This presentation premiered at WaterSmart Innovations

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San Diego Regional Highlights of a 5-Year Irrigation Retrofit Program

WaterSmart Innovations Conference 2011
Session 11-T-1161

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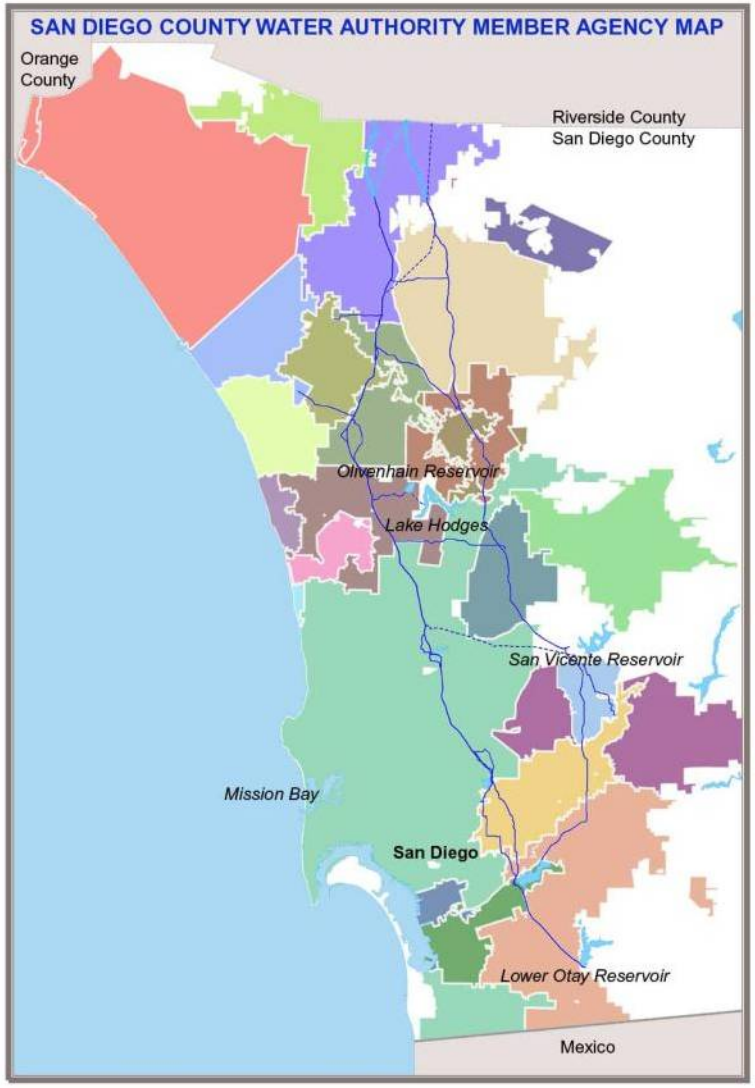
San Diego County Water Authority

- Wholesale water utility
- 24 member agencies
- 3.1 million people
- 920,000 acre service area
- $186 billion economy



Presentation Outline

PART I: Overview & Highlights

PART II: Program Evaluation Results

Results at a Glance

- Inputs
  - $ 2.4 million over 5 years (2005-2009)
  - 474 grants – total participating site acreage ~ 2,800 acres
- Program Results
  - Real Incremental Water Savings ~ 8,000 AF Lifetime
    - Multi-Family Sites = 10.8%
    - CII Sites = 20.5%

Results at a Glance (Cont'd)

- Program Results (Continued)
  - Cost Effective Savings ~ $300/AF
  - Evidence of Market Transformation
    - Demand: Strong Customer Acceptance
    - Supply Chain: Alignment & Response (Contractors, Distributors, Vendors)

Program Overview

Funding Agencies

- Sponsoring Agencies:
  - CA Department of Water Resources (Prop. 13)
  - US Bureau of Reclamation
  - Metropolitan Water District of Southern California
  - San Diego County Water Authority
    - 24 Member Agencies

- Acknowledgements:
  - Vickie Driver, Mayda Portillo and Lorna Ross

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Program Overview

Implementation Resources

- Utilities: Water Authority and Member Agency direction & support
- Program Management Contractor: Honeywell International
  - Marketing and applications
  - Verification and incentive payment
  - Quality control and reporting
- Marketing Consultant: WSA Marketing
  - Industry outreach
  - Recruitment
- Service Provider: Mission Resource Conservation District
  - Verifications and landscape audits
- Program Evaluation Consultant: A&N Technical Services

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Program Overview

Incentives (Grants)

- "Menu Type" irrigation hardware incentive program
- Eligible Devices:
  - Rotating Nozzles
  - Spray Heads
  - Rotors
  - Smart Controllers
  - Check Valves
  - Flow Sensors
  - Rain Sensors
  - Drip
  - Flush Valves
  - PVC Piping
  - Valves
  - Couplers
  - Controller Boxes
  - Pressure Regulators
  - Lines / Wiring
- $2,500/acre up to $5,000 for commercial, industrial, and multifamily
- Up to $10,000 for institutional (public) sites.

