

# This presentation premiered at WaterSmart Innovations

[watersmartinnovations.com](http://watersmartinnovations.com)



# Overcoming Barriers to Joint Water-Energy Efficiency Programs



## Water Smart Innovations 2014 *Panel Presentation*



# Agenda

- Heather Cooley, Pacific Institute - Moderator
- Mark Martinez, Southern California Edison
- Carlos Michelon, San Diego County Water Authority
- Mark Gentili, Los Angeles Department of Water and Power
- Rachel Young, American Council for an Energy-Efficient Economy (ACEEE)

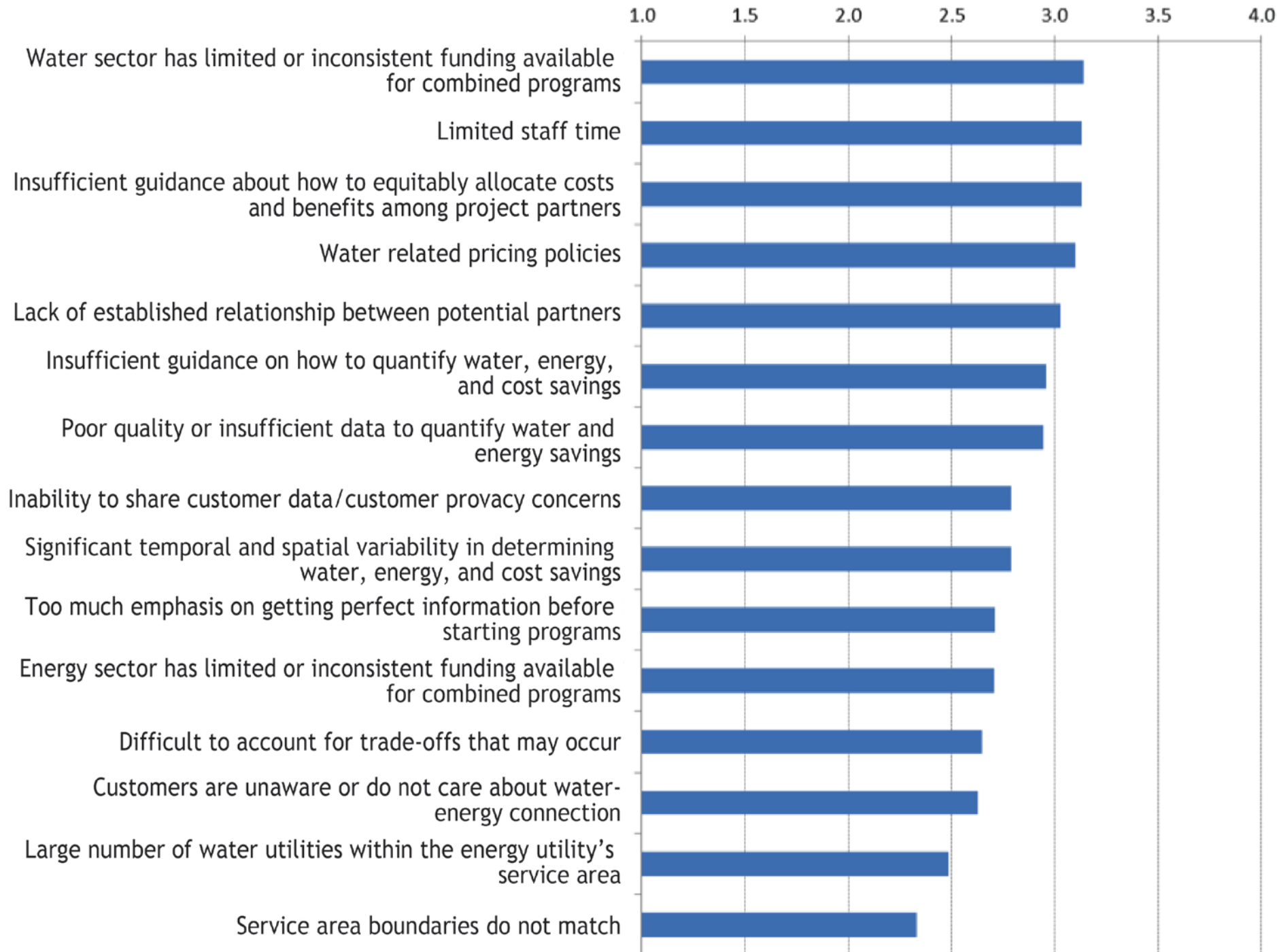
# About the Pacific Institute

The Pacific Institute works to create a healthier planet and sustainable communities. We conduct interdisciplinary research and partner with stakeholders to produce solutions that advance environmental protection, economic development, and social equity—in California, nationally, and internationally.



# Why are Coordinated Efficiency Programs so Uncommon?

- Identify barriers
  - 9 in-depth interviews with staff from water and energy utilities, state agencies, consulting firms, academic institutions, and NGOs
  - Literature review
- Evaluate barriers
  - Online survey – 76 respondents
- 4 case studies – 13 interviews



# Case Studies

- High-Efficiency Clothes Washer Rebate Program



- WaterSmart Landscape Efficiency Program



- Cash for Kitchens Program



- Master Inter-Utility Agreement



# Questions for the Panelists

- Please describe your efforts to develop joint water and energy efficiency programs.
- For the programs you have developed, what has worked and what hasn't worked?
- What have been the benefits of joint programs?
- Do you have efforts underway to expand these programs? If so, what types of programs are you considering?





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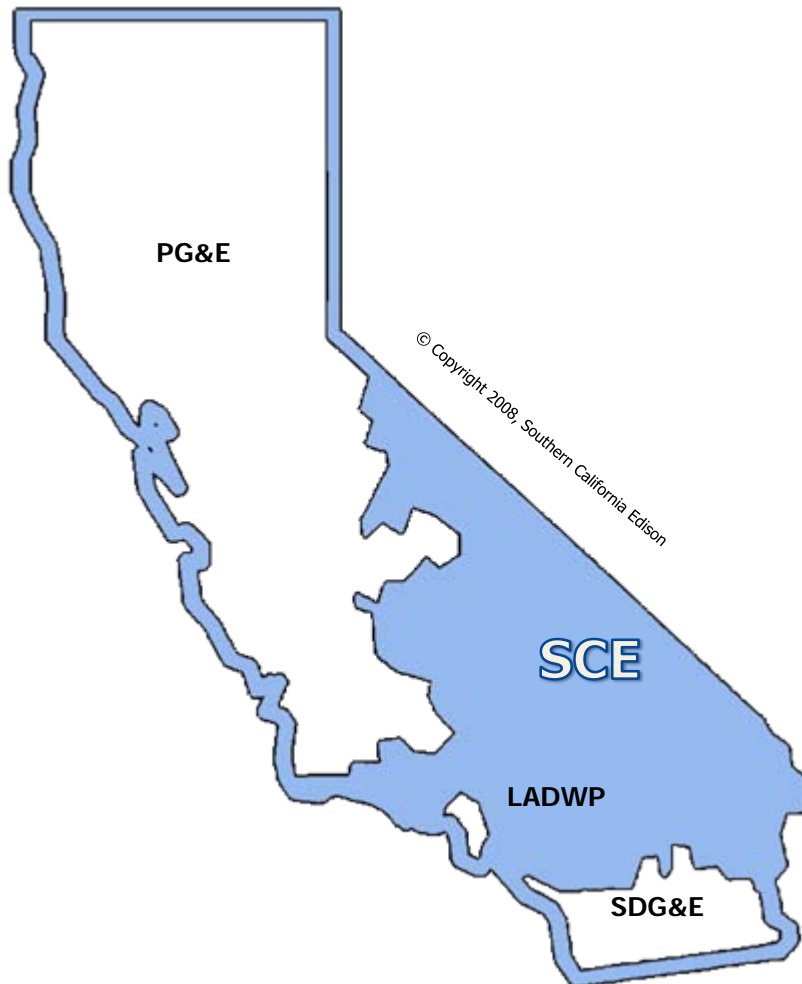
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# **The Water Energy Nexus: Overcoming Barriers**

**Mark S. Martinez**  
Southern California Edison



# Southern California Edison



One of the largest electric utilities in the U.S.

