

OVERALL FINDINGS

The ECoBA project analyzed a total of 88 separate cases (defined as one year of a program), from 42 different programs offered by 30 utilities. The programs analyzed occurred between the years 1994 and 2003. The size of the participating utilities varied greatly, serving a population of as many as 1,500,000 to as few as 13,500.

As we found utilities willing to participate in the ECoBA project and determined that they had the water use data and the direct cost information that we would need to do the analyses, the cases gathered into several distinct categories:

AUDITS, DEVICE GIVEAWAYS, WASHING MACHINE REBATES, LANDSCAPE CONVERSIONS, TOILET REBATES, TOILET DISTRIBUTIONS, RATES and MISCELLANEOUS.

ALL ECoBA PROGRAMS	
Total Cases Analyzed:	88
Total Programs Analyzed:	42
Participating Utilities:	30
Case Years Analyzed:	Between 1994 and 2003

For purposes of comparison between conservation measures we have, in some instances, chosen to look at the rate cases and miscellaneous programs separately. We have noted these inclusions and exclusions as they occur.

Participants in all the analyzed programs had overall water use ranging from 87% and 144% of their control groups prior to the measures studied, and their water use ranged from 77% to 132% of control group water use after the measures.

FINDINGS OF NOTE

- ◆ **TOILET REBATE programs showed only 63% of the predicted water savings, while TOILET DISTRIBUTION programs showed 228% of what was predicted in water savings.**
- ◆ **AUDIT programs and WASHING MACHINE programs attracted significantly higher water users than typical.**
- ◆ **LANDSCAPE CONVERSION programs attracted significantly lower than typical water users.**
- ◆ **The greatest variation in range of savings was seen with WASHING MACHINE REBATE programs followed by TOILET DISTRIBUTIONS.**

(cont'd on page 18)

FINDINGS OF NOTE, cont'd

Excluding the single ordinance, class, and surcharge programs analyzed:

- ◆ **TOILET DISTRIBUTION** programs showed the greatest savings per participant (27,000 gallons annually) followed by **LANDSCAPE CONVERSION** programs (22,000 gallons annually).
- ◆ **TOILET DISTRIBUTION** programs showed the greatest persistence in savings from year one to year two after the program, saving 77% more water per participant the second year after the program compared with year one.
- ◆ **AUDITS** showed the highest costs to save an AF of water (\$1,284) followed by **Landscape Conversions** (\$1,099).
- ◆ **TOILET DISTRIBUTIONS** showed the lowest cost to save an AF of water (\$181).
- ◆ **LANDSCAPE CONVERSIONS** showed the highest per participant costs to the Utility and Other Funders (\$650) followed by **TOILET DISTRIBUTIONS** (\$330), **TOILET REBATES** (\$151), **WASHING MACHINE** programs (\$144), **AUDITS** (\$116), and **DEVICE GIVEAWAYS** (\$4).

Ranges:

- ◆ The tightest range of savings per participant was realized with **TOILET REBATE** programs, followed by **DEVICE GIVEAWAYS** (consistently little or no savings).
- ◆ The most variable range of savings was with **WASHING MACHINE REBATE** programs followed by **TOILET DISTRIBUTIONS**.

Side Note: There was a relationship between the size of the utilities studied and the cost to save an AF of water (see page 26).

WATER SAVINGS

Some analyses show “negative” water savings, where control group water use decreased more (or increased less) than participant water use.

