

Phoenix Water Services Dept.

Toilet Distribution Program

The City of Phoenix Water Services Department (WSD) serves the city of Phoenix, AZ, a city of approximately 1.3 million people located in central Arizona. As of the 2000 Census the median household income for the City of Phoenix was \$41,207, which is higher than the statewide median of \$40,558.¹

UTILITY DEMOGRAPHICS

As of 2005, the City of Phoenix Water Services Department maintained 377,072 connections. Of these connections, 331,458 were single family residential users, 16,290 were multifamily residential, 23,735 were commercial, 185 were industrial, 2,893 were government, and 2,511 were other users. The City of Phoenix covers an area of 514 square miles, but the utility provides service beyond those borders, servicing 546 square miles. The population of this service area is approximately 1.4 million. As of 2004, the Phoenix WSD produced 103.1 billion gallons annually. Their average per capita water use was 208 gallons per capita per day (gpcd), with a residential per capita water use of 170 gpcd.

TOILET DISTRIBUTION PROGRAM

Eligible Customers:	SF, MF
Customers Analyzed:	SF
Program Years:	1994-present
Years Analyzed:	1994-2001

UTILITY RATE STRUCTURE AND PRICES

The City of Phoenix has a seasonal rate structure. The monthly base rate for service, as of March 2, 2005, is \$5.16 for 5/8" meters inside the city and \$7.74 outside the city, which includes zero gallons of water. An environmental charge of \$0.24 per 1,000 gallons is applied to all usage. The fee structure for water consumption is as follows:

Usage	Price	
	Inside City	Outside City
Low Months (Dec – Mar)	\$1.84/1,000 gal.	\$2.77/1,000 gal.
Med Months (Apr – May, Oct – Nov)	\$2.18/1,000 gal.	\$3.28/1,000 gal.
High Months (Jun – Sep)	\$2.75/1,000 gal.	\$4.13/1,000 gal.

CURRENT CAPACITY AND WATER SOURCES

About 95 percent of the water used by Phoenix WSD comes from surface sources, including the Salt, Verde and Colorado Rivers; the remaining 5 percent comes from wells. Surface water is delivered to the city by the Central Arizona Project (CAP) and the Salt River Project (SRP). The water is treated at five water treatment plants with a combined capacity of about 630 million gallons per day.

FUTURE PLANS TO MEET DEMAND

Phoenix WSD will meet future demand by continuing to use their allotment of CAP water, through water conservation, water reuse, and expanding facilities.

¹ US Census Bureau. CenStats Databases.

NEIGHBORS HELPING NEIGHBORS PROGRAM - DESCRIPTION

In 1994 the City of Phoenix Water Services Department, in a partnership with Metro Tech High School and the Phoenix Revitalization Corporation (PRC), initiated the Neighbors Helping Neighbors program in which plumbing students helped install conservation devices in low-income homes at no direct cost to customers. Targeted neighborhoods were also undergoing blight cleanup and crime prevention programs.

The program was designed to conserve water by replacing high capacity toilets with 1.6 gallon per flush toilets as well as replacing other

fixtures as needed, such as faucets and showerheads. Students benefited from the training experience while providing the community a service. Initial funding for the program was provided by the Arizona Department of Water Resources. However, the

OTHER PHOENIX CONSERVATION PROGRAMS

Public Education, *various start dates*

Water Conservation Ordinances, *various start dates*

exact amount and timing of support could not be determined, so all costs were considered costs to the utility.

In 2001, the program began providing a small number of retrofits throughout the city in cooperation with the Southwest Gas program called Seniors-Helping-Seniors. In addition, a part time worker was hired specifically for the program. The program also began targeting city council designated neighborhoods. In 2003, WSD staff began placing door hangers on all residences of targeted neighborhoods, which increased response rates to 20%.

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 program during the years 1994 through 2001. The water savings were calculated and a cost benefit analysis was performed for the years 1994, 1995, 1996, 1997, 1998, 1999, 2000, and 2001. Our findings refer to these eight years only, not to the ongoing program. The lifespan program was assumed to be twenty years.²

All quantified costs and benefits have been discounted to the first year of the analysis (1994) and inflated to 2004 dollars. The discount rate used in this analysis was 5.75%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1994 value of 148.2.

