2009 Impact Evaluation Concerns
ESAP Workshop #1

October 17, 2011

Outline

- 2009 Evaluation Objective and Description
- Concerns Regarding Impact Evaluation
- Insights From Impact Evaluation(s)
- Going Forward

Purpose, Before & Now
ESAP Impact Evaluations

- Provide First Year Energy Savings Estimates for Program Year Evaluated
  - √ Quantify program achievements for year
  - √ Program planning 2012-2014
- ESAP Impact Evaluations conducted 2000, 2001, 2002, 2005, 2009
  - Use as basis for measures in or out of program began in 2004
  - Report *should* put savings estimates in context by providing sense of the norm, if there is one, or the variations
  - Characterization of program for the year "what was installed, who saves what, how much?"

Data Inputs

What data is provided at the start of the evaluation?

- **Records of what was installed in homes 2008 and 2009 (contractor reports to utility, utility tracks)**
- **Records of home characteristics**
- **Customer bills**
- **Weather station data (daily & average temperatures)**

Data Outputs (Appendix D)

ACTUAL

- Number of households
- Number of items installed in households
- Household characteristics

ESTIMATED

- Energy savings per item installed
- kWh savings and/or therm savings
- Some items will generate electric and gas energy savings

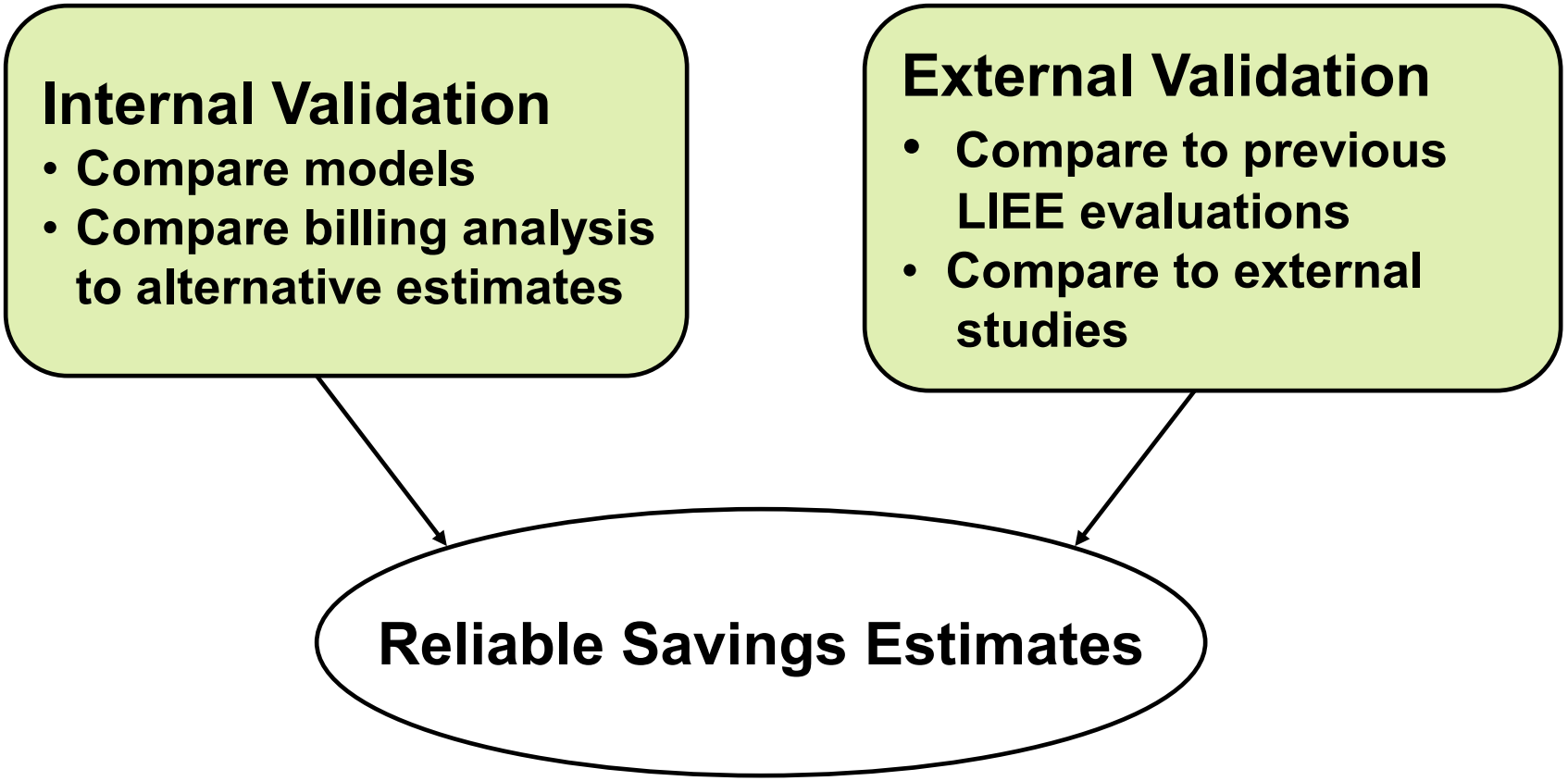
Item	# of Units Installed	X	Savings Per Unit	=	Total Program Savings
Evaporative Cooler	3,004		458.85 kWh		1, 378, 378

