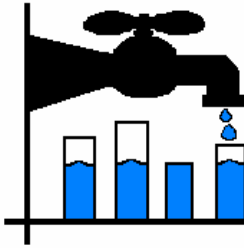


WASHING MACHINE REBATE

CASE NARRATIVES

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Camrosa Water District

Washing Machine Rebate Program

Camrosa Water District (CWD) provides potable, non-potable, and reclaimed water for communities in the southern portion of Ventura County, CA. The population of CWD's service area is 31,000. As of the 2000 Census, the median household income in Ventura County was \$59,666, which is higher than the statewide median of \$47,493.¹

UTILITY DEMOGRAPHICS

As of 2004, the District maintained 11,507 connections, 84% of which were residential. Of their total connections, 9,065 were single family residential, 544 were multifamily residential, 1,280 were commercial, 133 were industrial, 298 were irrigation, 108 were agricultural irrigation, and 79 consisted of fire suppression, line flushing, construction meters, and temporary meters. Camrosa Water District's total service area is 31 square miles. As of 2004, the average per capita water use for the utility as a whole was 290 gallons per capita per day (gpcd).

WASHING MACHINE REBATE

Eligible Customers:	SF
Customers Analyzed:	SF
Program Years:	March 2003 – Present
Years Analyzed:	FY 2003

UTILITY RATE STRUCTURE AND PRICES

Camrosa Water District employs an increasing block rate structure. As of February 2005, the monthly base rate for service is \$5.60 for ¾ inch meters (or \$0.19 per day), which includes zero gallons of water. Single family and multifamily residential usage charges are \$1.10 per HCF for the first 12 HCF of water and \$1.46 per HCF thereafter (\$1.47-\$1.95 per 1,000 gallons).

CURRENT CAPACITY AND WATER SOURCES

The current sources of supply for the customers and properties within CWD's service area comprise a mix of public and private sources including purchasing imported water from Calleguas Municipal Water District (CMWD), groundwater from three groundwater basins, surface water diverted from Conejo Creek, and recycled water from CWD's Water Reclamation Facility. The utility's total capacity from these sources is 46.0 million gallons per day (mgd).

FUTURE PLANS TO MEET DEMAND

The population within CWD's service area is growing at a rate of 0.9% per year. CWD plans to meet future demands through maintaining current sources, water conservation programs, water transfers, and water reuse.

WASHING MACHINE PROGRAM - DESCRIPTION

Camrosa Water District began a washing machine rebate program on March 25, 2003. They issued 93 rebates between March 25 and June 2, 2003. They have since given out 139 additional rebates. The rebate amount was \$300, paid for equally by CWD, Calleguas Municipal Water District (CMWD), and Metropolitan Water District of Southern California

¹ U.S. Census Bureau, QuickFacts.

CAMROSA WATER DISTRICT CONSERVATION PROGRAMS

1st Toilet Distribution, February 8, 1997
2nd Toilet Distribution, June 13, 1998
3rd Toilet Distribution, August 13, 1998
4th Toilet Distribution, April 26, 1999
Ongoing Toilet Distribution, 1999-present
Showerhead Giveaways, 1997-present
Home Water Survey (indoor/outdoor audits), 1994-present
Landscape Water Survey (outdoor audits), 1994-present
Protector del Agua, 1997-present
Public Education, on-going

(MWDSC). The rebate amount was reduced to \$225 for FY 2006.

The washing machines must be from a list of qualifying high efficiency washing machines on CWD's website. Qualifying machines have a water factor of 9.5 or less. Participants fill out the rebate form and return it along with the original receipt. Camrosa Water District customers were also eligible for washing machine rebates from

Southern California Edison and Southern California Gas Company. CWD advertises the program through brochures sent out in customers' water bills and on their website.

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 fiscal year (FY) 2003. The findings refer to this period only, not to the ongoing program. The lifespan of the washing machines installed, which is used as the period of this analysis, was assumed to be twelve years.

All quantified costs and benefits have been discounted to the first year of the analysis (2003) and inflated to 2004 dollars. The discount rate used in this analysis was 4.38%. The CPI values used in this analysis were the 2004 value of 188.9 and the 2003 value of 184.0.

The population studied for this analysis was comprised of participants who received a washing machine rebate during FY 2003. There were 51 usable participants out of a total of 93. Forty-two, or 45%, of the participants were unusable because they moved during the period of analysis or there were periods of two or more months with no water use.

All CWD residential customers that were not participants in this analysis were used as the control group. Participant pre-measure water consumption was 439,157 gallons per year while control group pre-measure water consumption was 244,774 gallons per year. The control group consisted of 8,976 households in FY 2001, 9,032 in FY 2002, 9,015 in FY 2003, 9,169 in FY 2004, and 9,321 in FY 2005.

ASSUMPTIONS

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

The estimated average cost of high efficiency washers was \$1000 each and high water use washers were \$400 each. The difference between

the two costs (\$600) is used as the cost to the participant, as it is assumed that they would have purchased a high water use washer had they not received the rebate.

The average cost of installation of a washing machine was assumed to be \$0. This is because many appliance stores offer free installation with the purchase of a new washing machine.

The price of water used in determining the benefits to customers from reduced water bills is the variable portion of CWD's price of water at the tier in which the participants' average water use falls (tier 2: use of 13 or more ccf per month). The price in FY 2004 was \$1.93 per 1,000 gallons, and the price in FY 2005 was the average of the 2004 and 2005 prices (\$1.94 per 1,000 gallons).

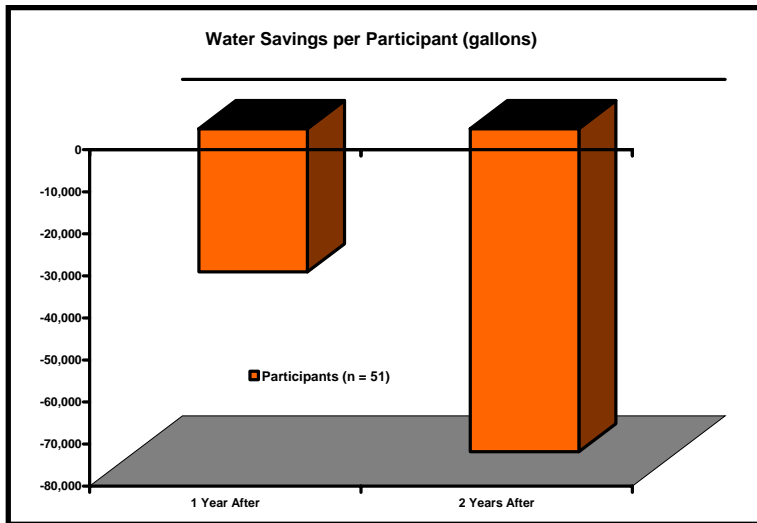
Participants who had two or more consecutive months of no water use were not included in the study.

Calleguas Municipal Water District and Metropolitan Water District of Southern

California each paid \$100 per rebate. Camrosa Water District paid \$100 per rebate for 55% of the rebates and \$0 per rebate for 45% of the rebates.

Advertising costs were \$1500 for the year.

Each rebate took 15 minutes to process at \$30 per hour.

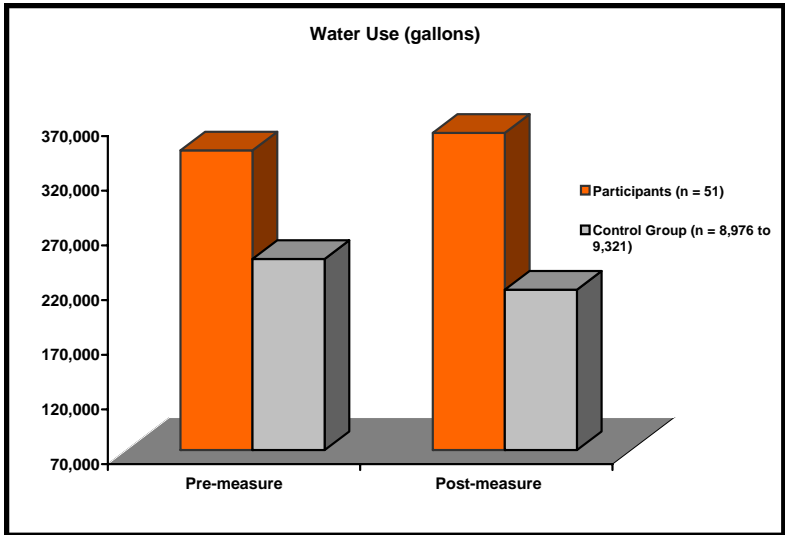


RESULTS - WATER SAVINGS

In the first year after the rebates, no water savings were documented. There was an increase in participant water use, relative to control group water use, of 3,865,693 gallons, or 75,798 gallons per participant per year (gppy) (17.3% of pre-measure water use). The second year after the rebates, no water savings were documented. There was an increase in participant water use, relative to control group water use, of 5,303,321 gallons, or 103,987 gppy (23.7% of pre-measure water use). On average, no water savings occurred; relative water use increased by 4,584,507 gallons (14.1 AF), or 89,892 gppy (20.5% of pre-measure water use). **Over the twelve year assumed lifespan of the conservation devices, there were no water savings; relative water use increased by 55,014,089 gallons (168.8 AF), or 1,078,708 gallons per participant.**

Before the washing machine rebate program, the participant group's water use was **179.4%** of the control group's use, on average. After the program, their water use was **220.9%** of the control group's use, on average. The participant group's water use increased by 9.0% from pre-measure to post-measure, whereas the control group's use

decreased by 11.5%. The resulting water savings attributable to this program was -20.5%.



RESULTS - COST BENEFIT ANALYSIS

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

- ◆ The quantified cost to the utility was \$4,435 (\$87 per participant). This includes payment of financial incentives, \$2,880 (\$56 per participant), and advertising, \$1,555 (\$30 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$31,415 (\$616 per participant), which includes the difference between the average cost of the high-efficiency washing machines and high water use washing machines.
- ◆ The quantified benefit to the participants was -\$67,954 (-\$1,332 per participant), which includes water bill savings, -\$83,661 (\$1,640 per participant), and financial incentives, \$15,707 (\$308 per participant).
- ◆ The quantified cost to others was \$10,472 (\$205 per participant). This includes the cost to CMWD and MWDC of financial incentive payments.
- ◆ The quantified benefit to others was \$0.

2003 Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Advertising	\$1,555	Not Quantified		Equipment	\$31,415	Water Bill Savings	-\$83,661
Incentive Payments	\$2,880					Incentive Payments	\$15,707
Total	\$4,435			Total	\$31,415	Total	-\$67,954

UTILITY PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) from the utility perspective of -\$4,435, or -\$87 per participant. The quantified benefits to the utility were less than the quantified costs to the utility. **The cost per acre-foot of water saved from the utility perspective was -\$26.**

PARTICIPANT PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of -\$99,369 from the participant perspective, or -\$1,948 per participant. The quantified benefits to the participant were less than the

quantified costs to the participant. **The cost per acre-foot of water saved from the participant perspective was -\$186.**

OVERALL PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) from an overall perspective of -\$114,275, or -\$2,241 per participant. The quantified benefits to the utility, participant, and others were less than the quantified costs to the utility, participant, and others. **The cost per acre-foot of water saved from an overall perspective was -\$274.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

- **The customers' time spent installing new washing machines.**
- **Possible landfill disposal of old washing machines.**

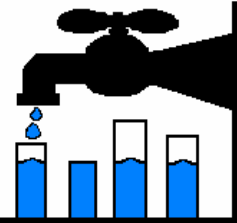
Benefits

- **Savings on sewer bills for participants.**
- **Avoided cost of acquisition and distribution of water saved.**
- **Some participants were eligible for an additional rebate from their energy company.**
- **Environmental benefits of reduced use of water.**
- **Potential income from sale of old washing machines.**
- **Increased public awareness about water conservation.**
- **Increased customer satisfaction.**
- **Reinforces need to conserve water and desirability of conserving.**
- **Water saved for future municipal use.**
- **Customers received new washing machines.**

