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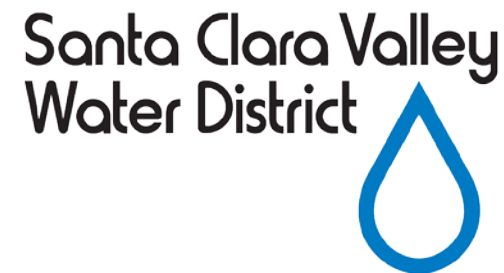
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Commercial, Industrial, & Institutional Water Conservation Surveys: Study Findings

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Overview

- SCVWD and Water Conservation
- CII Survey Program
- CII Survey Program STUDY
- Preliminary findings
- Next Steps



Santa Clara Valley Water District



Flood Protection



Water Supply



**Ecosystem/
Watershed Health**



**Open Space/
Trails/Recreation**

The Importance of Water Conservation



District is implementing over 20 water conservation programs....

- 💧 Residential Programs
- 💧 Landscape Programs
- 💧 Commercial, Industrial, Institutional Programs
- 💧 Agricultural Programs
- 💧 Outreach/Education



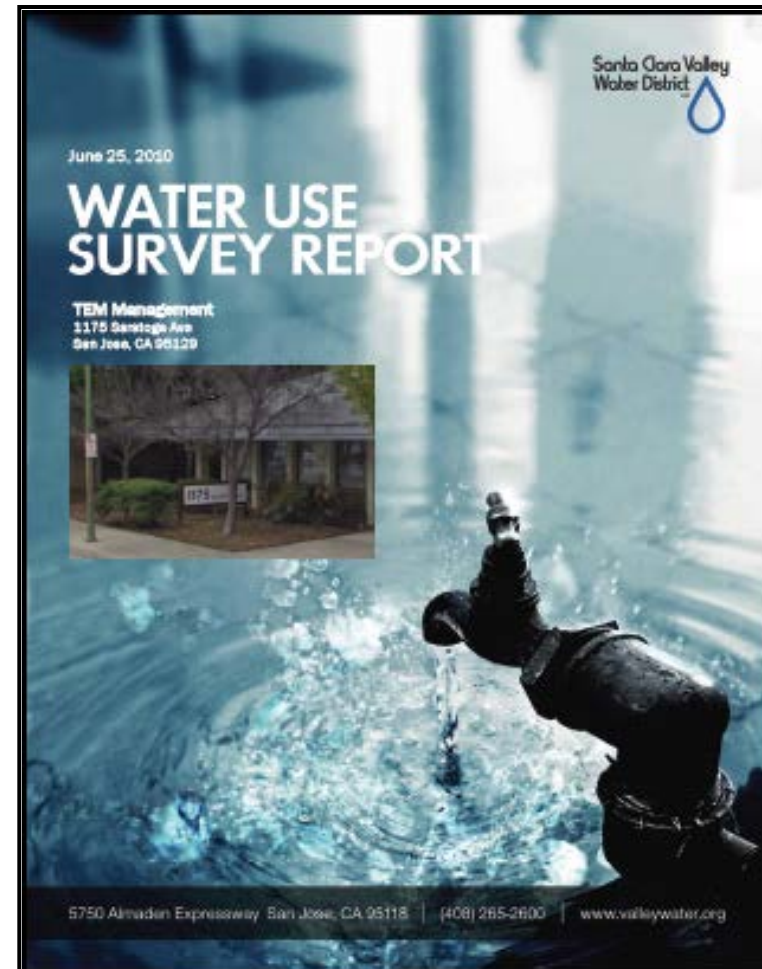
Programs for Businesses

- Free High-Efficiency Toilets and Urinals
- High-Efficiency Clothes Washer Rebates
- Landscape Survey Program
- Landscape Rebate Program
- Mobile Home Submeter Rebates
- **Water Surveys for Businesses**
- Water Efficient Technology Rebates



CII Survey Program

- Thorough indoor water survey, resulting in recommendations (cost/benefit analysis)
- Program started Sept. 2007
- Roughly 390 surveys completed



Example of a water survey report

Water Use Survey Report

Provided By:
**Santa Clara Valley
Water District**



5750 Almaden Expressway
San Jose, CA 95118
(408) 265-2600
www.valleywater.org

September 15, 2008



Hotel

100 Some Street
Some City, CA 10000

Prepared By:



1590 Oakland Rd, Suite B211
San Jose, CA 95131
(408) 496-6965
www.waterwise-consulting.com

Actual Results from water survey at local computer company I'm going to call "Acme Semiconductor"

Report Contains:

- Facility Description
- Allocation of Water Use
- Monthly Water Use Patterns
- Summary of Recommendations
- Details of Each Recommendation

Acme Semiconductor

Average Facility Water Use

Acme Semiconductor Water Use per Capita	41 gallons/day
Average Water Use per Capita in Facility of this Size and Type	45 gallons/day
Acme Semiconductor's Average Water Use	Lower than Average

Inventory of Water-Using Equipment & Plumbing

Existing Equipment	Number of Units	Volume of Use		Annual Use (gal)	Annual Use (HCF)
		Use	Units		
Flush Valve Toilets	86	1.6	gpf	1,194,752	1,597
Flush Valve Toilets	12	3.5	gpf	96,460	129
Urinals	72	1.0	gpf	517,920	692
Showerheads	12	1.5	gpm	195,000	261
Showerheads	9	2.5	gpm	325,000	434
Bathroom Faucets	13	0.5	gpm	2,340	3
Bathroom Faucets	204	2.0	gpm	885,040	1,183
Janitorial Faucets	35	3.5	gpm	111,800	149
Cooling Towers	1	2955.0	ton	16,749,635	22,393
Conveyor Dishwasher	1	336.0	gal/hour	276,360	369
Undercounter Dishwasher	1	6.0	gpm	936	1
Pre-Rinse Spray Valves	2	1.6	gpm	101,520	136
Kitchen Handwashing Faucets	4	2.0	gpm	56,400	75
Food Prep Faucets	2	2.0	gpm	430,050	575