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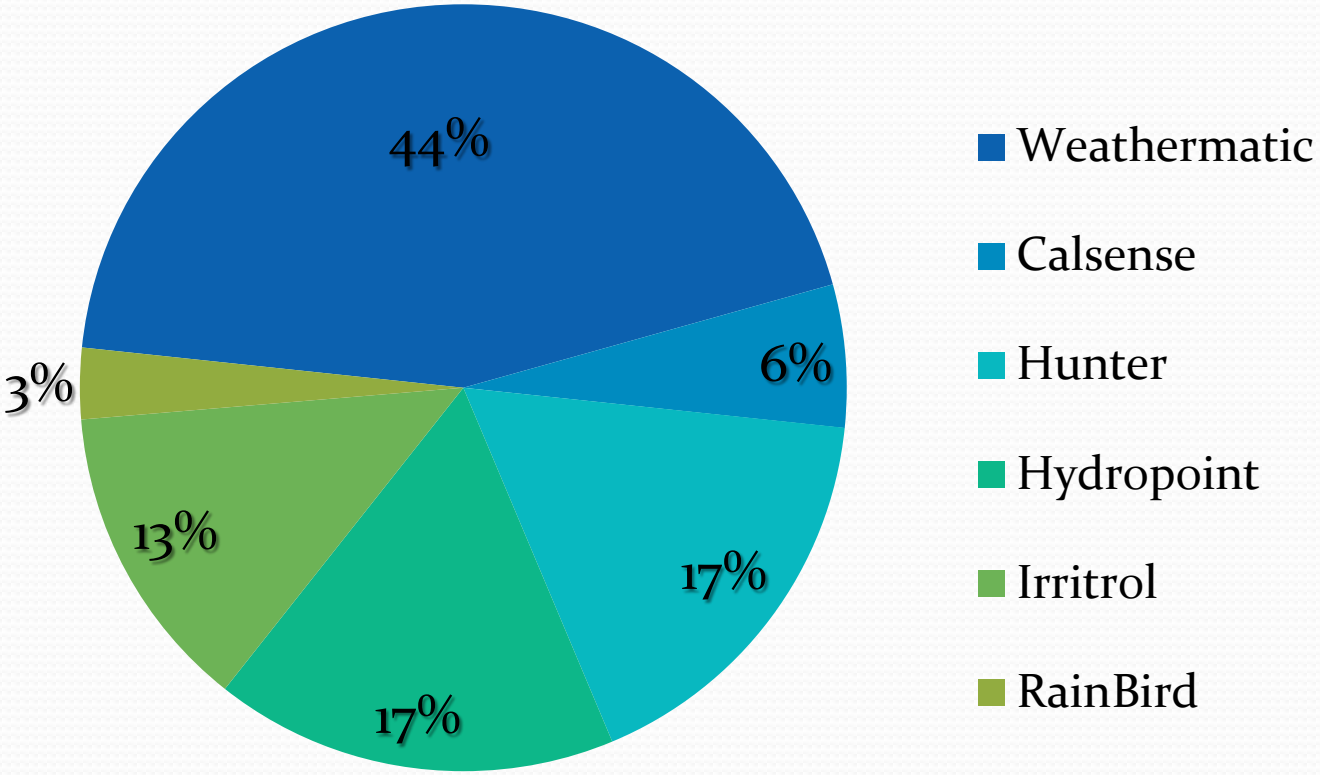
Sample Product Distribution