Approximately 1,500 households participated in the program between 1994 and 2001. Of these, 310 are included in this analysis. Those not included in the analysis either were multifamily residences or moved during the period of analysis. Included in the analysis are 19 participants in 1994, 93 participants in 1995, 54 participants in 1996, 17 participants in 1997, 33 participants in 1998, 20 participants in 1999, 29 participants in 2000, and 45 participants in 2001.

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² Pekelney, D.M., et al. *Guidelines to Conduct Cost-Effectiveness Analysis of Best Management Practices for Urban Water Conservation*. California, 1996.

The control group consists of 548 single family residential households from the participant groups' neighborhoods. However, the average pre-measure water use of the participants (203,379 gallons) was higher than that of the control group (149,022 gallons).

ASSUMPTIONS

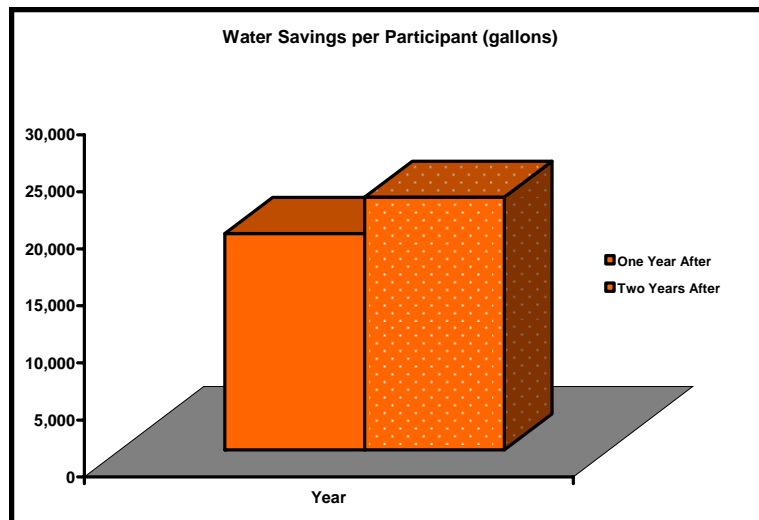
Please see the General Assumptions for the specific conditions and rules underlying all ECoBA analyses.

One hundred percent of participating households received a toilet, 5% received a handicap toilet, 50% received kitchen faucets, 50% received bathroom faucets, and 100% received showerheads.

Assumed the water savings occur equally throughout the year because the program addresses indoor water use. As a result, the value of the water saved was calculated by multiplying the amount of water saved by the average price of water from throughout the year (\$1.05 per ccf in 1994, \$1.11 per ccf in 1995, \$1.17 per ccf in 1996, \$1.24 per ccf in 1997, \$1.29 per ccf in 1998, \$1.29 per ccf in 1999, \$1.37 per ccf in 2000, \$1.44 per ccf in 2001, \$1.53 per ccf in 2002, \$1.53 per ccf in 2003, \$1.59 per ccf in 2004, and \$1.69 per ccf in 2005 and beyond). The City's environmental charge of \$0.18 per ccf was also included in the value of water saved.

Assumed that each site visit cost \$175 to the City of Phoenix in labor.

Participants and control group members who had two or more consecutive months of no water use were included in the study.



The discount rate used in this analysis was 5.75%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 1994 value of 148.2.

Each toilet cost \$102.22, each handicap toilet cost \$141.22, each kitchen faucet cost \$65.67, each bathroom faucet cost \$41.67, and each showerhead cost \$2.00.

