

# Connecting the Dots:

Local Projects that Save Energy and Water  
Investor-Owned Utilities Water-Energy Nexus  
Jesse Langley - Senior Program Manager - SCE



# Water and Energy

## A Dependent, Connected Relationship

### The Fact

Water and energy are fundamental elements of modern civilization

### The Paradox

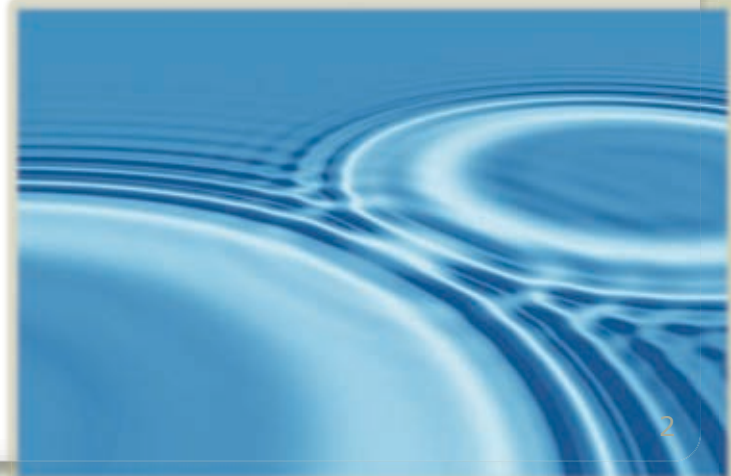
A large amount of water is required to produce energy

Energy is required for water treatment and transportation

### The Challenge (and Opportunity)

Significant energy benefits can be achieved through the dual goal of:

- Efficient end-user water usage
- Efficient water system energy usage



## **Water-Energy Nexus**

### Importance to Investor-Owned Utilities

Water-related energy accounts for approximately:

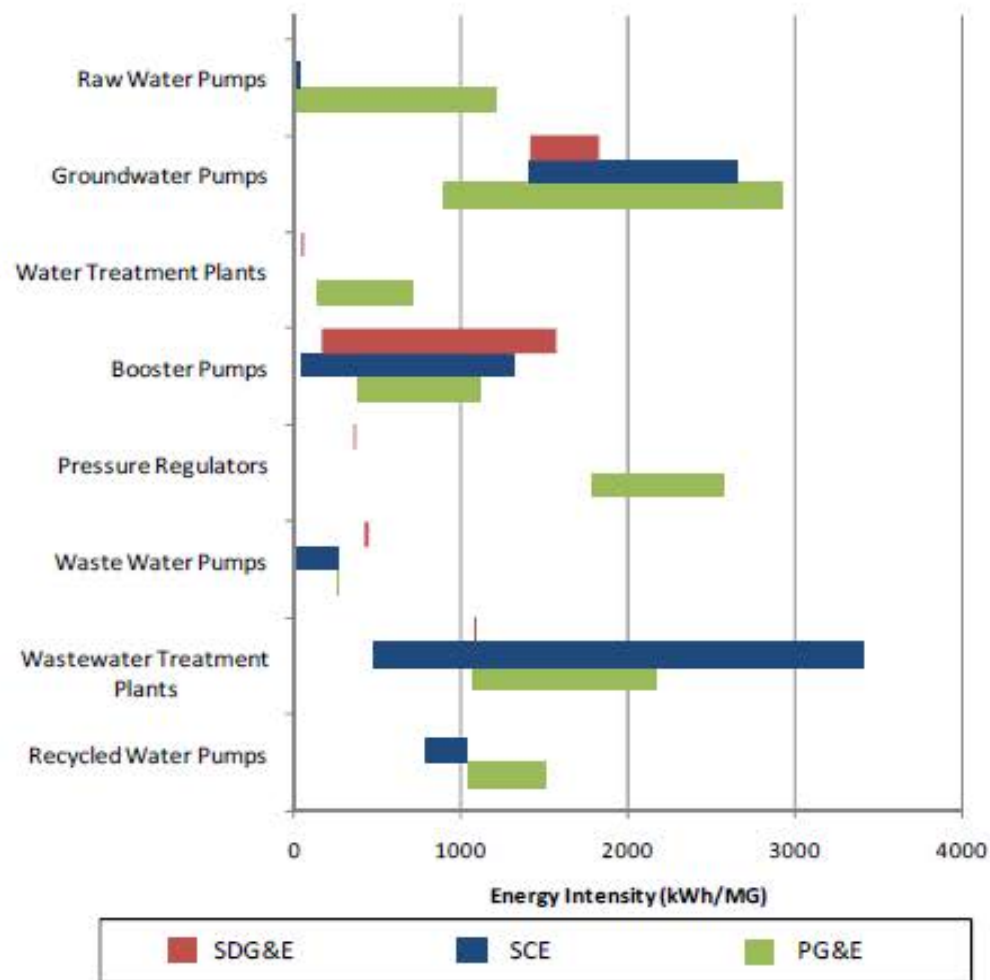
- 19.2% of California's electricity usage
- 30% of non-power plant-related natural gas consumption