Controllers



Program Overview

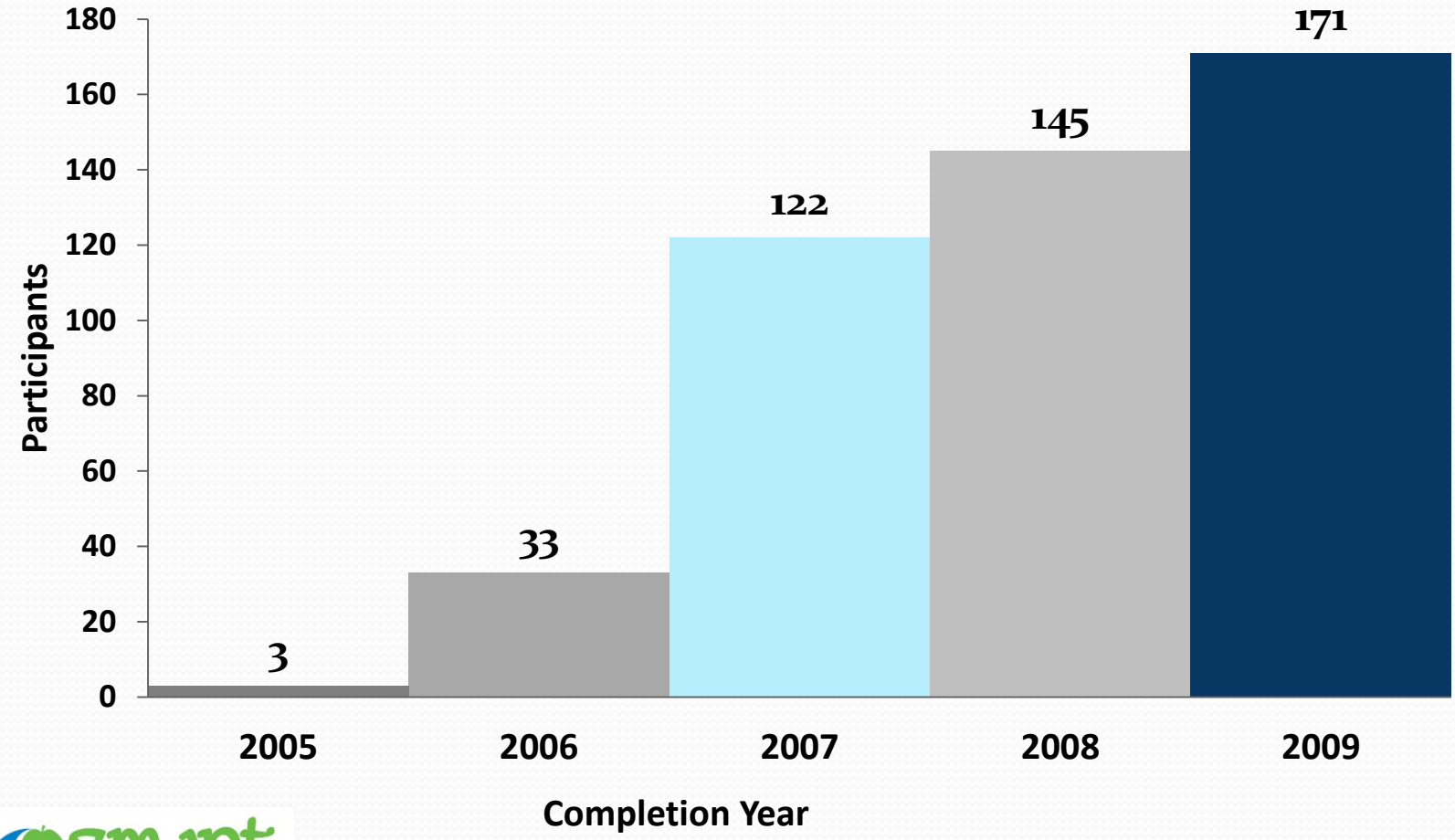
Key Challenges

Impacts from an Extended Drought:

- Participation Rate:
  From begging for participation to people beating the door down

- Mandatory Water Use Restrictions:
  Could we isolate water savings attributable to program?

Participation Rate