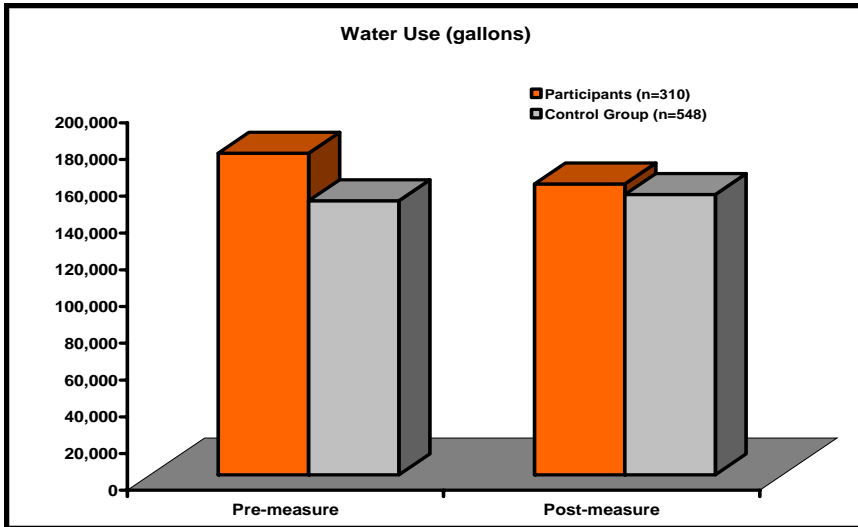
RESULTS - WATER SAVINGS

In the first year after the 1994 Neighbors Helping Neighbors program, the water savings amounted to 744,531 gallons, or 39,186 gallons per participant per year (gppy) (21.2% of pre-measure water use). The second year after the retrofits, the water savings amounted to 1,057,987 gallons, or 55,684 gppy (30.1% of pre-measure water use). The average savings per year was 901,259 gallons, or 47,435 gppy (25.6% of pre-measure water use). **The total savings over the twenty**

year assumed lifespan was 18,025,181 gallons (55.3 AF), or 948,694 gallons per participant.

The first year after the 1995 Neighbors Helping Neighbors program, the water savings amounted to 2,408,743 gallons, or 25,900 gppy (15.5% of pre-measure water use). The second year after the retrofits, the water savings amounted to 2,247,361 gallons, or 24,165 gppy (14.4%

of pre-measure water use). The average savings per year was 2,328,052 gallons, or 25,033 gppy (14.9% of pre-measure water use). **The total savings over the twenty year assumed lifespan was 46,561,040 gallons (142.9 AF), or 500,656 gallons per participant.**



The first year after the 1996 Neighbors Helping Neighbors program, the water savings amounted to

1,087,719 gallons or 20,143 gppy (11.9% of pre-measure water use). The second year after the retrofits, the water savings amounted to 966,224 gallons, or 17,893 gppy (10.5% of pre-measure water use). The average savings per year was 1,026,972 gallons, or 19,018 gppy (11.2% of pre-measure water use). **The total savings over the twenty year assumed lifespan was 20,539,434 gallons (63.0 AF), or 380,360 gallons per participant.**

The first year after the 1997 Neighbors Helping Neighbors program, the water savings amounted to 89,516 gallons, or 5,266 gppy (3.3% of pre-measure water use). The second year after the retrofits, the water savings amounted to 209,827 gallons, or 12,343 gppy (7.8% of pre-measure water use). The average savings per year was 149,671 gallons or 8,804 gppy (5.6% of pre-measure water use). **The total savings over the twenty year assumed lifespan was 2,993,429 gallons (9.2 AF), or 176,084 gallons per participant.**

The first year after the 1998 Neighbors Helping Neighbors program, the water savings amounted to 470,535 gallons, or 14,259 gppy (7.2% of pre-measure water use). The second year after the retrofits, the water savings amounted to 1,234,758 gallons, or 37,417 gppy (18.8% of pre-measure water use). The average savings per year was 852,647 gallons, or 25,838 gppy (13.0% of pre-measure water use). **The total savings over the twenty year assumed lifespan was 17,052,937 gallons (52.3 AF), or 516,756 gallons per participant.**

