

Community Water of Green Valley

Device Giveaway Program

Community Water Company of Green Valley (CWCGV), a cooperative water utility, is one of five water utilities that serve the town of Green Valley located in the Santa Cruz Valley of Southern Arizona. As of 2003, the town's population was approximately 18,700.¹ The median household income as of the 2000 census was \$40,213.²

UTILITY DEMOGRAPHICS

As of 2003, CWCGV had approximately 9,800 connections, 49.8% of which were residential. Of their total connections, 4,866 were single family residential, 4,672 were multifamily residential, 233 were commercial, 16 were government, and 11 were construction. CWCGV provides service to a population of 15,500 and currently maintains 10,817 connections. CWCGV's total service area is eight square miles. As of 2004, CWCGV's customer water use for the utility as a whole, in gallons per capita per day (gpcd), was 142.

DEVICE GIVEAWAY PROGRAM	
Eligible Customers:	SF, MF
Customers Analyzed:	SF
Program Years:	1992 to present
Years Analyzed:	1995, 1996, 1997

UTILITY RATE STRUCTURE AND PRICES

CWCGV has a uniform price structure. The minimum monthly charge for 5/8" meters, which account for the majority of the utility's connections, is \$12.50 and includes 2,000 gallons of water. Customers pay \$1.07 for every 1,000 gallons over 2,000 gallons. This rate structure has been in place since 1987, with no subsequent rate increases.

CURRENT CAPACITY AND WATER SOURCES

CWCGV depends solely on groundwater and maintains and operates four wells. The company has a current storage capacity of five million gallons.

FUTURE PLANS TO MEET DEMAND

The population within CWCGV's service area is growing at 6% per year. CWCGV plans to meet future demand with current capacity and water sources, and by implementing water conservation measures. CWCGV, in conjunction with other utilities, is studying the possibility of using Central Arizona Project (CAP) water in Green Valley.

DEVICE GIVEAWAY PROGRAM - DESCRIPTION

In 1992, CWCGV began distributing free conservation packets with two low-flow showerheads, two faucet aerators, and one low-flow faucet fixture. The packets are primarily given to customers upon request. However, CWCGV also gives them away once per year at the local county fair. The conservation packet giveaway is an ongoing program.

¹ Arizona Department of Commerce: Green Valley Community Profile.

² U.S. Census Bureau: Profile of General Demographic Characteristics 2000.

OTHER COMMUNITY WATER COMPANY CONSERVATION PROGRAMS

Public Education, *continuous*
CWCGV has sponsored workshops on a variety of outdoor water conservation topics and publishes monthly water saving tips in the local newspaper.

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 water conservation kits during the years 1995, 1996, and 1997. The water savings were calculated and a cost benefit analysis was performed for the years 1995, 1996, and 1997. The findings refer to these three years only, not to the ongoing program. The lifespan of the conservation devices, which is used as the period of analysis, was assumed to be five years.³

All quantified costs and benefits have been discounted to the first year of the analysis (1995) and inflated to 2004 dollars. The discount rate used in this analysis was 7.3%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1995 value of 152.4.

The population studied for this analysis was comprised of all participants who received a water conservation kit during 1995, 1996, and 1997. There were 23 usable participants out of 32 total in 1995, 21 out of 31 in 1996, and 13 out of 22 in 1997, for a total of 57 usable participants out of 85. Thirty-three percent, or 28, of the possible participants were unusable because they appear to have moved during the period of the analysis or there was insufficient raw data.

All CWCGV single family residential households that were not program participants and were from districts similar to the participants' were used as the control group in this analysis. There were a total of 25,039 single family residences in the control group, which includes 3,342 customers in 1993, 3,449 in 1994, 3,540 in 1995, 3,599 in 1996, 3,657 in 1997, 3,686 in 1998, and 3,766 in 1999. The average pre-measure annual water use of the participants (66,743 gallons) was lower than the weighted average pre-measure water use of the control group (72,166 gallons).

ASSUMPTIONS

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

The number of connections is an average of connections from throughout the year.

³ Pekelney, D.M. et al. *Guidelines to Conduct Cost-Effectiveness Analysis of Best Management Practices for Urban Water Conservation*. California, 1996.