## Service Area

- 50,000 square miles
- Over 400 cities and communities

## Population Served

- Nearly 14 million residents
- 4.95 million customer accounts

## 2012 Electric Revenues

- \$11.86 billion
- 88.2 billion Kilowatt-hours delivered (Bundled Service and Direct Access)

2012 Peak Demand = 21,996 MW

2012 Renewables = 19.9% of sales

Industry leader in renewable energy, DSM, electric transportation, Smart Grid and smart metering

# Parallel Concerns of Water and Energy

- Growing Demand
- Infrastructure
- Resource Adequacy
- Cost
- Source
- Quality/Diversity
- Reliable Supplies
- Environmental Protection
- Long-term Uncertainty



*Figure courtesy of Water Energy Innovations*

# Identifying High Potential Opportunities

## 19% of Electricity

- 8% by Water Sector
- 11% by Water Users

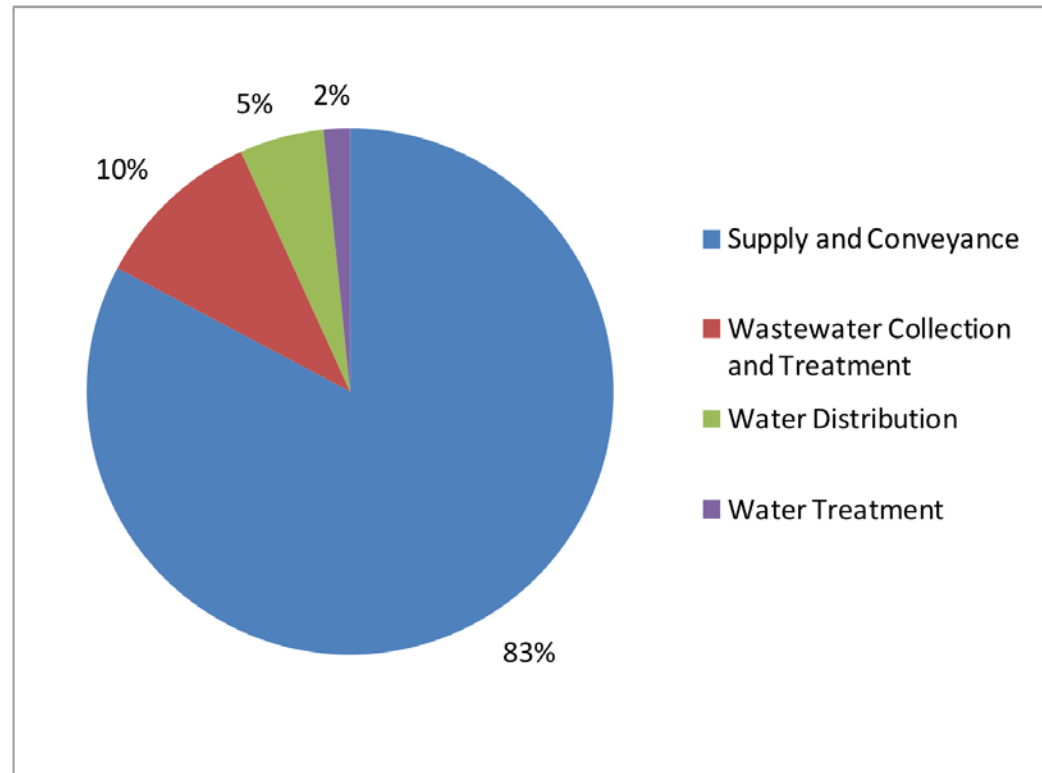
## BUT:

*It's not just how much;  
it's how much can it be  
changed?*

## Key Factors:

- 1 – Primary Drivers
- 2 – Energy Intensity
- 3 – Extent to which  
amount, timing & place of  
energy consumption can  
be change

