

**Solar Water Heating Staff Proposal  
Workshop – August 3, 2009  
Rulemaking 08-03-008**



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# Agenda

- Welcome and introduction
- Overview of Proposal and Cost-Effectiveness Analysis
- Program goals, strategy, design, and technology
- Lunch Break
- Program Administration, Budget & Rate Collections
- Incentive design & Calculator
- Low-income programs, market facilitation & handbook
- Wrap – up and next steps



# Welcome and Introduction

## **Timeline for final decision on Staff Proposal**

Written Comments on Staff Proposal	Due August 12
Reply Comments	Due August 24
Target Mail Date for Proposed Decision	November 3 or 13
Potential Commission Vote	December 3 or 17

## **Comment Instructions**

- Please refer to section numbers in the staff proposal when filing written comments.
- Remember to send me a hard copy, and electronically serve the service list for R.08-03-008

## **My Contact info:**

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# Overview of Proposal and Cost-Effectiveness

## Staff Proposal has three parts:

- Regulatory background and overview of Solar Water Heating Pilot Project (SWHPP) currently underway in San Diego
- Results of Cost-Effectiveness analysis conducted by Itron using data from the SWHPP
- Recommendations for a new program, The CSI-Thermal Program: A statewide incentive program for SWH systems that displace natural gas or electricity



# Overview of Proposal and Cost-Effectiveness

## Regulatory Background

- CPUC and legislature have initiated measures to incentivize SWH, but both are contingent upon cost-effectiveness evaluation
- **AB 1470**: \$250M incentives for 200,000 natural-gas displacing SWH systems, if “cost-effective and in the public interest”
- **CSI**: \$100.8M incentives for electric-displacing technologies, but CPUC must look at cost-effectiveness before SWH can qualify
  - Commission concerned that if electric-displacing SWH is already cost-effective, incentives will just increase the cost



# Overview of Proposal and Cost-Effectiveness

## **Solar Water Heating Pilot Project (SWHPP)**

- Kicked off in July 2007 under the management of the California Center for Sustainable Energy (CCSE) with a budget of \$2.6 million
- Goal is to install 750 residential systems
- Through June 2009, there are applications for 238 systems with \$281,554 reserved incentives
- Itron Inc., analyzed data from the SWHPP for the cost-effectiveness analysis that informed the Staff Proposal



# Overview of Proposal and Cost-Effectiveness

## Cost-Effectiveness Analysis

- Cost-Effectiveness analyzed under four scenarios
  - Present Day (2008) Condition
    - Natural Gas rates increase 4% per year
  - Business-as-usual – 2017 (BAU)
    - Nat. Gas rates increase 4% per year; Carbon Credits worth \$8 to \$160
  - Moderate Change – 2017 (MOD)
    - Nat. Gas rates increase 7% per year; Carbon Credits worth \$20 to \$220
  - Greenhouse-Gas Driven – 2017 (GHG)
    - Nat. Gas rates increase 10% per year; Carbon Credits worth \$100 to \$272
- Cost-effectiveness looked at from two perspectives
  - Participant: Costs and benefits to those participating in the program
  - Societal: All costs and benefits of the program, whether they accrue to participants or not



# Overview of Proposal and Cost-Effectiveness

## **Benefit-Cost Ratios for natural gas-displacing SWH**

- Itron found that NG-displacing SWH program would be cost effective in two of the three scenarios (MOD and GHG)
- SWH is close to cost-effective in the BAU scenario
  - Sensitivity analysis finds that a 16% reduction in system costs would make NG-Displacing SWH cost-effective in the for participants and society
- Present Day Scenario not relevant to AB 1470 mandate

Scenario	Societal Test	Participant Test
Present Day (2008)	0.65	0.93
Business as Usual (BAU)	0.85	1.04
Moderate Change (MOD)	1.30	1.36
Greenhouse-Gas Driven (GHG)	2.36	2.08
BAU with 16% system cost reduction	1.00	1.23

# Overview of Proposal and Cost-Effectiveness

## Benefit-Cost Ratios for electric-displacing SWH

- Electric-displacing SWH not cost-effective for single-family owners in the present day (2008) without incentives
  - Cost-effective for all other customer classes