Figure 2— Water Use Trend— January 2008 to December 2008

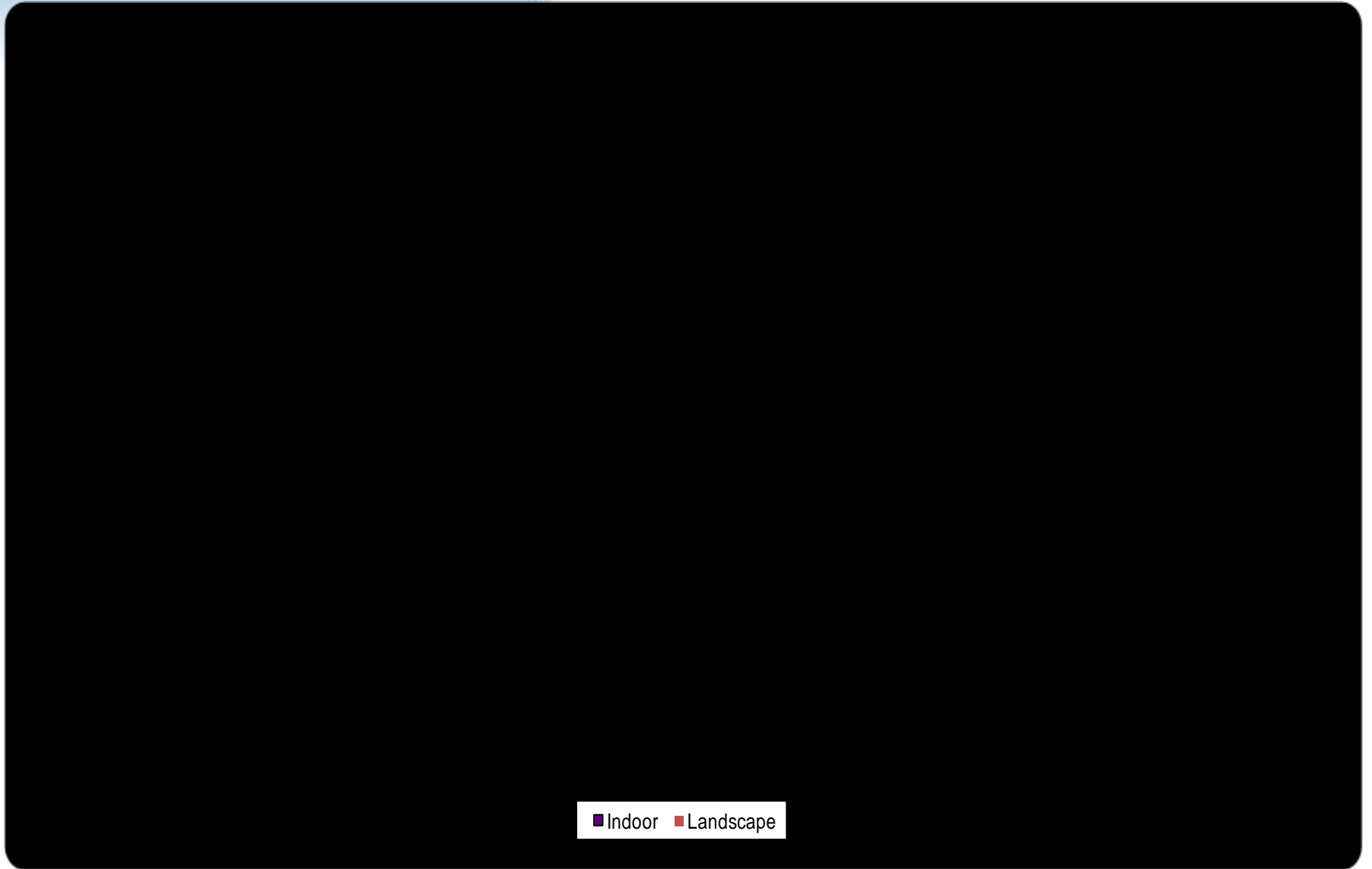
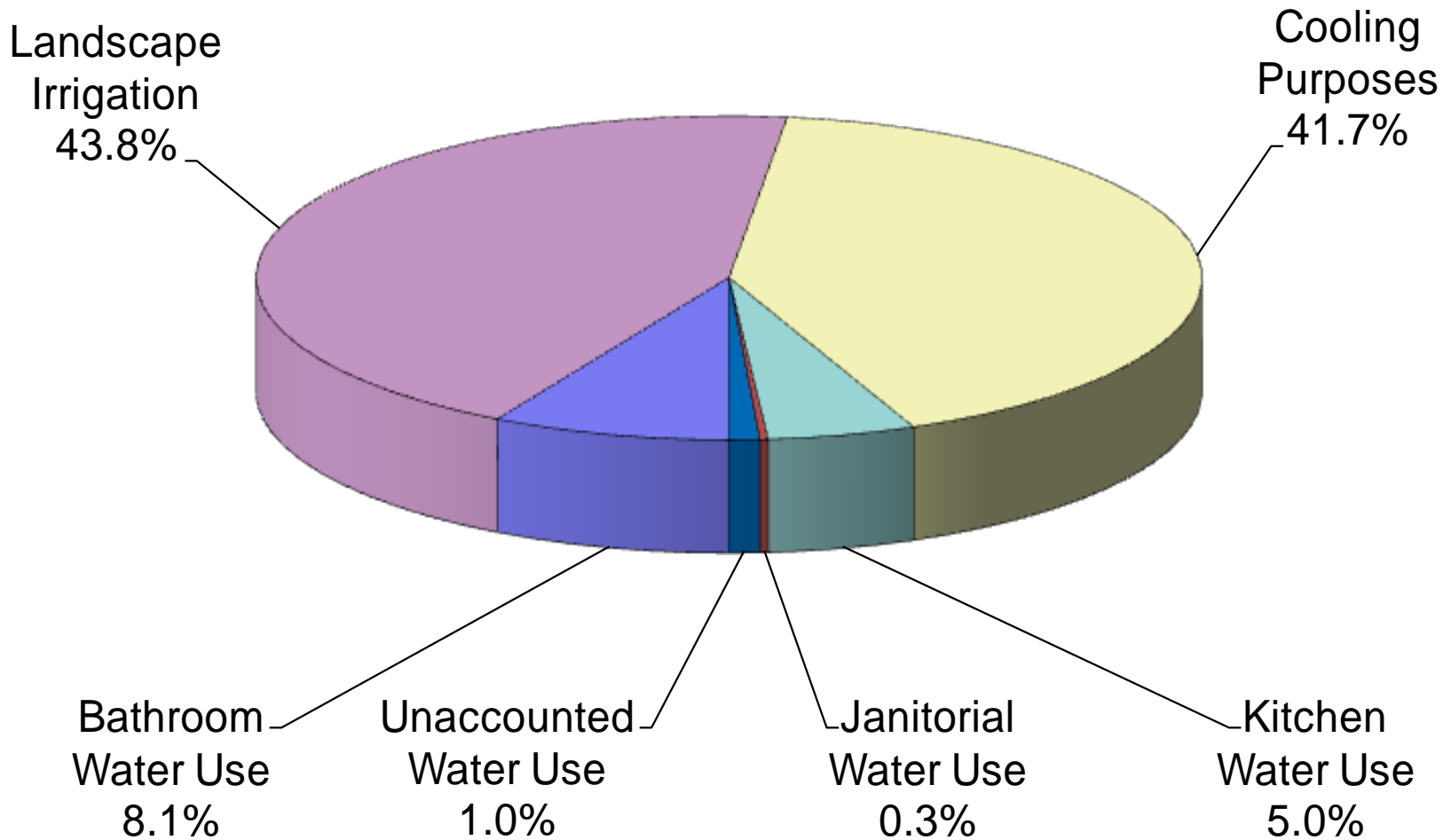