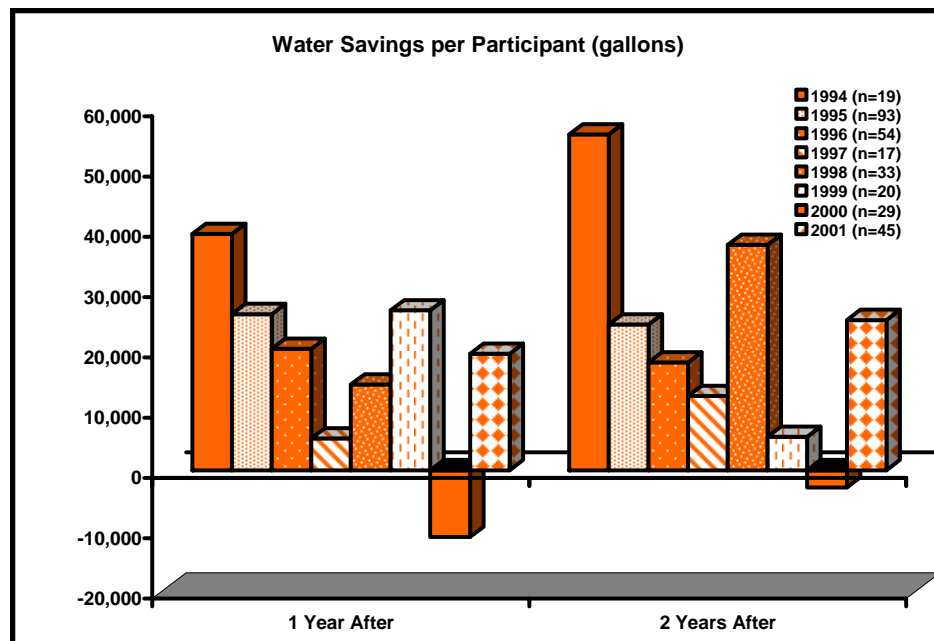
The first year after the 1999 Neighbors Helping Neighbors program, the water savings amounted to 530,402 gallons, or 26,520 gppy (16.1% of

pre-measure water use). The second year after the retrofits, the water savings amounted to 110,856 gallons, or 5,543 gppy (3.4% of pre-measure water use). The average savings per year was 320,629 gallons, or 16,031 gppy (9.7% of pre-measure water use). **The total savings over the twenty year assumed lifespan was 6,412,575 gallons (19.7 AF), or 320,629 gallons per participant.**

The first year after the 2000 Neighbors Helping Neighbors program, there was an increase in participant water use, relative to control group water use, of 321,270 gallons, or 11,078 gppy (6.7% of pre-measure water use). The second year after the retrofits, there was an increase in participant water use, relative to control group water use, of 82,854 gallons, or 2,857 gppy (1.7% of pre-measure water use). On average, relative water use increased by 202,062 gallons, or 6,968 gppy (4.2% of pre-measure water use). **Over the twenty year assumed lifespan of the program, relative water use increased by 4,041,236 gallons (12.4 AF), or 139,353 gallons per participant.**

The first year after the 2001 Neighbors Helping Neighbors program, the water savings amounted to 870,035 gallons, or 19,334 gppy (10.1% of pre-measure water use). The second year after the retrofits, the water savings amounted to 1,121,387 gallons, or 24,920 gppy (13.0% of pre-measure water use). The average savings per year was 995,711 gallons, or 22,127 gppy (11.6% of pre-measure water use). **The total savings over the twenty year assumed lifespan was 19,914,217 gallons (61.1 AF), or 442,538 gallons per participant.**

Total water savings for the eight years studied was 5,880,211 gallons, or 18,968 gppy (10.9% of weighted pre-measure water use) during the first year after and 6,865,546 gallons, or 22,147 gppy (12.7% of weighted pre-measure water



use) during the second year after the retrofits. **The total savings over the twenty year assumed lifespan was 127,457,578 gallons (391.2 AF), or 411,153 gallons per participant.**

Before the Neighbors Helping Neighbors program, the participant group's water use was 117.3% of the control group's use, on average.

After the Neighbors Helping Neighbors program, their water use was 103.8% of the control group's use, on average. The participant group's water use decreased by 9.5%, whereas the control group's use increased by 2.3%. **The resulting overall water savings attributed to this program was 11.8%.**

RESULTS - COST BENEFIT ANALYSIS

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

1994 PROGRAM

- ◆ The quantified cost to the utility was \$8,437. This includes the cost of conservation devices, \$4,199 and the cost of labor, \$4,238. This is a cost of \$ 444 per participant, including \$221 for devices and \$223 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$29,552, which includes the value of water bill savings. This is a water bill savings of \$1,555 per participant.

