

# Walnut Valley Water District

## Toilet Distribution Program

Walnut Valley Water District (WVWD) is located in the San Gabriel Valley, approximately 20 miles east of Los Angeles, in Walnut, California. WVWD provides water to over 98,000 customers in six communities. As of the 2000 census, the median household income in Walnut was \$81,015, which is higher than the statewide median of \$47,493.<sup>1</sup>

### UTILITY DEMOGRAPHICS

As of 2005, WVWD had 26,005 connections, 95.2% of which were residential. Of their total connections, 23,777 were single family residential, 1,002 were multifamily residential, 820 were commercial, 149 were industrial, 257 were irrigation users.

WVWD's service area includes Diamond Bar, and parts of Walnut, Industry, Pomona, West Covina, and Rowland Heights. Their total service area is 29 square miles. Average annual water delivery is 22,621 acre-feet. WVWD's total water use was 215 gallons per capita per day (gpcd) as of 2005.

### TOILET DISTRIBUTION PROGRAM

<b>Eligible Customers:</b>	<b>SF, MF</b>
<b>Customers Analyzed:</b>	<b>SF</b>
<b>Program Years:</b>	<b>1998-present</b>
<b>Years Analyzed:</b>	<b>1998, 1999, 2000</b>

### UTILITY RATE STRUCTURE AND PRICES

WVWD has a flat block rate structure. As of 2004, the monthly base rate for service to a residence is \$11.01, which includes zero gallons of water. The charge per hundred cubic feet (ccf) of water is \$1.68 (\$2.25 per 1,000 gallons).

### CURRENT CAPACITY AND WATER SOURCES

Walnut Valley Water District is primarily dependent on surface water from the Metropolitan Water District of Southern California (MWDSC), which gets its water from the Colorado River and Northern California. WVWD has a storage capacity of 85.4 million gallons.

### FUTURE PLANS TO MEET DEMAND

The population within Walnut Valley Water District's service area is growing at a rate of approximately 1% per year. Utilization of its current capacity and water sources, continuation of water conservation programs, and the possibility of expanding its recycled water system are the main components of WVWD's plans to meet future demand.

### TOILET DISTRIBUTION PROGRAM - DESCRIPTION

Since 1998, Walnut Valley Water District has held an annual ultra low-flush toilet (ULFT) distribution event. WVWD has offered ULFTs (1.6 gallons per flush) at no cost to residential customers who will replace their high water use toilets. Homes built prior to 1980 are targeted by sending postcards to those residences. Local high school students and teachers assist in the distribution program.

<sup>1</sup> US Census Bureau. QuickFacts

The distributions are held at the Walnut Valley Water District Office. Toilets are distributed by students from 3 or 4 local high schools, school staff and Water District staff members. Water District staff verify the customers' account, and the students assist with traffic control, loading the toilets into vehicles, and registration paperwork.

#### **OTHER WALNUT VALLEY CONSERVATION PROGRAMS**

**Washing Machine Rebate Program, 2002-present**  
Eligible customers can receive a \$100 rebate on the purchase of a qualifying high-efficiency clothes washer.

Two weeks later, there is a return day, where the old toilet is brought to the District office. The Water District pays the schools \$5 for each

toilet returned for recycling. If the toilet is not delivered on the return day, the participant is charged \$120 on their next water bill.

#### **METHODOLOGY**

*Please see the General Methodology for the specific procedures and techniques used for all ECoBA analyses.*

The analysis includes only single family households that participated in the ULFT distribution program during the years of 1998, 1999, and 2000. The water savings were calculated and a cost benefit analysis was performed for this time period. The findings refer to these three years only, not to the ongoing program. The lifespan of the toilets installed was assumed to be twenty years.

All quantified costs and benefits have been discounted to the first year of the analysis (1998) and inflated to 2004 dollars. The discount rate used for this analysis was 6.0%. The Consumer Price Index values used in this analysis were the 2004 value of 188.9 and the 1998 value of 163.0.