Figure 1– Allocation of Water Use



Recommended Measures Part 1

Water Efficiency Measure	Initial Cost	Rebates & Incentives	Water Savings (gal/yr)	Water Savings (HCF/Yr)	Annual Savings ¹	Simple Payback ² (Years)
Water for Cooling Purposes - Recommendations						
Adjust Cooling Tower Cycles	\$0	\$0	1,218,492	1,629	\$8,218	Immediate
Sanitary Water Efficiency Recommendations						
Replace Bathroom Faucet Aerators	\$408	\$0	663,476	887	\$4,044	Immediate
Retrofit Flush Valve Toilets (1.6 gpf) with Dual-Flush Handles	\$4,300	\$0	231,880	310	\$1,331	3.2
Replace Showerheads with Low-Flow Models	\$90	\$45	130,152	174	\$793	Immediate
Replace Flush Valve Toilets (3.5 gpf) with HET Models (1.28 gpf or less)	\$6,000	\$4,800	61,336	82	\$352	3.4

Recommended Measures Part 2

Water Efficiency Measure	Initial Cost	Rebates & Incentives	Water Savings (gal/yr)	Water Savings (HCF/Yr)	Annual Savings ¹	Simple Payback ² (Years)
Replace Food Steamer	\$5,000	\$1,254	94,248	126	\$541	6.9
Replace Kitchen Waste Disposer	\$535	\$268	84,524	113	\$485	Immediate
Replace Kitchen Handwashing Faucet Aerator	\$8	\$0	42,636	57	\$275	Immediate
Landscape Irrigation Recommendations						
Complete a Landscape Audit and Implement Efficient Irrigation Practices ³	\$0	Free Program	7,764,988	10,381	\$19,412	Immediate
Install Weather Based Irrigation Controller	\$8,505	\$4,900	3,882,868	5,191	\$9,707	Immediate
Totals:	\$24,846	\$11,267	10,291,732	13,759	\$35,453	0.4

Water Efficiency Measure: Tank-Type High Efficiency Toilets

The Hotel currently has 64 tank-type toilets, using an average flush volume of 3.5 gallons per flush (gpf). We recommend replacing these toilets with High Efficiency Toilet (HET) models, which flush at 1.28 gpf or less.

This facility may be eligible to receive free high efficiency toilets through the Santa Clara Valley Water District's Commercial, Industrial, and Institutional (CII) HET Plumbing Retrofit Program. This program installs high efficiency toilets free of charge to facilities with tank-type toilets flushing at 3.5 gpf or greater.

The estimated water savings from this retrofit equal 255,068 gallons (341 HCF) per year, which will yield an annual water and sewer cost savings of approximately \$3,246.

To schedule a free HET installation, call:
SJ Water Conservation Company
(888) 520-9494

For more information on the CII HET Plumbing Retrofit Program, contact:
Karen Morvay
Santa Clara Valley Water District
(408) 265-2607 ext. 2707
kmorvay@valleywater.org



Example of a
High Efficiency
Toilet (HET)

High Efficiency Toilets	
Estimated Annual Water Savings	255,068 gallons (341 HCF)
Estimated Annual Water and Sewer Cost Savings	\$3,246
Estimated Initial Cost of Fixtures*	Free program
Simple Payback in Years	Immediate

*HET and installation are provided free of charge to qualifying facilities.