California's 2007-2010 Drought

Governor Schwarzenegger declares beginning of drought on **June 4, 2008**

Governor Brown declares end to drought on **March 30, 2011**

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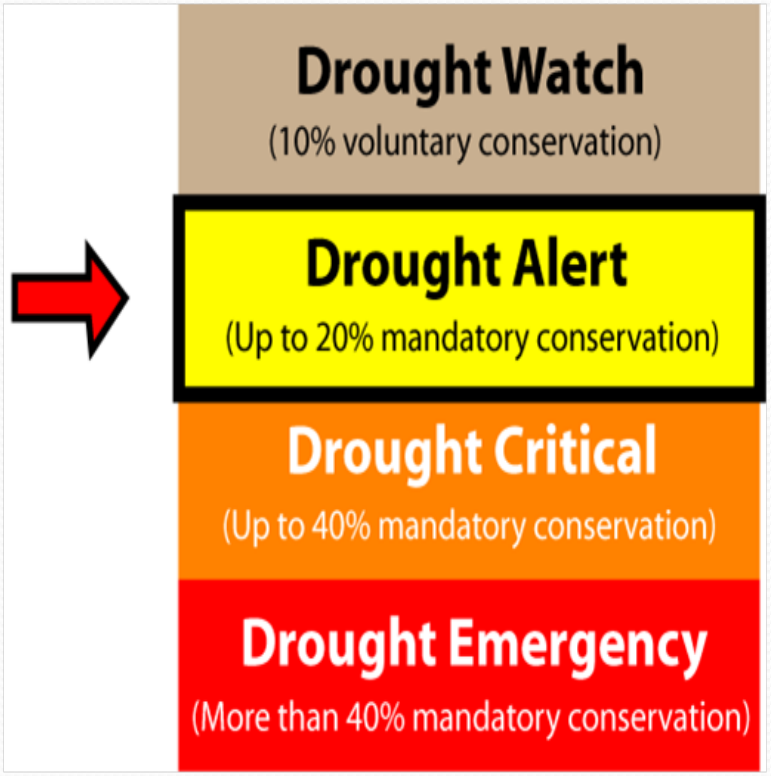
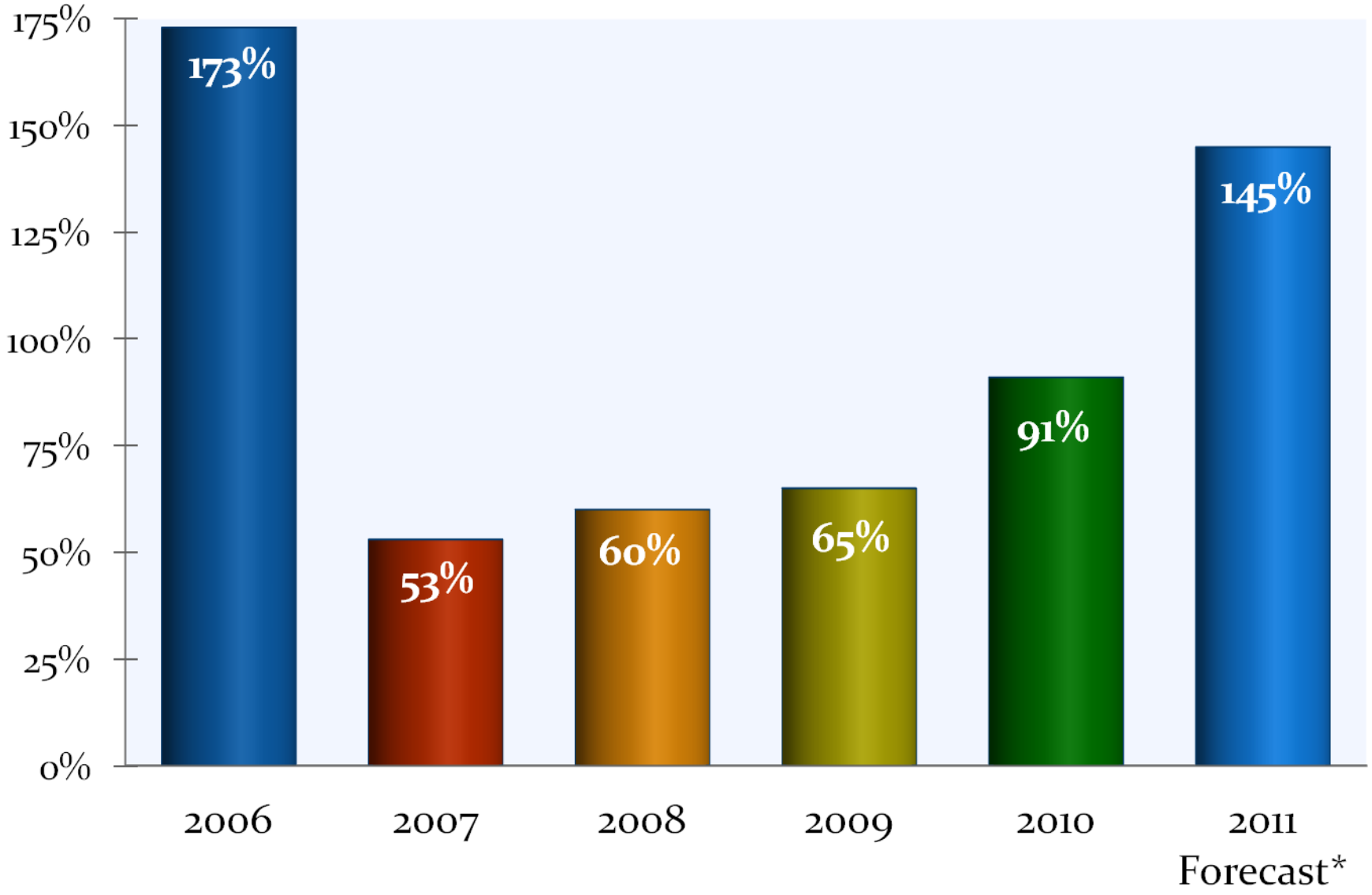
Lake Oroville Feb. 2009