## Annual Water-Related Electric Consumption by Segment of the Water Use Cycle

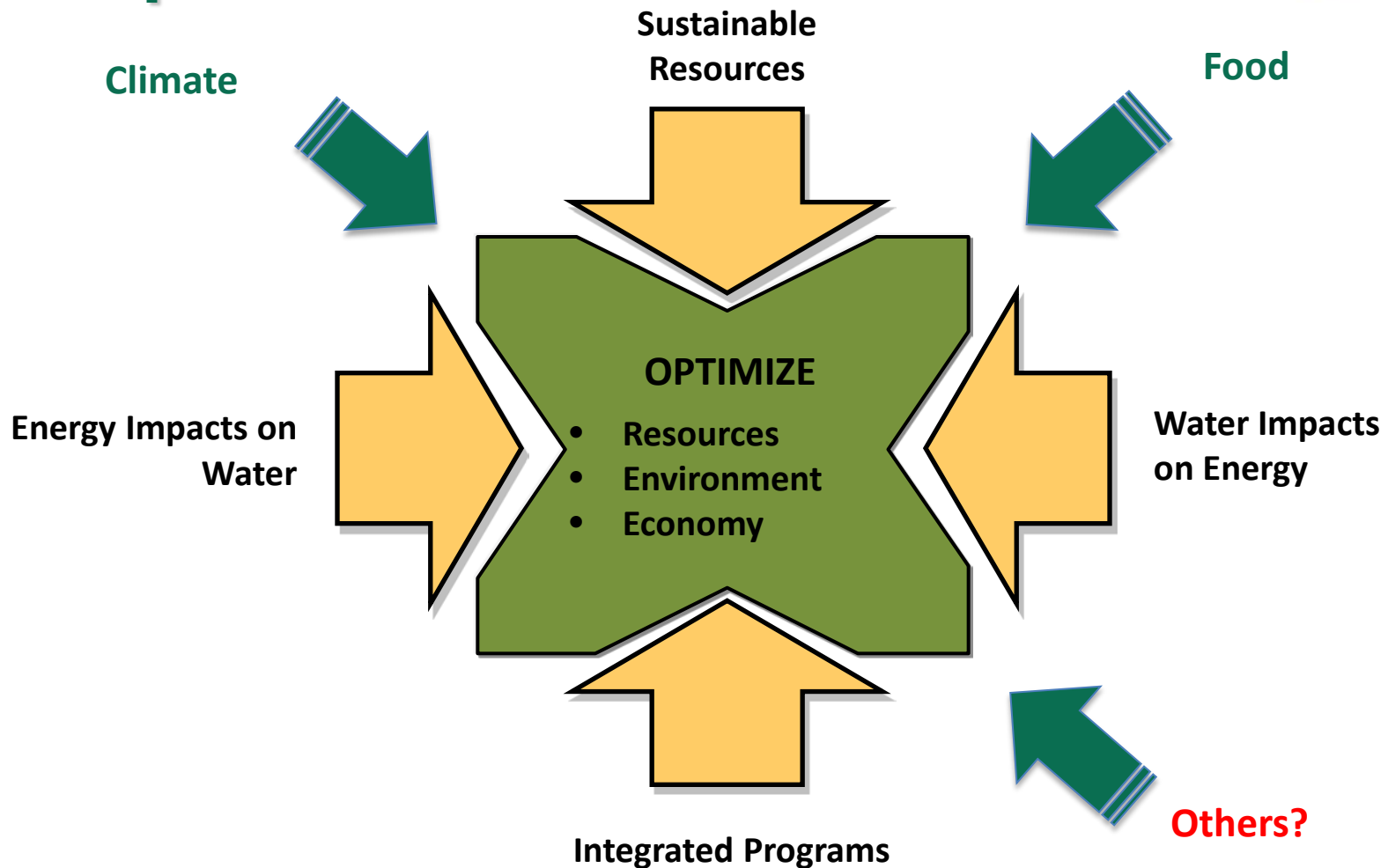




# What's Taking So Long?

- **CA Energy Commission study (2005):** claims that ~20% of total statewide electricity use is for/involve water purposes
- **California Global Warming Solutions Act of 2006 (AB32):** Created a Water-Energy Climate Action Team to assess, integrate and create initiatives across agencies to achieve water and energy savings and reduce GHG emissions
- **CA 20x2020 Water Conservation Plan (2010):** Achieve 20% reduction in per capita urban water use by 2020
- **California PUC Water-Energy Guidance:** Authorized energy IOUs to conduct water-energy pilots, analyze the water-energy nexus; outreach to agencies via local partnerships
- **Energy Division Focus (2013):** workshops on cost-effectiveness
- **Water-Energy OIR:** New CPUC proceeding for partnerships

# The Water-Energy Nexus is comprehensive







# CPUC Water Energy OIR (Key Points)

- Requests CPUC to issue an OII/OIR for water-energy nexus issues
- **Develop partnerships** between energy and water utilities
- Focuses on developing a statewide methodology for calculating energy – water savings to support C-E
- Separate proceeding will facilitate interested parties to focus on the water-energy nexus
- Major issues involve determining appropriate methodologies, strategies for overcoming barriers, funding mechanisms, and coordination between rulemakings

BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA

Petition of The Division of Ratepayer  
Advocates to Adopt, Amend, or Repeal  
a Regulation Pursuant to Pub. Util.  
Code § 1708.5

Petition \_\_\_\_\_  
(Filed May 22, 2013)

PETITION OF THE DIVISION OF RATEPAYER ADVOCATES  
TO ADOPT, AMEND, OR REPEAL A REGULATION PURSUANT TO  
PUB. UTIL. CODE § 1708.5 TO DEVELOP A PARTNERSHIP FRAMEWORK  
BETWEEN ENERGY INVESTOR OWNED UTILITIES AND THE WATER  
SECTOR TO CO-FUND WATER-ENERGY NEXUS PROGRAMS

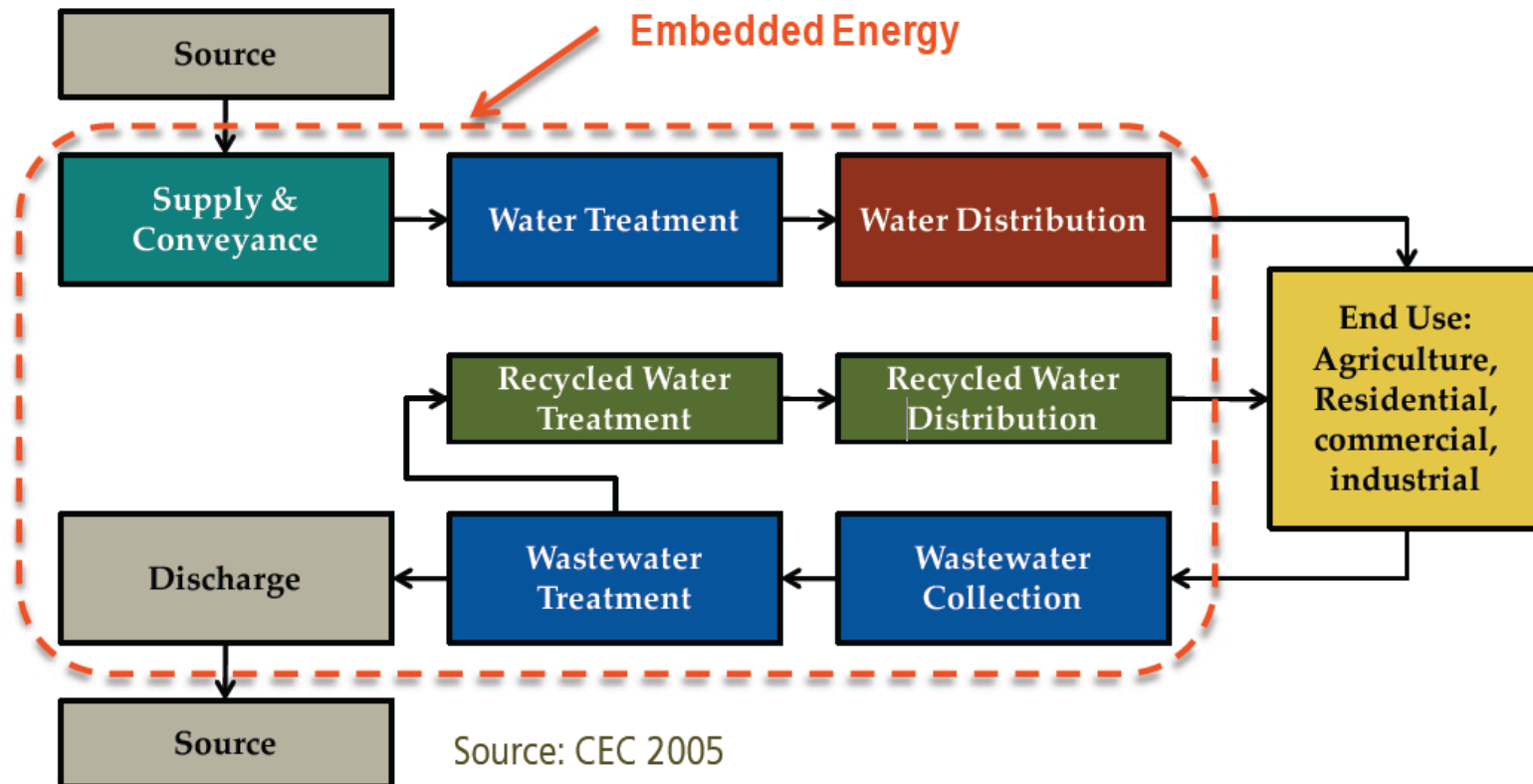
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May 22, 2013