Sample Recommended
Measure: Replace Toilets

Acme Semiconductor Summary

- The total estimated annual water savings for this facility, after implementation of all recommended measures, equals 10,291,732 gallons (13,759 CCF). This represents a **26% decrease** in annual water use for this facility.
- The total estimated annual cost savings after implementation of all recommended measures is **\$35,453**.
- Average simple payback for implementation of all recommended measures, including rebates and incentives, **is less than four months**.

CII Survey Program: Goal

- Goal: Achieve water savings in the CII sector
 - Achieved via implementing the survey recommendations:
 - Fix leaks
 - Participate in SCVWD's water conservation programs
 - Retrofit/purchase equipment
- Potential Savings

Implementation of the water efficiency recommendations included in the survey reports could potentially reduce the annual water use by about 426,015,064 gallons (569,539 HCF)
– a **41% water use reduction overall.**

Question: What is actual water savings from this program?

We decided to do a study to see if we could determine what kind of water savings we were seeing from this program.



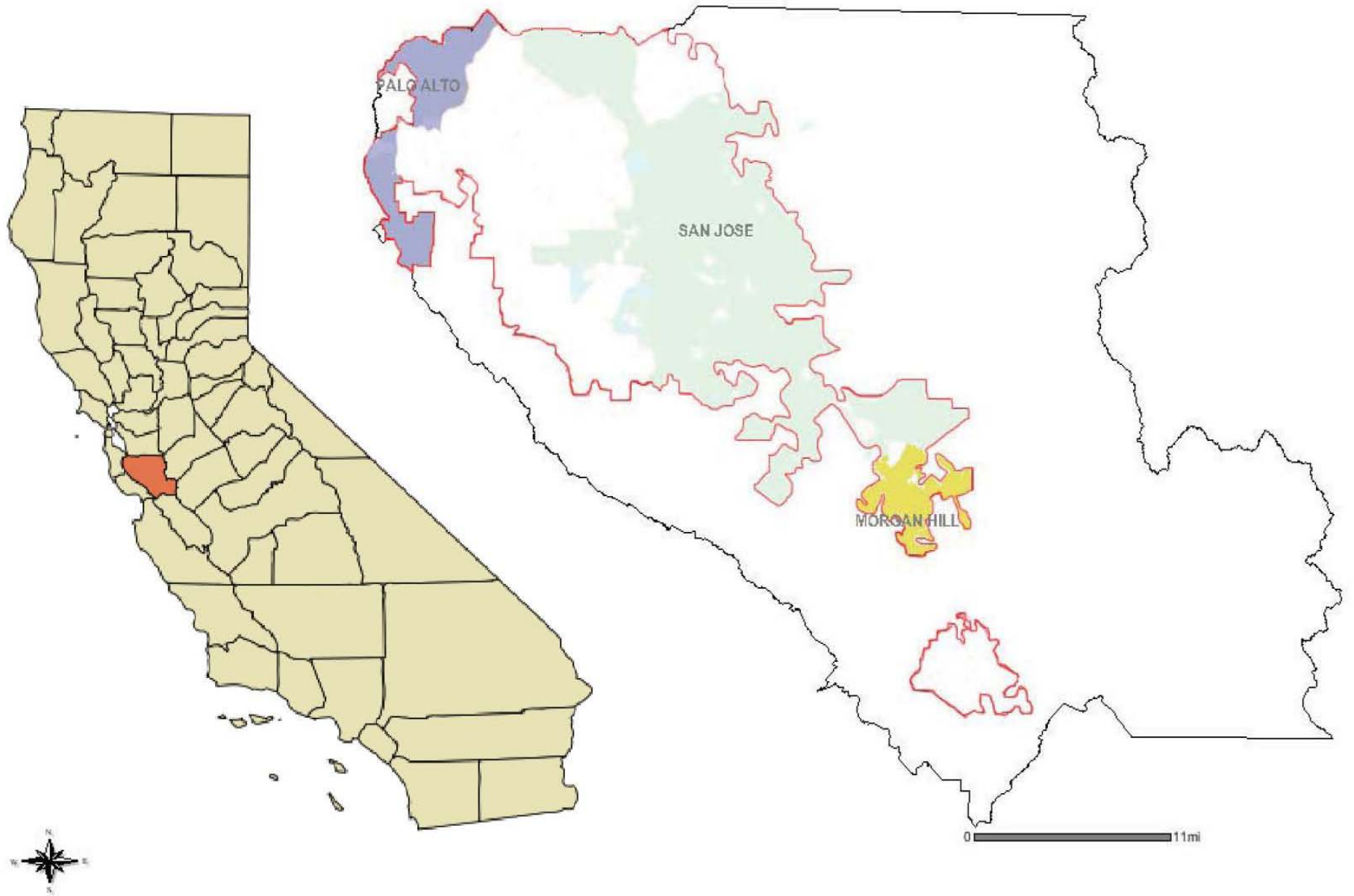
CII Survey Program STUDY: GOAL

- Goals: Objective assessment of the program impact - what the water savings is for survey program participants vs. non-participants



CII Survey Program STUDY

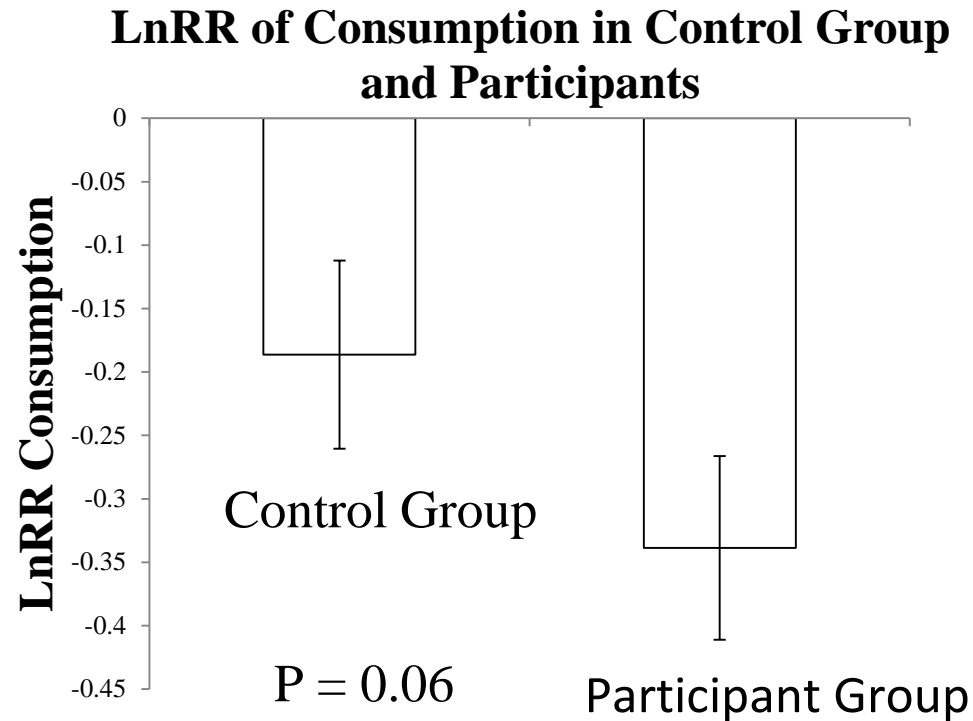
- Water meter data one year before and one year after
 - 55 participating sites, randomly selected
- Confounding variables
 - weather, economy
- Control group – selected a control group
 - 55 sites, randomly selected, similar attributes as the sites studied, same time period.



Study

- We used a year of consumption data before and a year after, divided the after number by the before number to give a ratio. “Log Natural Relative Ratio”
 - normalizes the data for ease of analysis.
 - $\ln RR = \ln (\text{Annual Consumption}_{\text{Post}} / \text{Annual Consumption}_{\text{Pre}})$
- Gives a number that represents the direction and magnitude of the change in water use for each site.
- Next step is to test it to see if there is a true pattern.
- Statistics
 - Wilcoxon rank-sum test
 - R statistical software

