

Metro Water District Toilet Rebate Program

Metro Water District (MWD) is located in the northwest region of metropolitan Tucson, Arizona. MWD is comprised of residential areas, but has a growing number of commercial connections as well. Median household income in Tucson was \$30,981 as of the 2000 census, which was lower than the statewide average of \$40,558.¹

UTILITY DEMOGRAPHICS

As of 2005, MWD maintained 17,083 connections, of which 95% were residential. Of total connections, 16,098 were single family residential, 110 were multifamily residential, 573 were commercial, 291 were irrigation, and 11 were public authority meters. MWD's total service area is approximately 25 square miles, and the population of this service area is approximately 44,000. As of 2003, average residential customer water use in gallons per capita per day (gpcd) was 135.

TOILET REBATE PROGRAM

Rebate Amount: \$50 first toilet, \$40 second
Eligible Customers: SF, MF
Customers Analyzed: SF
Program Years: 1995-present
Years Analyzed: 2002

UTILITY RATE STRUCTURE AND PRICES

From November 1995 through April 2004, MWD had both a tiered and seasonal rate structure in place. The summer rate was 33% higher in the summer months as in the winter. There was also a high user surcharge for those customers using more than 25,000 gallons per month.

On May 1, 2004, MWD implemented a new tiered rate structure in which the customer pays a higher rate per 1,000 gallons when their usage exceeds one of the tiers. The base rate, which includes the first 1,000 gallons, is \$11.96 for a 5/8 inch meter. The variable rates are as follows:

Usage	Price
1-12,000 gallons	\$1.98 per 1,000 gallons
12,001-20,000 gallons	\$2.88 per 1,000 gallons
20,001-32,000 gallons	\$3.62 per 1,000 gallons
32,001+ gallons	\$4.82 per 1,000 gallons

CURRENT CAPACITY AND WATER SOURCES

MWD uses only groundwater. They do have an allocation for Central Arizona Project (CAP) water, which they are currently recharging.

FUTURE PLANS TO MEET DEMAND

MWD plans to meet future demand through continuing its use of groundwater supply, seeking ways to use its 8,858 acre-foot allocation of CAP water for recharge of groundwater, expanding facilities with new wells, implementing more conservation, and using allocated effluent for outdoor water use.

¹ U.S. Census Bureau, American FactFinder.

REBATE PROGRAM - DESCRIPTION

Metro Water District began its toilet rebate program in 1995 and it has continued since. The program offers a \$50 rebate to a customer who replaces a high water use toilet with an ultra-low flush (1.6 gallon or less) toilet. For any additional toilets replaced at the residence, the rebate is \$40 per toilet. Rebates are primarily given to single family customers.

OTHER METRO WATER DISTRICT CONSERVATION PROGRAMS

Faucet Aerator Giveaway, January 1997-present

Graywater and Water Harvesting System Rebates, September 2002-present

Conservation Rates, 1995 and 2004

**Implemented a seasonal rate structure in 1995,
an increasing block structure in 2004.**

Leak Detection Program, 2000 and 2003

Outdoor Water Self-Audits , 1999-2000

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 received toilet rebates in 2002. The water savings were calculated and a cost benefit analysis was performed for this time period only, not to the ongoing program. The lifespan of the toilets, which is used as the period of analysis, was assumed to be twenty years.

All quantified costs and benefits have been discounted to the first year of the analysis (2002) and inflated to 2004 dollars. The discount rate used in this analysis was 5.45%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2002 value of 179.9.

The population studied for this analysis was comprised of all single-family participants who received toilet rebates in 2002. There were 73 single family participants in 2002, and all 73 had sufficient water use data to be included in the analysis.

All single family residential households in MWD's main service area (Metro Main) that did not receive rebates were used as the control group. The number of households in the control group was 13,759 in 2000, 14,084 in 2001, 14,399 in 2003, and 14,550 in 2004. The average annual pre-measure water use of the participants (145,001 gallons) was higher than that of the control group (125,792 gallons).

ASSUMPTIONS

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

The 2002 CPI value, 179.9, and the 2004 CPI value, 188.9, were used in this analysis.

A discount rate of 5.45% was used in this analysis.

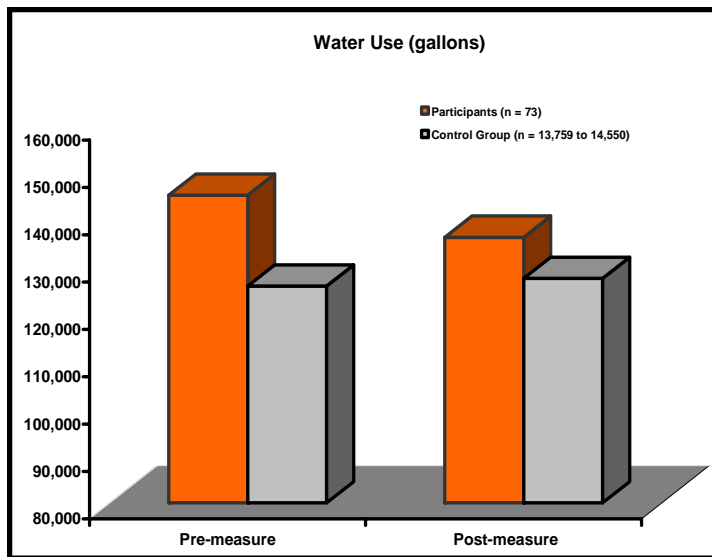
The average cost of a toilet in the MWD service area was assumed to be \$120.

It was assumed that thirty percent of the participants in this analysis had their new toilets professionally installed at a cost of \$80 per participant; the other 70% installed the toilets themselves.