W-1

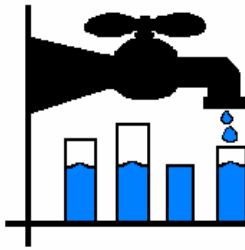
Camrosa Water District

Washing Machine Rebate Program



Results of Cost Benefit Analysis-Lifespan (12 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	4,435	NA	4,435
Costs to Participants	NA	31,415	31,415
Costs to Others	NA	NA	0
Total Costs	\$4,435	\$31,415	\$46,322
<u>Present Value Benefits</u>			
Total Water Savings	-168.83 AF	-168.83 AF	-168.83 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	-67,954	-67,954
Benefits to Others(CMWD & MWDSC)	NA	NA	0
Total Benefits	\$0	\$67,954	-\$67,954
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$4,435	-\$99,369	-\$114,275
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	-\$26 /AF	-\$186 /AF	-\$274 /AF



Helix Water District

Washing Machine Program

Helix Water District (HWD) is a public water provider serving San Diego County communities, located in Southern California. As of August 2004, the population served by Helix Water District was 251,586 people. As of the 2000 census, San Diego County median household income was \$47,067, which is lower than the statewide value of \$47,493.¹

UTILITY DEMOGRAPHICS

Helix Water District supplies water to the San Diego County communities of La Mesa, El Cajon (and nearby unincorporated areas), Lakeside, Lemon Grove, and Spring Valley. As of August 2004, the district maintained 54,742 connections, 92.1% of which are residential. Of their total connections, 45,647 were single family residential, 4,778 were multifamily residential, 3,262 were commercial/industrial, 495 were government, 439 were irrigation, and 121 were other types of connections (i.e. construction, temporary). Helix Water District's total service area encompasses approximately 50 square miles. As of 2004, HWD's total water use, in gallons per capita per day (gpcd) was 142. Their metered water use was 39,956 AF.²

WASHING MACHINE VOUCHER PROGRAM

Voucher Amount:	\$125
Eligible Customers:	SF, MF, ICI
Customers Analyzed:	SF
Program Years:	2000-present
Year Analyzed:	FY 2002

UTILITY RATE STRUCTURE AND PRICES

Helix Water District has an increasing block rate structure. As of July 1, 2005, the monthly base rate for service to single family residences was \$27.80 for 5/8" meters. The monthly service charge includes zero gallons of water. The fee structure for water consumption is as follows:

Usage	Price
0 – 10 ccf (up to 7,480 gal.)	\$1.54 per ccf (\$2.06 per 1,000 gal.)
11 – 30 ccf (8,228 – 22,440 gal.)	\$1.95 per ccf (\$2.61 per 1,000 gal.)
≥ 31 ccf (23,188 gal.)	\$2.38 per ccf (\$3.18 per 1,000 gal.)

CURRENT CAPACITY AND WATER SOURCES

Helix Water District has a current storage capacity of 63 million gallons, with the ability to treat up to 106 million gallons per day. Over 80% of their water is a blend of Colorado River water and northern California water from the State Water Project. Helix Water District purchases this water from the San Diego County Water Authority. The remaining water is supplied by runoff from winter rain and snow releases.

FUTURE PLANS TO MEET DEMAND

The population within Helix Water District's service area is stable, with no significant population growth reported. HWD intends to meet future

¹ U.S. Census Bureau, QuickFacts.

² HWD at-a-glance, Helix Water District.

water demand by maintaining its current capacity and sources. Future water demand will also be met by continuing conservation and public education.

VOUCHER PROGRAM - DESCRIPTION

Helix Water District's High Efficiency Washing Machine Voucher program was initiated in 2000. The district provides \$125 vouchers to single family residential, multifamily residential and commercial

customers who purchase high efficiency clothes washers. As of January 2005, 2,322 vouchers had been awarded.

Retailers regard the vouchers as coupons, so customers immediately receive the discount when they purchase the qualifying washing machine. Vouchers have to be presented at the time of purchase, as

rebates are not offered for previous washing machine purchases. Customers are informed of the program via billing statement inserts, newsletters and newspaper articles, television coverage, the utility website, brochures, and the utility's conservation hotline. On November 1, 2004, Helix Water District decreased the voucher amount from \$125 to \$100.

METHODOLOGY

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

The analysis includes only single family residential customers who received vouchers during fiscal year (FY) 2002 (July 1, 2001 – June 30, 2002). The water savings were calculated and a cost benefit analysis was performed for FY 2002. The findings refer to this year only, no to the ongoing program. The lifespan of the high efficiency clothes washing machines, which is used as the period of analysis, was assumed to be 12 years.³

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 for this analysis was 5.17%. The CPI values used in this analysis

OTHER HELIX WATER DISTRICT CONSERVATION PROGRAMS

Toilet Vouchers, 1992 to present

Showerhead and Aerator Giveaway, 1996 to present

Water Budget Program, currently in development

Irrigation Controller Installation Incentive, January 2005 to present

Leak Detection Service, offered since Helix has been in existence

Indoor/Outdoor Audits, September 1994 to present

Outdoor Audits, August 1990 to present

ICI Program, May 1993 to present

Vouchers available toward the purchase of ultra-low flow toilets, urinals and waterless urinals, cooling tower conductivity controllers, and coin-operated high efficiency clothes washers.

Public Education, 1965 to present

Conservation Ordinances, various start dates

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

were the 2004 value of 188.9 and the 2002 value of 179.9.

The population studied for this analysis was comprised of all participants who received vouchers during FY 2002. During FY 2002, 268 single family residential customers participated in the program. Of those 268 participants, 261 were usable for this analysis. Seven, or 2.6%, of program participants were unusable because sufficient raw data was not available to perform the analysis.

The control group in this analysis was comprised of a random selection of 200 Helix Water District single family residential customers. The average participant pre-measure water use (260,307 gallons) was greater than that of the control group (165,620 gallons).

ASSUMPTIONS

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

The price of water used in this calculation is the price for the category in which the average bi-monthly use of the participants falls (31+ ccf). The price at this category is 2.19 per ccf, or 2.93 per 1,000 gallons in 2003, and 2.28 per ccf, or 3.05 per 1,000 gallons in 2004 and beyond.

The estimated average cost of high efficiency washers was \$1000 each and high water use washers was \$400 each. The difference between the two costs (\$600) is used as the cost to the participant, as it is assumed that they would have purchased a high water use washer had they not received the rebate.

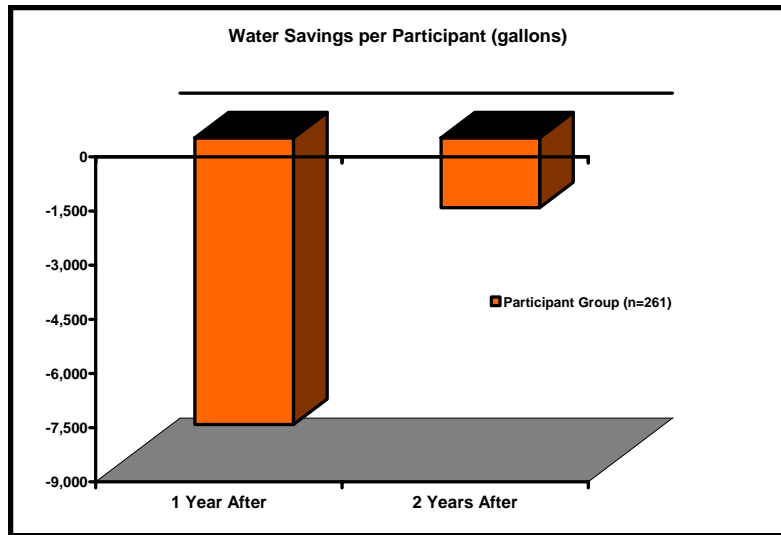
The discount rate used in this analysis was 5.17%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2002 value of 179.9.

RESULTS - WATER SAVINGS

In the first year after receiving the washing machine vouchers, no water savings were documented. There was an increase in participant water use, relative to control group water use, of 2,072,662 gallons, or 7,941 gallons per participant per year⁴ (gppy) (3.1% of pre-measure water use). The second year after

receiving the vouchers, no water savings were documented. There was an increase in participant water use, relative to control group water use, of 506,220 gallons, or 1,940 gppy (0.8% of pre-measure water use). On average, no water savings were documented; relative water use increased by 1,289,441 gallons, or 4,940 gppy (1.9% of pre-measure



⁴ This value also represents the average water savings per voucher, as each participant only received one voucher.

water use). Over the twelve year assumed lifespan of the high efficiency washing machines, no water savings were documented; relative water use increased by 15,473,296 gallons (47.5 AF), or 59,285 gallons per participant.

During the two years before replacing the high water use washing machines with efficient washing machines, the participants' water use was 157.2% of the control group's use, on average. During the two years after replacing the washing machines, the participants' water use was 160.4% of the control group's use, on average. The participant group's water use decreased by 4.5% whereas the control group's water use decreased by 6.4% on average. **The resulting overall water savings attributed to this program was -1.9%.**

RESULTS - COST BENEFIT ANALYSIS

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

Quantified Costs and Benefits								
Utility				Participants				
Costs		Benefits		Costs		Benefits		
HWD Incentive Payments	\$8,751	Not Quantified		Washing Machines	\$164,434	Incentive Payments	\$34,444	
							Water Bill Savings	-\$36,122
Total	\$8,751			Total	\$164,434	Total	-\$1,678	

- ◆ The quantified cost to the utility was \$8,751. This includes Helix Water District's contribution to the financial incentives. This is a cost of \$34 per participant.

Quantified Costs and Benefits			
MWDSC and SDCWA			
Costs		Benefits	
Incentive Payments	\$25,693	Not Quantified	
Total	\$25,693		

- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$164,434. This cost reflects the estimated cost of new high efficiency washing machines. This is a cost of \$630 per participant.
- ◆ The quantified benefit to the participants was -\$1,678. This value includes the amount that participants received in financial incentives, -\$34,444 and water bill savings, -\$36,122. This is a benefit of -\$6 per participant, including \$132 per participant in financial incentives, and -\$138 in water bill savings.
- ◆ The quantified cost to others was \$25,693. This includes contributions to the financial incentives by Metropolitan Water district of Southern California (MWDSC) and San Diego County Water Authority (SDCWA). This is a cost of \$98 per participant.
- ◆ The quantified benefit to others was \$0.

UTILITY PERSPECTIVE

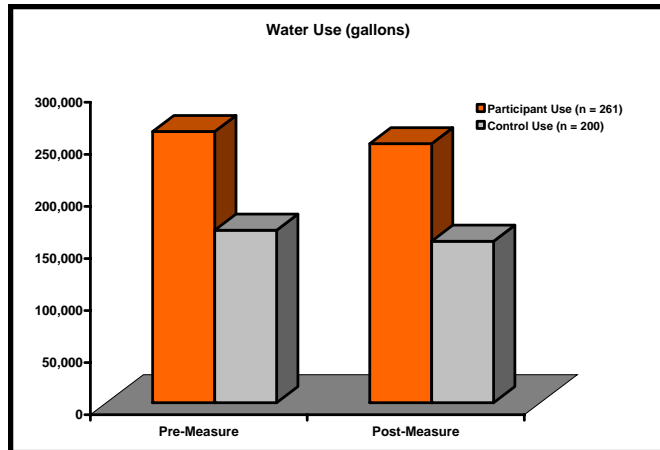
Results of cost benefit analysis show a net benefit (net present value) of -\$8,751 from the utility perspective. This is a net benefit of -\$34 per participant. The quantified costs to the utility were greater than the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was -\$184.**

PARTICIPANT PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$164,434 from the participant perspective. This is a net benefit of -\$630 per participant. The quantified costs to participants were greater than the quantified benefits to participants. **The cost per acre foot of water saved from the participant perspective was -\$3,463.**

OVERALL PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$200,556 from an overall perspective. This is a net benefit of -\$768 per participant. The quantified costs to the utility, participants, and others were greater than the quantified benefits to the utility participants, and others. **The cost per acre-foot of water saved from an overall perspective was -\$4,188.**



UNQUANTIFIED COSTS AND BENEFITS

Costs

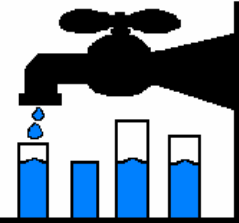
- Advertising costs.
- Cost of processing vouchers.
- Increased surface water use.
- Laundry detergent specially designed for high efficiency machines.
- Removal/disposal of old washing machines.

Benefits

- Increased public awareness about water conservation.
- Avoided cost of acquisition and distribution of water saved.
- Potential income from the sale of old washing machines.
- Need for reduced quantities of detergent.
- Increased customer satisfaction with the utility.
- Reinforcement of the desirability of water conservation.
- Participant satisfaction with the new washing machines.

