

# 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.<sup>1</sup>

### 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

<sup>1</sup> 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.<sup>2</sup>

### **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

<sup>2</sup>IRWD 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.*

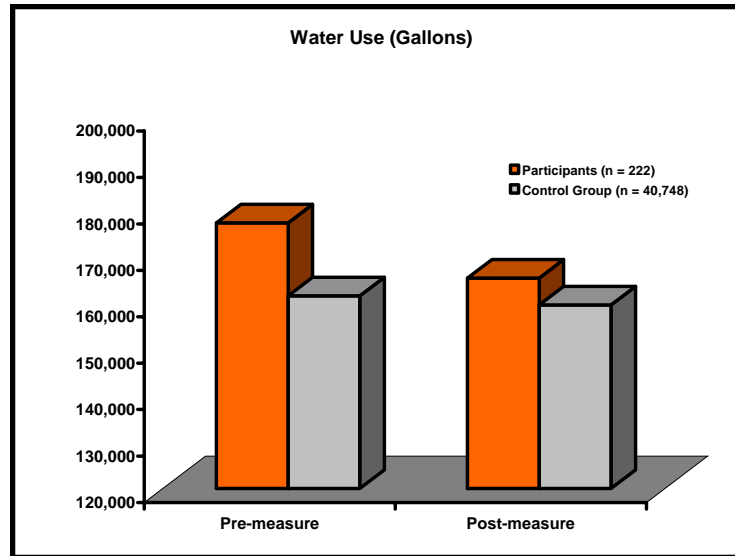
The 2002 CPI value, 179.9, and the 2004 CPI value, 188.9, were used in this analysis.

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
<b>Total</b>	<b>\$1,050</b>		<b>Total</b>	<b>\$139,864</b>	<b>Total</b>	<b>\$46,595</b>

#### 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.

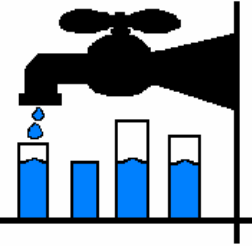
##### Benefits

- 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.

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# Irvine Ranch Water District

## Washing Machine Rebate Program



### Results of Cost Benefit Analysis-Lifespan (12 Years)

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