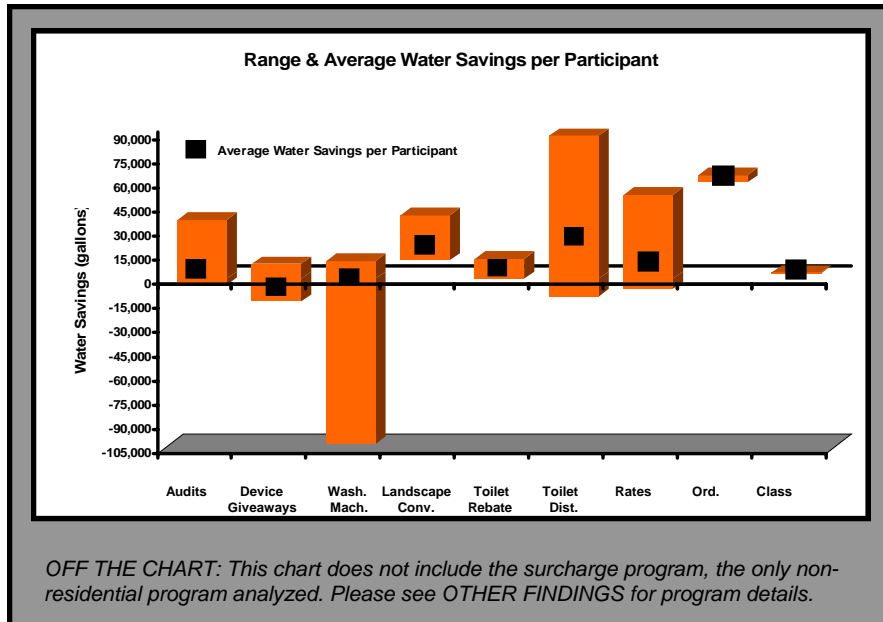
RANGE & AVERAGE SAVINGS

For **AUDIT** programs, water savings per participant varied from 36,490 gallons to -4,152 gallons (a relative increase in water use) for the eight cases we examined. **The average water savings for program participants was 8,690 gallons, a savings of 5.0%.**

Water savings for **DEVICE GIVEAWAY** programs varied from 9,229 gallons per participant per year to -14,341 gallons (a relative increase in water use) per participant. **The average annual water savings for**

these programs was **-6,692** gallons, a savings of **- 4.7%**.

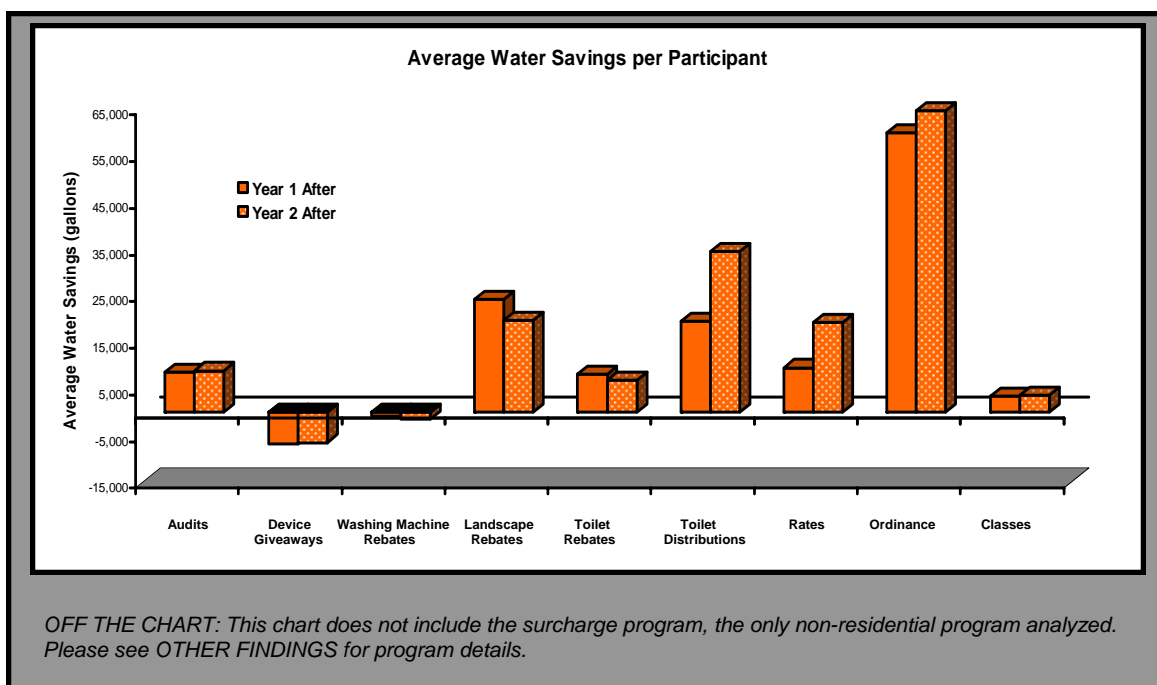
**W A S H I N G
M A C H I N E**
programs showed a range of savings per participant per year from 11,242 gallons to **-103,987** gallons (a relative increase in water use). Without **Utility W-1**, the range was 11,242 gallons to **-7,941** gallons, and the **average water savings was 3,176 gallons, or 2.0%**.