The control group is comprised of single family residential households served by Community Water Company that are characteristically comparable to program participants (Districts 2, 4, 7, 12, 13, 16, 18, and 32).

The discount rate used in this analysis was 7.3%.

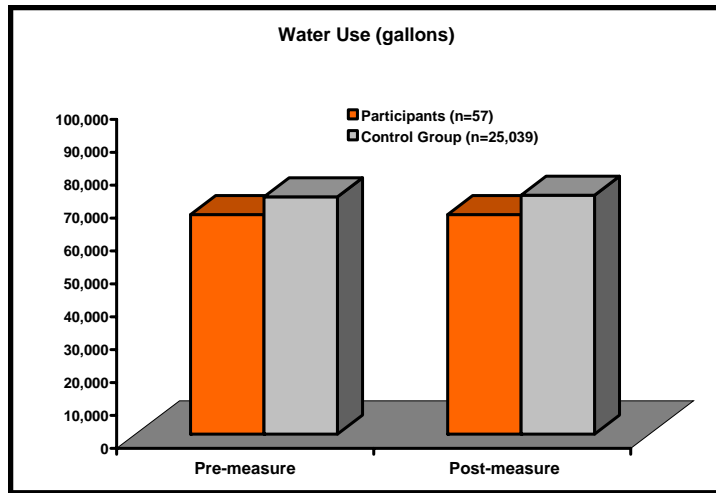
The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1995 value of 152.4.

The price of water used in determining the benefits to customers from reduced water bills is the variable portion of the utility's price of water. \$1.07 per 1,000 gallons was used throughout the analysis (including future years).

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

RESULTS - WATER SAVINGS

In the first year after the 1995 showerhead and faucet aerator giveaways, there was an increase in participant water use, relative to control group water use, of 214,355 gallons, or 9,320 gallons per participant per year (gppy) (14.2% of pre-measure water use). The second year after, there also was an increase in participant water use, relative to control group water use, of 110,832 gallons, or 4,819 gppy (7.3% of pre-measure water use). On average, relative water use increased by 162,594 gallons (0.5 AF), or 7,069 gppy (10.8% of pre-measure water use). **Over the five year assumed lifespan of the 1995 device giveaway, no water savings occurred; relative water use increased by 812,969 gallons (2.5 AF), or 35,346 gallons per participant.**



The first year after the 1996 showerhead and faucet aerator giveaways, the water savings was 193,801 gallons, or 9,229 gppy (12.1% of pre-measure water use). The second year after, the water savings was 104,031 gallons, or 4,954 gppy (6.5% of pre-measure water use). The average water savings per year was 148,916 gallons (0.46 AF), or 7,091 gppy (9.3% of pre-measure water use). **The total water savings over the five year assumed lifespan of the 1996 device giveaway was 744,579 gallons (2.3 AF), or 35,456 gallons per participant.**

The first year after the 1997 showerhead and faucet aerator giveaways, the water savings was 78,562 gallons, or 6,043 gppy (11.3% of pre-measure water use). The second year after, the water savings was 46,044 gallons, or 3,542 gppy (6.6% of pre-measure water use). The average water savings per year was 62,303 gallons (0.19 AF), or 4,793

gppy (9.0% of pre-measure water use). **The total water savings over the five year assumed lifespan of the 1997 device giveaway was 311,515 gallons (1.0 AF), or 23,963 gallons per participant.**

Total water savings for the three years studied was 58,007 gallons, or 1,018 gppy (1.5% of weighted pre-measure water use) during the first year after and 39,243 gallons, or 688 gppy (1.0% of weighted pre-measure water use) during the second year after the device giveaway. **The total water savings over the five year assumed lifespan of the conservation devices was 243,125 gallons (0.75 AF), or 4,265 gallons per participant.**

During the two years before participating in the showerhead and faucet aerator giveaway program, participants' water use was 92.5% of the control group's use, on average. During the two years after participating in the program, their water use was 91.9% of the control group's use, on average. The participants' water use decreased by 0.1% from pre-measure to post-measure, whereas the control group's use increased by 0.6%. **The resulting overall water savings attributed to this program was 0.7%.**

RESULTS - COST BENEFIT ANALYSIS

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

1995 DEVICE GIVEAWAY

- ◆ The quantified cost to the utility was \$143. This includes the cost of conservation devices, \$143. This is a cost of \$6 per participant.
- ◆ The quantified cost to participants was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified benefit to the participants was -\$881. This reflects the value of water bill savings, -\$881. This is a benefit of -\$38 per participant.