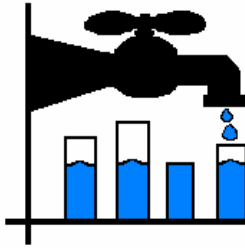
Helix Water District

Washing Machine Program



Results of Cost Benefit Analysis-Lifespan (12 Years)

	UTILITY	PARTICIPANT	OVERALL
<i><u>Present Value Costs</u></i>			
Costs to Utility	8,751	NA	8,751
Costs to Participants	NA	164,434	164,434
Costs to Others (MWDSC & SDCWA)	NA	NA	25,693
Total Costs	\$8,751	\$164,434	\$198,878
<i><u>Present Value Benefits</u></i>			
Total Water Savings	-47.49 AF	-47.49 AF	-47.49 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	-1,678	-1,678
Benefits to Others (MWDSC & SDCWA)	NA	NA	0
Total Benefits	\$0	-\$1,678	-\$1,678
<i><u>Cost Benefit Calculations</u></i>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$8,751	-\$166,112	-\$200,556
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	-\$184 /AF	-\$3,463 /AF	-\$4,188 /AF



Irvine Ranch Water District

Washing Machine Rebate Program

Irvine Ranch Water District (IRWD), located in Irvine, California, provides domestic water service, sewage collection, and water reclamation for the city of Irvine and portions of surrounding communities. The 1999 median household income in Irvine was \$72,057, which is higher than the statewide median of \$47,493.¹

UTILITY DEMOGRAPHICS

IRWD serves the City of Irvine, the Santa Ana Heights community, and portions of Tustin, Newport Beach, Costa Mesa, Orange, and Lake Forest.

As of June 2004, IRWD had 85,278 connections, 88.4% of which were residential. Of their total connections, 46,110 were single family residential, 29,312 were multifamily residential, 3,547 were reclaimed water, 3,278 were commercial, 1,827 were irrigation, 891 were industrial, 216 were institutional, and 97 were agricultural.

WASHING MACHINE REBATE PROGRAM	
Type of Program:	Rebate
Eligible Customers:	SF, MF
Customers Analyzed:	SF
Program Years:	2002- present
Years Analyzed:	2002

IRWD's total service area is 132.8 square miles. As of 2004, the population of IRWD's service area was approximately 308,400. The total amount of treated water use was 55,139 acre-feet. The average residential per capita water use was 90 gallons per capita per day (gpcd).

UTILITY RATE STRUCTURE AND PRICES

IRWD has a conservation rate structure based on five tiers of water use: low volume, conservation, inefficient, excessive, and wasteful. Customers are given both an indoor and outdoor water allocation, which is determined by the number of people per household and the square-footage of the outdoor landscaped area. The standard allocation of 75 gallons per day is based on a four person household with a 1,300 square foot landscaped area; unless they provide documentation showing that they have more people in the household and/or more landscaped area. Each tier corresponds to a percentage of allocated water used by the customer, who will in turn receive a rate based on that percentage. A *Low Volume* customer uses 0-40% of their water allocation, a *Conservation* customer uses 41-100%, an *Inefficient* customer uses 101-150%, an *Excessive* customer uses 151-200%, and a *Wasteful* customer uses +201%.

Tier	% Use of Allocation	2004 Rates
<i>Low Volume</i>	0-40%	\$0.69 per ccf
<i>Conservation</i>	41-100%	\$0.75 per ccf
<i>Inefficient</i>	101-150%	\$1.50 per ccf
<i>Excessive</i>	151-200%	\$3.00 per ccf
<i>Wasteful</i>	+201%	\$6.00 per ccf

¹ US Census Bureau.

Other Irvine Ranch Conservation Programs

Device Giveaways, 1990-present
Irrigation System Incentives, 1992-1997
Conservation Rate Structure, 1991-present
Toilet rebates, 1996-present
Indoor/Outdoor Audits, 1991-present
Public education, various start dates
Conservation Rules and Regulations, 2002
Other Rebate Programs, various start dates

CURRENT CAPACITY AND WATER SOURCES

IRWD purchases approximately 35 percent of its drinking water from the Metropolitan Water District of Southern California (MWDSC). This imported water comes from the Colorado River and Northern California. The remaining 65 percent of the supply comes from local wells.²

FUTURE PLANS TO MEET DEMAND

The population within IRWD's service area is growing at a rate of 3% per year as of 2004. Water conservation and water reuse are the main components of the IRWD's plans to meet demand.

WASHING MACHINE REBATE PROGRAM - DESCRIPTION

Since 2002, the Irvine Ranch Water District, with funding and staff support provided by both MWDSC and MWDOC, has offered a \$100 rebate to residential customers that replace their old washing machines with new High Efficiency Clothes Washers (HECW). Currently, machines must be purchased between July 1, 2005 and December 31, 2006. The HECW must be from a list of eligible machines. These machines, with a water factor of 6.0 or less, use 15 to 25 gallons less water per load. Depending on use, this can save 7,000 gallons of water per year.

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 2002. The findings refer to this year only, not to the ongoing program. The lifespan of the washing machines installed, which is used as the period of this analysis, was assumed to be twelve 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 5.17%. 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 single family households that received a rebate during 2002. There were 222 usable participants out of a total of 249 single family participants rebated during 2002. Twenty-seven, or 10.8%, of the participants were not included in the analysis because they had two or more consecutive months with no water use. There were also 267 multifamily participants during 2002, which were not included.

A sample of IRWD single family residential customers were used as the

²IRWD Fact Sheet, July 2005.

control group. Starting with all single family accounts, certain service villages were eliminated based on data from the participant group. Accounts with ages of housing construction, landscape size, and landscape design similar to the participants were chosen. From this group, a random sample was taken.

Participant pre-measure water consumption was 177,212 gallons while control pre-measure water consumption was 161,515 gallons. The control group consisted of 40,748 households for all years (2000-2004).

ASSUMPTIONS

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

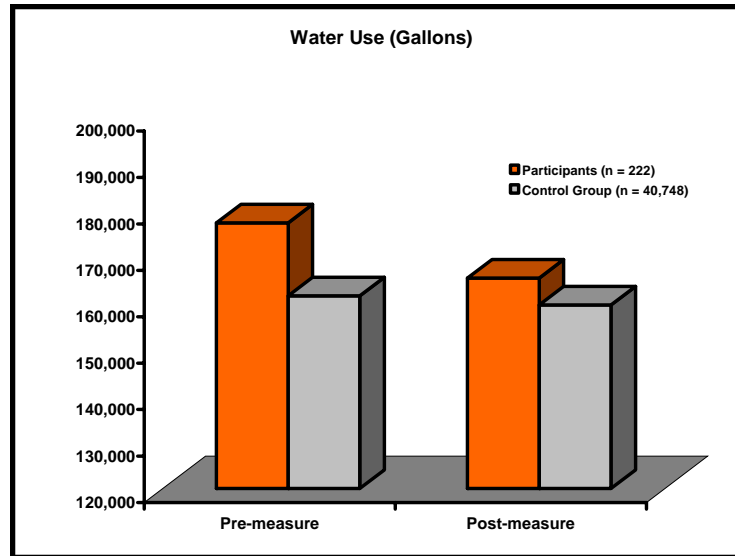
The 2002 CPI value, 179.9, and the 2004 CPI value, 188.9, were used in this analysis.

The estimated average cost of high efficiency washers was \$1000 each and high water use washers was \$400 each. The difference between the two costs (\$600) is used as the cost to the participant, as it is assumed that they would have purchased a high water use washer had they not received the rebate.

The average cost of installation of a washing machine was assumed to be \$0. This is because many appliance stores offer free installation with the purchase of a new washing machine.

It was assumed that 17% of single family residential customers fall into the Low Volume water use category, 68% fall into the Conservation category, 12% fall into the inefficient category, 2% fall into the excessive category, and 1% fall into the wasteful category.

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 2002 rebates, water savings amounted to 2,495,694 gallons (7.66 AF), or 11,242 gallons per participant per year (gppy) (6.3% of pre-measure water use). The second year after, water savings amounted to 1,824,683 gallons (5.6 AF), or 8,219 gppy (4.6% of pre-measure water use). The average water savings per year was 2,916,188 gallons (6.6 AF), or 9,731 gppy (5.5% of pre-measure water use). **The total water savings over the twelve year assumed lifespan was 25,922,261 gallons (79.6 AF), or 116,767 gallons per participant.**

During the two years before participating in the rebate program, participants' water use was 109.7% of the control group's use, on average. During the two years after participating in the rebate program, their water use was 103.6% of the control group's use, on average. The participants' water use decreased by 6.7% from pre-measure to post-measure, whereas the control group's decreased by 1.2%. **The resulting overall water savings attributed to this program was 5.5%.**

RESULTS - COST BENEFIT ANALYSIS

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

- ◆ The quantified cost to the utility was \$1,050 (\$5 per participant). This includes the cost of advertising.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$139,864 (\$630 per participant). This cost includes the difference between the average cost of the high-efficiency washing machines and high water use washing machines.
- ◆ The quantified benefit to the participants was \$46,595 (\$210 per participant). This includes water bill savings, \$23,284 (\$105 per participant), and financial incentives, \$23,311 (\$105 per participant).
- ◆ The quantified cost to others was \$26,183 (\$119 per participant). This includes a cost to MWDOC for advertising, \$187 (\$1 per participant), staff-time, \$354 (\$2 per participant), and a cost to MWDCS for financial incentives and administration, \$25,642 (\$116 per participant).
- ◆ The quantified benefit to the society was \$0.

Quantified Costs and Benefits						
Utility			Participants			
Costs		Benefits	Costs		Benefits	
Advertising	\$1,050	Not Quantified	Washing Machines	\$139,864	Water Bill Savings	\$23,284
					Financial Incentives	\$23,311
Total	\$1,050		Total	\$139,864	Total	\$46,595

UTILITY PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$1,050 from the utility perspective. This is a net benefit of -\$5 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 \$13.**

PARTICIPANT PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$93,269 from the participant perspective. This is a net benefit of -\$420 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 \$1,758.**

OVERALL PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$120,502 from an overall perspective. This is a net benefit of -\$543 per participant. The quantified costs to the participants, society, and the utility were greater than the quantified benefits to the participants, society, and utility. **The cost per acre-foot of water saved from an overall perspective was \$2,100.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

- The customers' time spent during the installation and rebate process.

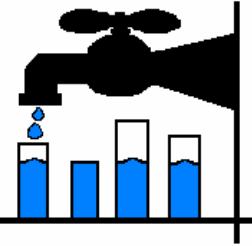
Benefits

- Financial savings on sewer bill for participants.
- Avoided cost 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.
- Reinforces need to conserve water and desirability of conserving.
- Water saved for future municipal use.
- Customers received new washing machine.
- Possible income from the sale of old machines.
- Participants have decreased energy and sewer bills.
- High-efficiency machines use less detergent.

W-3

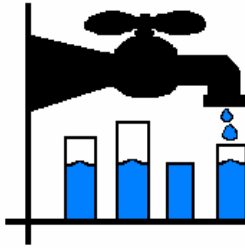
Irvine Ranch Water District

Washing Machine Rebate Program



Results of Cost Benefit Analysis-Lifespan (12 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	1,050	NA	1,050
Costs to Participants	NA	139,864	139,864
Benefits to Others (MWDSC & MWDOC)	NA	NA	26,182
Total Costs	\$1,050	\$139,864	\$167,096
<u>Present Value Benefits</u>			
Total Water Savings	79.55 AF	79.55 AF	79.55 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	46,595	46,595
Benefits to Others (MWDSC & MWDOC)	NA	NA	0
Total Benefits	\$0	\$46,595	\$46,595
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$1,050	-\$93,269	-\$120,502
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$13 /AF	\$1,758 /AF	\$2,100 /AF



Port Angeles Utilities Dept.

Washing Machine Rebate Program

The City of Port Angeles Public Works and Utilities Department serves the city of Port Angeles in Clallam County, Washington. As of the 2000 Census, the median household income in Port Angeles was \$33,130, which is lower than the statewide median of \$45,776.¹

UTILITY DEMOGRAPHICS

As of 2004, the City of Port Angeles had 7,928 connections, 89% of which was residential. Of their total connections, 6,900 were single family residential, 195 were multifamily residential, 831 were commercial, and 2 were industrial.

The City of Port Angeles' total service area is 14 square miles. The population of this service area as of the 2000 census is approximately 18,000. As of 2004, the City of Port Angeles' total water use was 155 gallons per capita per day (gpcd) and their residential water use was 84 gpcd.