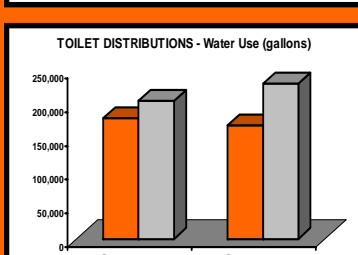
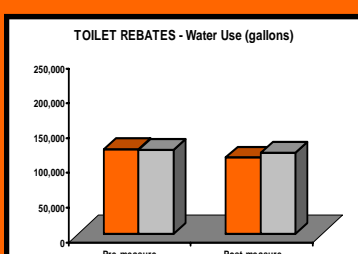
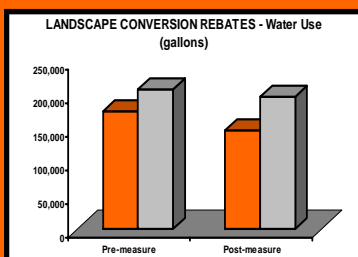
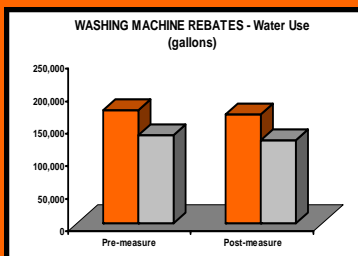
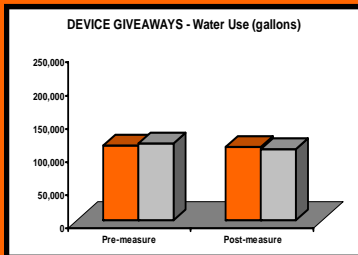
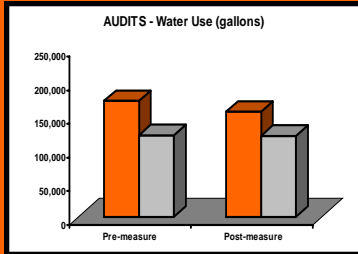


For **LANDSCAPE CONVERSIONS**, water savings per participant per year ranged from 11,387 gallons to 39,665 gallons per participant. **The average water savings per participant was 21,897 gallons, or 11.6%**.

Water savings for customers taking advantage of **TOILET REBATE** programs we studied varied from 12,504 gallons to a **-760** gallons per participant per year (a relative increase in water use). **The average water savings per participant was 7,440 gallons, a savings of 6.7%**.

TOILET DISTRIBUTION programs showed a range of water savings





Participant Groups
 Control Groups

PRE & POST MEASURE RELATIVE WATER USE

The water use characteristics of participants compared with their control groups varied between programs and are reflected in the charts to the left. Customers receiving audits and washing machine rebates are substantially higher water users than average. Those receiving conservation devices and toilet rebates almost exactly reflect the single family residential populations of their utilities, and participants in the landscape conversion and toilet replacement programs are substantially lower than average water users even before taking advantage of these utility offerings.

Those availing themselves of **AUDITS** offered by their utility showed water use at 144% of the control group prior to the audit and 132% after. These are significantly higher water users than average. Some of the utilities studied actively target their high water users for auditing while it appears that other utilities who offer audits to all customers are attracting higher water users who may be more conscious of the need to lower their water use expenditures.

Water use among folks accepting free **CONSERVATION DEVICES** was so close to control group water use as to be statistically insignificant: 97% prior to obtaining the devices, and 101% after.

There is a significant difference between water use among customers who availed themselves of **WASHING MACHINE REBATES** and the control group. Prior to acquiring the new washing machines, participants used 130% of the typical single family customer in their utility. The two years following the installation of the new machine, these same customers actually used 132% of the control group. This is not a significant change.