65607373

# Energy Consuming Segments of California's Water-Use Cycle





# Opportunity: Save Water, Save Energy

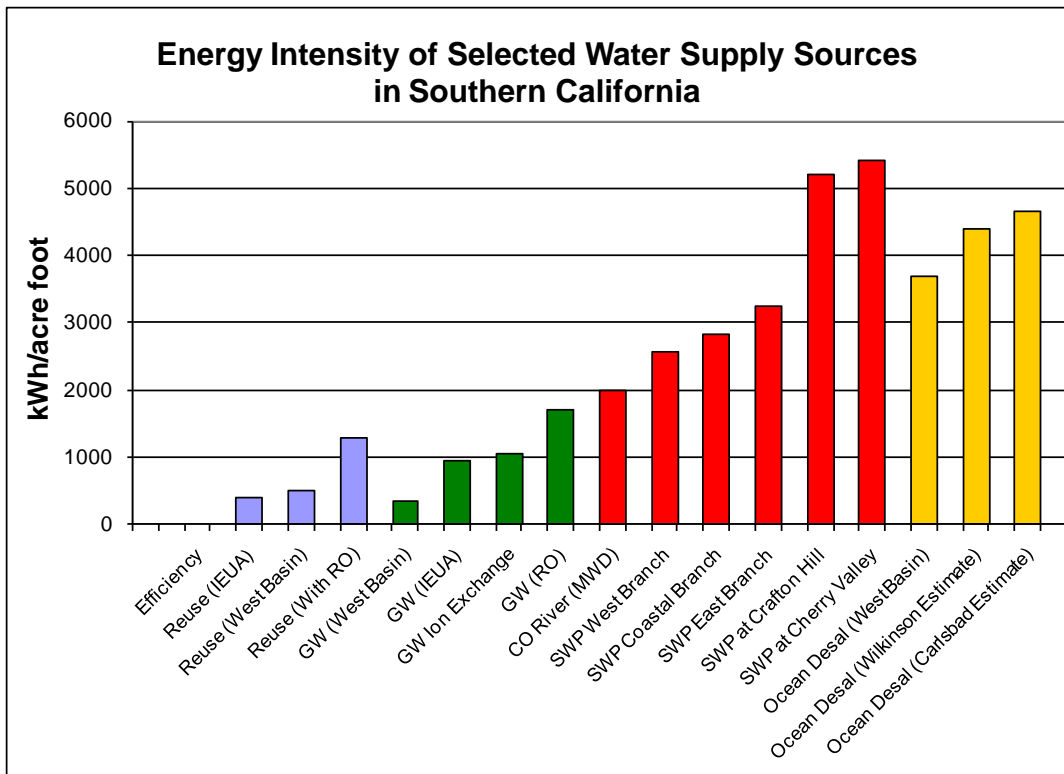


Figure courtesy of Professor Robert Wilkinson,  
Bren School, University of California Santa Barbara

- Up to 70% of all potable water used during in southern California during summer is poured onto lawns
- One building in Sacramento has recorded 18 million gallons of sump water pumped into a storm water drain every year
- One region in southern California estimates more than 13 billion gallons leaves the area every year due to urban hardscape, creating the need to supplement water supplies with imports
- About 2 million AF (650 billion gallons) of treated wastewater is discharged every year to the environment that could be recycled

- **Change Water Supply Mix**
- **Reduce Losses**
- **Reduce Consumption**



# SCE Program Activities

- **SCE Plans for 2013 – 2014 Portfolio:**

- Develop a leak detection/water management offering in collaboration with Local Government Partnerships agencies
- Investigate cost-effective opportunities to increase awareness of available energy and water incentives/services benefitting both agricultural and industrial customers

- **California Statewide Efforts**

- Continue to create strong partnerships among energy and water utilities to allow for collaboration, co-investment and implementation synergies
- Continue to explore integration of programs and services across energy, water, and air quality conservation resources
- Continue progress towards AB32 and 20x2020 goals

# Pump Efficiency Services (PES):



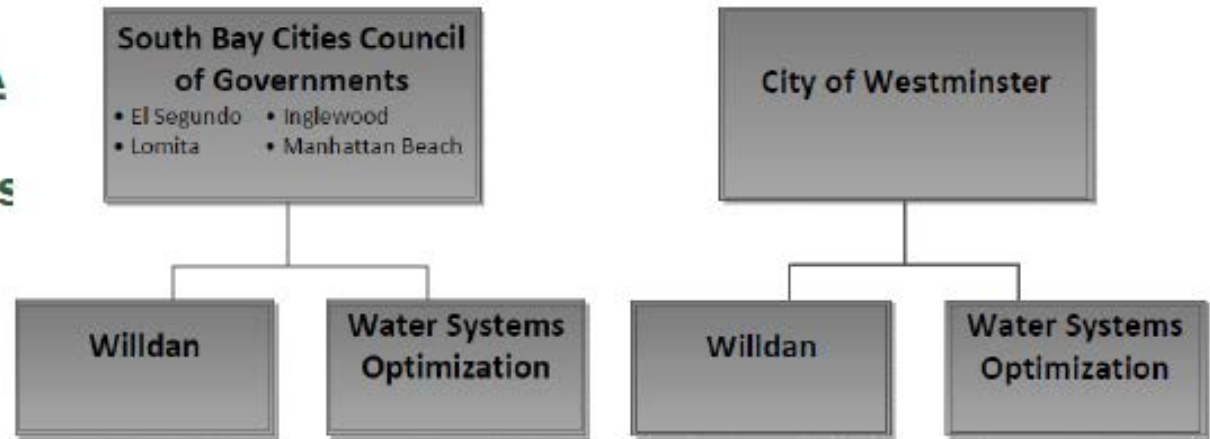
Designed to help pumping customers **make informed decisions** about improving inefficient pumping systems and operations.

The solutions are **communicated in a technical report** providing recommendations derived from onsite pump tests and/or direct observations of processes.

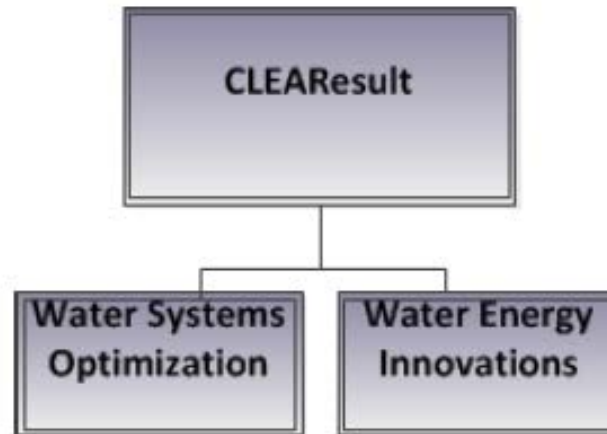
***Since 1911, a comprehensive water and energy management service for the efficient delivery of water for SCE customers***

# SCE Water Loss Pilot program

## Opportunity A Water Loss Control Studies




## Opportunity B Cost Effectiveness Studies & Program Design





# Summer water-energy messaging




## Conserve Our Precious Resources


**Please Do Your Part with These  
Water & Energy Saving Tips:**

- Hang up towels that do not need to be washed
- Only turn the faucet on before and after brushing your teeth
- While shaving, use a stopper in the sink
- Do a "switch check" before you leave your room to make sure all lights are off
- Reduce energy and water use during peak hours, between noon and 6 p.m.

**View energy-saving tips at [sce.com/savenow](http://sce.com/savenow).**



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## WATER CONSERVATION

### SAVE ENERGY WHILE SAVING WATER

On the hottest summer afternoons, everyone can help prevent blackouts by minimizing energy and water use. Avoid unnecessary water use like washing dishes and watering outside to help conserve. By using water more efficiently, you're helping your water and wastewater providers use energy more efficiently.