Lake Oroville Mar. 2011

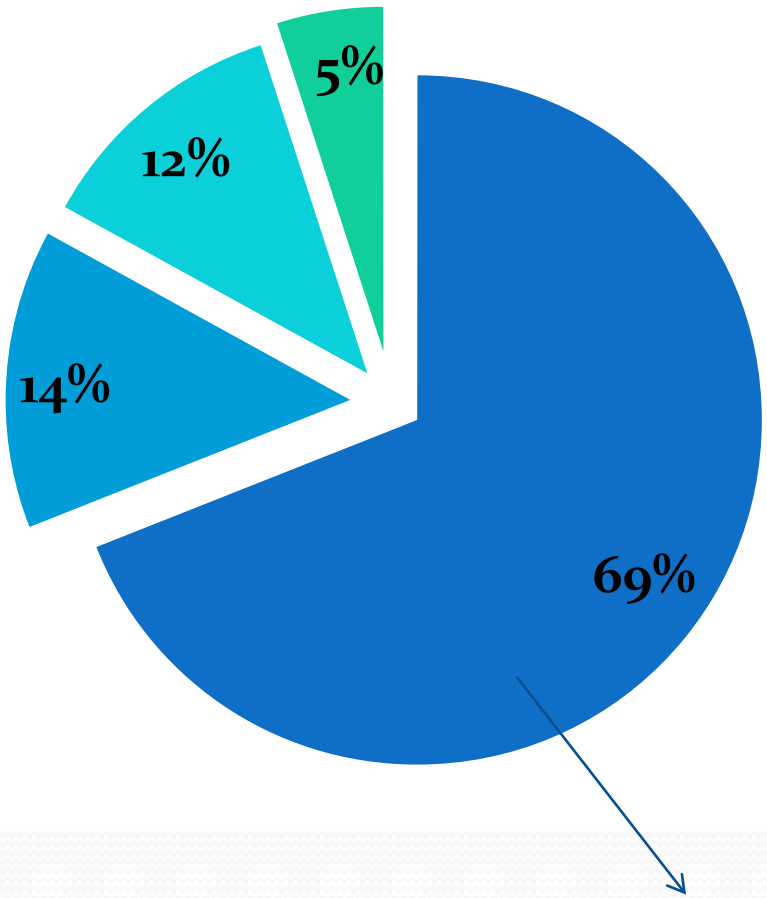
San Diego Regional Drought Response



CA Average Statewide Runoff



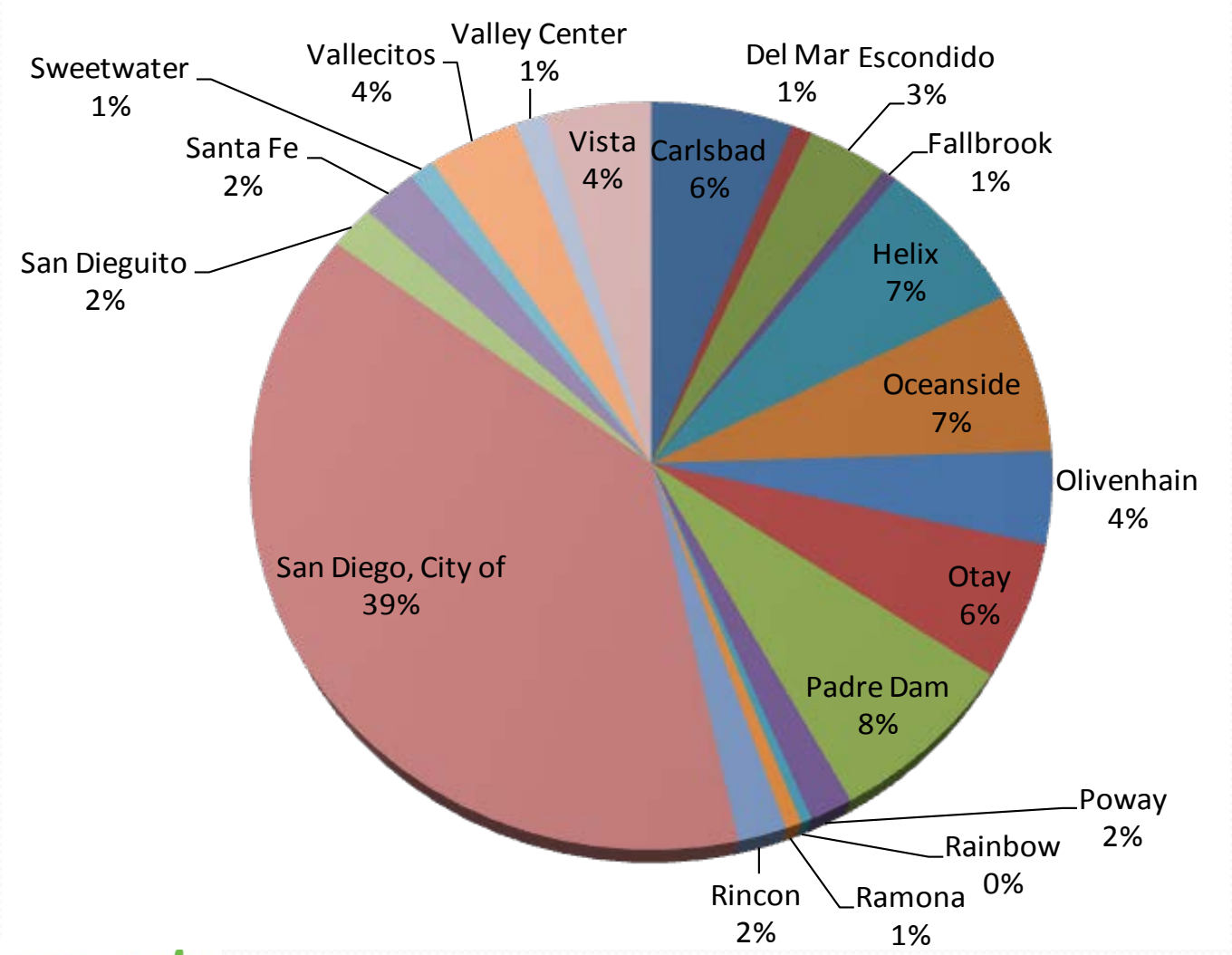
Participating Sectors



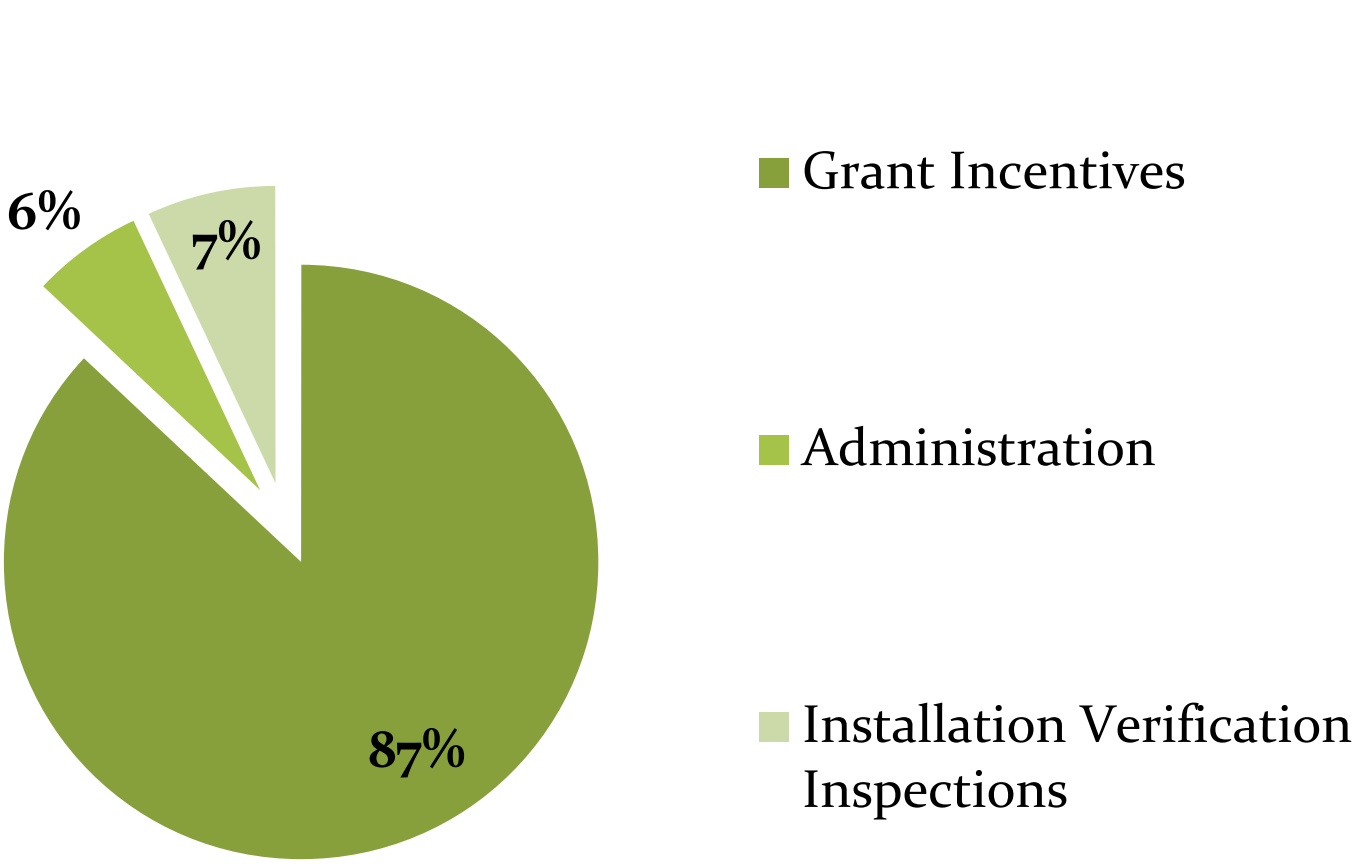
- Multi-family (Community Assoc.)
- Commercial (business/ office complexes)
- Institutional (schools)
- Industrial (including distribution centers)