Customers who took advantage of their utility's **LANDSCAPE CONVERSION REBATES** had water use that was 87% of the control group prior to the conversion and 77% following the conversion. These rebates were available to all customers so they weren't actively targeting high water users. The programs seemed to attract folks who were already thrifter than average and who were looking to cut their water use even farther, perhaps have less maintenance, and take full advantage of other side benefits of the program.

Water use for customers who took advantage of **TOILET REBATE** programs offered by their utilities was very similar to the control group: 104% prior to receiving their rebates and 96% following the rebates.

TOILET DISTRIBUTION programs were targeted to a certain demographic area within the boundary of the utility and those receiving the distributed toilets used 91% of average water per household control group prior to the toilet distribution and 78% the two years following the distribution

per participant of 89,116 gallons to **-11,078** gallons per participant per year (a relative increase in water use). **The average savings per participant was 26,890 gallons, a savings of 15.1%.**

RATE CHANGE programs showed a range of water savings per participant of 52,188 gallons to **-6,394** gallons per participant per year (a relative increase in water use). **The average savings per participant was 14,335 gallons, a savings of 4.8%.**

The **ORDINANCE** program showed an average savings per participant per year of 62,208 gallons, or 30.5%.

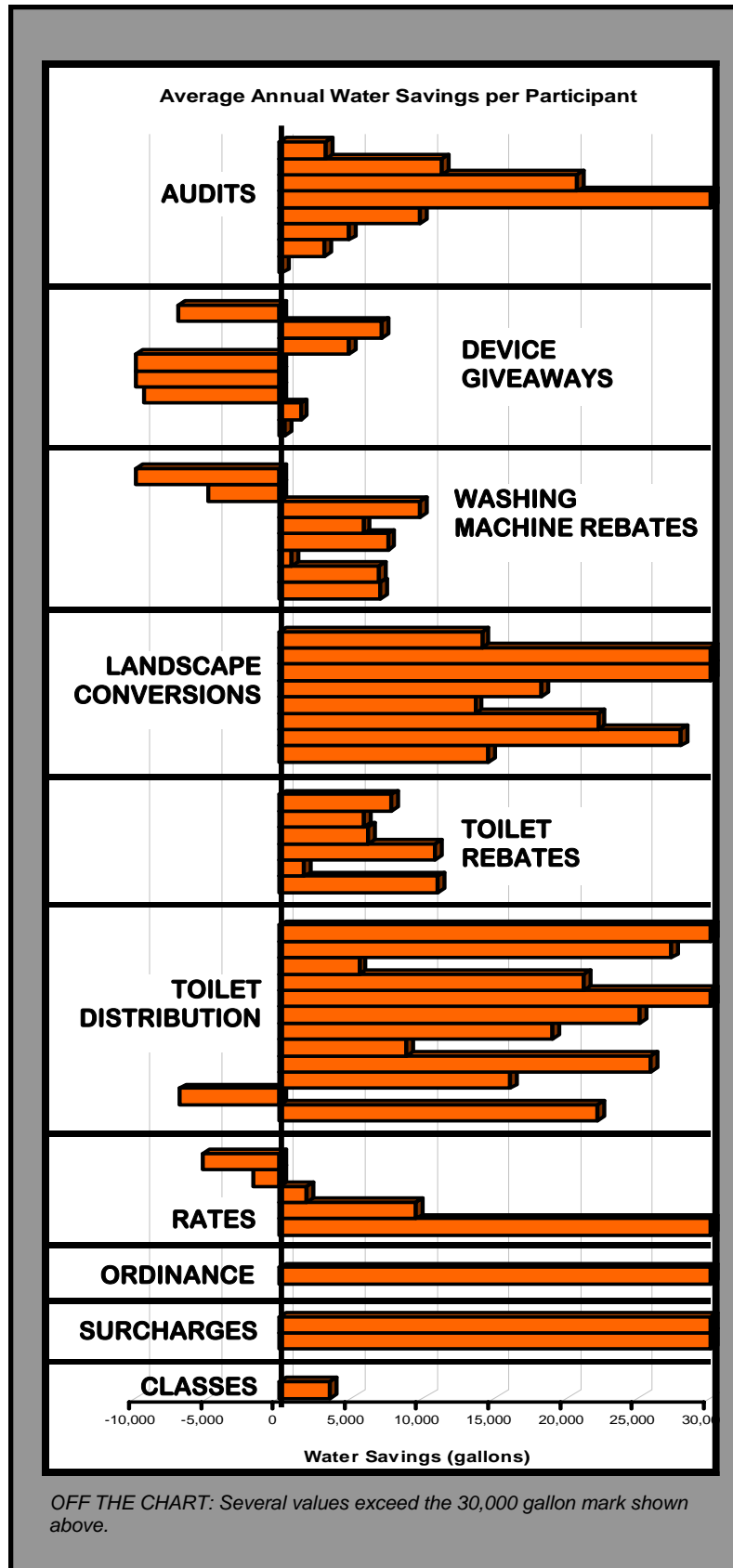
The **SURCHARGE** program showed an average savings per participant per year of 241,157 gallons, or 12.5%.