**Get More Water-saving Tips**



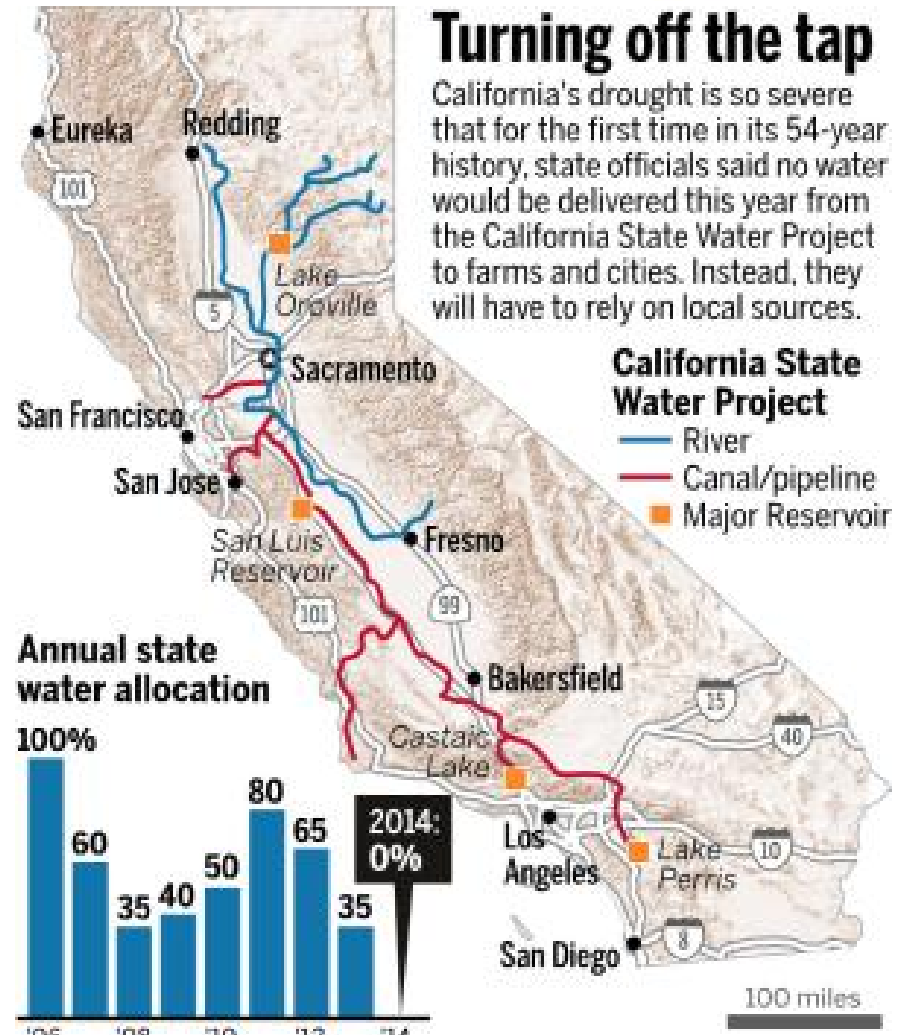
## DON'T HOSE ME MAN!

**@Lawn\_Dude**

**It's A Drought. Conserve Now.**  
[socialwater.org](http://socialwater.org)



# Third year of the drought





# SCE specific coordination activities

- SCE has established a **Water-Energy program advisory group** (WET-PAG) with large water agencies
- Multiple groups engaged (MWD,DWR, WET-CAT)
- **SCE engagement** with ACWA & CalWEC increased
- **SCE** joining the PCG on water-energy C-E tool
- Experts engaged for **water strategy** development and coordination with WET-CAT and
- **Drought activities** coordinated with the Governor's Office for joint communications with water messages
- **DSM programs** include water agency energy plans



# Thank you!



**[Mark.S.Martinez@sce.com](mailto:Mark.S.Martinez@sce.com)**



# **Water-Energy Partnership in the San Diego Region**

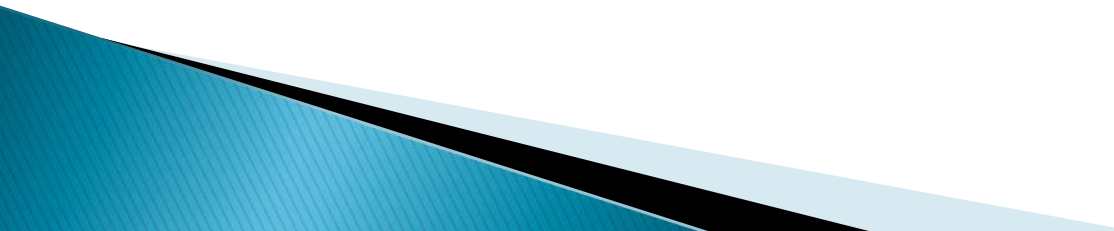
Water-Energy Panel  
2014 WaterSmart Innovations Conference

October 10, 2014

Carlos Michelin  
Principal Water Resources Specialist



# Key Questions

- ▶ Local efforts to develop joint water and energy efficiency programs
  - ▶ What has worked and what hasn't?
  - ▶ What have been the benefits of joint programs?
  - ▶ Do you have efforts underway to expand these programs? If so, for what types of programs?
- 

# Acknowledgements

## WaterSmart Landscape Efficiency Program



*This program is funded by California utility ratepayers and administered by San Diego Gas & Electric Company, under the auspices of the California Public Utilities Commission*

*This program is funded in part by a Proposition 50 grant administered by the California Department of Water Resources*



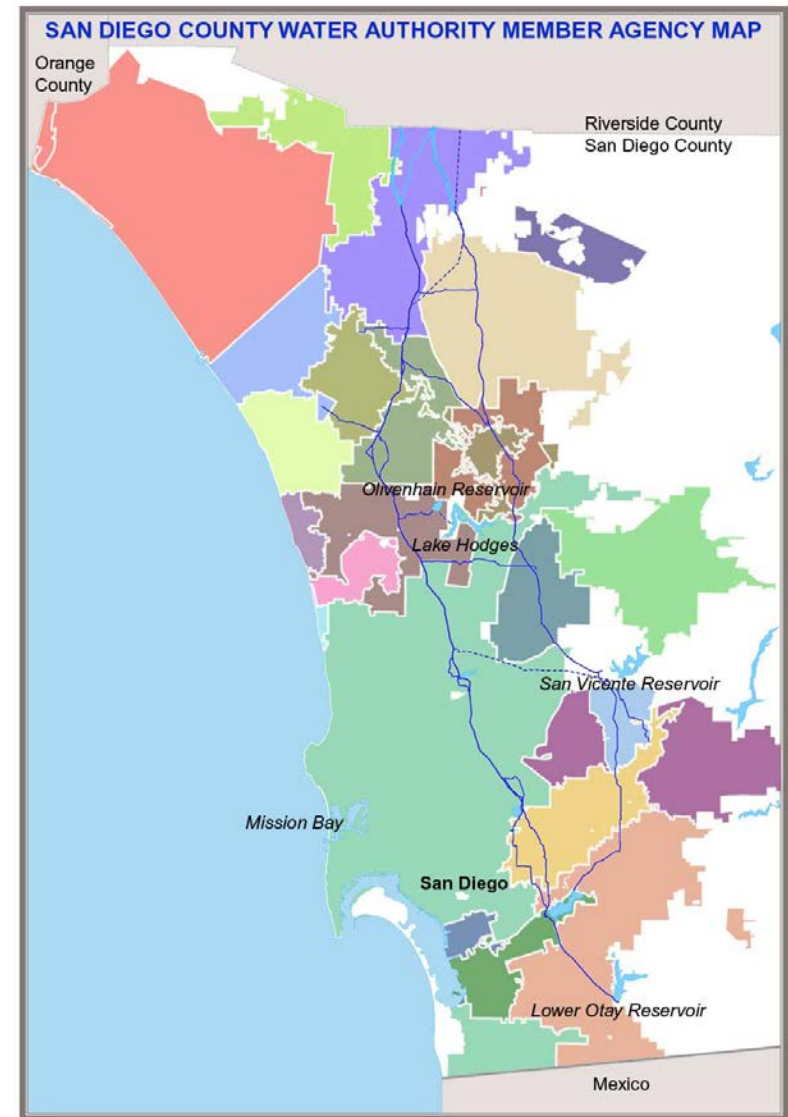
# Water-Energy Partnership in San Diego County