1994 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$4,199	Not Quantified	Not Quantified	Water Bill Savings	\$29,552
Labor	\$4,238			Total	\$29,552
Total	\$8,437				

UTILITY PERSPECTIVE - 1994

Results of the cost benefit analysis show a net benefit (net present value) of -\$8,437 from the utility perspective. This is a net benefit of -\$444 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 \$153.**

PARTICIPANT PERSPECTIVE - 1994

Results of the cost benefit analysis show a net benefit (net present value) of \$29,552 from the participant perspective. This is a net benefit of \$1,555 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 \$0.**

OVERALL PERSPECTIVE - 1994

Results of cost benefit analysis show a net benefit (net present value) of \$21,115 from an overall perspective. This is a net benefit of \$1,111 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 \$153.**

1995 PROGRAM

- ◆ The quantified cost to the utility was \$39,053. This includes the cost of conservation devices, \$19,436 and the cost of labor, \$19,616. This is a cost of \$420 per participant, including \$209 for devices and \$211 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$73,808, which includes the value of water bill savings. This is a water bill savings of \$793 Per participant.

1995 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$19,436	Not Quantified	Not Quantified	Water Bill Savings	\$73,808
Labor	\$19,616			Total	\$73,808
Total	\$39,053				

UTILITY PERSPECTIVE - 1995

Results of the cost benefit analysis show a net benefit (net present value) of -\$39,053 from the utility perspective. This is a net benefit of -\$420 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 \$273.**

PARTICIPANT PERSPECTIVE - 1995

Results of the cost benefit analysis show a net benefit (net present value) of \$73,808 from the participant perspective. This is a net benefit of \$793 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 \$0.**

OVERALL PERSPECTIVE - 1995

Results of cost benefit analysis show a net benefit (net present value) of \$34,755 from an overall perspective. This is a net benefit of \$374 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 \$273.**

1996 PROGRAM

- ◆ The quantified cost to the utility was \$21,443. This includes the cost of conservation devices, \$10,762 and the cost of labor, \$10,771. This is a cost of \$397 per participant, including \$199 for devices and \$198 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$31,399, which includes the value of water bill savings. This is a water bill savings of \$581 per participant.

1996 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$10,762	Not Quantified	Not Quantified	Water Bill Savings	\$31,399
Labor	\$10,771			Total	\$31,399
Total	\$21,443				

UTILITY PERSPECTIVE - 1996

Results of the cost benefit analysis show a net benefit (net present value) of -\$21,443 from the utility perspective. This is a net benefit of -\$397 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 \$340.**

PARTICIPANT PERSPECTIVE - 1996

Results of the cost benefit analysis show a net benefit (net present value) of \$31,399 from the participant perspective. This is a net benefit of \$581 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 \$0.**

OVERALL PERSPECTIVE - 1996

Results of cost benefit analysis show a net benefit (net present value) of \$9,956 from an overall perspective. This is a net benefit of \$184 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 \$340.**

1997 PROGRAM

- ◆ The quantified cost to the utility was \$6,384. This includes the cost of conservation devices, \$3,177 and the cost of labor, \$3,207. This is a cost of \$376 per participant, including \$187 for devices and \$189 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$4,394, which includes the value of water bill savings. This is a water bill savings of \$258 per participant.

UTILITY PERSPECTIVE - 1997

Results of the cost benefit analysis show a net benefit (net present value) of -\$6,384 from the utility perspective. This is a net benefit of -\$376 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 \$695.**

PARTICIPANT PERSPECTIVE - 1997

Results of the cost benefit analysis show a net benefit (net present value) of \$4,394 from the participant perspective. This is a net benefit of \$258 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 \$0.**

1997 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$3,177	Not Quantified	Not Quantified	Water Bill Savings	\$4,394
Labor	\$3,207			Total	\$4,394
Total	\$6,384				

OVERALL PERSPECTIVE - 1997

Results of cost benefit analysis show a net benefit (net present value) of -\$1,989 from an overall perspective. This is a net benefit of -\$117 per participant. 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 an overall perspective was \$695.**

1998 PROGRAM

- ◆ The quantified cost to the utility was \$11,718. This includes the cost of conservation devices, \$5,832 and the cost of labor, \$5,886. This is a cost of \$355 per participant, including \$177 for devices and \$178 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$24,069, which includes the value of water bill savings. This is a water bill savings of \$729 per participant.

