

CPUC Embedded Energy in Water Pilots

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Presentation Overview

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Background

On October 16, 2006, the CPUC issued a ruling soliciting applications for a \$10 million one-year pilot to explore counting embedded energy savings^[2] associated with water use efficiency. The ruling asked the four largest energy IOUs^[3] to partner with one large water provider^[4] to implement a jointly funded program to maximize embedded energy savings per dollar of program cost. This pilot would focus on efforts that would:

- Conserve water;
- Use less energy-intensive water (gravity-fed or recycling versus groundwater, aqueducts or desalination);
- Make delivery and treatment systems more efficient

- ^[1] Rulemaking (R.) 06-04-010.
- ^[2] By "embedded energy," we mean the amount of energy needed to produce, convey, and treat a given quantity of water.
- ^[3] The four participating energy California investor owned utilities are Pacific Gas and Electric Company (PG&E), Southern California Edison (SCE), San Diego Gas & Electric Company (SDG&E), and the Southern California Gas Company (SCG).
- ^[4] The ruling encouraged the IOUs to work with the municipal water utilities to the extent that they appear to be the most promising partners.

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Background

- December 2007, the CPUC approved \$6.4 mil for a one-year pilot to study the potential for energy efficiency savings achieved via embedded energy through water use-reduction measures
- Pilot slated to start July 1, 2008 and be administered by 4 largest energy IOUs in CA: PG&E, SCE, SDG&E, and SCG in partnership w/one or more water agencies
- Studies were also approved to examine the relationship of water and energy in CA to develop statewide information outside the scope of the pilots
- Pilots focus on quantifying IOU energy saved as a result of water-use reduction measures

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Objectives

Goal of the pilot effort is to provide the informational basis for a meaningful ex-post assessment of the potential for competitive embedded energy efficiency savings.

This assessment will help the Commission determine whether embedded energy programs should be included as part of the next energy efficiency program cycle

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Objectives

Whether water conservation programs and/or measures should be added to the utilities' energy efficiency portfolio in 2009-2011 and beyond will be determined by analyzing the results of:

1. Impact and process evaluations of the pilot programs (program implementation requirements and evaluation methodology development)
2. Predictive model results from Study 1 (relationship between statewide hydrology and supply and demand)
3. Study 2 components of the water use cycle (processes with the highest potential for energy savings)
4. Study 3 load shapes (water savings measures for predictive use in the embedded energy calculator)
5. Embedded energy calculator update (societal and GHG cost-effectiveness; refined CE methodology; refined water agency energy use shapes; CE results of pilot programs)

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Pilot Activities

1. Embedded Energy in Water Pilot Programs (Evaluated by EcoNorthwest)
2. Three studies (contracted on behalf of CPUC by CIEE):
 1. Statewide and Regional Water-Energy Relationship Study (Performed by GEI)
 2. Water Agency and Function Component Study and Embedded Energy-Water Load Profiles (Performed by GEI)
 3. End-Use Water Demand Profile Study (Performed by Aquacraft)
3. CWA Water Efficiency Projects (Approved Nov, 2008 in D. 08-11-057)

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Pilot Projects* and Water Agency Partners

1. PG&E Large Commercial (EBMUD, Sonoma Co. Water Agency)
2. PG&E Emerging Tech (EBMUD, San Jose Water Company)
3. PG&E HET (Santa Clara Valley Water District)
4. SDG&E Recycled Water (San Diego Co. Water Authority)
5. SDG&E Managed Landscape (San Diego Co. Water Authority)
6. SDG&E Large Commercial Audits (San Diego Co. Water Authority)
7. SCE Leak Detection (Los Virgenes Municipal Water District, Apple Valley Ranchos Water Company)
8. SCE HET (Irvine Ranch Water District)
9. SCE pH / ET Controllers (MWD)

*It should be noted that 13 programs were originally approved, but that on 9/5/08 SCE filed a Petition for Modification (<http://docs.cpuc.ca.gov/efile/PM/87715.pdf>) to remove the Lake Arrowhead related programs.

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Pilot Projects

1. **PG&E Large Commercial**
 - Program for PG&E commercial/industrial customers in water agency service areas
 - Multiple incentives cover portion of retrofit cost
 - laundry ozone retrofits, institutional school, detention centers, wineries and creamery
 - M&V underway at 3 sites
2. **PG&E Emerging Technology**
 - Plan to integrate real-time pump electric data into existing and new SCADA systems to improve operational decisions
 - M&V will consist of analyzing SCADA water and energy usage data, to learn how pump metering is affecting operational decisions

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Pilot Projects

3. **PG&E Single Family HETs**
 - Program for low-income customers
 - Multiple incentives cover entire cost of HET
 - 850-900 HET installations expected
4. **SDG&E Recycled Water**
 - Six projects expected
 - Program significantly reduces potable water usage by replacing it with recycled water
 - Caltrans, City of Carlsbad, City of San Diego
5. **SDG&E Managed Landscape**
 - Up to 20 sites expected
 - Program reduces potable water usage by better control of frequency and duration of landscape irrigation
 - Remote control of irrigation system through use of weather data

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Pilot Projects

6. SDG&E Large Customer Audit

- Program for SDG&E commercial and industrial customers
- Seven to ten audits will be performed
- Multiple incentives cover portion of retrofit cost

7. SCE Leak Detection

- Contractor (WSO) will identify *apparent* water losses (metering/data problems, theft) and *real* losses (leaks)
- In selected areas, leaks will be identified and repaired or managed

8. SCE Multifamily HETs

- Multiple incentives cover entire cost of HET
- 550 HET installations expected in 3-4 apartment complexes
- Low-income multifamily properties

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Pilot Projects

9. SCE pH and ET Controllers

- Rebates through Water Express Efficiency program: pH controllers for cooling towers & ET controllers for landscapes
- Expected participation: 20 pH controllers & 5 ET controllers

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Statewide Studies

Study plans can be accessed at

<http://www.energydataweb.com/cpuc/>

Study 1: Statewide and Regional Water-Energy Relationship

- The goal of Study 1 is to develop a predictive model of the functional relationship between wholesale water deliveries in California and the energy used to deliver that water. Essential model inputs are the primary determinants of the energy intensity of the state's largest wholesale water systems.

Study 2: Water Agency and Function Component Study and Embedded Energy-Water Load Profiles

- The goal of Study 2 is to characterize and quantify the relationships between water and energy use by water and wastewater agencies, and to determine the range of magnitudes and key drivers of embedded energy in water. As used herein, "water" includes both potable water and wastewater.

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Statewide Studies

Study 3: End-Use Water Demand Profile Study

- Designed to provide accurate hourly water use profile data that may be used alongside concurrent studies' information to update the CPUC Embedded Energy Calculator
- End-use Water Demand Profile study measures cold water demands of six end-use (customer) categories:
 1. Residential (Normal and Low-income, Single-family)
 2. Residential (Low-income, Multi-family)
 3. Commercial
 4. Industrial
 5. Public Buildings
 6. Agriculture

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Timing

- Implementation is occurring much later than expected for the majority of the programs. This is likely due to the redirection of water agency resources in response to the severe draught in California, and long lead times required by partner agencies obligated to receive approval from boards and other constituents. The CWA projects were only recently approved and are just getting under way.
- The 3 Statewide Studies were started in October 2008 and are on schedule to be completed by 9/09, 01/10, and 10/10 respectively
- Final evaluation report scheduled for January 2010, although the IOUs may apply for an extension of the pilot programs.

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Questions

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