& 24 member agencies

# San Diego County Water Authority

- Wholesale water agency
- 24 member agencies
- Service area
  - 3.1 million people (97% of county's population)
  - \$206 billion regional economy
  - 950,000 acres



# WSLEP Incentives

1. Site enrollment..... \$100 per site
2. Calculation of water savings potential..... \$500 per site
3. Hardware procurement..... up to \$5,000 per site
4. Hardware installation..... up to \$5,000 per site
5. Irrigation management ..... \$1,200 per site
6. Performance fee (20% reduction)..... \$1,700 per site

**TOTAL up to \$13,500 per site**

# Efforts to develop joint water and energy efficiency programs (Past)

SDCWA and SDG&E - More than 2 decades of collaboration

- ▶ Outreach
- ▶ Incentives – Appliances & Plumbing fixtures
- ▶ 2008 Pilot Programs:
  - Managed Landscapes Program
  - Detention Facility Retrofits
  - Leak Loss Detection / Pressure Regulation
  - Conversions from Potable to Recycled Water

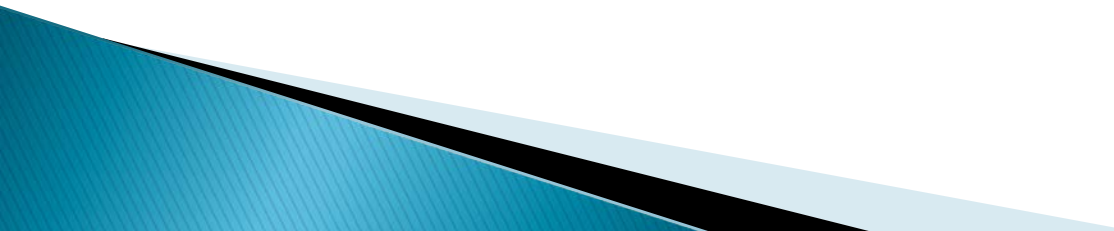


# Efforts to develop joint water and energy efficiency programs (Present)

- ▶ Authorized by CPUC (Decision 12-11-015)
- ▶ Also funded by California DWR
- ▶ Scope:
  - Water Leak / Loss Detection, pressure management
  - WaterSmart Landscape Efficiency Program\*
  - Prison Retrofit
- ▶ Funding: \$829,280 (\$679,280 by SDGE and \$150,000 by SDCWA)
  - \$360,000 WSLEP
  - \$285,280 Leak Loss Detection / Pressurization Management
  - \$184,000 Prison retrofit



## What's working...

- Inter-agency collaboration (authorization, partnerships, funding, collaboration)
  - Funding agencies are starting to support with grant funding (USBR, DWR)
  - Landscape WUE: Hardware & irrigation management services have posted good results
  - Enrollment and participation rates
- 

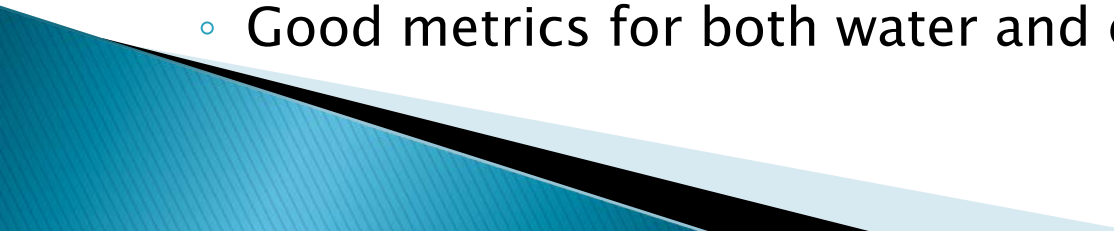
# What's not working...

- ▶ Long-Term “Market Transformation”
  - Scalability:
    - Clear methodology & consistent implementation
    - Increased proficiency by industry professionals
  - Administrative Red Tape (capital projects vs. water conservation programs):
    - Public works project definition / Applicability of labor compliance requirements

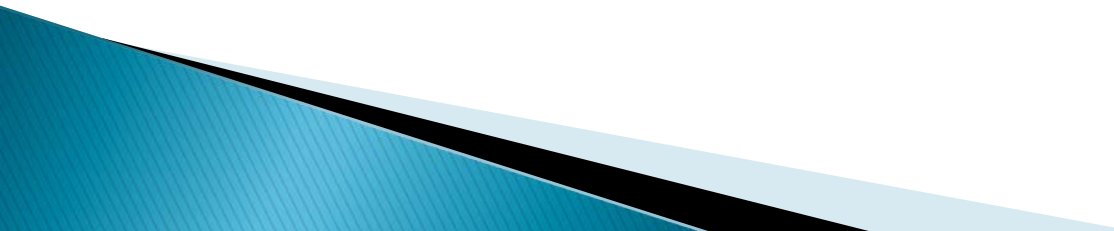
# What's taking longer than anticipated...

- Method for crediting IOUs for embedded energy in water efficiency programs...
- Technical complexity of programs:
  - Landscape: needs streamlined methods (continuity & vertical integration)
- Administrative hurdles

# Benefits of joint programs

- ▶ Strong inter-agency ties & long-term collaboration
  - ▶ Pooling of Resources
    - Multiple sources of funding (CPUC, DWR)
    - Collaboration / division of labor
      - Administration
      - Program management
      - Joint outreach
  - ▶ Ability to Successfully Pilot New Concepts
    - Program R&D vs. replication
    - Performance-based landscape programs
  - ▶ Performance to Date
    - Good metrics for both water and energy achieved thus far
- 

# Efforts to expand these programs

- ▶ 2015 CPUC bridge funding
  - ▶ Preliminary selection for IRWM–SD grant BY DWR
  - ▶ In total more than \$400k
  - ▶ More emphasis on industry training to help contractors
  - ▶ Future changes to CPUC budget authorizations (multi-year plans)
- 



**Carlos Michelon**

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# Next Century Water and Power: Efficiency Solutions for LA

## WaterSmart Innovations Joint Energy-Water Efficiency Programs

October 10, 2014

Mark Gentili

Supervisor of Water Conservation



# Next Century Water and Power: Agenda



- Energy Efficiency for LA
- Water Efficiency for L.A.
- Barriers to Joint Energy and Water Efficiency Programs
- Examples of Joint Energy and Water Efficiency Programs at LADWP
  - Small Business Direct Install Program (SBDI)
  - Home Energy Improvement Program (HEIP)
  - Supermarket Evaporative Condenser Projects



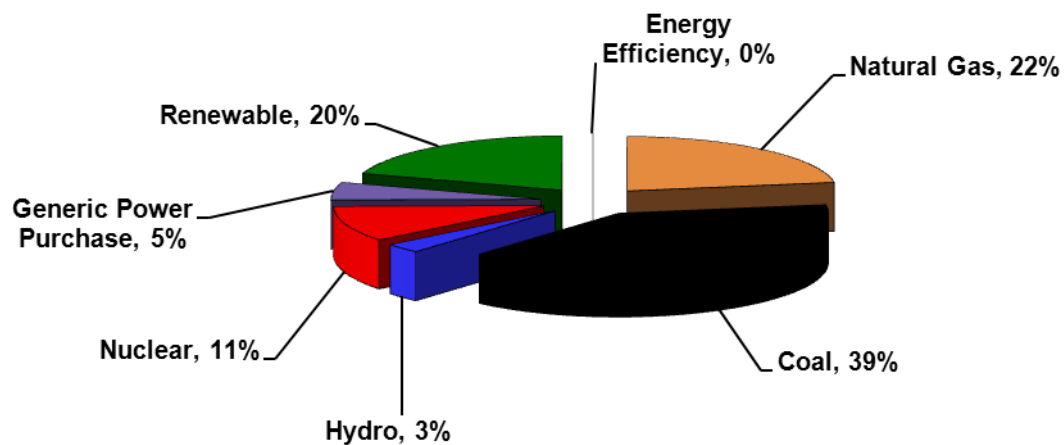
# Next Century Water and Power: Why Energy Efficiency?