UTILITY PERSPECTIVE - 1998

Results of the cost benefit analysis show a net benefit (net present value) of -\$11,718 from the utility perspective. This is a net benefit of -\$355 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 \$224.**

PARTICIPANT PERSPECTIVE - 1998

Results of the cost benefit analysis show a net benefit (net present value) of \$24,069 from the participant perspective. This is a net benefit of \$729 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 \$0.**

OVERALL PERSPECTIVE - 1998

Results of cost benefit analysis show a net benefit (net present value) of \$12,351 from an overall perspective. This is a net benefit of \$374 per participant. The quantified costs to the participants and utility were

1998 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$5,832	Not Quantified	Not Quantified	Water Bill Savings	\$24,069
Labor	\$5,886			Total	\$24,069
Total	\$11,718				

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less than the quantified benefits to the participants and utility. **The cost per acre-foot of water saved from an overall perspective was \$224.**

1999 PROGRAM

- ◆ The quantified cost to the utility was \$6,715. This includes the cost of conservation devices, \$3,342 and the cost of labor, \$3,373. This is a cost of \$336 per participant, including \$167 for devices and \$169 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$8,843, which includes the value of water bill savings. This is a water bill savings of \$442 per participant.

1999 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$3,342	Not Quantified	Not Quantified	Water Bill Savings	\$8,843
Labor	\$3,373			Total	\$8,843
Total	\$6,715				

UTILITY PERSPECTIVE - 1999

Results of the cost benefit analysis show a net benefit (net present value) of -\$6,715 from the utility perspective. This is a net benefit of -\$336 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 \$341.**

PARTICIPANT PERSPECTIVE - 1999

Results of the cost benefit analysis show a net benefit (net present value) of \$8,843 from the participant perspective. This is a net benefit of \$442 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 \$0.**

OVERALL PERSPECTIVE - 1999

Results of cost benefit analysis show a net benefit (net present value) of \$2,127 from an overall perspective. This is a net benefit of \$106 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 \$341.**

2000 Program

- ◆ The quantified cost to the utility was \$9,208. This includes the cost of conservation devices, \$4,583 and the cost of labor, \$4,625. This is a cost of \$318 per participant, including \$158 for devices and \$160 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was -\$5,249, which includes the value of water bill savings. This is a water bill savings of \$181 per participant.

2000 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$4,583	Not Quantified	Not Quantified	Water Bill Savings	-\$5,249
Labor	\$4,625			Total	-\$5,249
Total	\$9,208				

UTILITY PERSPECTIVE - 2000

Results of the cost benefit analysis show a net benefit (net present value) of -\$9,208 from the utility perspective. This is a net benefit of -\$318 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 -\$742.**

PARTICIPANT PERSPECTIVE - 2000

Results of the cost benefit analysis show a net benefit (net present value) of -\$5,249 from the participant perspective. This is a net benefit of -\$181 per participant. 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 \$0.**

OVERALL PERSPECTIVE - 2000

Results of cost benefit analysis show a net benefit (net present value) of -\$14,457 from an overall perspective. This is a net benefit of -\$499 per participant. 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 an overall perspective was -\$742.**

2001 PROGRAM

- ◆ The quantified cost to the utility was \$13,511. This includes the cost of conservation devices, \$6,725 and the cost of labor, \$6,787. This is a cost of \$300 per participant, including \$149 for devices and \$151 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$24,686, which includes the value of water bill savings. This is a water bill savings of \$495 per participant.