WASHING MACHINE REBATE PROGRAM	
Voucher Amount:	\$75
Eligible Customers:	SF, MF
Customers Analyzed:	SF
Program Years:	2001-present
Years Analyzed:	2001-2002

UTILITY RATE STRUCTURE AND PRICES

The City of Port Angeles uses a flat rate structure. Effective January 1, 2005, the monthly base rate for service is \$14.95 for 5/8" meters, which includes zero gallons of water.² Consumption charges for single family and multifamily residential connections are \$1.19 per ccf (\$1.59 per 1,000 gallons).

CURRENT CAPACITY AND WATER SOURCES

The City of Port Angeles has a storage capacity of approximately 18 million gallons. The City of Port Angeles' water supply is groundwater, accessed by a 60 foot deep collector well near the Elwha River. The pumping system is currently able to provide 11 millions gallons per day.

FUTURE PLANS TO MEET DEMAND

The population within the City of Port Angeles' service area is growing at a rate of 1%. The District plans to meet future water demand through the use of current sources. They are permitted to use up to 32.5 mgd through the year 2015.

WASHING MACHINE REBATE PROGRAM - DESCRIPTION

The City of Port Angeles' washing machine rebate program was first initiated on June 1, 2001 and is continuing. The rebate is offered with the purchase of an efficient washing machine. The washing machine must be an Energy Star machine, and the customer must have an electric water heater to qualify. The initial rebate amount was \$75. Since the program began, there have been several changes in the

¹ US Census Bureau. QuickFacts

² City of Port Angeles website

rebate amount offered to customers. The rebates offered for 2001, 2002, 2003, 2004, and 2005 were \$75, \$150, \$100, \$100, and \$50 respectively. The financial incentives are funded by the Bonneville Power Administration energy conservation program.

OTHER PORT ANGELES CONSERVATION PROGRAMS
Showerhead & Aerator Giveaway, July 2001-present
Conservation Ordinance, 2000-present
Adopted as part of a drought response plan,
with water shortage stages and corresponding
water conservation actions.

The District informs its customers about the washing machine rebate program through bill inserts, newspaper articles, radio advertisements, television advertisements, and internet. In addition,

plumbing retailers have encouraged customers to participate in the program upon purchasing new ultra low flow toilets.

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 a rebate in 2001 and 2002. The water savings were calculated and a cost benefit analysis was performed for the years 2001 and 2002. The findings refer to these two years only, not to the ongoing program. The lifespan of the washing machines was assumed to be twelve years.³

All quantified costs and benefits have been discounted to the first year of the analysis (2001) and inflated to 2004 dollars. The discount rate used in this analysis was 5.39%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2001 value of 177.1.

The population studied for this analysis was comprised of participants who received rebates in 2001 or 2002. One hundred twenty-two customers received rebates during this time period. Of those 122 participants, 111 customers were usable for this analysis. Sufficient raw data was not available for 11 program participants (9.0%).

A random sample of 133 City of Port Angeles single family residential households were used in the control group for this analysis. The average pre-measure water use of the 2001 participants (78,839 gallons) was higher than that of the control group (77,031 gallons). The pre-measure water use of the 2002 participants (92,921 gallons) was also higher than the control group (75,532 gallons).

ASSUMPTIONS

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

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

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

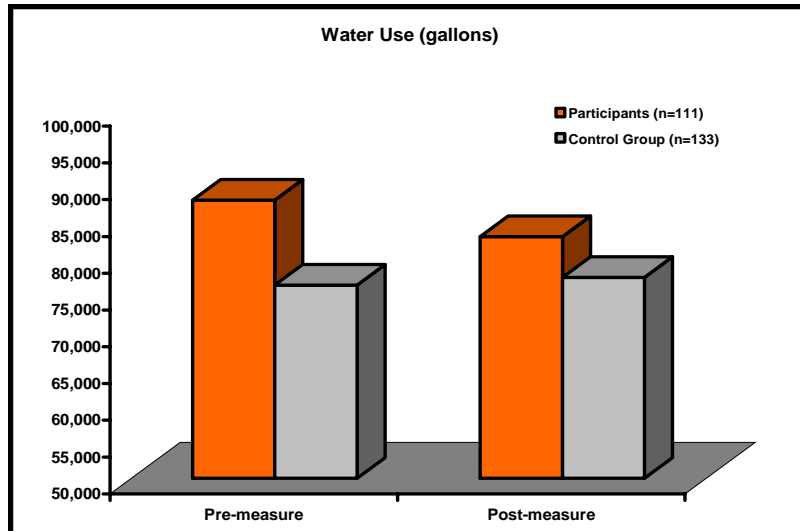
The price of water used in determining the benefits to customers from reduced water bills is the variable portion of the customers' water bill (\$1.07 per ccf in 2002, \$1.11 per ccf in 2003, \$1.16 per ccf in 2004, and \$1.19 per ccf in 2005 and beyond).

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

The estimated average cost of high efficiency washers was \$1000 each and high water use washers was \$400 each. The difference between the two costs (\$600) is used as the cost to the participant, as it is assumed that they would have purchased a high water use washer had they not received the rebate.

The discount rate used in this analysis was 5.39%.

The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2001 value of 177.1.



RESULTS - WATER SAVINGS

In the first year after the 2001 washing machine rebate program, the water savings amounted to 307,233 gallons, or 7,681 gallons per participant per year (gppy) (9.7% of pre-measure water use). The second year after, the water savings amounted to 157,416 gallons, or 3,935 gppy (5.0% of pre-measure water use). The average savings per year was 232,324 gallons or 5,808 gppy (7.4% of pre-measure water use). **Over the twelve year lifespan of the washing machine, the total water savings was 2,787,890 gallons (8.6 AF), or 69,697 gallons per participant.**

In the first year after the 2002 rebate program, the water savings amounted to 307,968 gallons, or 4,338 gallons per participant per year (gppy) (4.7% of pre-measure water use). The second year after, the water savings amounted to 760,506 gallons, or 10,711 gppy (11.5% of pre-measure water use). The average savings per year was 534,237 gallons or 7,524 gppy (8.1% of pre-measure water use). **Over the twelve year lifespan of the washing machine, the total water savings was 6,410,843 gallons (19.7 AF), or 90,294 gallons per participant.**

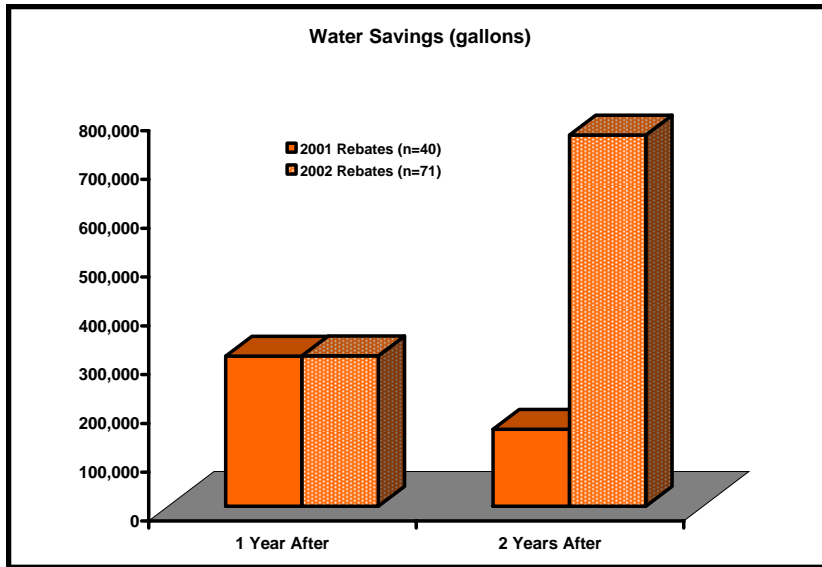
Total water savings for the two years studied was 615,201 gallons, or 5,542 gppy (6.3% of weighted pre-measure water use) during the first year after the rebates and 917,921 gallons, or 8,270 gppy (9.4% of weighted pre-measure water use) during the second year after the

rebates. The total savings over the twelve year assumed lifespan of the washing machines was 9,198,733 gallons (28.2 AF), or 82,871 gallons per participant.

During the two years before participating in the program, participants' water use was 115.2% of the control group's use, on average. During

the two years after participating in the audit program, their water use was 107.2% of the control group's use, on average.

The participants' water use decreased by 5.7% from pre-measure to post-measure, whereas the control group's use increased by 1.4%. The resulting overall water savings attributed to this program was 7.1%.



RESULTS - COST BENEFIT ANALYSIS

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

2001 REBATES

- ◆ The quantified cost to the utility was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$25,599 (\$640 per participant). This cost includes the difference between the average cost of the high-efficiency washing machines and high water use washing machines.
- ◆ The quantified benefit to the participants was \$8,468 (\$212 per participant). This includes water bill savings, \$3,348 (\$84 per participant), and financial incentives \$5,120 (\$128 per participant).
- ◆ The quantified cost to others was \$5,120 (\$128 per participant), including payment of financial incentives by the Bonneville Power Administration.
- ◆ The quantified benefit to others was \$0.

UTILITY PERSPECTIVE - 2001

Results of the cost benefit analysis show a net benefit (net present value) of \$0 from the utility perspective. This is a net benefit of \$0 per participant. The quantified costs to the utility were equal to the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$0.**

PARTICIPANT PERSPECTIVE - 2001

Results of the cost benefit analysis show a net benefit (net present value) of -\$17,131 from the participant perspective. This is a net benefit of -\$428 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 \$2,992.**

OVERALL PERSPECTIVE - 2001

Results of cost benefit analysis show a net benefit (net present value) of -\$22,251 from an overall perspective. This is a net benefit of -\$556 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 \$3,590.**

2001 Quantified Costs and Benefits					
Utility		Participants			
Costs	Benefits	Costs		Benefits	
Not Quantified		Equipment	\$25,599	Water Bill Savings	\$3,348
				Financial Incentives	\$5,120
		Total	\$25,599	Total	\$8,468

2001 Quantified Costs and Benefits		
Bonneville Power Administration		
Costs		Benefits
Financial Incentive Payments	\$5,120	Not Quantified
Total	\$5,120	

2002 REBATES

- ◆ The quantified cost to the utility was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$43,115 (\$607 per participant).

This cost includes the difference between the average cost of the high-efficiency washing machines and high water use washing machines.

- ◆ The quantified benefit to the participants was \$18,307 (\$258 per participant). This includes water bill savings, \$7,377 (\$104 per participant), and financial incentives \$10,930 (\$154 per participant).
- ◆ The quantified cost to others was \$10,930 (\$154 per participant), including payment of financial incentives by the Bonneville Power Administration.
- ◆ The quantified benefit to others was \$0.

UTILITY PERSPECTIVE - 2002

Results of the cost benefit analysis show a net benefit (net present value) of \$0 from the utility perspective. This is a net benefit of \$0 per participant. The quantified costs to the utility were equal to the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$0.**

PARTICIPANT PERSPECTIVE - 2002

Results of the cost benefit analysis show a net benefit (net present value) of -\$24,807 from the participant perspective. This is a net benefit of -\$349 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 \$2,191.**

OVERALL PERSPECTIVE - 2002

Results of cost benefit analysis show a net benefit (net present value) of -\$35,738 from an overall perspective. This is a net benefit of -\$503 per participant. The quantified costs to the participants, utility, and

2002 Quantified Costs and Benefits					
Utility		Participants			
Costs	Benefits	Costs		Benefits	
Not Quantified		Equipment	\$43,115	Water Bill Savings	\$7,397
				Financial Incentives	\$10,930
		Total	\$43,115	Total	\$18,307

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 \$2,747.**

2002 Quantified Costs and Benefits			
Bonneville Power Administration			
Costs		Benefits	
Financial Incentive Payments	\$10,930	Not Quantified	
Total	\$10,930		

BOTH YEARS

- ◆ The quantified cost to the utility was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$68,714 (\$619 per participant). This cost includes the difference between the average cost of the high-efficiency washing machines and high water use washing machines.
- ◆ The quantified benefit to the participants was \$26,775 (\$241 per participant). This includes water bill savings, \$10,725 (\$97 per participant), and financial incentives \$16,050 (\$145 per participant).
- ◆ The quantified cost to others was \$16,050 (\$145 per participant), including payment of financial incentives by the Bonneville Power Administration.
- ◆ The quantified benefit to others was \$0.