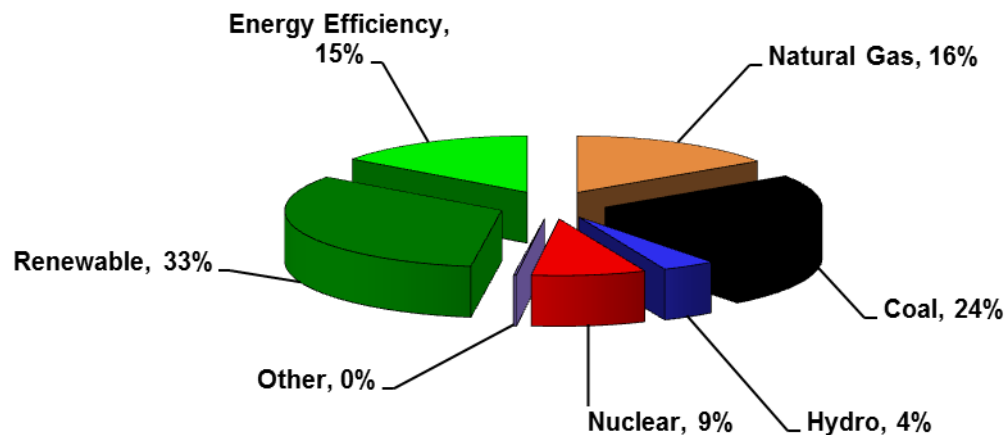
- LADWP plans to exit coal by 2025
  - AB 32 – Environmental Leadership
  - 2 years ahead of schedule
  - Coal about 33% of power supply today
- Replacement power
  - Natural gas
  - Renewables – 33% State-mandated by 2020
  - Energy Efficiency (EE) – 15% goal by 2020
- Renewables and EE
  - Combined will serve almost 50% of power needs by 2020
  - More by 2025 – How much more?

# Next Century Water and Power: LADWP Power Supply Mix

2010



2020



# Next Century Water and Power: Why Water Conservation and Efficiency?



- We are in a drought!!!
- Sierra snowpack 30% of normal in 2014
- State Water Project deliveries to Southern California at 5% of normal

# Sources of Water for Los Angeles





# Barriers to Joint Energy and Water Efficiency Program



- Barriers to Implementation
  - Power System vs Water System
  - Funding streams
  - Program designs
  - Implementation staff
  - **Ownership of commitment to joint programs**
- Strategies to overcome barriers
  - House efficiency efforts in a “joint” organization independent of the Power and Water systems
  - Integrate staff
  - Integrate program planning
  - **Leadership**

# Spotlight – Small Business Direct install Program (SBDI)



- SBDI serves commercial customers under 30kW
  - Estimated 150,000 in City
  - Helps small businesses reduce their electric, gas, and water bills (and sewer!)
- Measure highlights (not exhaustive)
  - Lighting retrofits - electric
  - Faucet aerators, showerheads – water & gas
  - High-efficiency flush valves and toilet tank repair
  - Pipe wrap - gas
  - Thermostatic fan controllers – electric and gas



# Spotlight – Home Energy Improvement Program (HEIP)



- HEIP is a long-term offering, directly installing efficiency measures in residents' homes
  - Not income-qualified, targeted to low, moderate, fixed-income areas
  - Both single and multi-family residences may participate
  - Will help residents reduce their electric, gas, and water bills (and sewer!)
- Measure highlights (not exhaustive)
  - Weatherization measures – electric and gas
  - Window/wall AC replacement – electric
  - Faucet aerators & showerheads – water & gas
  - High-efficiency toilets – water
  - Pipe wrap and tank blankets – gas

# Spotlight – Technical Assistance Program for custom water conservation projects that are water and energy efficient



# Spotlight – Technical Assistance Program for custom water conservation projects

## Projects that are water and energy efficient



- Major Supermarket chain wanted to do the following 6-store pilot:
  - 24/7 water treatment monitoring equipment was installed
  - Installs installed September 2013: savings 719,824 gallons/per store/year, average 25% of overall water usage per store.
  - Last few months 49 additional stores retrofitted! (total 55)

# Water treatment for Evaporative Condensers

- Why is the water circulating through Evaporative Condensers treated?
- Want to prevent slime and scale from forming on the heat transfer surfaces (copper tube bundle inside of the evaporative condenser)



# Slime in Evaporative Condensers

This is what slime looks like  
on copper tubes



# Scaled EV tubes





# Treatment supermarkets did: pH Control (partial pH control)

- Adding sulfuric acid to bring pH below 8.6.  
Scale (Calcium Carbonate) will not form in this pH range with scale inhibitors.
- pH in Evaporative Condenser is normally  $\geq 8.9$
- With the treatment above the water in the Evaporative Condenser can be recirculated longer before dumping it

# Energy savings for 4 of the 6 stores

- Out of the 6 stores in the pilot – 4 get their electricity from the LADWP
- Have 11 months of “after” data. Compared with previous 3 years of usage history
- Saw a 4.0% average in kWh savings average
  - Approximately 320,000 kWh/yr/store which is about \$9,500 in savings/yr/store

For More Information

**Mark Gentili**

**LADWP Water Conservation Group**

**(213) 367-8556**



American Council for an Energy-Efficient Economy

# **Saving Water and Energy Together - Helping Utilities Build Better Programs**

Rachel Young, ACEEE

October 2014

Presented at the WaterSmart Innovations  
Conference, Las Vegas, NV

# The American Council for an Energy-Efficient Economy (ACEEE)

- ACEEE is a nonprofit 501(c)(3) that acts as a catalyst to advance energy efficiency policies, programs, technologies, investments & behaviors
- Nearly 50 staff based in Washington, D.C.
- Focus on end-use efficiency in industry, buildings, utilities & transportation
- Other research in economic analysis; behavior; national, state, & local policy
- Funding:
  - Foundation Grants (52%)
  - Contract Work & Gov. Grants (20%)
  - Conferences and Publications (20%)
  - Contributions and Other (8%)



# Background: Programs that Save Energy and Water

- A greater recognition of the energy-water nexus has spurred more programs that save water and energy
- States and Cities are implementing programs and instituting state policies that recognize the nexus.
- Private companies are implementing sustainability programs that save water and energy.
  - (see: <http://aceee.org/research-report/e131> for more info)
- However there are limited examples of programs that are being run by energy and water utilities jointly.



# Benefits of Working Together

- Increased market penetration of efficiency programs.
- Improved cost-effectiveness of energy efficiency when considering both water and energy.
- Creation of dual water and energy audits, rebate programs, and education and outreach efforts reduces the number of times utilities knock on doors.
- Leveraging relationships with different manufacturers and retailers and running joint programs so that the utilities can bring in multiple stakeholders and take advantage of those different relationships.