UTILITY PERSPECTIVE - 2001

Results of the cost benefit analysis show a net benefit (net present value) of -\$13,511 from the utility perspective. This is a net benefit of \$300 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 \$221.**

PARTICIPANT PERSPECTIVE - 2001

Results of the cost benefit analysis show a net benefit (net present value) of \$24,686 from the participant perspective. This is a net benefit of \$495 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 \$0.**

2001 Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$6,725	Not Quantified	Not Quantified	Water Bill Savings	\$24,686
Labor	\$6,787			Total	\$24,686
Total	\$13,511				

OVERALL PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of \$11,174 from an overall perspective. This is a net benefit of \$195 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 \$221.**

ALL YEARS

- ◆ The quantified cost to the utility was \$116,469. This includes the cost of conservation devices, \$57,965 and the cost of labor, \$58,504. This is a cost of \$376 per participant, including \$187 for devices and \$189 in labor.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$0.
- ◆ The quantified benefit to the participants was \$191,363, which includes the value of water bill savings. This is a water bill savings of \$617 per participant.

ALL YEARS Quantified Costs and Benefits					
Utility			Participants		
Costs		Benefits	Costs	Benefits	
Cost of Devices	\$57,965	Not Quantified	Not Quantified	Water Bill Savings	\$191,363
Labor	\$58,504			Total	\$191,363
Total	\$116,469				

UTILITY PERSPECTIVE - ALL YEARS

Results of the cost benefit analysis show a net benefit (net present value) of -\$116,469 from the utility perspective. This is a net benefit of -\$376 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 \$298.**

PARTICIPANT PERSPECTIVE - ALL YEARS

Results of the cost benefit analysis show a net benefit (net present value) of \$191,363 from the participant perspective. This is a net benefit of \$617 per participant. The quantified costs to the participants were less than the quantified benefit to the participants. **The cost per acre-foot of water saved from the participant perspective was \$0.**

OVERALL PERSPECTIVE - ALL YEARS

Results of cost benefit analysis from an overall perspective show a net benefit (net present value) of \$74,894 from an overall perspective. This is a net benefit of \$242 per participant. 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 an overall perspective was \$298.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

- Landfill disposal of replaced equipment.
- Energy and water consumed to manufacture new equipment.

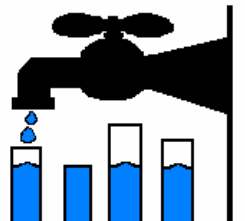
Benefits

- Financial savings on sewer bills for participants.
- Avoided cost of acquisition and distribution of water saved.
- Environmental benefits of reduced use of water.
- Increased public awareness for conservation programs.
- Improved public relations for the utility.
- Reinforces desirability and need for water conservation.
- Customers received new fixtures.
- Plumbing apprentices gain plumbing experience.

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Phoenix Water Services Dept.

Toilet Distribution Program



1994

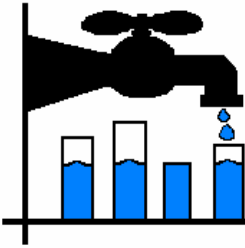
Results of Cost Benefit Analysis-Lifespan (20 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	8,437	NA	8,437
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$8,437	\$0	\$8,437
<u>Present Value Benefits</u>			
Total Water Savings	55.32 AF	55.32 AF	55.32 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	29,552	29,552
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$29,552	\$29,552
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$8,437	\$29,552	\$21,115
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$153 /AF	\$0 /AF	\$153 /AF

1995

Results of Cost Benefit Analysis-Lifespan (20Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	39,053	NA	39,053
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$39,053	\$0	\$39,053
<u>Present Value Benefits</u>			
Total Water Savings	142.89 AF	142.89 AF	142.89 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	73,808	73,808
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$73,808	\$73,808
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$39,053	\$73,808	\$34,755
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$273 /AF	\$0 /AF	\$273 /AF



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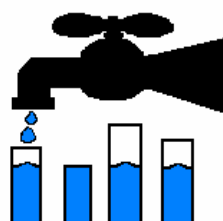
1996			
Results of Cost Benefit Analysis-Lifespan (20 Years)			
	UTILITY	PARTICIPANT	OVERALL
<i><u>Present Value Costs</u></i>			
Costs to Utility	21,443	NA	21,443
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$21,443	\$0	\$21,443
<i><u>Present Value Benefits</u></i>			
Total Water Savings	63.03 AF	63.03 AF	63.03 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	31,399	31,399
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$31,399	\$31,399
<i><u>Cost Benefit Calculations</u></i>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$21,443	\$31,399	\$9,956
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$340 /AF	\$0 /AF	\$340 /AF