The **CONSERVATION CLASS** showed an average savings per participant per year of 3,524 gallons, or 2.7%

PERSISTENCE OF SAVINGS

In the first year following the **AUDITS**, the average water savings per participant was 8,543 gallons. Year two following the audits showed a savings per participant of 8,838 gallons. This is a 3.5% increase in water savings from year one to year two.

For **DEVICE GIVEAWAYS**, no water savings were documented. There was an average savings of **-6,846**



gallons per participant (a relative increase in water use) the first year following the program and -6,538 gallons (a relative increase in water use) the second year following. This is a 4.5% increase in water savings from year one to year two.

Customers who participated in the **WASHING MACHINE REBATE** programs saved an average of -915 gallons (a relative increase in water use) the first year following the rebate. The average water savings per participant the second year following the program was -1,600 gallons (another relative increase). Without **Utility W-1**, the savings was 2,823 gallons the first year and 3,529 gallons the second year after the rebate. This is an increase in water savings of 25.0% from year one to year two.

LANDSCAPE CONVERSION programs showed an average water savings per household of 24,121 gallons the first year following the conversion to a low water using landscape and an average savings of 19,673 gallons for year two, for a fall off of 18.4%.

TOILET REBATE programs showed an average water savings per participant of 8,063 gallons the first year after the incentive was received, and a savings of 6,816 gallons the second year after the incentive. This is a fall off in water savings of 15.5% from year one to year two.

Average water savings for **TOILET DISTRIBUTION** programs varies markedly from the toilet rebate programs' water savings. The first year following the distributions, average water savings per participant was 19,403 gallons and the second year following, the average savings was 34,377 gallons. This is a 77% increase in water savings from year one to year two after the program.

RATE CASE programs showed a water savings of 9,518 gallons per participant the first year after and 19,151 gallons per participant the second year after the program. This is a 102.3% increase in water savings from year one to year two after the program.

The water savings shown with the **ORDINANCE** program was 59,854 gallons per participant the first year after and 64,562 gallons per participant the second year after the program. This is a 7.9% increase in water savings from year one to year two after the program.