These estimates include:

- Direct electricity used by water and wastewater systems
- Electricity used for water consumption



## Energy Intensity Range by Functional Component for Each IOU



From Study 2 by GEI Consultants/Navigant Consulting  
Prepared for the CPUC

## IOU Accomplishments

### CPUC Water-Energy Pilot A Strategy to a Solution



#### About the Pilot

- California statewide IOU effort
- Conducted July 2008 to December 2009

#### Objectives

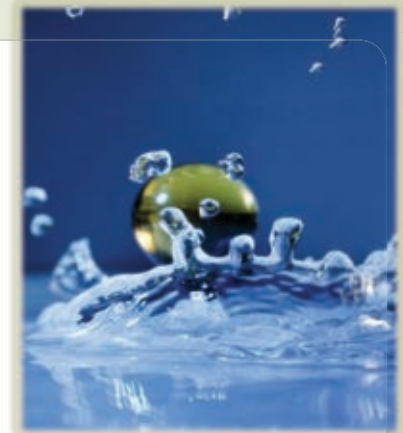
- Achieve and quantify energy savings through reduced water usage
- Stimulate new partnerships
- Conduct pilot programs and studies to benchmark and analyze potential savings

#### Strategies

- PG&E, SCE, and SDG&E each conducted pilots
- Focused on high-efficiency toilets, landscaping, large customer and water agency site audits, leak detection, and water systems tests

# Current IOU Efforts

## San Diego Gas & Electric



Local Government Partnerships

### **San Diego County Water Authority**

#### Leak Loss Detection

- Water loss control to water agencies (3<sup>rd</sup> party implementation)
- High-value targets: high energy intensity/embedded energy, high leakage levels
- Acoustic leak detection equipment “listens” for leaks

#### Pressure Management

- Pressure zones may have gradually increased due to low pressure complaints, poor design
- Zones adjustable with current equipment or with flow-modulated pressure reducing valves

#### Managed Landscape

- For San Diego County Water Authority and member agencies
- Managed Landscape, a successful water pilot, will be rolled out and expanded
- County Detention Center Retrofit, developed under the water-energy pilots

## **Current IOU Efforts**

### **San Diego Gas & Electric**

#### **City of Chula Vista**

Conservation Section collaborates with two local water providers to conserve water by providing:

- Water conservation information at weekly Farmers Markets
- Free water efficiency evaluations for homes and businesses
- Rebate programs for water-efficient plumbing and appliance upgrades
- Revised building standards and development guidelines to maximize water efficiency and water reuse opportunities.

#### **Port of San Diego**

Green Business Network:

- Connects Port businesses to free technical assistance, workshops, and best practices to help them meet water conservation, energy efficiency, and sustainability goals

#### **Balboa Park Cultural Partnership**

2010-2012 cycle-funded LEED Feasibility Study identified several recommendations for savings:

- Add faucet aerators to institutions that reduce water consumption
- Savings results if implemented: 1,527,000 gallons



## Accomplishments

Southern California Edison

### **Integrated Energy-Water Commercial Audit Pilot Program**

A targeted pilot to integrate electric energy and water efficiency into small business audits coordinated by West Basin Municipal Water District and SCE.