See www.20gallonchallenge.com/pdf/HOA_howtoguide.pdf

Geographic Distribution



Cost Distribution



Primary Program Objective

Repairs & Upgrades

Obstructions

Leaks

Primary Program Objective

Repairs & Upgrades (Cont'd)

Sunken Heads

Misting

Sample Participant

Homeowner Association

Issues:

- High water bills
- Irrigation Runoff (slopes)
- System breaks, leaking valves
- Over- and under-watering
- Stressed plants
- Sprinklers on in the rain

HOA Site: Built in 1989 / 90 Units / 7 acres / steep slopes

Sample Participant

Homeowner Association (Cont'd)

Retrofits Installed:

- Replaced Valves
- Pressure Compensating Heads
- Drip Irrigation
- Smart Controllers

Project Cost:	~ $8,340
Program Incentive:	$4,252
Pay Back Period:	< 1 year

Program Design Conclusions

There Are No Shortcuts

Recommended Implementation Sequence:

1. Begin with landscape audit (area measurement, average yearly consumption baseline, site-appropriate water budget, and repairs / upgrades punch list)

2. Focus first on distribution system improvements (encourage pressure regulation and low-volume systems)

3. Upgrade to smart irrigation controllers (once DU is improved)

4. Actively monitor and manage water use to comply with site water budget

Presentation Outline

PART I: Overview & Highlights

PART II: Program Evaluation Results

Next

Program Evaluation

- In 2010, the Water Authority retained A&N Technical Services to conduct a process evaluation, impact assessment and cost-effectiveness analysis of the program.

- Impact assessment and cost effectiveness analysis revealed:

  1) significant savings and

  2) a favorable cost-effectiveness determination, when compared to imported water. Results of the process evaluation show high customer satisfaction levels, opportunities for process improvement and evidence of market transformation.