The value of the water saved was calculated by multiplying the amount of water saved by the price of water (\$2.52 per 1,000 gallons in 2003 and \$1.98 per 1,000 gallons in 2004 and beyond). The 2003 price was the average of the winter and summer rates. The 2004 price was at the average level of use of the participants (falls into the first tier: 1– 12,000 gallons per month).

Labor costs included \$17.89/hour for processing rebates, which took approximately 20 minutes per rebate.

An annual cost of \$300 for advertising of the program was assumed.



RESULTS - WATER SAVINGS

In the first year after the rebates, the water savings amounted to 912,827 gallons, or 12,504 gallons per participant per year (gppy) (8.6% of pre-measure water use). The second year after, the water savings amounted to 659,401 gallons, or 9,033 gppy (6.2% of pre-measure water use). The average water savings per year was 786,114 gallons, or 10,769 gppy (7.4% of pre-measure water use). **The total water savings over the twenty year assumed lifespan of the toilets was 15,722,276 gallons (48.2 AF), or 215,374 gallons per participant.**

During the two years prior to receiving rebates, participants' water use was 115.3% of the control group's use, on average. During the two years after, their water use was 106.8% of the control group's use, on average. The participants' water use decreased by 6.1% from pre-measure to post-measure, whereas the control group's use increased by 1.3%. **The resulting overall water savings attributed to this program was 7.4%.**

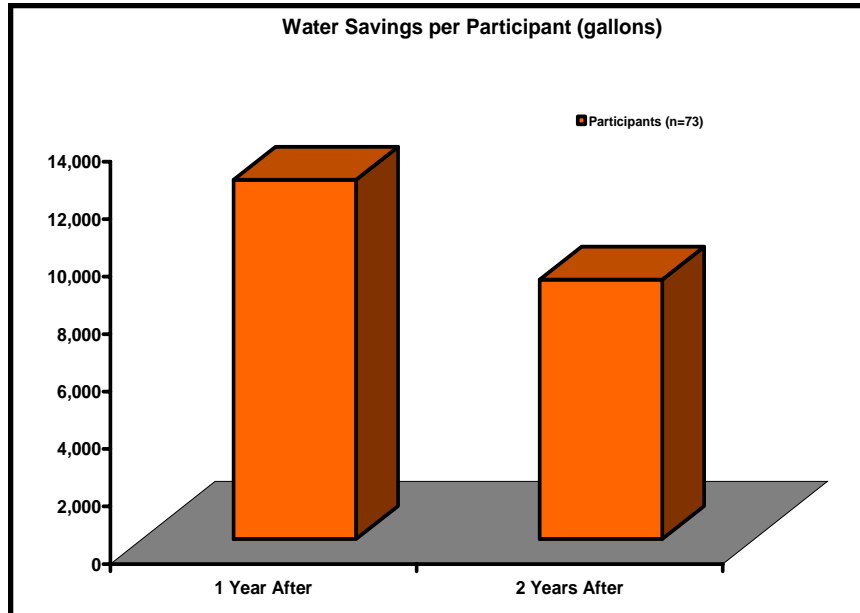
RESULTS - COST BENEFIT ANALYSIS

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

- ◆ The quantified cost to the utility was \$7,492 (\$103 per participant), which includes the cost of financial incentive payments, \$6,353 (\$87 per participant), labor, \$824 (\$11 per participant), and advertising, \$315 (\$4 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$18,598 (\$255 per

participant), which includes the cost of the toilets, \$16,758 (\$230 per participant), and installation, \$1,840 (\$25 per participant).

- The quantified benefit to the participants was \$32,822 (\$450 per participant), which includes water bill savings, \$20,116 (\$276 per participant), and financial incentives, \$6,353 (\$87 per participant).



UTILITY PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$7,492 from the utility perspective. This is a net benefit of -\$103 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 \$155.**

PARTICIPANT PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of \$14,224 from the participant perspective. This is a net benefit of \$195 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 \$385.**

Quantified Costs and Benefits						
Utility			Participants			
Costs			Costs		Benefits	
Financial Incentives	\$6,353	Not Quantified	Toilets	\$16,758	Water bill savings	\$20,116
Labor	\$824		Installation	\$1,840	Financial Incentives	\$6,353
Advertising	\$315		Total	\$18,598	Total	\$32,822
Total	\$7,492					

OVERALL PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of \$6,732 from an overall perspective. This is a net benefit of \$92 per participant. The quantified costs to the participants and utility were less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$541.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

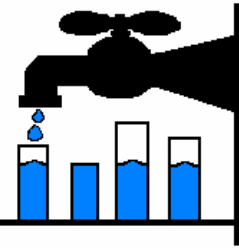
- Time spent installing new toilets, when not professionally installed.
- Landfill disposal of old toilets.

Benefits

- Financial savings on sewer bills for participant.
- Avoided cost of acquisition and distribution of water saved.
- Environmental benefits of reduced use of water.
- Increased public awareness about water conservation.
- Reinforces need to conserve water and desirability of conserving.
- Improved public relations for the utility.
- Participants received new toilets.

Metro Water District

Toilet Rebate Program



Results of Cost Benefit Analysis-Lifespan (20 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	7,492	NA	7,492
Costs to Participants	NA	18,598	18,598
Costs to Others (CMWD & MWDSC)	NA	NA	0
Total Costs	\$7,492	\$18,598	\$26,090
<u>Present Value Benefits</u>			
Total Water Savings	48.25 AF	48.25 AF	48.25 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	32,822	32,822
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$32,822	\$32,822
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$7,492	\$14,224	\$6,732
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$155 /AF	\$385 /AF	\$541 /AF