#### Customer

- Water-saving fixtures at no cost
- One-stop shop: less interruption to business

#### Water Utilities

- 20x2020 water savings target
- Reduced reliance on imported water

#### SCE

- CPUC Recommendation to partner with water utilities
- Enhances existing offering to customers



# Current IOU Efforts

## Southern California Edison

### **Residential and Commercial Energy Efficiency**

Incentives for combined energy and water-efficient fixtures, appliances

### **Agricultural and Industrial Energy Efficiency**

Incentives, technical assistance for pump efficiency testing, water-energy nexus, water/wastewater treatment, Continuous Energy Improvement

### **Integrated Demand-Side Management**

Working with Energy Division to design a proposed Water-Energy IDSM pilot

### **Codes and Standards**

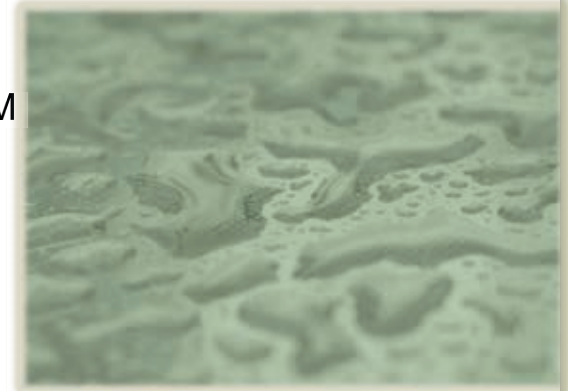
Water efficiency, water distribution systems, and building water usage

### **Emerging Technologies**

Investigating advanced technologies for water heaters and water treatment

### **Workforce Education and Training**

Education on water efficiency and conservation



# Current IOU Efforts

Southern California Edison

## Leak Loss and Pressure Management RFP for Program Design

### Overview

Commercialized water leak detection and pressure management program, based on successful 2008-2009 SCE water pilot.

### Objectives

- Achieve measurable energy savings by repairing water leaks and optimizing water system pressures
- Refine the methodology to accurately capture savings
- Advance the methodology for determining the total energy savings associated with cold water conservation
- Apply validated cost-effectiveness calculation to projects
- Identify a comprehensive water agency offering to identify applicable EE, DR, DG measures

## Current IOU Efforts

Pacific Gas & Electric

### Water-Energy Accomplishments

- 2011 Water savings analysis found 6 EE measures saved over 800 million gallons of customer water.
- 2012 analysis estimated at over 1.3 billion gallons

### Water-Energy Emerging Technologies

- Embedded Energy Variability
- Water Agency Efficiency
- Sprinkler, Drip, and Low-Pressure Irrigation Innovation
- Combined Irrigation System Evaluations
- Ag Water Management and Education
- CSU Fresno Ag Water & Energy Center
- Customer Water Savings Analysis



## Current IOU Efforts

### Pacific Gas & Electric

#### Local Government Partnerships

- Building relationships with local water agencies to create customer water-energy audits/benchmarks
- Best practices for improvements like leak loss detection and pump efficiency.
- Water-Energy Task Force for government partners and PG&E experts to work together on projects

#### San Mateo County Energy Watch

- Benchmarking 174 K-12 schools in ENERGY STAR® Portfolio Manager this cycle
- Partnering with local water districts to include water consumption information and water audit for schools with high consumption

#### Sierra Nevada Energy Watch

- Sierra Business Council case study to assess water agency best practices for leak loss detection/repair, water loss, and pump/process energy efficiency
- Assess accuracy of distribution/master water meters
- Reached out to 14 water agencies, 4 signed up for the study
- Implementing a rural pilot to provide the community with aerators and low-flow showerheads to offset high-cost emergency water; includes tracking energy and watershed impacts

#### Napa County Energy Watch

- Working to partner with local water districts on audits and analyses
- Addressing water and energy in municipal facilities and the end-use connection



# Current IOU Efforts

Southern California Gas Company

## Water Energy Accomplishments At a Glance

- 10+ Years Partnership
- Residential Washer Program
- Savings by Design
- MWD Innovative Conservation Program Panel
- CII Customer Recognition Awards
- Food Service Expo
- Gas Co Business Expo
- Monthly Water Use Efficiency Meetings
- Co-Marketing Pieces and at ERC
- Water Savings Incentive Program
- Restaurant Vendor Program
- Green Team
- School Symposiums
- Program for Resource Efficiency in Private Schools (PREPS)
- Restaurant Training
- Cooling Tower Classes
- Energy Resource Center Landscaping
- Landscaping Workshops
- Co-Presenting at WaterSmart 2013