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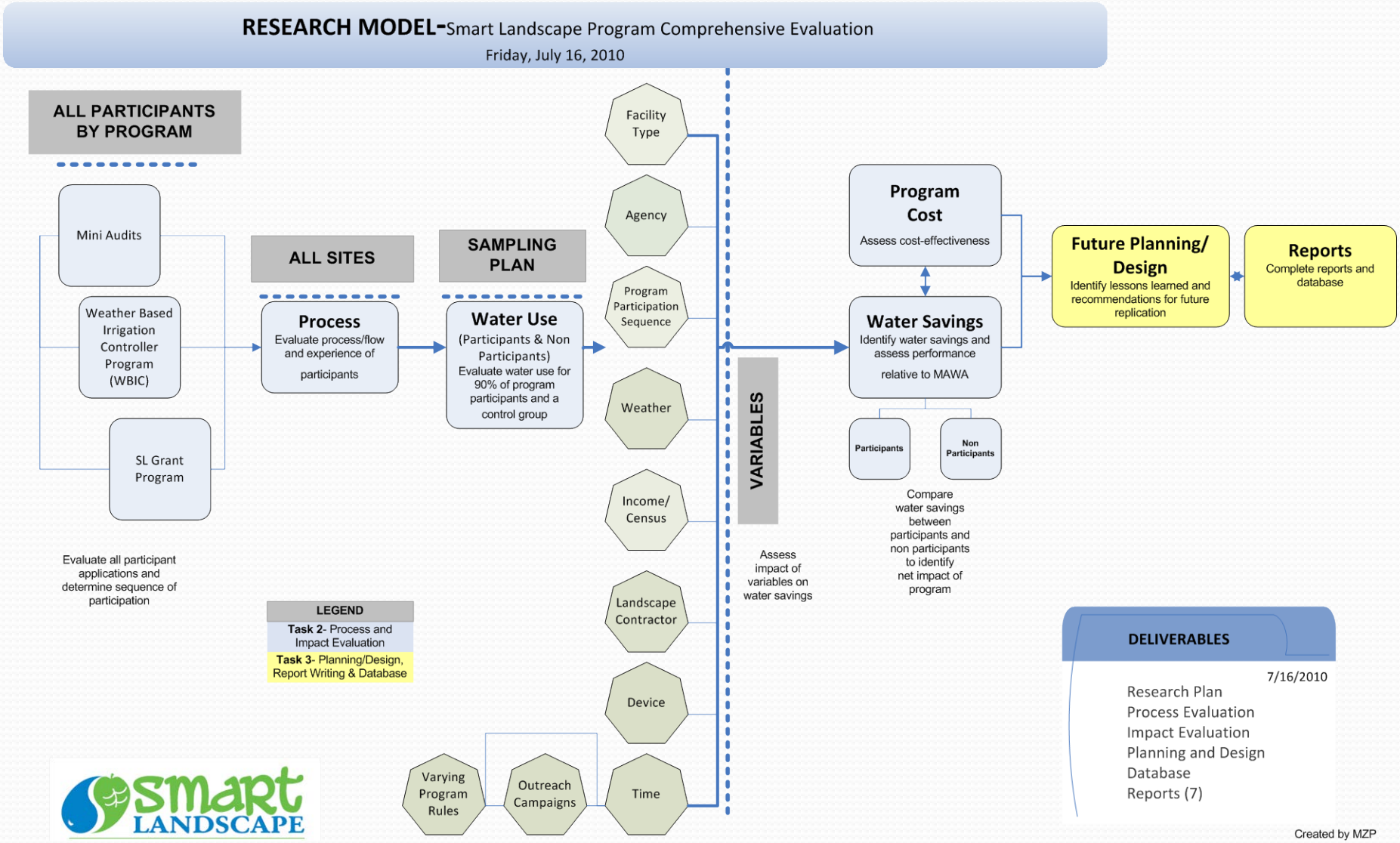
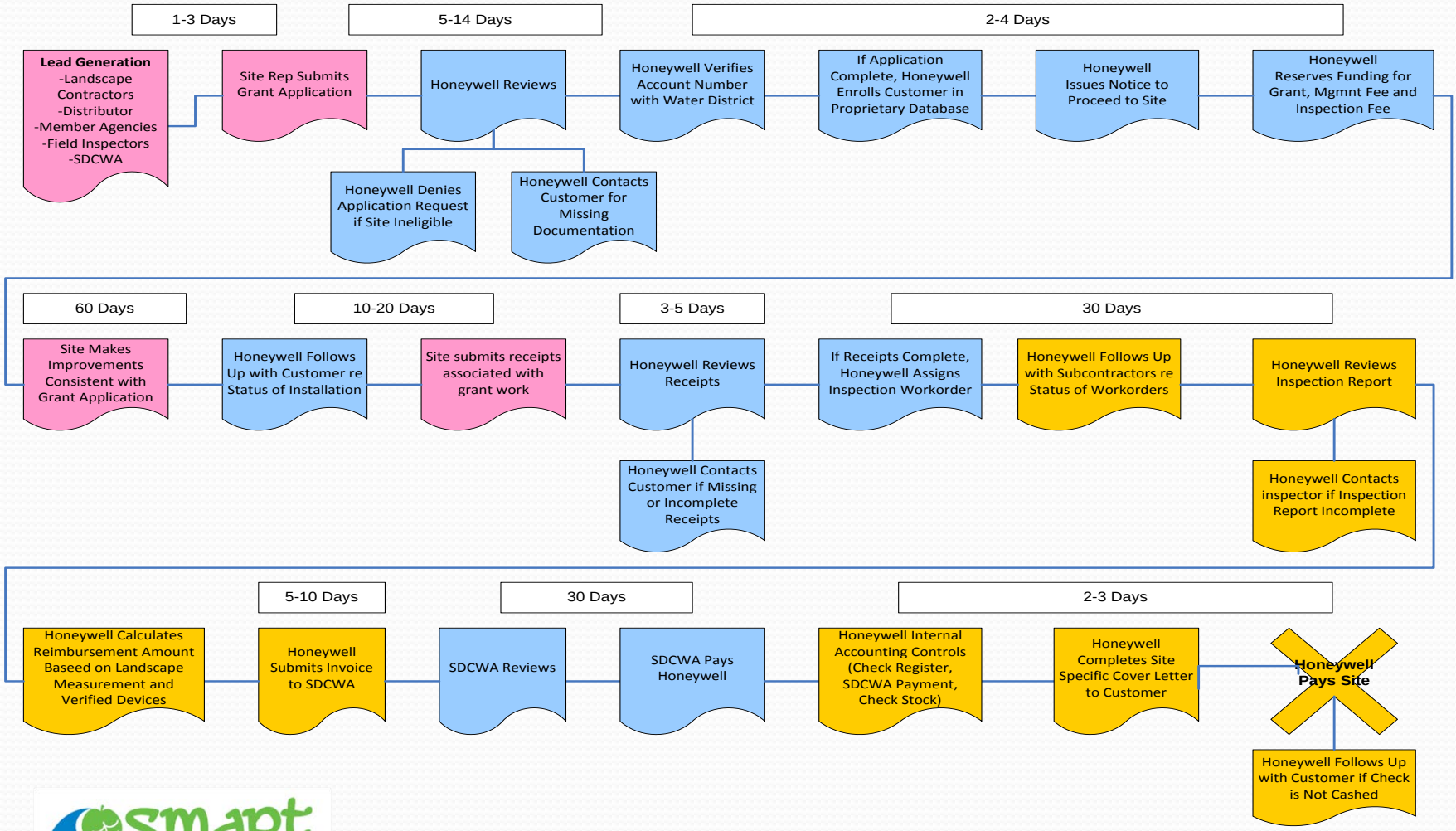
Research Model



Smart Landscape Grants

Vendor Flow Chart



Smart Landscape Grant Process Flow

1. Customer completes application and site information worksheet.
2. Customer faxes /mails application and supporting documents to San Diego Smart Landscape Program.
3. Honeywell reviews application and, if complete, notifies applicant of approval. If not complete Honeywell contacts customer for missing information.
4. Customer completes installation of hardware upgrades within sixty days of approval notification.
5. Customer notifies Honeywell that installation is complete and ready for inspection. Appointment for inspection is set.
6. Customer sends final receipts of hardware costs to Honeywell.
7. Program administrator requests funds from the Water Authority.
8. The Water Authority pays Honeywell.
9. Honeywell makes payment to customer.