Scenario	Sector	Participant
2008 (with incentive)	Single-Family	1.14
	Multifamily	1.27
2008 (no incentive)	Single-Family	0.95
	Multifamily	1.15

- Program is Cost-effective under all three future scenarios

Scenario	Participant test	Societal Test
Business as Usual (BAU)	1.34	1.09
Moderate Change (MOD)	1.67	1.47
Greenhouse-Gas Driven (GHG)	2.17	2.06



# Program goals, strategy, design, and technology

## **CSI-Thermal Program Goals and Strategy**

- Program goal of displacing 585,000,000 therms of natural gas for that component of the CSI-Thermal Program.
- Program goal of displacing 150 MW of electric capacity for the electric-displacing component of the CSI-Thermal Program.
- The Program should adopt a strategy that addresses upfront costs via incentives and other market barriers via Market Facilitation.
- The Program should set its goals in terms of energy displaced instead of total number of SWH systems installed.
- The Program should be based on program design principles that build upon the CSI Program, focus on rewarding high performing systems, and grow the size of the SWH market.



# Program goals, strategy, design, and technology

## **Technology Eligibility and Requirements**

- Systems installed after release of staff proposal should be eligible to participate in the program after it is approved (if it is approved)
- Program provides incentives to SWH and other (non-SWH) solar thermal technologies (except pool heating) in all new and existing facilities for IOU customers.
  - Incentives should not be offered in situations where SWH is employed to meet minimum state energy efficiency standards.
- Non-residential systems should be monitored and data made available to contractors for at least five years
- Metering equipment should be installed on a representative sample of residential systems to verify expected performance.
- Program should require appropriate energy efficiency improvements.
  - Specific energy efficiency requirements should be specified in the CSI-Thermal Program handbook.



# Program administration and budget

- **Natural Gas portion**: \$250 million budget, divided as follows: 80% for Incentives, 10% Market Facilitation, and 10% for Administration and Measurement & Evaluation.
- **Electric portion**: \$118,300,000 budget excluding administrative costs. The non-administrative costs will be divided as follows: 85% for Incentives, 10% Market Facilitation, and 5% for Measurement & Evaluation.
- **Overall budget**: Approximately \$368.3 million. Market Facilitation and Evaluation budgets use comingled funds from the natural gas displacing and electric displacing funds, on a ratio of 2:1.



# Administration and budget

CSI—Thermal Program Elements	CSI—Thermal Program Sub-Elements	Natural Gas Displacing	Electric displacing	Total
Incentives	General Market Incentive Component	180,000,000	100,800,000	\$280,800,000
	Low-Income Incentive Component	20,000,000	0	\$20,000,000
	<i>Subtotal</i>	\$200,000,000	\$100,800,000	\$300,800,000
Market Facilitation	Marketing & Outreach	25,000,000	12,500,000	\$37,500,000
Program Admin	Application/incentive processing, General Administration, and System Inspection	15,000,000	Subject to the overall CSI budget, but tracked separately	\$15,000,000
	Measurement and Evaluation	10,000,000	5,000,000	\$15,000,000
	<i>Subtotal</i>	\$25,000,000	\$5,000,000	\$30,000,000 + CSI Admin
<b>Total</b>		\$250,000,000	\$118,300,000	\$368,300,000 + CSI Admin



# Administration and budget

- Rate collections for natural gas: 51% - SCG, 39% - PG&E, and 10% to SDG&E. The rate collections should occur in even increments over eight years.
- Rate collections for electric customers should occur in accordance with existing CSI program decisions.

Program Administrator	Budget Breakdown %	Total Program Collections	Incentives	Non-incentives (administration, M&O)
PG&E	39%	\$97.5 M	\$78 M	\$19.5 M
SCG	51%	\$127.5 M	\$102 M	\$25.5 M
SDG&E	10%	\$25 M	\$ 20 M	\$5 M
<b>Total</b>	<b>100%</b>	<b>\$250 M</b>	<b>\$200 M</b>	<b>\$50 M</b>



# Administration and Budget

- For natural gas-displacing, incentives allocated between customer classes in the following proportion:
  - 40% residential, divided between:
    - 10% single family
    - 30% multifamily
  - 60% commercial.
- The initial incentive split between customer classes may be revisited as the program progresses and the market response becomes clear
- For electric-displacing, no specific designation for Residential vs. Multifamily/Commercial.
  - Cap of 80% on program participation from the multifamily and commercial sectors.