The population studied for this analysis was comprised of participants who received toilets during the program years 1998, 1999, and 2000. There were 196 usable participants out of 280 total participants in 1998, 222 out of 347 in 1999, and 194 out of 306 in 2000, for a total of 612 usable participants out of 933. Thirty-four percent, or 321, of the possible participants were unusable because there was not sufficient pre- and post-measure data to perform the analysis or the participant moved during the period of analysis.

A random sample of all WVWD single family residential households, not including ULFT participants, was used as the control group for each program year. The average annual pre-measure water use of the participants (164,796 gallons) was lower than the weighted annual pre-measure average of the control group (222,555 gallons). The control group consisted of 810 households for the 1998 program year, 797 households for the 1999 program year, and 781 households for the 2000 program year.

## ASSUMPTIONS

Please see the General Assumptions for the specific conditions and rules underlying all ECoBA analyses.

The value of the water saved was calculated by multiplying the amount of water saved by the average price of water for the year (\$1.97 per 1,000 gallons in 1999, \$2.01 per 1,000 gallons in 2000, \$2.04 per 1,000 gallons in 2001, \$2.10 per 1,000 gallons in 2002, \$2.18 per 1,000 gallons in 2003, \$2.23 per 1,000 gallons in 2004, and \$2.25 per 1,000 gallons in 2005 and beyond).

The toilets were paid for by the Metropolitan Water District of Southern California (\$60 per toilet each year) and WWD (\$55 per toilet in 1998 and 1999, \$58.80 per toilet in 2000).

The control group is a random sample of all single family residential connections.

Assumed 30% of participants paid for professional installation of their toilets at \$100 per participant.

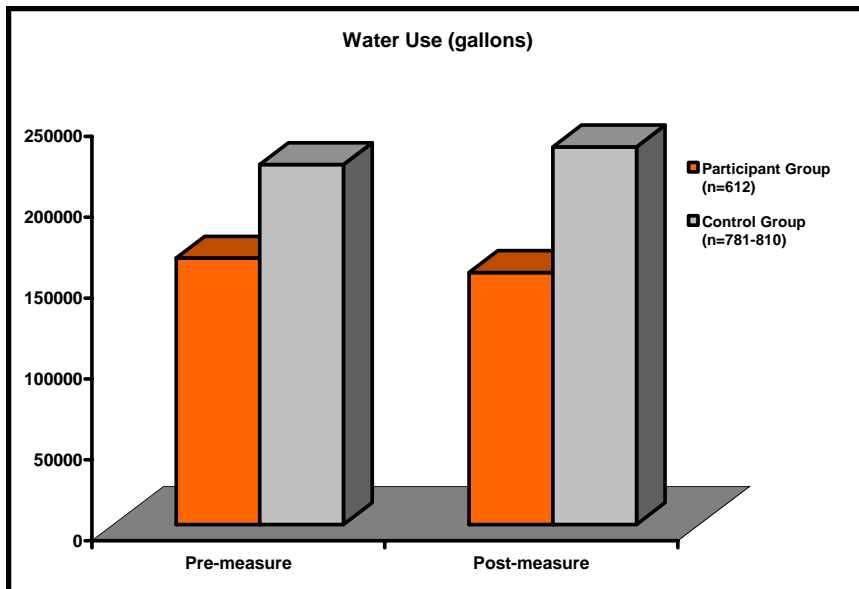
Participants who had two or more consecutive months of no water use were not included in the study.

Participants who had less than 11 months of water use data in a calendar year, or less than 6 months during period of bi-monthly billing, were not included in the study.

Assumed \$10 per toilet in labor costs to the utility.

The discount rate used in this analysis was 6.0%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1998 value of 163.0.