Findings

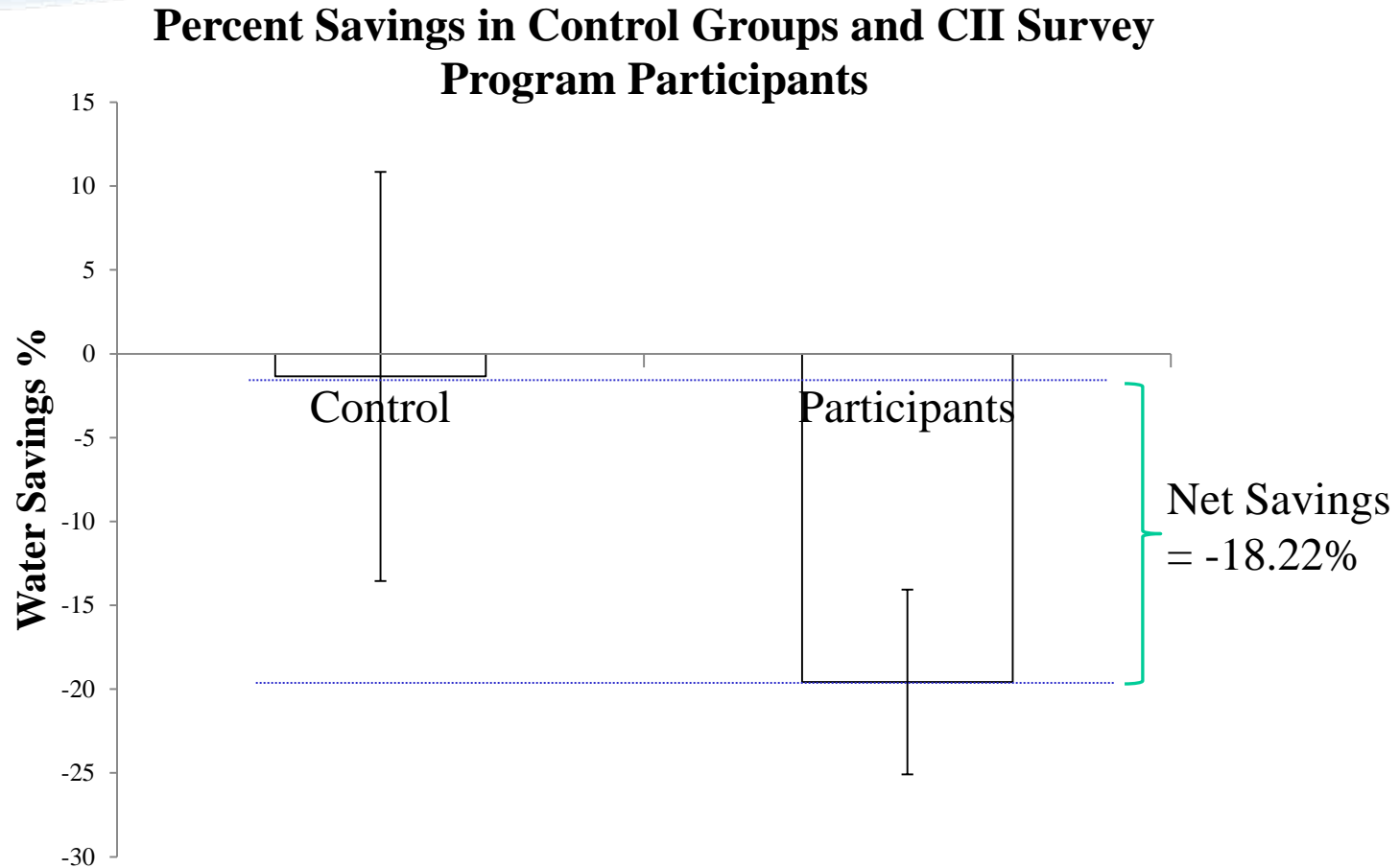


P = probability that this is due to chance.

94% chance that if we did this again with different participants, we'd see same result

Small data set, given the variability, nevertheless the P value from the Wilcoxon Rank Sum test shows that there is indeed a pattern that we can feel very confident about.

Findings: Water Savings



On average, the water savings was 18.22 percent, but with variability it could be less or more

Discussion

- Implications
 - CII Survey savings number?
 - Savings by sector
- Limitations
 - Highly variable response in participants
 - Relatively small sample

Discussion

- Next Steps:
 - Cost/Benefit study – given this savings, is it cost effective to continue the CII Survey Program.
 - Lewis Reed, graduate student intern, will be finishing this study. Publication in late 2011.

Questions?

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