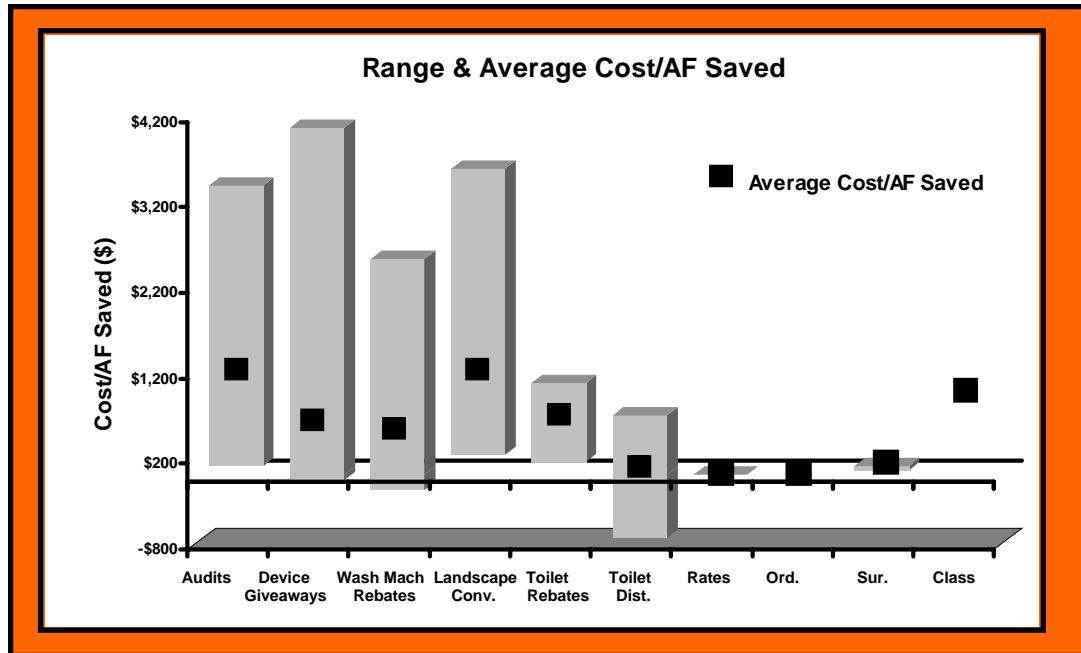
The **SURCHARGE** program showed a water savings of 303,210 gallons per participant the first year after and 179,104 gallons per participant the second year after the program. This is a 41.0% decrease in water savings from year one to year two after the program.

The **CONSERVATION CLASS** showed a water savings of 3,442 gallons per participant the first year after and 3,606 gallons per participant the second year after the program. This is a 4.8% increase in water savings from year one to year two after the program.

ECONOMIC ANALYSIS

RANGE, AVERAGE, MEDIAN COST PER ACRE FOOT SAVED

The costs to the utility to save an acre foot (AF) of water with **AUDITS** ranged between \$101 and \$55,315. Without including one year of Utility A-4's analysis, the range was \$101 to \$3,276. **The average**



cost, without that year, to save an AF of water was \$1,284. The median cost per AF of savings was \$873.

DEVICE GIVEAWAYS showed a wide range of costs to save an AF of water. Even though the programs themselves were inexpensive to fund they resulted in such poor water savings as to impact the cost/AF of savings in many cases. Costs per AF ranged from a **-\$57** to \$4,059. **The average cost to save an AF of water with these giveaways was \$457, with a median cost of -\$3.**

The range of costs per AF for **WASHING MACHINE REBATE** programs was **-\$184** to \$2,519. **The average cost per AF saved was \$404, and the median was \$7.**

Utilities spent between \$236 and \$3,338 to save an AF of water with **LANDSCAPE CONVERSION REBATE** programs. **Their average cost to save an AF was \$1,099, and the median cost per AF among the programs studied was \$942.**