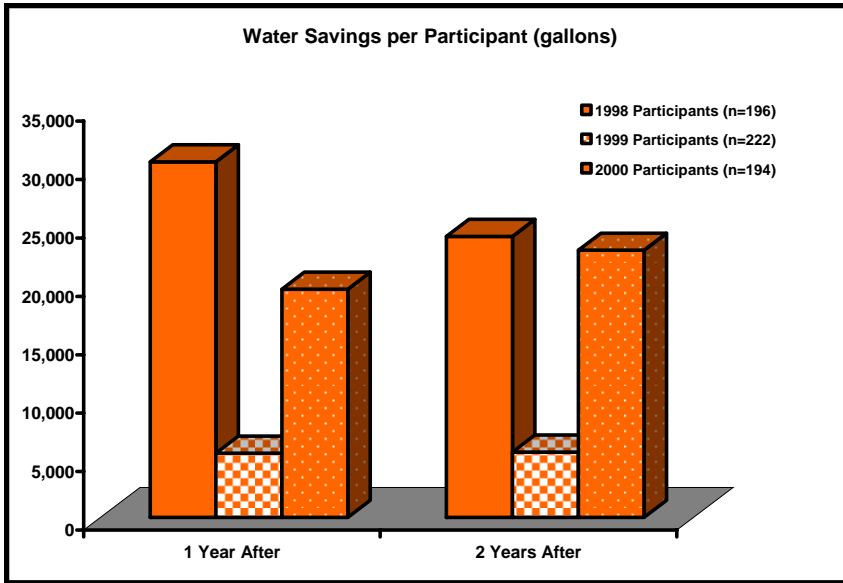


## RESULTS - WATER SAVINGS

In the first year after the 1998 ULFT distribution program, the water savings amounted to 5,961,844 gallons, or 30,418 gallons per participant per year (gppy) (19.1% of pre-measure water use). The second year after, the water savings amounted to 4,707,916 gallons, or 24,020 gppy (15.1% of pre-measure water use). The average water savings per year was 5,334,880 gallons, or 27,219 gppy (17.1% of pre-measure water use). **The total water savings over the twenty year assumed lifespan of the toilets was 106,697,600 gallons (327.4 AF), or 544,376 gallons per participant.**

The first year after the 1999 ULFT distribution program, the water savings amounted to 1,219,018 gallons, or 5,491 gppy (3.6% of pre-measure water use). The second year after, the water savings amounted to 1,237,249 gallons, or 5,573 gppy (3.7% of pre-measure water use). The average water savings per year was 1,228,133 gallons, or 5,532 gppy (3.6% of pre-measure water use). **The total water savings over the twenty year assumed lifespan of the toilets was 24,562,667 gallons (75.4 AF), or 110,643 gallons per participant.**

The first year after the 2000 ULFT distribution program, the water savings amounted to 3,784,896 gallons, or 19,510 gppy (10.6% of pre-measure water use).



The second year after, the water savings amounted to 4,433,729 gallons, or 22,854 gppy (12.4% of pre-measure water use). The average water savings per year was 4,109,313 gallons, or 21,182 gppy (11.5% of pre-measure water use). **The total water savings over the twenty year assumed lifespan of the toilets was 82,186,253 gallons (252.2 AF), or 423,640 gallons per**

**participant.**

Total water savings for the three years studied amounted to 10,965,758 gallons or 17,918 gppy (10.9% of weighted pre-measure water use) during the first year after and 10,378,894 gallons, or 16,959 gppy (10.3% of weighted pre-measure water use) during the second year after the program. **The total water savings over the twenty year assumed lifespan of the toilets was 213,446,520 gallons (655.0 AF), or 348,769 gallons per participant.**

During the two years before participating in the ULFT distribution program, participants' water use was 75.8% of the control group's use, on average. During the two years after, their water use was 68.3% of the control group's use, on average. The participants' water use decreased by 5.4% from pre-measure to post-measure, whereas the control group's use increased by 4.9%. **The resulting overall water savings attributed to this program was 10.3%.**

## RESULTS - COST BENEFIT ANALYSIS

*Costs and benefits listed below represent the entire lifespan of the program (twenty years).*

### 1998 PROGRAM

- ◆ The quantified cost to the utility was \$29,772 (\$152 per participant). This includes half of the cost of the toilets, \$23,392 (\$119 per participant), the cost of labor, \$4,253 (\$22 per participant), and payment to the high schools, \$2,127 (\$11 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$6,814 (\$35 per participant).
- ◆ The quantified benefit to the participants was \$154,417 (\$788 per participant), which includes water bill savings.
- ◆ The quantified cost to MWDSC, a funding source for the program, was \$25,519 (\$130 per participant), which includes half of the cost of the toilets.
- ◆ The quantified benefit to the high schools was \$2,127 (\$11 per participant).