UTILITY PERSPECTIVE - BOTH YEARS

Results of the cost benefit analysis show a net benefit (net present value) of \$0 from the utility perspective. This is a net benefit of \$0 per participant. The quantified costs to the utility were equal to the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$0.**

PARTICIPANT PERSPECTIVE - BOTH YEARS

Results of the cost benefit analysis show a net benefit (net present

value) of -\$41,938 from the participant perspective. This is a net benefit of -\$378 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 \$2,434.**

BOTH YEARS Quantified Costs and Benefits					
Utility		Participants			
Costs	Benefits	Costs		Benefits	
Not Quantified		Equipment	\$68,714	Water Bill Savings	\$10,725
				Financial Incentives	\$16,050
		Total	\$68,714	Total	\$26,775

BOTH YEARS Quantified Costs and Benefits		
Bonneville Power Administration		
Costs		Benefits
Financial Incentive Payments	\$16,050	Not Quantified
Total	\$16,050	

OVERALL PERSPECTIVE - BOTH YEARS

Results of cost benefit analysis show a net benefit (net present value) of -\$57,989 from an overall perspective. This is a net benefit of -\$522 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 \$3,003.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

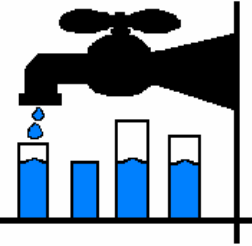
- The customers’ time spent installing the washing machines.
- Proper disposal of old washing machines.
- Advertising and administration costs of the program.

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 about water conservation.
- Water saved for future municipal use.
- Program participants received new washing machines.
- Possible income to participants from the sale of old washing machines.
- Environmental and monetary benefits of reduced use of energy.
- Improved public relations for the utility

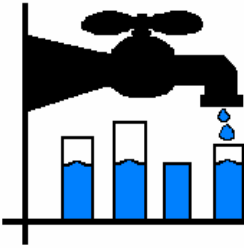
Port Angeles Utilities Dept.

Washing Machine Rebate Program



2001		Results of Cost Benefit Analysis-Lifespan (12 Years)		
	UTILITY	PARTICIPANT	OVERALL	
<u>Present Value Costs</u>				
Costs to Utility		0	NA	0
Costs to Participants		NA	25,599	25,599
Costs to Others		NA	NA	5,120
Total Costs		\$0	\$25,599	\$30,719
<u>Present Value Benefits</u>				
Total Water Savings		8.56 AF	8.56 AF	8.56 AF
Benefits to Utility		0	NA	0
Benefits to Participants		NA	8,468	8,468
Benefits to Others		NA	NA	0
Total Benefits		\$0	\$8,468	\$8,468
<u>Cost Benefit Calculations</u>				
Net Present Value (NPV) (Total Benefits - Total Costs)		\$0	-\$17,131	-\$22,251
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)		\$0 /AF	\$2,992 /AF	\$3,590 /AF

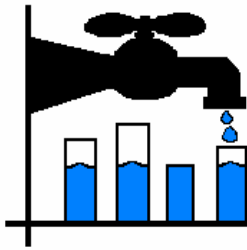
2002		Results of Cost Benefit Analysis-Lifespan (12 Years)		
	UTILITY	PARTICIPANT	OVERALL	
<u>Present Value Costs</u>				
Costs to Utility		0	NA	0
Costs to Participants		NA	43,115	43,115
Costs to Others		NA	NA	10,930
Total Costs		\$0	\$43,115	\$54,045
<u>Present Value Benefits</u>				
Total Water Savings		19.67 AF	19.67 AF	19.67 AF
Benefits to Utility		0	NA	0
Benefits to Participants		NA	18,307	18,307
Benefits to Others		NA	NA	0
Total Benefits		\$0	\$18,307	\$18,307
<u>Cost Benefit Calculations</u>				
Net Present Value (NPV) (Total Benefits - Total Costs)		\$0	-\$24,807	-\$35,738
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)		\$0 /AF	\$2,191 /AF	\$2,747 /AF



Port Angeles Utilities Dept.

Washing Machine Rebate Program

BOTH YEARS	Results of Cost Benefit Analysis-Lifespan (12 Years)		
	UTILITY	PARTICIPANT	OVERALL
<i><u>Present Value Costs</u></i>			
Costs to Utility	0	NA	0
Costs to Customers	NA	68,714	68,714
Costs to Others	NA	NA	16,050
Total Costs	\$0	\$68,714	\$84,764
<i><u>Present Value Benefits</u></i>			
Total Water Savings	28.23 AF	28.23 AF	28.23 AF
Benefits to Utility	0	NA	0
Benefits to Customers	NA	26,775	26,775
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$26,775	\$26,775
<i><u>Cost Benefit Calculations</u></i>			
Net Present Value (NPV) (Total Benefits - Total Costs)	\$0	-\$41,938	-\$57,989
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$0 /AF	\$2,434 /AF	\$3,003 /AF



City of Santa Rosa Utilities

Washing Machine Rebate Program

The City of Santa Rosa Utilities (CSRU) serves the City of Santa Rosa, north of San Francisco in Sonoma County, California. The 1999 median household income in the City of Santa Rosa was \$50,931, which was higher than the statewide median of \$47,493.¹

UTILITY DEMOGRAPHICS

As of December 2004, the City of Santa Rosa Utilities had 48,779 connections. Of these connections, 41,310 were single family residential, 3,046 were multifamily residential, 2,737 were commercial, 1,673 were irrigation, and 13 were recycled water connections. The City of Santa Rosa's total service area is 40.5 square miles. The population of this service area was 154,379 as of January 2004. The City of Santa Rosa's 2004 gross water use was 136 gallons per capita per day (gpcd) and the total residential water use was 99 gpcd.

WASHING MACHINE REBATE PROGRAM	
Type of Program:	Rebate
Eligible Customers:	SF
Customers Analyzed:	SF
Program Years:	1997 - present
Years Analyzed:	2002

UTILITY RATE STRUCTURE AND PRICES

The City of Santa Rosa uses a uniform rate structure. As of 2004, the monthly base rate for water service was \$4.65 for 5/8" meters, which includes zero gallons of water. Single family and multifamily residential usage charges are \$1.98 per hundred cubic feet (ccf) or \$2.65 per 1,000 gallons. The fixed charge for wastewater was \$10.79 for 5/8" meters, with a variable charge of \$4.94 per ccf (\$6.61 per 1,000 gallons).

CURRENT CAPACITY AND WATER SOURCES

The City of Santa Rosa has a storage capacity of 18.7 million gallons. The City of Santa Rosa purchases its water from the Sonoma County Water Agency (SCWA). This water, in turn, is from Lake Mendocino and Lake Sonoma, both located on tributaries of the Russian River.²

FUTURE PLANS TO MEET DEMAND

The population within the City of Santa Rosa's service area is growing at an annual rate of about 1.2%, making it one of the fastest growing cities in the state. The City of Santa Rosa plans to meet future demand by continuing the use of current water supply sources, continuing water conservation programs, water reuse, and possibly developing the use of the City's groundwater resources.

REBATE PROGRAM— DESCRIPTION

Since 1998, the City of Santa Rosa has offered a rebate to customers

¹ US Census Bureau.

² Sonoma County Water Agency. *Water Supply*.

that purchase qualifying water conserving washing machines. From 1998 to 2004, the city offered a \$75 rebate per washing machine.

In July 2004, the rebate amount increased to \$100–150 per qualifying washing machine depending on its efficiency, as determined by the Consortium for Energy Efficiency’s rating system for water and energy efficiency. For washing machines in Tiers 1, 2 and 3A, the rebate is \$100. For washing machines in Tier 3B, the rebate is \$150.

SCWA manages the washing machine rebate program and Electric and Gas Industries Association (EGIA) provides processing and administrative support. During the period of this analysis, customers were eligible for an additional rebate from Pacific Gas and Electric (PG&E).

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

OTHER CSRU CONSERVATION PROGRAMS

Public Education, 1992-present.
Commercial & Multifamily Washing Machine Rebates, April 2000-present
Low-Flow Device Giveaway and Rebates, 1992-2002
Efficient Irrigation Rebate Program, 2002-present
Irrigation customers earn \$1.53 for every 1,000 gallons they save below their Efficient Irrigation Goal for each calendar year.
Audit Program, 1998-present
Water Waste Ordinance, adopted 1999
Best Available Technologies Program, 1997-present
Reduces sewer demand fees for new laundromats and restaurants that install the most water efficient technologies.
Sustained Reduction Rebate Program, 1998-present
Rebates \$100 for every 1,000 gallons of water an ICI customer saves through means other than a toilet, showerhead, or aerator replacement.
Pre-Rinse Spray Nozzle Replacement Program, 2002-present

in the program during 2002. The findings refer to this year only, not to the ongoing program. The lifespan of the washing machines installed, which is used as the period of this analysis, was assumed to be twelve 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 5.17%. 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 households that received a rebate during 2002. There were 174 usable participants out of a total of 456 households rebated during 2002. Two hundred forty, or 53%, of the participants were unusable because they

moved during the period of analysis. Thirty-seven, or 8%, of the participants were unusable because they had participated in more than one conservation program during the time period of analysis. Five participants (1%) were not included in the analysis because they had two or more consecutive months with no water usage. All City of Santa Rosa single-family residential customers that were not participants in the analysis were used as the control group. Participant pre-measure water consumption was 125,037 gallons while control group pre-measure water consumption was 105,482 gallons. The control group consisted of 38,348 households in 2000, 39,476 in 2001, 40,240 in 2002, 40,651 in 2003, and 41,136 in 2004.

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.

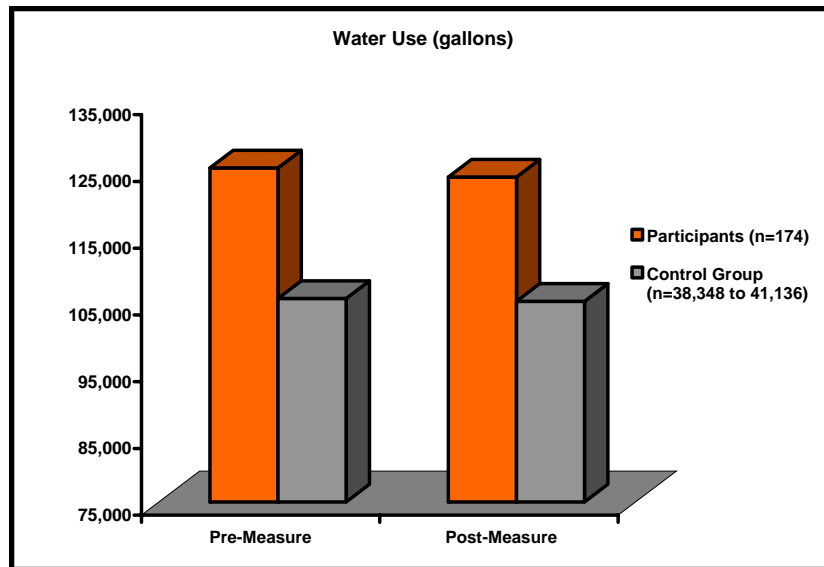
The estimated average cost of high efficiency washers was \$1000 each and high water use washers was \$400 each. The difference between the two costs (\$600) is used as the cost to the participant, as it is assumed that they would have purchased a high water use washer had they not received the rebate.

The average cost of installation of a washing machine was assumed to be \$0. This is because many appliance stores offer free installation with the purchase of a new washing machine.

The price of water used in determining the benefits to customers from reduced water bills is the variable portion of the City's price of water. \$2.43 per 1,000 gallons in 2002 and 2003, \$2.65 per 1,000 gallons in 2004 (and assumed to be \$2.65 for the rest of the lifespan).