## Current IOU Efforts

Southern California Gas Company

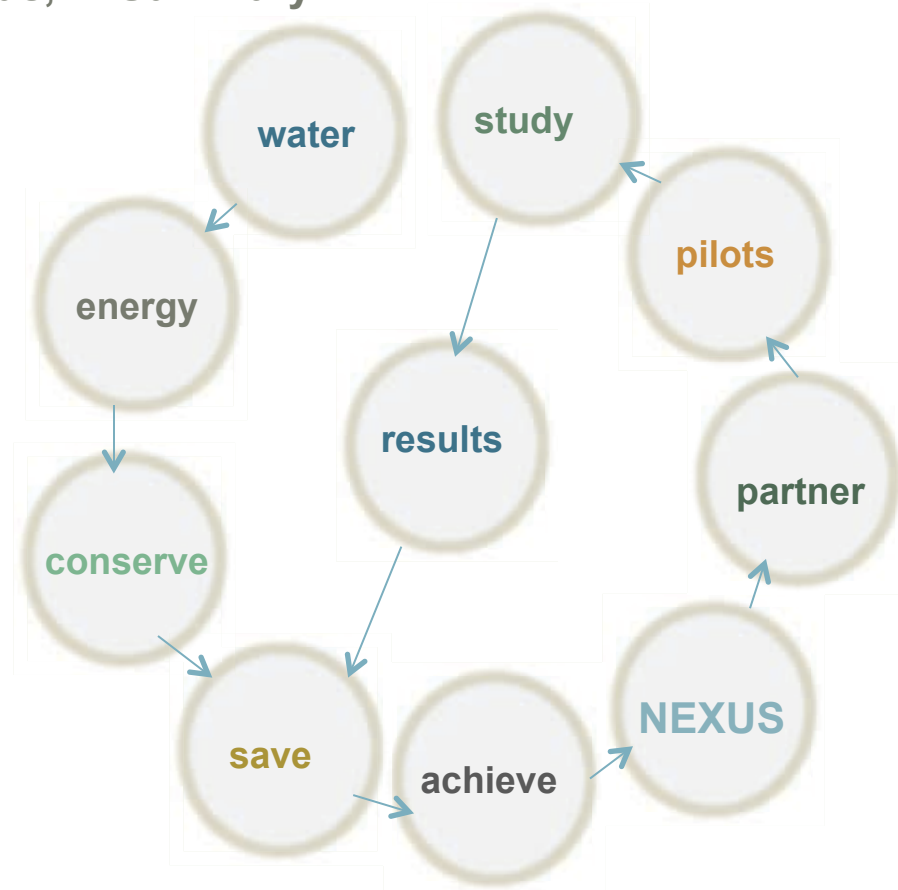
RFP for Natural Gas Leak Detection/ Pressure Management

- Natural Gas Engine Leak Detection/ Pressure Management
- Leveraged CPUC Study 2 and Internal SCG Study
- Agency Load Profiles
- Calculate Therms/AF

# Connecting the Dots:

## The IOU Water-Energy Nexus, in Summary

- Water is used to generate energy
- Energy is used to work with water
- Conserve water
- Save energy
- Achieve conservation goals
- Achieve energy efficiency goals
- **IOU Water-Energy Nexus**
- Establish partnerships
- Launch pilots
- Conduct studies
- Measure results
- Realize savings



## Appendix

### CPUC Water-Energy Pilot Key Findings from Draft Impact Evaluation

- SCE's Leak Detection program appears to offer the greatest energy savings potential (at relatively low cost) among all the Pilot programs
- PG&E and SDG&E detention facility projects installed efficient toilets, urinals, and toilet flush timers – generated high energy savings
- Future programs may seek to focus on these types of projects, pending detailed cost-effectiveness analyses
- Recycled water retrofit projects can offer large potable water savings, but additional research is needed on the IOU embedded energy in recycled water treatment (which offsets energy savings from potable water)
- Additional research is needed on actual program spending and potential changes in end-user energy (e.g., new motors, reduced hot water) to better understand cost-effectiveness of the other pilot programs