# Benefits of Working Together

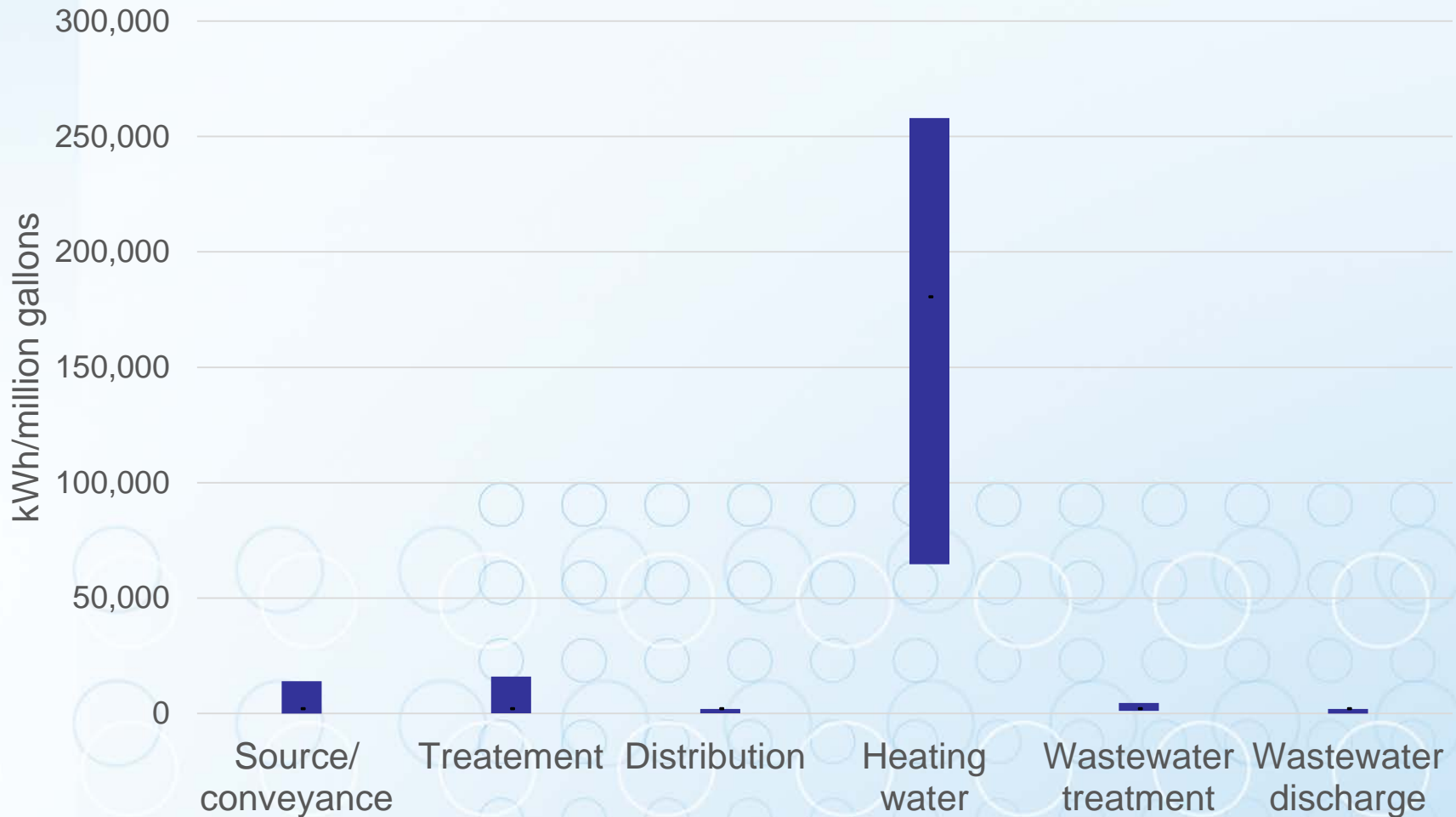
- Multiple perspectives and agendas in the program planning process, which can help identify additional untapped savings opportunities.
- Having water utilities and energy utilities together during the planning process helps ensure that unintended consequences are avoided.
- Increased understanding of the relationship between water and energy through advanced tracking, metering and evaluating.

# Areas of Opportunities

- Residential Programs
- Commercial Programs
- Agriculture Programs
- Industrial Programs
- Water/Wastewater Programs



# Energy in water by service



# Savings!

	Hot water energy efficiency scenario (30% savings) (million kWh)	Cold water efficiency scenario (30% savings) (million kWh)
<b>Water service electricity use</b>		
Energy in water source/conveyance	2,300	1,200
Energy in treatment	2,800	1,500
Energy in distribution	700	400
<b>Domestic electricity use</b>		
Electricity to heat water consumed (typical water heating scenario) (kWh/million gallons)	102,000	-
Gas to heat water consumed (typical water heating scenario) (Therm/million gallons)	5,000	-
<b>Wastewater service electricity use</b>		
Energy in wastewater collection and treatment	1,400	700
Energy in wastewater discharge	200	100
<b>Total (million kWh)</b>	<b>110,000*</b>	<b>3,800</b>



# Conclusions

- There are many opportunities for energy and water utilities to work together to achieve greater savings.
- Utilities should take advantage of the benefits of joint programs.
- “Just add water” to current programs and to the energy resource planning process.
- Begin developing and implementing pilots of some of the recommended programs.




# Next Steps

- Beginning a dialogue about opportunities between the two (or more) utilities and establishing relationships.
- Creating utility partnerships for joint messaging.
- Collaborating to identify unique funding opportunities.
- Developing a format to add energy savings calculations to water programs and vice versa.
- Working with energy regulators to establish credit for embedded energy savings from water efficiency programs (and vice versa).
- Creating a clearly communicated strategy with measurable goals to help clarify priorities and cement roles.

# Water-Energy Program Directory

[Contact](#) | [Site Map](#) | [Energy Efficiency Links](#) | [Glossary](#) | [Privacy](#)

  
American Council for an Energy-Efficient Economy

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## Water-Energy Program Directory

**Keyword**

**Organization**

**State (e.g., CA, NY)**

**Program Category**  
- Any -

### Programs Directory

**Low Flow Showerhead and Faucet Aerator Program**  
CenterPoint Energy | AR, MN, OK  
Program Category: Residential (indoor & outdoor)

**Bonneville Power Administration (BPA) Agricultural Energy Efficiency – “Save Water-Save Energy” Program**  
Bonneville Power Administration | BPA's service area includes the states of WA, OR, ID, western parts of MT and WY, and the northern parts of CA, NV and UT  
Program Category: Agriculture

**Des Moines Metropolitan Wastewater Reclamation Authority - Infor ASE Implementation**  
Des Moines Metropolitan Wastewater Reclamation Authority | Des Moines, IA  
Program Category: Corporate/ Government/ Institutional Sustainability

**EMWD - Energy Management Strategies**  
EMWD | Eastern Municipal Water District, CA  
Program Category: Energy Supply or Generation

**West Basin Municipal Water District- Water-Energy Efficiency Master Plan**  
West Basin Municipal Water District | CA  
Program Category: Corporate/ Government/ Institutional Sustainability

### About the Directory

This directory is a publicly-available online resource which provides basic information on over 450 existing programs saving both water and energy from across the United States, Canada and Australia. The program information was received from program nominations for *Tackling the Nexus: Exemplary Programs that Save Both Energy and Water*, submissions directly to the directory, and from the E Source DSMdat database. The directory also includes contact information for point people administering each program when available.

Does your organization have a water-energy program you'd like to share? In order to keep the directory up to date we encourage anyone involved in the management of a program that saves both water and energy to submit their program for inclusion in the directory. If your program is already in the database and you would like to update information on it, please [email us](#).

# Questions

Rachel Young

Policy Researcher

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202-507-4023

Downloadable version of the report is available here:

<http://aceee.org/research-report/e13h>

Water-Energy Program Directory:

<http://www.aceee.org/w-e-programs>