program separates “fence sitters” thinking about completing the program from those that are serious. This allows businesses to either complete the program or have the application expire, thereby making room for other businesses to participate in a program with limited funding.