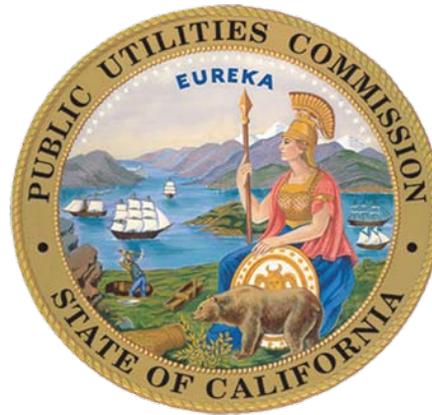




# Evaluation, Measurement and Verification of IOU Energy Efficiency Programs



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Verification, Evaluating and Auditing ARRA Programs*

**Mikhail Haramati**

**California Public Utilities Commission**  
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# Presentation Overview

1. 2010-12 IOU Energy Efficiency Programs Overview
2. 2010-2012 Evaluation
3. 2006-2008 Evaluation
4. Areas for Coordination





## 2010-2012: Portfolio

\$3.1 billion for efficiency programs

- Three Year Savings Potential:
  - ◆ 7,000 GWH ◆ 1,500 MW ◆ 150 MM Therms
  - ◆ 3 million tons of CO<sub>2</sub>e avoided
- Equivalent to 3 large power plants
- Supports 15,000 – 18,000 new/retained jobs \*
- Additional \$750 million for low-income home retrofits and appliances

\*Job benefits calculated based on Council of Economic Advisers' May 2009 publication of "*Estimates of Job Creation from the American Recovery and Reinvestment Act of 2009*"





# 2010-2012: Programs

- 12 Uniform statewide programs (by economic sector and market segment)
- Cal SPREE (Statewide Program for Residential Energy Efficiency) with pilot approach to 20%+ savings for up to 130,000 homes
- Commercial and government benchmarking and retrofits
- Comprehensive heating, ventilation, cooling quality services
- Commercial and institutional On-Bill Financing
- Training for contractors, architects, owners, managers, inspectors
- Pathway to Zero Net Energy new construction
- Starts shift from basic compact fluorescent lamps (CFLs) to advanced lighting technologies
- Statewide marketing & outreach coordinated across 4 IOUs





# 2010-2012 Evaluation





## 2010-2012: Evaluation

- \$125 million for all EM&V projects related to 2010-2012 programs (4% of the portfolio budget)
- \$34 mil for IOU EM&V, \$91 mil for CPUC
- Maintains firewall between implementer and evaluator set out in D.05-01-055





## 2010-2012: Reasons for Evaluation\*

- Determine program performance
- Improve programs and develop new measures
- Measure whether IOUs are meeting energy savings goals set by the CPUC
- Determine if IOUs should receive a RRIM payment, and/or penalty
- Ensure the state can depend on EE as a resource

\*As identified in D.10-04-029 [http://docs.cpuc.ca.gov/PUBLISHED/FINAL\\_DECISION/116710.htm](http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/116710.htm)





# 2010-2012: Joint M&V Plan

Increased CPUC-IOU collaboration within flexible framework valuing:  
transparency; consensus; cost efficiency; synergies

- **Phase I:** Inventory, Reporting tools, early M&V
- **Phase II:** formative, M&V, process evaluation and market research to inform program modifications
- **Phase III:** summative or ex-post evaluations for retrospective statements of portfolio accomplishments; formative research if needed





# 2010-2012: Evaluation Activities

1. Savings Measurement and Verification
2. Program Evaluation
3. Market Assessment\*\*
4. Performance Metrics\*\*
5. Policy and planning support
6. Financial and Management audit

\*\*New to 2010-12 Evaluation





## 2010-2012: Programs requiring new evaluation approaches

- IDSM
- ZNE
- Sustainable Communities
- Behavioral
- 3<sup>rd</sup> party programs





# 2006-2008 Evaluation





## 2006-2008: Span of evaluation effort

- Total Evaluation Budget: \$97 mil
- % of Implementation Budget: 4.8%
- Savings evaluated: 90%
- Technical Contracts: 23
- Personnel: 1,070
- Surveys completed: >50,000
- M&V sites visited: >12,000





## 2006-2008: Evaluation Goals

- Measure and verify energy and peak load savings for individual programs, groups of programs and at the portfolio level
- Generate the data for savings estimates and cost-effectiveness inputs
- Measure and evaluate achievements of energy efficiency programs, groups of programs and/or the portfolio terms of the “performance basis” established under the CPUC-adopted EM&V protocols
- Evaluate whether program or portfolio goals are met.