# Incentive Design and Calculator

- Incentives for both natural gas and electric-displacing portions of the program are based on system performance
  - Actual incentive amounts are determined by expected first-year annual energy displacement, based on SRCC rating
- Incentives for natural gas-displacing systems decline in four steps
  - Incentives are designed so that the average residential system displacing 117 therms/year will receive incentives of \$1500, \$1200, \$900 and \$600 per system in each step, respectively
- Incentives for electric-displacing systems do not decline, but incentive level may be revisited



# Incentive Design and Calculator

## Incentives for Natural Gas-Displacing SWH

- Incentives capped at 125% of average system incentive for residential systems and \$150,000 for MF and commercial

Step	Incentive for average SWH system	Funding amount (\$1,000s)	Incentive per annual therm displaced	Estimated SWH System Equivalents
1	\$1,500	\$30,000	\$12.82	20,000
2	\$1,200	\$50,000	\$10.26	41,667
3	\$900	\$60,000	\$7.69	66,667
4	\$600	\$40,000	\$5.13	66,667



# Incentive Design and Calculator

## Incentives for Natural Gas-Displacing SWH

- Incentive steps move separately for Program Administrator and for each customer class within a particular service territory
- Incentive declines triggered by annual thermal displacement of confirmed reservations in each class
- Program designed to provide incentives for “equivalent” of 200,000 residential systems
  - Actual number of systems will be lower, because some will be larger commercial/multifamily systems



# Incentive Design and Calculator

## Incentives for Electric-Displacing SWH

- Electric-displacing systems are available at only one incentive level
  - Incentive is set so that the average residential system would receive an incentive of \$1000
    - Incentive is \$0.37 per kWh of first-year thermal displacement, based on SRCC rating
- Incentives for Electric-displacing commercial and multifamily systems capped at \$100,000



# Incentive Design and Calculator

## **Calculating incentive levels**

- PAs to develop an on-line incentive calculator to estimate energy displacement based on performance rating, location and design
- For SRCC OG-300 systems, calculator should use SRCC rating combined with Solar Orientation Factor
- For SRCC OG-100 systems, calculator should use currently available software to estimate annual savings for each custom designed system



# Incentive Design and Calculator

## Calculating incentive levels

### Example 1:

- OG-300 SWH system rated to displace 117 therms per year
- SOF of 0.95
- Incentive Step 2: \$10.26/therm

$$117 \text{ therms/yr} \times \$10.26 \times 0.95 \text{ SOF} = \underline{\underline{\$1140}}$$

### Example 2:

- OG-100 SWH system rated to displace 300 therms per year
- SOF of 1.0
- Incentive Step 3: \$7.69/therm

$$300 \text{ therms/yr} \times \$7.69 \times 1.0 \text{ SOF} = \underline{\underline{\$2307}}$$



## Low-Income Program

- \$20 Million set aside to fund low-income single-family homeowners who install gas-displacing SWH systems
  - Incentive level is 200% of the incentive level in the general market program
  - Eligibility requirements should be analogous to the SASH program component of CSI
  - Multi-family low-income incentives not recommended due to relatively high portion of residents who do not pay for water heating
- Low-income program for electric-displacing customers not recommended due to low penetration of electric water heating in California



## Program Handbook

- PAs should use a public process to develop a CSI-Thermal Program Handbook & host quarterly meetings to entertain parties' suggestions for modifications
- CSI-Thermal Program Handbook should be reconciled with the current CSI Program Handbook
- All incentive requirements should be specified in the handbook; AB 1470 should be used as a starting point



# Low-Income Program, Market Facilitation & Handbook

- Program Administrators responsible for design and implementation of Market Facilitation activities that address non-financial barriers to the SWH market
- \$15 million allocated to Measurement and Evaluation in order to assess the program and make recommendations for improvement
  - Detailed plan for Measurement and Evaluation will be created by Energy Division at a later date