How Reliable Are The Actuals?

		PG&E	SCE	SDG&E	SoCal Gas	Total	
2009	**2009 Annual Reports Households Participating**	81,308	62,624	20,927	85,147	250,006	
	2009 Impact Eval	81,516	71,896	20,835	66,082	240,329	
	Difference	0%	15%	0%	-22%	-4%	
2008	**2008 Annual Reports ***	61,034	54,635	20,804	58,800	179,050	
	2008 (Draft) Impact Eval	39,791	33,275	12,312	35,289	120,667	
	Difference	-35%	-39%	-41%	-40%	-33%	
	2008 Raw Data Used for Billing Regression					110,544 (kWh Obs)	118,420 (Therm Obs)

*Master-metered units in 2008: PG&E (7%) SCE (6%) SDG&E (2%) SoCalGas (14%)

How Reliable Are The Estimates?



Measure Comparisons

	Unit Electric Savings (kWh)		Unit Gas Savings (Therms)	
	2009	**2005**	**2009**	**2005**
Attic Insulation (Cooling)	103	257		
Attic Insulation (Heating)	0	70	10.1	47.2
Hot Water Conservation			7.5	13.5
Water Heater Repair/Replace			0	12.1
Heating System Repair/Replace			0	2.4
Pool Pump	0	n/a		

Concerns-Screening

- Articulated in TELACU/JBS Energy Memo of April 18, 2011 and QCS memo of May 10, 2011
- Choice of usage levels, monthly vs. annual
- Research Plan had several scenarios for making adjustments if large numbers of records were screened, but the Evaluation did not employ these adjustments
- Relaxed Screen too far in the other direction

Screened Data
(Appendix E, Table 1)

	Report Screens					Relaxed Usage Screens			
	kWh	%	Therm	%		kWh	%	Therm	%
Raw Data	110,544		118,420			Same			
High/Low Screens	16,886	15%	31,041	26%		6,079	5%	1,200	1%
Other Screens	57,764	52%	52,038	44%		Same			
TOTAL	74,650	68%	83,079	70%		63,843	58%	53,238	45%

Confidence in Estimates

- Initial screens may leave few participant records for individual measures
- Table 73 in Final Report shows sufficiency of sample points, implicating confidence in some estimates

Item	# records	# installed	% screened
Refrigerator	9,086	35,046	74%
DHW conservation	2,253	-----(hard to compare from Annual Report)	
CFL	32,077	-----	
HWD Light	11,951	------	
Pool Pump	7	36	81%
Evaporative Cooler	1,191	8,808	85%
AC	112	5,598	98%
Insulation/Heating	44	6,962	99%
Insulation/Cooling	58	6,962	99%
Weatherization/Heating	1,213	--------	
Weatherization/Cooling	803	-------	

Concerns-Screening, Other

- Unclear whether master-meter records are included or excluded
- Extreme Climate Zones particularly affected
  - Climate Zone 15: 83% screened
  - Climate Zones 13 & 14: 31% screened in each
- How are records with no prior heating use handled (inoperable heaters)?

Variability Leads To Less Confidence in Some Estimates

- "While one would like to see more stable estimates of savings, we also need to recognize the limitations of the method"
  - Little or no house-specific information to account for changes in the household over time" (2005, p. 19)
- The dwellings serviced have variations
  - Consumption
  - Weather conditions (shift in climate zones)
  - Residential billing

Comparison of Estimates: Household Savings

Average Savings per Home, ESAP Evaluations						
	PY09	PY08	PY05	PY02	PY01	PY00
Trends (kWh)	330	344	423	366	213	175
Trends (Therms)	9	10	18	8	18	24

Comparison of Household Energy Use & Savings Estimates

	2008			2005		
	Average Energy Use	Average Household Savings	% savings	Average Energy Use	Average Household Savings	% savings
Trends (kWh)	5,752	344	6.0%	5,431	423	7.8%
Trends (Therms)	318	10	3.1%	421	18	4.3%