1997			
Results of Cost Benefit Analysis-Lifespan (20 Years)			
	UTILITY	PARTICIPANT	OVERALL
<i><u>Present Value Costs</u></i>			
Costs to Utility	6,383	NA	6,383
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$6,383	\$0	\$6,383
<i><u>Present Value Benefits</u></i>			
Total Water Savings	9.19 AF	9.19 AF	9.19 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	4,394	4,394
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$4,394	\$4,394
<i><u>Cost-Benefit Calculations</u></i>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$6,383	\$4,394	-\$1,989
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$695 /AF	\$0 /AF	\$695 /AF

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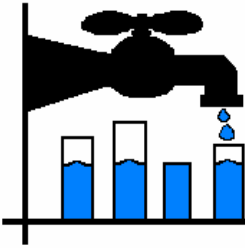
Toilet Distribution Program



1998	Results of Cost Benefit Analysis-Lifespan (20Years)		
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	11,718	NA	11,718
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$11,718	\$0	\$11,718
<u>Present Value Benefits</u>			
Total Water Savings	52.33 AF	52.33 AF	52.33 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	24,069	24,069
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$24,069	\$24,069
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$11,718	\$24,069	\$12,351
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$224 /AF	\$0 /AF	\$224 /AF

1999	Results of Cost Benefit Analysis-Lifespan (20Years)		
	OVERALL	UTILITY	PARTICIPANT
<u>Present Value Costs</u>			
Costs to Utility	6,715	NA	6,715
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$6,715	\$0	\$6,715
<u>Present Value Benefits</u>			
Total Water Savings	19.68 AF	19.68 AF	19.68 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	8,843	8,843
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$8,843	\$8,843
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$6,715	\$8,843	\$2,127
Cost Effectiveness Analysis (CEA)	\$341 /AF	\$0 /AF	\$341 /AF

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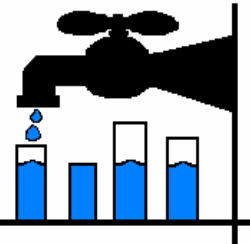
2000			
Results of Cost Benefit Analysis-Lifespan (20 Years)			
	UTILITY	PARTICIPANT	OVERALL
<u><i>Present Value Costs</i></u>			
Costs to Utility	9,208	NA	9,208
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$9,208	\$0	\$9,208
<u><i>Present Value Benefits</i></u>			
Total Water Savings	-12.40 AF	-12.40 AF	-12.40 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	-5,249	-5,249
Benefits to Others	NA	NA	0
Total Benefits	\$0	-\$5,249	-\$5,249
<u><i>Cost Benefit Calculations</i></u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$9,208	-\$5,249	-\$14,457
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	-\$742 /AF	\$0 /AF	-\$742 /AF

2001			
Results of Cost Benefit Analysis-Lifespan (20 Years)			
OVERALL	UTILITY	PARTICIPANT	
<u><i>Present Value Costs</i></u>			
Costs to Utility	13,511	NA	13,511
Costs to Participants	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$13,511	\$0	\$13,511
<u><i>Present Value Benefits</i></u>			
Total Water Savings	61.11 AF	61.11 AF	61.11 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	24,686	24,686
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$24,686	\$24,686
<u><i>Cost Benefit Calculations</i></u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$13,511	\$24,686	\$11,174
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$221 /AF	\$0 /AF	\$221 /AF

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ALL YEARS	Results of Cost Benefit Analysis-Lifespan (20Years)		
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	116,469	NA	116,469
Costs to Customers	NA	0	0
Costs to Others	NA	NA	0
Total Costs	\$116,469	\$0	\$116,469
<u>Present Value Benefits</u>			
Total Water Savings	391.15 AF	391.15 AF	391.15 AF
Benefits to Utility	0	NA	0
Benefits to Customers	NA	191,363	191,363
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$191,363	\$191,363
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$116,469	\$191,363	\$74,894
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$298 /AF	\$0 /AF	\$298 /AF