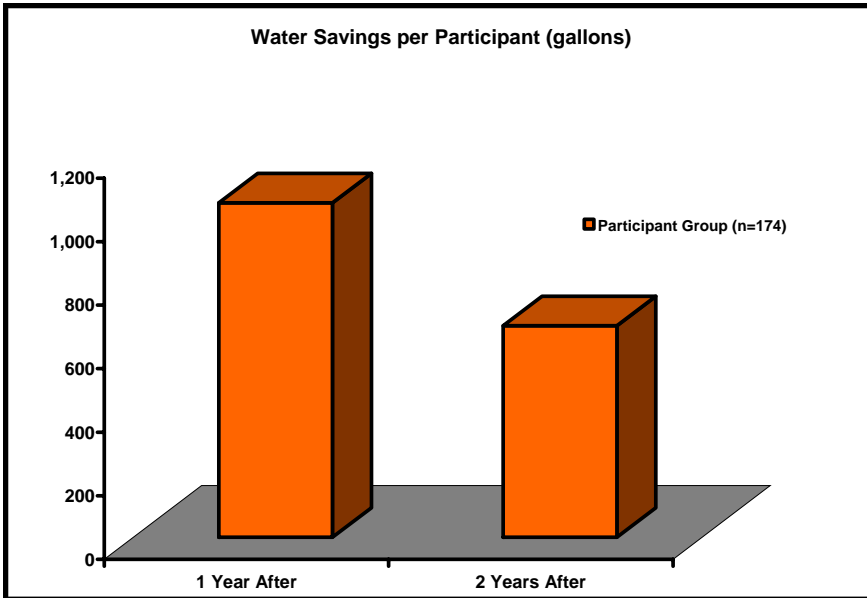
Participants who had two or more consecutive months of no water use were not included in the study.

Participants who participated in any other conservation program during the years 2000 through 2004 were not included in the study.



RESULTS—WATER SAVINGS

In the first year after the 2002 washing machine rebates, the water savings were 183,175 gallons, or 1,053 gallons per participant per year (gppy) (.84% of pre-measure water use). The second year after the



rebate program, water savings were 115,801 gallons or 666 gppy (0.53% of pre-measure water use). The average savings per year was 149,488 gallons (0.46 AF), or 859 gppy (0.69% of pre-measure water use). **The total savings over the twelve year assumed lifespan was 1,793,854 gallons (5.5 AF), or 10,310 gallons per participant.**

During the two years before participating in the washing machine rebate pro-

gram, participants' water use was 119% of the control group's use, on average. During the two years after participating in the program, their water use was 118% of the control group's use, on average. The participants' water use decreased by 1.1% from pre-measure to post-measure, whereas the control group's use decreased by 0.4%. **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 (twelve years).

- ◆ The quantified cost to the utility was \$13,869, including the cost of financial incentive payments, \$13,703, and in-house administration costs, \$166. This is a cost of about \$80 per participant, composing of \$79 for financial incentive payments and \$1 for administration.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$109,623. This exclusively includes the cost of equipment, \$109,623. This is a cost of \$630 per participant.
- ◆ The quantified benefit to the participants was \$17,319. This includes water bill savings, \$3,616; and financial incentives \$13,703. This is a benefit of \$100 per participant, including \$21 for water bill savings and \$79 for financial incentives.
- ◆ The quantified costs to OTHERS was \$3,996. This includes the cost to SCWA, \$2,457, and EGIA, \$1,539, to administer the program. This is a cost of \$23 per participant, including \$14 to SCWA and \$9 to EGIA.

cost to SCWA, \$2,457, and EGIA, \$1,539, to administer the program. This is a cost of \$23 per participant, including \$14 to SCWA and \$9 to EGIA.

- The quantified benefits to OTHERS was \$0.

Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Financial Incentives	\$13,703	Not Quantified		Equip.	\$109,623	Water Bill Savings	\$3,616
Admin. Costs	\$166					Financial Incentives	\$13,703
Total	\$13,869					Total	\$17,319

Quantified Costs and Benefits			
OTHERS (SWCA, EGIA)			
Costs		Benefits	
EGIA admin.	\$13,703	Not Quantified	
SCWA admin.	\$166		
Total	\$13,869		

UTILITY PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of -\$13,869 from the utility perspective. This is a net benefit of -\$80 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 \$2,519.**

PARTICIPANT PERSPECTIVE

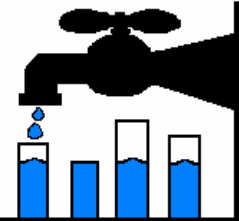
Results of the cost-benefit analysis show a net benefit (net present value) of -\$92,304 from the participant perspective. This is a net benefit of -\$530 per participant. The quantifiable costs to the participants were greater than the quantifiable benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$19,913.**

OVERALL PERSPECTIVE

Results of cost-benefit analysis show a net benefit (net present value) of -\$110,169 from an overall perspective. This is a net benefit of -\$633 per participant. The quantifiable costs to the utility, the participants, and outside funders were greater than the quantifiable benefits to the utility, the participants, and outside funders. **The cost per acre-foot of water saved from an overall perspective was \$23,158.**

City of Santa Rosa Utilities

Washing Machine Rebate Program



Results of Cost Benefit Analysis-Lifespan (12 Years)			
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	13,869	NA	13,869
Costs to Participants	NA	109,623	109,623
Costs to Others (SWCA, EGIA)	NA	NA	3,996
Total Costs	\$13,869	\$109,623	\$127,488
<u>Present Value Benefits</u>			
Total Water Savings	5.51 AF	5.51 AF	5.51 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	17,319	17,319
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$17,319	\$17,319
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$13,869	-\$147,116	-\$164,981
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$2,519 /AF	\$19,913 /AF	\$23,158 /AF

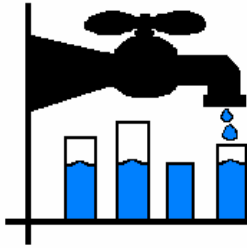
UNQUANTIFIED COSTS AND BENEFITS

Costs

- Customers' time spent installing new washing machines.
- Possible landfill disposal of old washing machines.

Benefits

- Savings on sewer bills.
- Avoided cost of acquisition and distribution of water saved.
- Some participants were eligible for an additional rebate from their energy company.
- Environmental benefits of reduced use of water.
- Increased public awareness about water conservation.
- Water saved for future municipal use.
- Program participants received new washing machines.
- Improved public relations for the utility.
- Potential income from sale of old washing machines.



Tualatin Valley Water District

Washing Machine Rebate Program

Tualatin Valley Water District (TVWD), located in eastern Washington County, Oregon, serves the communities of Cedar Hills, Oak Hills, Terra Linda, Cedar Mill, Reedville, Rock Creek, Cooper Mountain, The Bluffs, Progress, Metzger, Bonny Slope, Aloha, and Orenco. In addition, TVWD also serves portions of the cities Tigard, Beaverton, Portland, and Hillsboro. The District serves a population of approximately 192,000 people. The area's economy has been sustained through the development of high technology, retail, and distribution businesses.¹ As of the 2000 census, the median household income for Washington County was \$52,122, which is higher than the statewide value of \$40,916.²

WASHING MACHINE REBATE PROGRAM	
Rebate Amount	\$50
Eligible Customers:	SF
Customers Analyzed:	SF
Program Years:	2002- present
Years Analyzed:	2002

UTILITY DEMOGRAPHICS

As of March 2004, Tualatin Valley Water District maintained 52,933 connections. Single family and multifamily residential customers accounted for about 94% of total connections (49,553 single family users and 709 multifamily users). The remaining 6% of connections are distributed among commercial users (1,372), industrial users (52), irrigation users (692), and miscellaneous users (555). TVWD's service area encompasses approximately 45 square miles. TVWD's average water use in 2004, in gallons per capita per day (gpcd), was 117. TVWD delivered over 8.8 billion gallons of water in FY2003.³

UTILITY RATE STRUCTURE AND PRICES

Tualatin Valley Water District has an increasing block rate structure. As of November 1, 2004, the bimonthly base rate for service to a typical residential connection is \$13.88. The price per unit of water is as follows:

Usage	Price
0 to 50 ccf (0 – 37,400 gallons)	\$1.63 per ccf (\$2.18 per 1000 gallons)
>50ccf (>37,400 gallons)	\$2.61 per ccf (\$3.49 per 1000 gallons)

CURRENT CAPACITY AND WATER SOURCES

The current storage capacity of Tualatin Valley Water District is over 53 million gallons, spread over 24 covered reservoirs.⁴ TVWD purchases its water from the Portland Water Bureau, which comes primarily from the Bull Run Watershed, and the Joint Water Commission, which comes from the Barney Reservoir. Both are surface water sources.

¹ *About Our District.* Tualatin Valley Water District

² US Census Bureau.

³ *Annual Report 2004.* Tualatin Valley Water District.

⁴ *Annual Report 2004.* Tualatin Valley Water District.

FUTURE PLANS TO MEET DEMAND

TVWD plans to meet its future water needs by continuing the use of current sources, through conservation, possibly purchasing more water from their wholesale water providers, and possibly expanding current sources and facilities.

OTHER TUALATIN VALLEY CONSERVATION PROGRAMS

Landscape Rebate Program, March 2004-present
Water-Saving Kit Distribution, 2002-present
Outdoor Audits, 1997-present
Leak Detection Program, 1970's-present
Conservation Rates, 1994-present
Public Education, 1990-present

REBATE PROGRAM - DESCRIPTION

Since May 2002, Tualatin Valley Water District has offered a rebate of \$50 off the purchase price to single family residential customers who replace high water use washing machines with Energy Star machines. TVWD issues a rebate check directly to the customer. Residents of Oregon also are eligible for a tax credit of up to \$180 of the purchase price of an Energy Star washing machine.

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 a rebate in 2002. The water savings were calculated and a cost benefit analysis was performed for the year 2002. The findings refer to this year only, not to the ongoing program. The lifespan of the washing machines installed, which is used as the period of this analysis, was assumed to be twelve years.⁵

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 for this analysis was 4.29%. The Consumer Price Index values 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 participants who received rebates in 2002. One hundred sixty customers received rebates during this time period. Of those 160 participants, 130 customers (who received 130 rebates) were usable for this analysis. Sufficient raw data was not available for 30 program participants (18.8%). It is possible that some of the remaining 130 households did not live in the household for the full period of analysis.

Tualatin Valley Water District single family residential households,

⁵ Pekelney, D.M. et al. *Guidelines to Conduct Cost-Effectiveness Analysis of Best Management Practices for Urban Water Conservation*. California, 1996.

excluding those included in this analysis, were used as the control group. The control group consisted of 44,667 households in 2000, 46,053 in 2001, 47,370 in 2002, 48,536 in 2003, and 49,578 in 2004.

The average pre-measure annual water use of the participants (102,442 gallons) was greater than that of the control group (87,313 gallons).

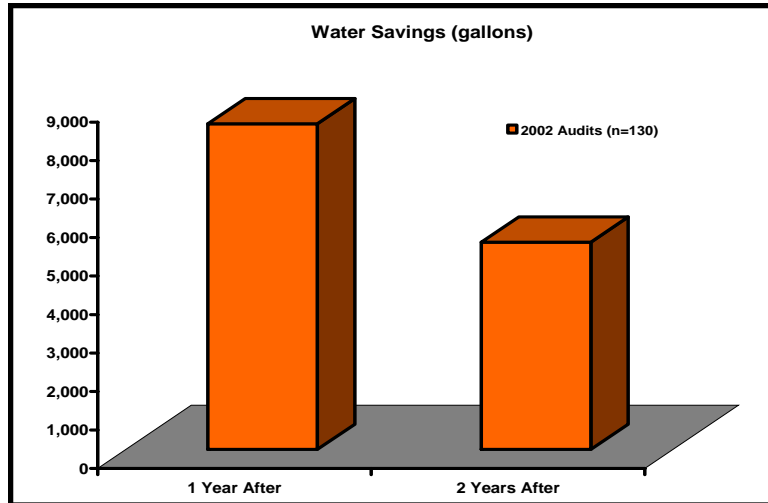
ASSUMPTIONS

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

The number of single family residential connections used for the control group is an average from throughout the year.

The costs for the program in 2002 were assumed to be \$200 for program start-up (\$2000 over 10 years), \$20 for evaluation, \$8 per rebate for processing, \$0.03 per participant for a program brochure, and \$0.02 per participant for advertising in their newsletter.

The price of water used in determining the benefits to customers from reduced water bills is the price from the range where the participants' pre-measure average bimonthly use fell. Average bimonthly use fell into the first tier, so the water rate used was \$1.46 per ccf for 2003, \$1.50 per ccf for 2004, and \$1.63 per ccf for 2005 and beyond.