1995 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Conservation Devices	\$143	Not Quantified	Not Quantified	Conservation Devices	\$0
				Water Savings	-\$881
Total	\$143			Total	-\$881

UTILITY PERSPECTIVE - 1995

Results of cost benefit analysis show a net benefit (net present value) of -\$143 from the utility perspective. 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 not calculated, as there were no water savings.**

PARTICIPANT PERSPECTIVE - 1995

Results of cost benefit analysis show a net benefit (net present value) of -\$881 from the participant perspective. The quantified costs to the participants were greater than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was not calculated, as there were no water savings and no quantified costs to the participants.**

OVERALL PERSPECTIVE - 1995

Results of cost benefit analysis show a net benefit (net present value) of -\$1,024 from an overall perspective. The quantified costs to the participants and utility were greater than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from the overall perspective was not calculated, as there were no water savings.**

1996 DEVICE GIVEAWAY

- ◆ The quantified cost to the utility was \$121. This includes the cost of conservation devices, \$121. This is a cost of \$6 per participant.
- ◆ The quantified cost to participants was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified benefit to the participants was \$752. This reflects the value of water bill savings, \$752. This is a benefit of \$36 per participant.

1996 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Conservation Devices	\$121	Not Quantified	Not Quantified	Conservation Devices	\$0
				Water Savings	\$752
Total	\$121			Total	\$752

UTILITY PERSPECTIVE - 1996

Results of cost benefit analysis show a net benefit (net present value) of -\$121 from the utility perspective. 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 \$53.**

PARTICIPANT PERSPECTIVE - 1996

Results of cost benefit analysis show a net benefit (net present value) of \$752 from the participant perspective. 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 \$0 as there was no quantified cost to the participants.**

OVERALL PERSPECTIVE - 1996

Results of cost benefit analysis show a net benefit (net present value) of \$631 from an overall perspective. 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 the overall perspective was \$53.**

1997 DEVICE GIVEAWAY

- ◆ The quantified cost to the utility was \$70. This includes the cost of conservation devices, \$70. This is a cost of \$5 per participant.
- ◆ The quantified cost to participants was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified benefit to the participants was \$293. This reflects the value of water bill savings, \$293. This is a benefit of \$23 per participant.

1997 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Conservation Devices	\$70	Not Quantified	Not Quantified	Conservation Devices	\$0
				Water Savings	\$293
Total	\$70			Total	\$293

UTILITY PERSPECTIVE - 1997

Results of cost benefit analysis show a net benefit (net present value) of -\$70 from the utility perspective. 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 \$73.**

PARTICIPANT PERSPECTIVE - 1997

Results of cost benefit analysis show a net benefit (net present value) of \$293 from the participant perspective. 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 \$0 as there were no costs to the participants.**

OVERALL PERSPECTIVE - 1997

Results of cost benefit analysis show a net benefit (net present value) of \$223 from an overall perspective. 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 the overall perspective was \$73.**

ALL YEARS

- ◆ The quantified cost to the utility was \$334. This includes the cost of conservation devices, \$334. This is a cost of \$6 per participant.
- ◆ The quantified cost to participants was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified benefit to the participants was \$164. This reflects the value of water bill savings, \$164. This is a benefit of \$3 per participant.