1998 Quantified Costs and Benefits							
Utility			Participants				
Costs		Benefits	Costs		Benefits		
Toilets	\$23,392	Not Quantified	Installation	\$6,814	Water Bill Savings	\$154,417	
Labor	\$4,253						
Payment to High Schools	\$2,127						
<b>Total</b>	<b>\$29,772</b>	<b>Total</b>	<b>\$0</b>	<b>Total</b>	<b>\$6,814</b>	<b>Total</b>	<b>\$154,417</b>

### UTILITY PERSPECTIVE - 1998

Results of cost benefit analysis show a net benefit (net present value) of -\$29,772 from the utility perspective. This is a net benefit of \$152 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$91.**

1998 Quantified Costs and Benefits			
MWDSC & High Schools			
Costs – MWDSC		Benefits – High Schools	
Toilets	\$25,519	Incentive Payments	\$2,127
<b>Total</b>	<b>\$25,519</b>	<b>Total</b>	<b>\$2,127</b>

### PARTICIPANT PERSPECTIVE - 1998

Results of cost benefit analysis show a net benefit (net present value) of \$147,603 from the participant perspective. This is a net benefit of \$753 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$21.**

**OVERALL PERSPECTIVE - 1998**

Results of cost benefit analysis show a net benefit (net present value) of \$94,439 from an overall perspective. This is a net benefit of \$482 per participant. The quantified costs to the participants, utility, and others were less than the quantified benefits to the participants, utility, and others. **The cost per acre-foot of water saved from an overall perspective was \$190.**

**1999 PROGRAM**

- ◆ The quantified cost to the utility was \$32,526 (\$147 per participant). This includes half of the cost of the toilets, \$25,556 (\$115 per participant), the cost of labor, \$4,647 (\$21 per participant), and payment to the high schools, \$2,323 (\$11 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$6,429 (\$29 per participant).
- ◆ The quantified benefit to the participants was \$33,833 (\$152 per participant), which includes water bill savings.
- ◆ The quantified cost to MWDSC, a funding source for the program, was \$27,879 (\$126 per participant), which includes half of the cost of the toilets.
- ◆ The quantified benefit to the high schools was \$2,323 (\$11 per participant).

1999 Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Toilets	\$25,556	Not Quantified		Installation	\$6,429	Water Bill Savings	\$33,833
Labor	\$4,647						
Payment to High Schools	\$2,323						
<b>Total</b>	<b>\$32,526</b>			<b>Total</b>	<b>\$6,429</b>	<b>Total</b>	<b>\$33,833</b>

1999 Quantified Costs and Benefits			
MWDSC & High Schools			
Costs – MWDSC		Benefits – Schools	
Toilets	\$27,879	Incentive Payments	\$2,323
<b>Total</b>	<b>\$27,879</b>	<b>Total</b>	<b>\$2,323</b>

**UTILITY PERSPECTIVE - 1999**

Results of cost benefit analysis show a net benefit (net present value) of -\$32,526 from the utility perspective. This is a net benefit of \$147 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$431.**

**PARTICIPANT PERSPECTIVE - 1999**

Results of cost benefit analysis show a net benefit (net present value) of \$27,404 from the participant perspective. This is a net benefit of \$123 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$85.**

**OVERALL PERSPECTIVE - 1999**

Results of cost benefit analysis show a net benefit (net present value) of -\$30,678 from an overall perspective. This is a net benefit of -\$138 per participant. The quantified costs to the participants, utility, and others were greater than the quantified benefits to the participants,

utility, and others. **The cost per acre-foot of water saved from an overall perspective was \$887.**

**2000 PROGRAM**

- ◆ The quantified cost to the utility was \$28,544 (\$147 per participant). This includes half of the cost of the toilets, \$22,742 (\$117 per participant), the cost of labor, \$3,868 (\$20 per participant), and payment to the high schools, \$1,934 (\$10 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$6,003 (\$31 per participant).
- ◆ The quantified benefit to the participants was \$107,641 (\$555 per participant), which includes water bill savings.
- ◆ The quantified cost to MWDSC, a funding source for the program, was \$23,207 (\$120 per participant), which includes half of the cost of the toilets.
- ◆ The quantified benefit to the high schools was \$1,934 (\$10 per participant).