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Descriptive Statistics

Smart Landscape Grant Program Accounts Descriptive Statistics			
	Smart Landscape Grant Participants		Non Participants
	Multi Family	Commercial, Indus., Institutional	Random Control Group
Number of Usable Accounts	235	77	1,567
Number of Consumption Meters	641	166	2,018
Meter reads in Sample	31,480	5,798	112,025
PreSL Grant, Mean Use (gpd)	3,759	6,144	2,389
Mean Acres per Participating Account	9.63	6.64	Not Known
Total Acres of Irrigated Area	2,273	511	Not Known

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Statistical Impact Evaluation

- ~200,000 meter read consumption values
- Control and Participant Groups
- 2004-2010 Data
- Time Series Cross Section Method
  - Meter-specific Intercept,
  - Season, (S),
  - Weather (W), and
  - Effect of SLGrant (E)
- Variance Components with Random Effects
- Estimation Method: Maximum Likelihood

$$Use = \mathbf{f}\left(\mathbf{S}_t, \mathbf{W}_t, E_t\right) + \varepsilon$$

$$\ln Use_{i,t} = \mu_i + S_t + W_t + E_{i,t}$$

$$E_{i,t} \equiv I_{MF} \cdot \beta_{MF} + I_{CII} \cdot \beta_{CII}$$

$$\varepsilon_{it} = \mu_i + \xi_{it}$$

where

$$\mu_i \sim N(0, \sigma_\mu^2)$$

$$\xi_{it} \sim N(0, \sigma_\xi^2)$$

$$\sigma_\varepsilon^2 = T \cdot \sigma_\mu^2 + \sigma_\xi^2$$

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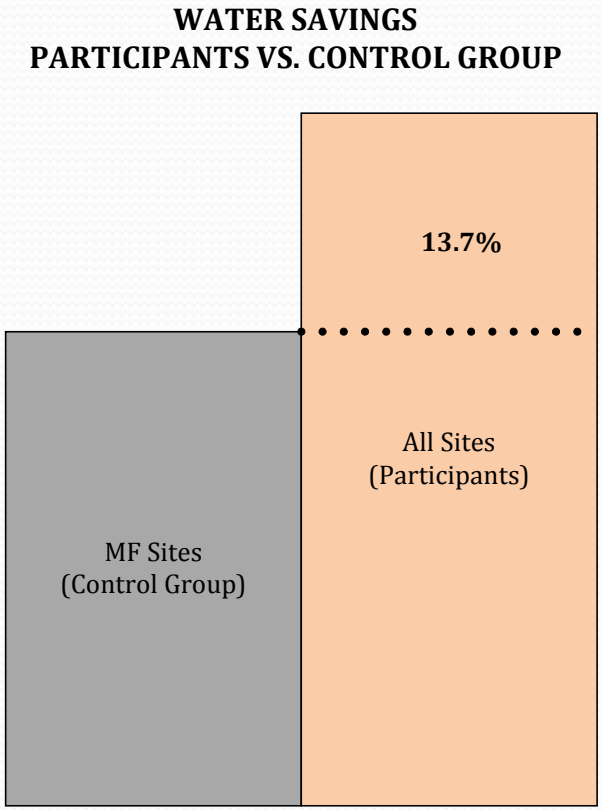
Water Savings

0.21 AF per acre, per year (13.7%)



Savings by Sector (Customer Type):

Multi-Family Sites – **10.8%**

Commercial, Industrial, Institutional (CII) Accounts – **20.5%**

Estimated Cost Effectiveness

Estimated Cost-Effectiveness SL Grant Program			
Site Type	Label	Value	Units
All Sites	Lifetime Water Savings All Sites (MF+CII)	7,988.80	Acre-Feet net savings over a 10 Lifetime
	Total Direct Regional Funding	$ 2,387,949	See SL Grant Program Funding
	Unit Cost All Sites (MF+CII)	$ 298.91	Nominal $ per Nominal AF
Note: Direct Regional Costs do not include water agency labor or overhead.			

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Evaluation of Program

Design

Conclusions

- Program Supported/Aided Local Market Transformation

Recommendations

- Improve customer targeting to increase cost effectiveness
- Consider Supporting Water Restriction Waivers for Incentive Program Participants
- Reinforce Need for Better Programming of Controllers

Marketing

Conclusions

- Program Successfully Accepted by Industry & Integrated by Industry in Daily Operations

Recommendations

- Offer Contractors More Access to Promotional Materials to Better Sell Program
- Encourage On-line Product Overviews and More Installation Training for Contractors
- Communicate Program Participation Process and Contractor Requirements On-line.

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Evaluation of Program

Eligibility & Requirements

Conclusions

- Too many changes in program requirements and eligibility
- Payment delays too frequent

Recommendations

- Better planning up-front so as to avoid frequent changes in requirements and eligibility
- Consider impact on all parties prior to making changes
- Improve communication of program requirements

Systems & Processes

Conclusions

- Outstanding financial process and accounting quality control system
- Good customer service

Recommendations

- Improve flexibility of program databases & add online function
- Create databases at Water Authority to facilitate program administration and information retention
- Reduce program costs by reducing the requirement that 100% of the installations be verified

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Key Findings

- Incentives for irrigation efficiency upgrades to large landscapes are a cost-effective measure.
- Successful implementation requires close collaboration between sponsoring utilities and the green industry (manufacturers, distributors and contractors).
- The program was possible thanks to external grant funding from federal, state and regional sources.

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