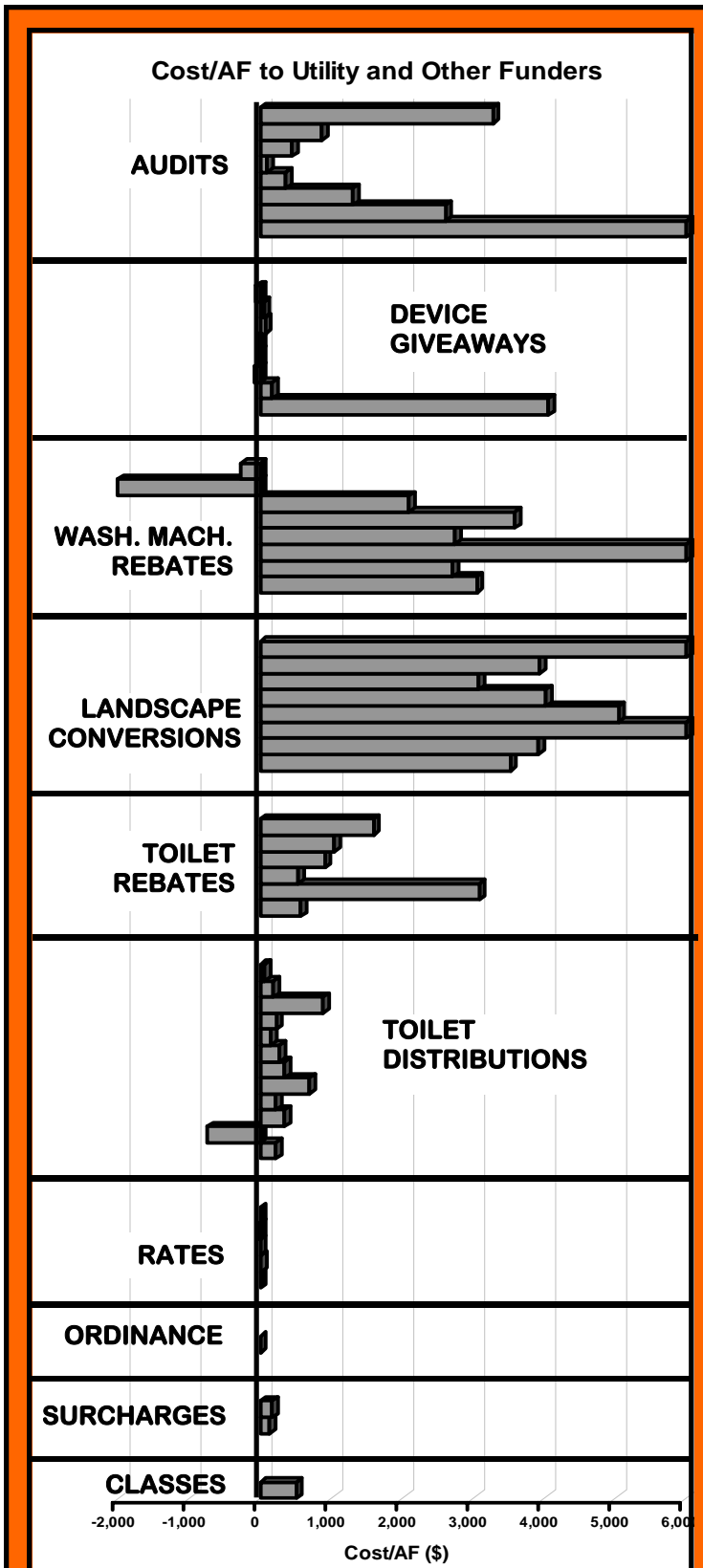
Toilet programs proved to have the tightest ranges of costs with **TOILET REBATES** ranging between \$155 to \$926 to save an acre foot of water. **The average cost to save an AF of water was \$436, with a median cost of \$297.**

TOILET DISTRIBUTION programs had a range of costs to save an AF of water between **-\$742** and \$695. **The average cost per AF saved was \$181 and the median of the costs was \$223.**

RATE CASE programs had a range of costs to save an AF of water between **-\$22** and \$6. **The average cost per AF saved was -\$3 and the median of the costs was \$0.**

The utility spent \$2 to save an AF of water with the **ORDINANCE** program.

The **SURCHARGE** program had a range of costs to save an AF of



OFF THE CHARTS: Several values exceed the \$6,000 mark shown above, with the highest cost/AF of \$55,315.

water between \$46 and \$59. Both the average and median cost per AF saved was \$53.

The utility spent \$513 to save an AF of water with the CONSERVATION CLASS.

COST TO THE UTILITY PER PARTICIPANT

AUDIT programs cost the utilities we studied an average of \$116 per participant. There were no outside funders for any of the audit programs in the study.

Utilities spent an average of \$5 on their DEVICE GIVEAWAYS, with additional funding from other sources averaging \$2. This is a total cost of \$7 for all funding.

WASHING MACHINE REBATE programs had an average cost to the utilities offering the rebates of \$54. Several of the utilities had outside funders to augment these programs and their costs averaged \$91 per participant. The overall costs from all funders was \$144.

The cost per participant for LANDSCAPE CONVERSION REBATES averaged \$650, and there were no outside funders for any of these incentive programs studied.

There were no outside funders for any of the TOILET REBATE programs examined and the average cost to the utilities was \$151 per participant.