2000				Quantified Costs and Benefits			
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Toilets	\$22,742	Not Quantified		Installation	\$6,003	Water Bill Savings	\$107,641
Labor	\$3,868						
Payment to High Schools	\$1,934						
Total	\$28,544			Total	\$6,003	Total	\$107,641

**UTILITY PERSPECTIVE - 2000**

Results of cost benefit analysis show a net benefit (net present value) of -\$28,544 from the utility perspective. This is a net benefit of -\$147 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$113.**

2000				Quantified Costs and Benefits			
				MWDSC & High Schools			
Costs – MWDSC		Benefits – High Schools					
Toilets	\$23,207	Incentive Payments	\$1,934				
Total	\$23,207	Total	\$1,934				

**PARTICIPANT PERSPECTIVE - 2000**

Results of cost benefit analysis show a net benefit (net present value) of \$101,639 from the participant perspective. This is a net benefit of \$524 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$24.**

**OVERALL PERSPECTIVE - 2000**

Results of cost benefit analysis show a net benefit (net present value) of \$51,821 from an overall perspective. This is a net benefit of \$267 per participant. The quantified costs to the participants, utility, and others were less than the quantified benefits to the participants, utility, and others. **The cost per acre-foot of water saved from an overall perspective was \$229.**

**ALL YEARS**

- ◆ The quantified cost to the utility was \$90,842 (\$148 per participant). This includes half of the cost of the toilets, \$71,691 (\$117 per participant), the cost of labor, \$12,767 (\$21 per participant), and payment to the high schools, \$6,384 (\$11 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$19,246 (\$31 per participant).
- ◆ The quantified benefit to the participants was \$295,891 (\$483 per participant), which includes water bill savings.
- ◆ The quantified cost to MWDSC, a funding source for the program, was \$76,605 (\$125 per participant), which includes half of the cost of the toilets.
- ◆ The quantified benefit to the high schools was \$6,384 (\$11 per participant).

**UTILITY PERSPECTIVE - ALL YEARS**

Results of cost benefit analysis show a net benefit (net present value) of -\$90,842 from the utility perspective. This is a net benefit of -\$148 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$139.**

**PARTICIPANT PERSPECTIVE - ALL YEARS**

Results of cost benefit analysis show a net benefit (net present value) of \$276,645 from the participant perspective. This is a net benefit of \$452 per participant. The quantified costs to the participants were less than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$29.**

ALL YEARS Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Toilets	\$71,691	Not Quantified		Installation	\$19,246	Water Bill Savings	\$295,891
Labor	\$12,767						
Payment to Schools	\$6,384						
Total	\$90,842			Total	\$19,246	Total	\$295,891

ALL YRS Quantified Costs and Benefits			
MWDSC & High Schools			
Costs – MWDSC		Benefits – Schools	
Toilets	\$76,605	Incentive Payments	\$6,384
Total	\$76,605	Total	\$6,384

**OVERALL PERSPECTIVE - ALL YEARS**

Results of cost benefit analysis show a net benefit (net present value) of \$115,582 from an overall perspective. This is a net benefit of \$189 per participant. The quantified costs to the participants, utility, and others were less than the quantified benefits to the participants, utility, and others. **The cost per acre-foot of water saved from an overall perspective was \$285.**

## **UNQUANTIFIED COSTS AND BENEFITS**

### **Costs**

- **The customers' time spent during the distribution and installation.**
- **Landfill disposal of old toilets.**

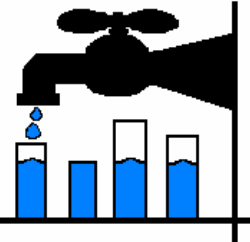
### **Benefits**

- **Financial savings on sewer bills for participants.**
- **Avoided costs of acquisition and distribution of water saved.**
- **Environmental benefits of reduced use of water.**
- **Increased public awareness about water conservation.**
- **Increased customer satisfaction with the utility.**
- **Involves youth in community conservation efforts.**
- **Water saved for future municipal use.**
- **Customers received new fixtures.**