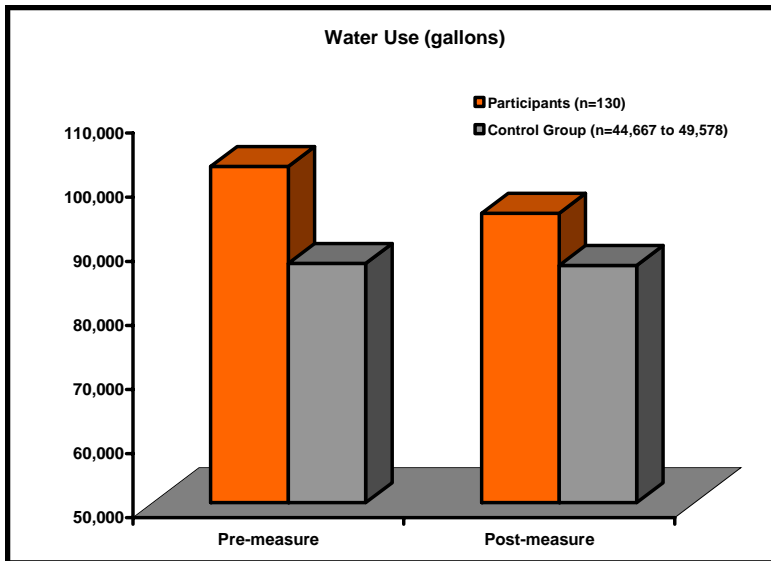


Participants who had two or more consecutive months of no water use were not included in the study.

The estimated average cost of high efficiency washers was \$1000 each and high water use washers was \$400 each. The difference between the two costs (\$600) is used as the cost to the participant, as it is assumed that they would have purchased a high water use washer had they not received the rebate.

RESULTS - WATER SAVINGS

The first year after the rebate program, the water savings amounted to 1,100,459 gallons, or 8,465 gallons per participant per year (gppy) (8.3% of pre-measure water use). The second year after the rebates, the water savings amounted to 700,160 gallons or 5,386 gppy (5.3% of pre-measure water use). Average savings per year was 900,309 gallons or 6,926 gppy (6.8% of pre-measure water use). Total savings over the twelve year assumed lifespan was 10,803,716 gallons (33.2 AF) or about 83,106 gallons per participant.



During the two years before replacing the high water use washing machines, the participant group's water usage was 117.3% of the control group's usage, on average. During the two years after replacing the washing machines, the participant group's water usage was 109.4% of the control group's usage, on average. The participant group's water use decreased by 7.1%, whereas the control group's use decreased by 0.4%. **The resulting**

overall water savings attributed to this program was 6.7%.

RESULTS - COST BENEFIT ANALYSIS

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

- ◆ The quantified cost to the utility was \$7,945 (\$61 per participant). This cost includes the cost of incentive payments, \$6,825 (\$53 per participant), labor, \$1,092 (\$8 per participant), consulting, \$21 (\$0.16 per participant), and advertising, \$7 (\$0.05 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to participants was \$81,902 (\$630 per participant). This cost includes the difference between the average cost of the high-efficiency washing machines and high water use washing machines.
- ◆ The quantified benefit to participants was \$25,493 (\$197 per participant). This value includes water bill savings, \$18,668 (\$144 per participant), and the amount that the customers received in financial incentives, -\$6,825 (\$53 per participant).

Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Incentive Payments	\$6,825	Not Quantified		Washing Machines	\$81,902	Water Bill Savings	\$18,668
Labor	\$1,092					Financial Incentives	\$6,825
Consulting	\$21						
Advertising	\$7						
Total	\$7,945						

UTILITY PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$7,945 from the utility perspective. This is a net benefit of -\$61 per participant. This is a negative result; 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 \$240.**

PARTICIPANT PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$56,409 from the participant perspective. This is a net benefit of -\$434 per participant. This is a negative result; the quantified costs to program participants were greater than the quantified benefits to the participants. **The cost per acre-foot of water saved from the participant perspective was \$2,470.**

OVERALL PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$64,354 from an overall perspective. This is a net benefit of -\$495 per participant. This is a negative result; 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 \$2,710.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

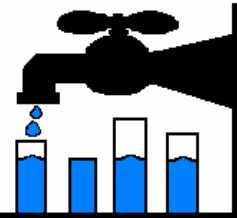
- **Possible landfill disposal of old washing machines.**

Benefits

- **Financial savings on sewer bills for participants.**
- **Avoided costs of acquisition and distribution of water saved.**
- **Environmental benefits of reduced water use.**
- **Increased public awareness about water conservation.**
- **Water saved for future municipal use.**
- **Reduced groundwater depletion, subsidence and surface water use.**
- **Program participants received new washing machines.**
- **Possible income from the sale of old machines.**
- **Some machines are refurbished and given to low-income families.**
- **Participants receive a tax credit from the State of Oregon for up to \$180.**
- **Participants have decreased energy and sewer bills.**
- **High-efficiency machines use less detergent.**

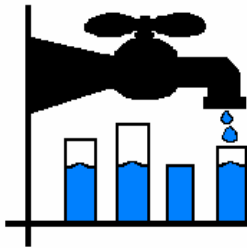
Tualatin Valley Water District

Washing Machine Rebate Program



Results of Cost Benefit Analysis-Lifespan (12 Years)

	UTILITY	PARTICIPANT	OVERALL
<u><i>Present Value Costs</i></u>			
Costs to Utility	7,945	NA	7,945
Costs to Participants	NA	81,902	81,902
Costs to Others	NA	NA	0
Total Costs	\$7,945	\$81,902	\$89,847
<u><i>Present Value Benefits</i></u>			
Total Water Savings	33.16 AF	33.16 AF	33.16 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	25,493	25,493
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$25,493	\$25,493
<u><i>Cost Benefit Calculations</i></u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$7,945	-\$56,409	-\$64,354
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$240 /AF	\$2,470 /AF	\$2,710 /AF



Thornton Water Res. Div.

Washing Machine Rebate Program

The City of Thornton Water Resources Division (TWRD) is located in Thornton, Colorado, approximately 10 miles north of downtown Denver. As of March 31, 2005, the population served by TWRD was 127,832, where 111,002 reside inside the city and 16,830 reside outside the city. Median household income was \$54,445 as of the 2000 census, which was higher than the statewide average of \$47,203.¹

UTILITY DEMOGRAPHICS

As of May 2005, TWRD maintained 34,259 connections of which 94.3% were residential. Of their total connections, 30,377 were single family residential, 1,937 were multifamily residential, 628 were ICI, and 1,317 were irrigation accounts, including city parks. In addition to providing water to individual retail customers, TWRD provides 2.0 million gallons per day (mgd) of treated water to the City of Westminster. TWRD's total service area is 19 square miles. As of 2004, average customer water use in gallons per capita per day (gpcd) was 142 for all customers and 129 for residential customers.

WASHING MACHINE REBATE	
Eligible Customers:	SF
Customers Analyzed:	SF
Program Years:	2003 – present
Years Analyzed:	2003

UTILITY RATE STRUCTURE AND PRICES

As of 2004, the domestic inside-city monthly service charge is \$2.46 for a 5/8 x 3/4 inch meter and the outside-city charge is \$3.69 per month. TWRD has an increasing block rate structure. The four-tier structure categorizes rates by determining how much a customer uses relative to their Average Winter Consumption (AWC) and their Monthly Outdoor Allowance (MOA):

USAGE	PRICE	
	INSIDE CITY	OUTSIDE CITY
0 gallons - AWC	\$3.00/1,000g	\$4.50/1,000g
> AWC, up to AWC + MOA	\$3.00/1,000g	\$4.50/1,000g
> AWC + MOA, up to AWC + 2xMOA	\$4.50/1,000g	\$6.75/1,000g
> AWC + 2xMOA	\$9.00/1,000g	\$13.50/1,000g

CURRENT CAPACITY AND WATER SOURCES

Currently, the capacity of existing raw water storage from reservoirs is 26,594 acre-feet. Their treated water storage capacity is 27 mgd. TWRD has two water treatment plants that have a combined capacity of 65 mgd. TWRD's primary water sources are Clear Creek and the South Platte River.

FUTURE PLANS TO MEET DEMAND

The City of Thornton's growth rate has decreased from 5.0% in 2002 to 3.8% in 2004. The city's plans to meet future demand through a

¹ U.S. Census Bureau, American FactFinder.

number of different actions. They plan to continue use of current capacity and sources, implement a planned surface water supply project from the Cache la Poudre River basin, expand storage and treatment facilities, continue conservation efforts, purchase and exchange additional water rights, and develop water reuse projects.

REBATE PROGRAM - DESCRIPTION

On May 1, 2003, the Washing Machine Rebate program began, which offers single family customers a \$125 credit on their water bill for the purchase of a new high-efficiency washing machine. The rebate is limited to one per household. Washing machines must be on a list of qualifying models to be eligible. Participants must take a picture of the new, installed washing machine and attach it to the rebate application. Participants can

OTHER THORNTON CONSERVATION PROGRAMS

Toilet Rebates, May 1, 2003 - present
Tiered Conservation Rates, effective May 15, 2003
Public Education, May 2002-present
Water Conservation Ordinances, various start dates

also be selected for inspection of their new washing machine and their original sales receipt. The program is advertised in billing inserts, on TWRD's website, on television ads, at festivals, and in TWRD's quarterly magazine.

During the time of the washing machine rebate program, especially from 2002 to 2004, the area was experiencing a drought and there were ongoing water conservation campaigns to mitigate the effects of the drought. However, a major snowstorm in March 2003 improved TWRD's water supply situation. Another important measure taking place during the period of the washing machine rebate program was the utility-wide transition from a flat rate structure to a conservation rate structure in May 2003.

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 a washing machine rebate between May 1 and December 31, 2003. The water savings were calculated and a cost benefit analysis was performed for this time period. Results refer to this time period, not to the ongoing program. The lifespan of the washing machines, which is used as the period of analysis, was assumed to be 12 years.

All quantified costs and benefits have been discounted to the first year of the analysis (2003) and inflated to 2004 dollars. The discount rate used in this analysis was 4.38%. The CPI values that were used in this analysis were the 2004 value of 188.9 and the 2003 value of 184.0.

Since two complete years of pre- and post-measure water use could not be acquired for this analysis, water use data for the participants was acquired from 18 months before the program and 18 months after the program for all households that were residing there for that full period. The pre-measure period includes January 2002 to June 2003, and the

post-measure period includes January 2004 to June 2005.

The population studied for this analysis was comprised of all participants who received washing machine rebates between May 1 and December 31, 2003. There were 85 usable participants out of 174 total participants during the period under analysis.

All TWRD single family households, including the participants, were used as the control group. The average annual pre-measure water use of the participants (122,976 gallons) was higher than that of the control group (107,839 gallons). The number of control group connections varied by month, from a minimum of 20,148 to a maximum of 24,532.

ASSUMPTIONS

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

The 2003 CPI value, 184.0, and the 2004 CPI value, 188.9, were used in this analysis.

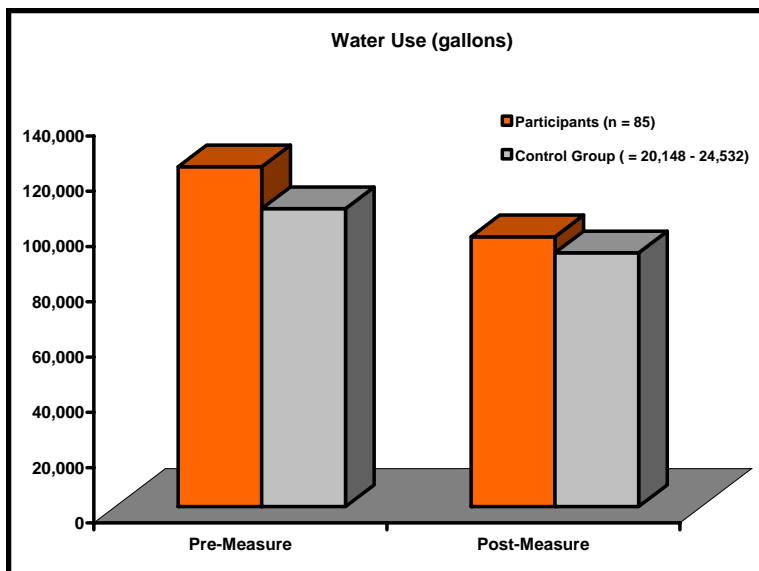
Participants who participated in any other water conservation program during the period of analysis were not included in the study.

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

Any participants that had 11 to 13 months of usage per year were included in the study.

The control group consisted of all single family residential connections, including participants.

The percentage of washing machine rebate program participants who lived inside the city was 97%. However, it was assumed that 100% of participants lived inside the city, thus Inside-City rates apply for all cost benefit analysis calculations.