UTILITY PERSPECTIVE - ALL YEARS

Results of cost benefit analysis show a net benefit (net present value) of -\$334 from the utility perspective. 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 \$447.**

PARTICIPANT PERSPECTIVE - ALL YEARS

Results of cost benefit analysis show a net benefit (net present value) of \$164 from the participant perspective. 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 \$0 as there were no quantified costs to the participants.**

ALL YEARS Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Conservation Devices	\$334	Not Quantified	Not Quantified	Conservation Devices	\$0
				Water Savings	\$164
Total	\$334			Total	\$164

OVERALL PERSPECTIVE - ALL YEARS

Results of cost benefit analysis show a net benefit (net present value) of -\$170 from an overall perspective. The quantified costs to the participants and utility were greater than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from the overall perspective was \$447.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

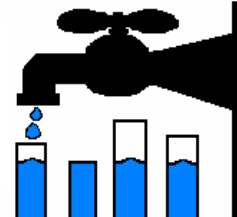
- Cost of participants installing the devices
- Cost to CWCGV of managing the program
- Landfill deposit of old devices

Benefits

- Financial savings on sewer bills for participants.
- Avoided cost of acquisition and distribution of water saved.
- Environmental benefits from reduced water use
- Increased public awareness about water conservation
- Increased energy savings from reduced hot water use
- Participants received new fixtures

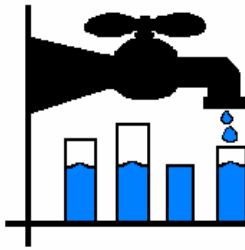
Community Water of Green Valley

Device Giveaway Program



1995			
Results of Cost Benefit Analysis-Lifespan (5 Years)			
	UTILITY	PARTICIPANT	OVERALL
<u><i>Present Value Costs</i></u>			
Costs to Utility	143	NA	143
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$143	\$0	\$143
<u><i>Present Value Benefits</i></u>			
Total Water Savings	-2.49 AF	-2.49 AF	-2.49 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	-881	-881
Benefits to Others	NA	NA	0
Total Benefits	\$0	-\$881	-\$881
<u><i>Cost Benefit Calculations</i></u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$143	-\$881	-\$1,024
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	-\$57 /AF	0 /AF	-\$57 /AF

1996			
Results of Cost Benefit Analysis-Lifespan (5 Years)			
	UTILITY	PARTICIPANT	OVERALL
<u><i>Present Value Costs</i></u>			
Costs to Utility	121	NA	121
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$121	\$0	\$121
<u><i>Present Value Benefits</i></u>			
Total Water Savings	2.29 AF	2.29 AF	2.29 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	752	752
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$752	\$752
<u><i>Cost Benefit Calculations</i></u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$121	\$752	\$631
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$53 /AF	\$0 /AF	\$53 /AF



Community Water of Green Valley

Device Giveaway Program

Results of Cost Benefit Analysis-Lifespan (5 Years)		1997		
	UTILITY	PARTICIPANT	OVERALL	
<u><i>Present Value Costs</i></u>				
Costs to Utility	70	NA	70	
Costs to Participants	NA	0	0	
Costs to Others	NA	NA	0	
Total Costs	\$70	\$0	\$70	
<u><i>Present Value Benefits</i></u>				
Total Water Savings	0.96 AF	0.96 AF	0.96 AF	
Benefits to Utility	0	NA	0	
Benefits to Participants	NA	293	293	
Benefits to Others	NA	NA	0	
Total Benefits	\$0	\$293	\$293	
<u><i>Cost Benefit Calculations</i></u>				
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$70	\$293	\$223	
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$73 /AF	\$0 /AF	\$73 /AF	

Results of Cost Benefit Analysis-Lifespan (5 Years)		ALL YEARS		
	UTILITY	PARTICIPANT	OVERALL	
<u><i>Present Value Costs</i></u>				
Costs to Utility	334	NA	334	
Costs to Participants	NA	0	0	
Costs to Others	NA	NA	0	
Total Costs	\$334	\$0	\$334	
<u><i>Present Value Benefits</i></u>				
Total Water Savings	0.75 AF	0.75 AF	0.75 AF	
Benefits to Utility	0	NA	0	
Benefits to Customers	NA	164	164	
Benefits to Others	NA	NA	0	
Total Benefits	\$0	\$164	\$164	
<u><i>Cost Benefit Calculations</i></u>				
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$334	\$164	-\$170	
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$447 /AF	\$0 /AF	\$447 /AF	