**TD-2**

# Walnut Valley Water District

## Toilet Distribution Program



### 1998

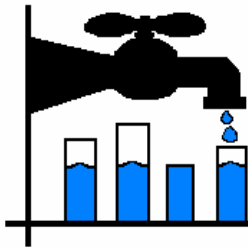
#### Results of Cost Benefit Analysis-Lifespan (20 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	29,772	NA	29,772
Costs to Participants	NA	6,814	6,814
Costs to MWDSC	NA	NA	25,519
Total Costs	\$29,772	\$6,814	\$62,105
<u>Present Value Benefits</u>			
Total Water Savings	327.44 AF	327.44 AF	327.44 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	154,417	154,417
Benefits to MWDSC	NA	NA	2,127
Total Benefits	\$0	\$154,417	\$156,544
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$29,772	\$147,603	\$94,439
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$91 /AF	\$21 /AF	\$190 /AF

### 1999

#### Results of Cost Benefit Analysis-Lifespan (20 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	32,526	NA	32,526
Costs to Participants	NA	6,429	6,429
Costs to MWDSC	NA	NA	27,879
Total Costs	\$32,526	\$6,429	\$66,833
<u>Present Value Benefits</u>			
Total Water Savings	75.38 AF	75.38 AF	75.38 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	33,833	33,833
Benefits to MWDSC	NA	NA	2,323
Total Benefits	\$0	\$33,833	\$36,156
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$32,526	\$27,404	-\$30,678
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$431 /AF	\$85 /AF	\$887 /AF



# Walnut Valley Water District

## Toileet Distribution Program

<b>Results of Cost Benefit Analysis-Lifespan (20 Years)</b>		<b>2000</b>	
	UTILITY	PARTICIPANT	OVERALL
<b><u>Present Value Costs</u></b>			
Costs to Utility	28,544	NA	28,544
Costs to Participants	NA	6,003	6,003
Costs to MWDSC	NA	NA	23,207
<b>Total Costs</b>	<b>\$28,544</b>	<b>\$6,003</b>	<b>\$57,754</b>
<b><u>Present Value Benefits</u></b>			
Total Water Savings	252.22 AF	252.22 AF	252.22 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	107,641	107,641
Benefits to MWDSC	NA	NA	1,934
<b>Total Benefits</b>	<b>\$0</b>	<b>\$107,641</b>	<b>\$109,575</b>
<b><u>Cost Benefit Calculations</u></b>			
<b>Net Present Value (NPV)</b> (Total Benefits - Total Costs)	<b>-\$28,544</b>	<b>\$101,639</b>	<b>\$51,821</b>
<b>Cost Effectiveness Analysis (CEA)</b> (Total Costs ÷ Total Water Savings)	<b>\$113 /AF</b>	<b>\$24 /AF</b>	<b>\$229 /AF</b>

<b>Results of Cost Benefit Analysis-Lifespan (20 Years)</b>		<b>ALL YEARS</b>	
	UTILITY	PARTICIPANT	OVERALL
<b><u>Present Value Costs</u></b>			
Costs to Utility	90,842	NA	90,842
Costs to Participants	NA	19,246	19,246
Costs to MWDSC	NA	NA	76,605
<b>Total Costs</b>	<b>\$90,842</b>	<b>\$19,246</b>	<b>\$186,692</b>
<b><u>Present Value Benefits</u></b>			
Total Water Savings	655.04 AF	655.04 AF	655.04 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	295,891	295,891
<b>Total Benefits</b>	<b>\$0</b>	<b>\$295,891</b>	<b>\$302,275</b>
<b><u>Cost Benefit Calculations</u></b>			
<b>Net Present Value (NPV)</b> (Total Benefits - Total Costs)	<b>-\$90,842</b>	<b>\$276,645</b>	<b>\$115,582</b>
<b>Cost Effectiveness Analysis (CEA)</b> (Total Costs ÷ Total Water Savings)	<b>\$139 /AF</b>	<b>\$29 /AF</b>	<b>\$285 /AF</b>

**TD-2**