Since all participants were assumed to reside inside the city, Outside-City connections were not included in the control group.

It was assumed that average participant water use falls into tier 1 or 2 of the increasing block rate structure implemented in 2003.

The average cost of installation of a washing machine was assumed to be \$0. This is because many appliance stores offer free installation with the purchase of a new washing machine.

The estimated average cost of high efficiency washers was \$1000 each and high water use washers were \$400 each. The difference between

the two costs (\$600) is used as the cost to the participant, as it is assumed that they would have purchased a high water use washer had they not received the rebate.

RESULTS - WATER SAVINGS

During the 18 months after receiving the washing machine rebates, water savings amounted to 895,796 gallons or 10,539 gallons per participant (5.7% of pre-measure water use). The average savings per year was 597,197 gallons, or 7,026 gallons per participant per year (gppy) (5.7% of pre-measure water use). **The total savings over the twelve year assumed lifespan was 7,166,367 gallons (22.0 AF), or 84,310 gallons per participant.**

During the 18 months before participating in the washing machine rebate program, the participant group's water use was, on average, 114.0% of the control group's use. During the 18 months after, the participant group's water use was 106.4% of the control group's use, on average. The participant group's water use decreased by 20.6%, whereas the control group's use decreased by 14.9%. **The resulting overall water savings attributed to this program was 5.7%.**

RESULTS - COST BENEFIT ANALYSIS

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

- ◆ The quantified cost to the utility was \$13,659 (\$161 per participant). This cost includes the cost of financial incentives, \$10,908 (\$128 per participant), labor, \$2,659 (\$31 per participant), and advertising, \$91 (\$1 per participant).
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to the participants was \$52,358 (\$616 per participant), which includes the cost of the washing machines.
- ◆ The quantified benefit to the participants was \$27,796 (\$327 per participant). This includes the benefits of water bills savings, \$16,888 (\$199 per participant), and financial incentives, \$10,908 (\$128 per participant).

Quantified Costs and Benefits							
Utility				Participants			
Costs		Benefits		Costs		Benefits	
Financial Incentives	\$10,908	Not Quantified		Washing Machines	\$52,358	Water bill savings	\$16,888
Labor	\$2,659					Financial Incentives	\$10,908
Advertising	\$91						
Total	\$13,659					Total	\$27,796

UTILITY PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of -\$13,659 from the utility perspective over the twelve year assumed lifespan of the washing machines. This is a net benefit of -\$161 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 \$621.**

PARTICIPANT PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of -\$24,563 from the perspective of the participant. This is a net benefit of -\$289 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 \$2,381.**

OVERALL PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of -\$38,221 from an overall perspective. This is a net benefit of -\$450 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 \$3,002.**

UNQUANTIFIED COSTS AND BENEFITS

Costs

- Possible landfill disposal of old washing machines.

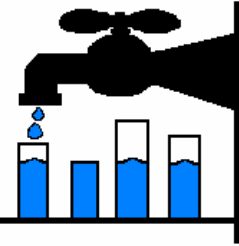
Benefits

- Financial savings on sewer bill for participants.
- Utility avoids the cost of acquiring and distributing the water saved.
- Reduced energy bills for participants.
- 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.
- Water saved for future municipal use.
- Participants received new washing machines.
- Possible income from the sale of old machines.
- Participants have decreased energy and sewer bills.
- High-efficiency machines use less detergent.

W-7

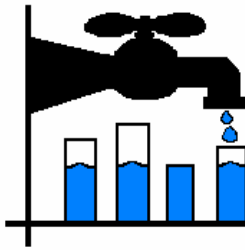
Thornton Water Res. Div.

Washing Machine Rebate Program



Results of Cost Benefit Analysis-Lifespan (12 Years)

	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	13,659	NA	13,659
Costs to Participants	NA	52,358	52,358
Costs to Others	NA	NA	0
Total Costs	\$13,659	\$52,358	\$67,139
<u>Present Value Benefits</u>			
Total Water Savings	21.99 AF	21.99 AF	21.99 AF
Benefits to Utility	0	NA	0
Benefits to Participants	NA	27,796	27,796
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$27,796	\$27,796
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	-\$13,659	-\$24,563	-\$38,221
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$621 /AF	\$2,381 /AF	\$3,002 /AF



Community Water of Green Valley

Commercial Washing Machine 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 was 142 gallons per capita per day (gpcd).

UTILITY RATE STRUCTURE AND PRICES

CWCGV has a uniform price structure. The minimum monthly charge for 5/8" meters, which accounts 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.

WASHING MACHINE REPLACEMENT

Eligible Customers:	Condominium Complex
Years Analyzed:	Installation: March 2003 Water Use 2000 - 2004

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.

COMMERCIAL WASHING MACHINE REPLACEMENT PROGRAM - DESCRIPTION

In March 2003, six washing machines were replaced in one of the Villas West Condominiums' community laundromats. The Villas West Condominiums is a condominium complex built in 1964, with 672 units. It is an age restricted community (55+). There are four laundromats at the complex and the particular facility where these machines were

¹ Arizona Department of Commerce: Green Valley Community Profile.

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

replaced is heavily used by residents. Top loading Speed Queen washing machines were replaced by front loading Maytag Neptune commercial high efficiency washing machines. The top loading Speed Queen machines use approximately 30 gallons per cycle. The Maytag Neptune machines use approximately 13 gallons per cycle.

Villas West Condominiums contracts with WEB Service Company for laundromat management. This contract entails the provision of washing machines, service, and maintenance. The company considers

OTHER CWCGV CONSERVATION PROGRAMS

Public Education, *ongoing.*

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

Showerhead and Faucet Aerator Giveaway,

1992 – present

CWCGV distributes free conservation packets with two low-flow showerheads, two faucet aerators, and one low-flow faucet fixture.

the property's needs (e.g. the need for new machines, as well as the need to cut water and energy costs) in addition to the nature of the contract when making decisions regarding machine selection and/or replacement. WEB Service Company purchased the new washing machines for \$725 each. The approximate retail price for these machines is \$1,600 each. Community Water Company of Green Valley was not involved through

incentive or any other means in this washing machine replacement; however, it does provide water to the condominiums.

METHODOLOGY

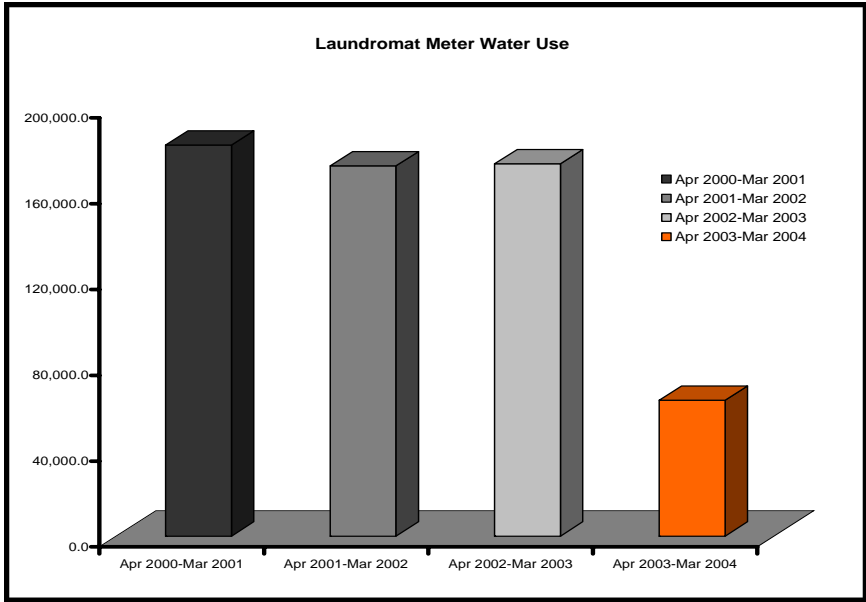
Please see the General Methodology for the specific procedures and techniques used for all ECoBA analyses.

The analysis includes one laundromat at Villas West Condominiums. This laundry facility is served by one meter for which water use data was acquired for three years before and one year following the washing machine replacement. The analysis findings refer only to the washing machine replacements at this particular laundromat during the specified time period only, and not to subsequent washing machine replacements. The lifespan of the washing machines was assumed to be two years because they were intended for commercial use.³ Given this assumption, water savings, costs, and benefits were extrapolated to March 2006.

All quantified costs and benefits have been discounted to the first year of the analysis (2003) and inflated to 2004 dollars. The discount rate used for this analysis was 3.1%. The Consumer Price Index value used in this analysis was the 2004 value of 188.9 and the 2003 value of 184.0.

Water use data was acquired for three years before and one year after the washing machine replacement at Villas West Condominiums. Given the nature of this analysis, no control group was available.

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



ASSUMPTIONS

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

There was no control group for this analysis as only one facility's water use was being analyzed before and after the installation of water conserving appliances.

The discount rate used was 3.1%, for a 3-year lifespan (the minimum specified in OMB Circular A-94) from 2003.

The Consumer Price Index value used in this analysis was the 2004 value of 188.9 and the 2003 value of 184.0.

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).

RESULTS - WATER SAVINGS

In the year after the installations, the water savings amounted to 112,767 gallons, or 0.35 AF (64% of pre-measure use). **The total savings over the two year assumed lifespan was 225,533 gallons, or 0.69 AF.**

During the year after the washing machine replacements, water use at the laundry facility was 36.0% of the average water use during the three years before the replacements. **The resulting overall water savings attributed to this program was 64%.**

RESULTS - COST BENEFIT ANALYSIS

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



Quantified Costs and Benefits					
Utility		Participant			
Costs	Benefits	Costs	Benefits		
Not Quantified		Washing Machines	\$4,466	Water Bill Savings	\$237
		Total	\$4,466	Total	\$237

- ◆ The quantified cost to the utility was \$0.
- ◆ The quantified benefit to the utility was \$0.
- ◆ The quantified cost to Villas West Condominiums was \$4,466. This includes the cost of six washing machines purchased in bulk through WEB Services at \$744 each.
- ◆ The quantified benefit to Villas West Condominiums was \$237. This includes water bill savings, \$237.

UTILITY PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of \$0 from the utility perspective. The quantified costs to the utility were equal to the quantified benefits to the utility. **The cost per acre-foot of water saved from the utility perspective was \$0 as there was no quantified cost to the utility.**

PARTICIPANT PERSPECTIVE

Results of the cost benefit analysis show a net benefit (net present value) of -\$4,235 from Villas West Condominiums' perspective. The quantified costs to the condominium were greater than the quantified benefits to the condominium. **The cost per acre-foot of water saved from the participant perspective was \$6,452.**

OVERALL PERSPECTIVE

Results of cost benefit analysis show a net benefit (net present value) of -\$4,229 from an overall perspective. The quantified costs to the condominium and utility were greater than the quantified benefits to the condominium and utility. **The cost per acre-foot of water saved from an overall perspective was \$6,452.**

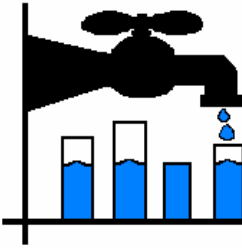
UNQUANTIFIED COSTS AND BENEFITS

Costs

- Disposal of old washing machines
- Laundry detergent specially designed for high efficiency washing machines

Benefits

- Financial savings on sewer bills for participants.
- Avoided cost of acquisition and distribution of water saved.
- Reduced energy bills
- Environmental benefits from reduced water use
- New washing machines
- Resident satisfaction with new laundry facility



Community Water of Green Valley

Commercial Washing Machine Program

Results of Cost Benefit Analysis-Lifespan (2 Years)			
	UTILITY	PARTICIPANT	OVERALL
<u>Present Value Costs</u>			
Costs to Utility	0	0	0
Costs to Customers	NA	4,465	4,465
Costs to Others	NA	0	0
Total Costs	\$0	\$4,465	\$4,465
<u>Present Value Benefits</u>			
Total Water Savings	0.69 AF	0.69 AF	0.69 AF
Benefits to Utility	0	0	0
Benefits to Customers	NA	237	237
Benefits to Others	NA	NA	0
Total Benefits	\$0	\$237	\$237
<u>Cost Benefit Calculations</u>			
Net Present Value (NPV) (Total Benefits - Total Costs)	\$0	-\$4,229	-\$4,229
Cost Effectiveness Analysis (CEA) (Total Costs ÷ Total Water Savings)	\$0 /AF	\$6,452 /AF	\$6,452 /AF