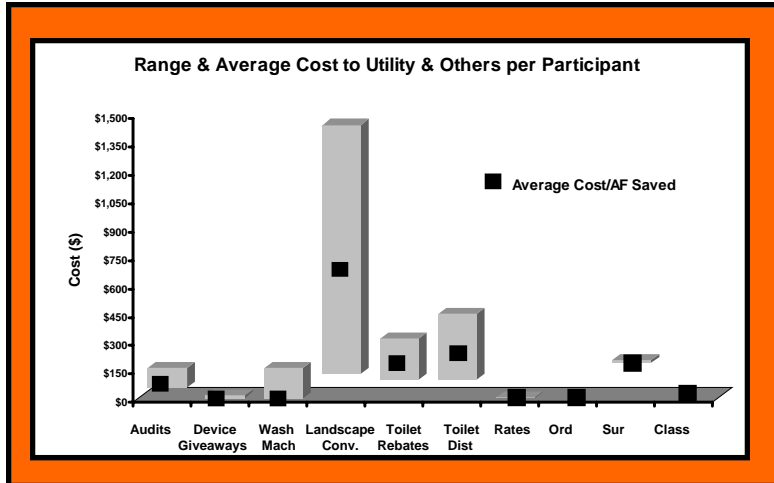
TOILET DISTRIBUTIONS cost the utility on average \$291 per participant. A couple of the programs studied had some outside funding support that averaged \$39 per participant.

There were no outside funders

for any of the **RATE CASE** programs examined and the average cost to the utilities was \$0.82 per participant (per connection).

The cost per participant for the **ORDINANCE** was \$4, and there were no outside funders for this program.

There were no outside funders for the **SURCHARGE** program and the cost to the utility averaged \$193 per participant.



There were also no outside funders for the **CONSERVATION CLASS** and the cost to the utility was \$28 per participant.

COST TO PARTICIPANTS

There were no quantified costs to the participants of the **AUDIT, DEVICE GIVEAWAY, RATES** or **CONSERVATION CLASS** programs.

The cost to the participants of the **WASHING MACHINE REBATE** programs ranged from \$616 to \$630 per participant to buy the washing machines. The average cost to the participants was \$624 per participant. The median cost per participant was \$630.

The cost to the **LANDSCAPE CONVERSION REBATE** participants to actually get their new landscapes in the ground ranged from \$1,181 to \$5,258 per participant. The average cost to the participants was \$2,401 per participant, and the median cost per participant was \$2,051.

The cost to the **TOILET REBATE** participants to buy the toilets and have them installed ranged from \$193 to \$444 per participant. The average cost to the participants was \$270 per participant, and the median cost per participant was \$248.

The cost to the **TOILET DISTRIBUTION** participants to install the toilets ranged from \$0 to \$48 per participant. The average cost to the participants was \$26 per participant. The median cost per participant was \$31.

The cost to the **ORDINANCE** participants was \$0.12 per participant.

The cost to the **SURCHARGE** participants was \$351 per participant.

NET PRESENT VALUE

The net present value is the result of all of the quantified costs minus all of the quantified benefits of the program. In this study, it includes costs like rebate costs, costs of administering the programs, cost of buying toilets or washing machines, etc., and benefits like receiving rebates and savings on water bills. It does not include all of the cost or all of the benefits of each program.

Many of the benefits of these programs, in particular, are difficult to

quantify and were not quantified for the study. Therefore, we think that these values are underestimated. It is beneficial to view them not so much as their absolute values, but look at them in comparison to each other, since they were derived with the same methodology across the board.

In general, when determining if a program is “worthwhile”, a positive value is considered good and a negative value is considered bad.

However, as already mentioned, these values are underestimated and you would not necessarily expect hard benefits to the utility anyway.

The Net Present Values can be found in the individual FINDINGS sections.

UTILITY SIZE & COST PER AF OF WATER SAVED

In looking at the data and organizing it in a variety of ways to tease out information such as ranges, averages, costs to save, and amounts of savings, we began to see what appeared to be a trend for larger utilities to have higher costs to save an AF of water. The graph below shows this tendency.

Two possible factors creating this trendline come to mind:

Larger utilities will tend to have more bureaucratic factors at play in their overall management, such as entrenchment, higher overhead costs, resistance to change, etc.

On the other hand, large utilities tend to be the utilities that have lead the way in water conservation over the past two or three decades. Perhaps they have achieved all the easy, cheap savings some time ago and are now at work on the more costly efforts to save that next increment of water.