## 2006-2008: Types of evaluations and fieldwork

- Participant and non participant
- Surveys
- Large customer and retailer/manufacturer interviews
- Statistical analysis
- In-situ metering
- Lab testing
- Spot measurements
- Baseline data collection
- Building modeling, IPMVP option D





## 2006-2008: Prioritization

- High Impact Measure (HIM) approach
  - Selected measures contributed 1% or more to utility's total claims for kw, kwh or Th
  - Number and variety of programs meant not all could be evaluated
  - Successfully evaluated nearly 90% of claimed savings
- Key evaluation parameters: UES, NTG, Installation Rate





## 2006-2008: Evaluation Challenges

- High-stakes outcome with possibility of up to \$450 mil in utility incentives
- Large evaluation effort and limited staff resources
- Inconsistencies in IOU program data quality and record keeping
- Difficulty acquiring data from utilities, and the need to format data before use
- Need for real time data collection and cooperation from implementers to gain access to customer sites
- Large variety of program offerings
- Tight evaluation timeframe





## 2006-2008: Lessons Learned

- Get evaluators on board early
- Develop a broad M&V plan early and fill in as more program details are known
- Get out in the field early
  - So baselines don't have to be reconstructed after the fact
  - To ensure adequate time for data collection
- Prioritize evaluation efforts for time and resources
- Check reporting submissions early to ensure guidelines are followed and data reported accurately
- Avoid receiving same data in different formats and set up reporting systems early





# CPUC-CEC ARRA Coordination

- Evaluation working group with CPUC and CEC staff to address:
  - “Leveraged funds” used by recipients
  - Participant contact/sampling
  - Financing and marketing of same efforts
  - Reporting of costs and savings
- Load forecasting
  - Methodologies
  - Calculation of uncertainty





# Evaluation Resources

- **2006-2008 Evaluation report:**  
<http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/2006-2008+Energy+Efficiency+Evaluation+Report.htm>
- **CA Evaluation Protocols:**  
[ftp://ftp.cpuc.ca.gov/puc/energy/electric/energy+efficiency/em+and+v/EvaluatorsProtocols\\_Final\\_AdoptedviaRuling\\_06-19-2006.doc](ftp://ftp.cpuc.ca.gov/puc/energy/electric/energy+efficiency/em+and+v/EvaluatorsProtocols_Final_AdoptedviaRuling_06-19-2006.doc)
- **April 21 EM&V decision (and joint M&V plan):**  
[http://docs.cpuc.ca.gov/PUBLISHED/FINAL\\_DECISION/116710.htm](http://docs.cpuc.ca.gov/PUBLISHED/FINAL_DECISION/116710.htm)
- **EEGA: Utility savings reporting site:**  
<http://eega2006.cpuc.ca.gov/Default.aspx>
- **Prime evaluation RFP:**  
<https://www.bidsync.com/DPX/ca/cdgs?ac=view&auc=1124765>
- **New EE Rulemaking: A.08-07-021**
- **EE EM&V public documents site:** [www.energydataweb.com](http://www.energydataweb.com)
- **Standard Practice Manual:**  
<ftp://ftp.cpuc.ca.gov/puc/energy/electric/energy+efficiency/em+and+v/Std+Practice+Manual.doc>





## Questions

- Zenaida Tapawan-Conway  
[ztc@cpuc.ca.gov](mailto:ztc@cpuc.ca.gov), (415) 703-2624
- Mikhail Haramati [mkh@cpuc.ca.gov](mailto:mkh@cpuc.ca.gov),  
(415) 703-1458