Concern-Measure Combinations

- Central and room A/C estimated jointly
- Evaporative cooler installation & evaporative cooler replacement estimated jointly

Useful Insights From Report

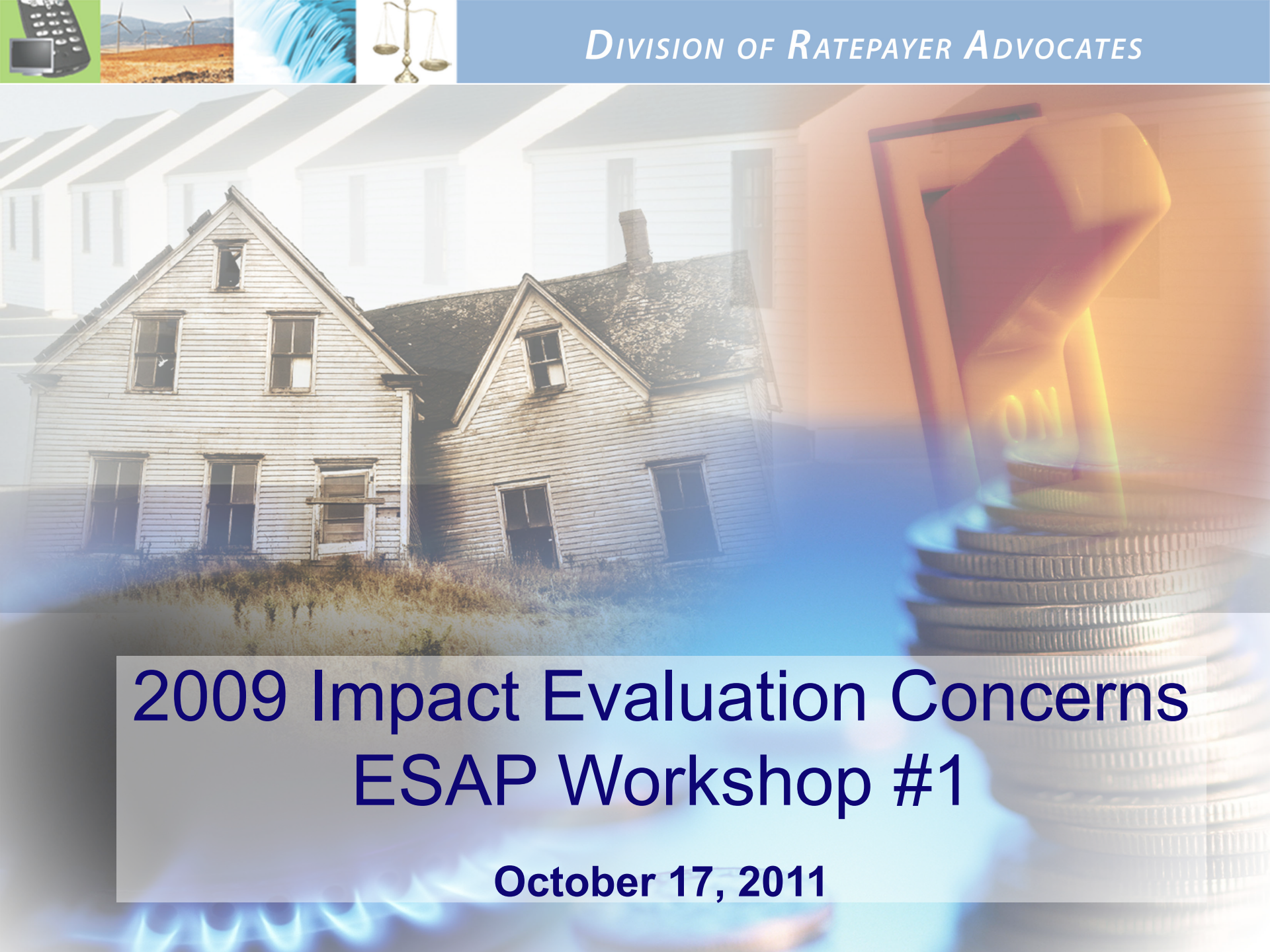
- Phone and on-site surveys generate information for weather-sensitive measures
  - Furnaces/heating systems
  - Evaporative coolers, A/C
  - Weatherization
- Recommendations from phone & on-site surveys consistent with 2005 LIEE Impact Evaluation
- Valid question whether to pursue estimating measure-level benefits, or pursue possibly overlooked non-energy benefits
  - Gas safety improvements
  - Indoor air quality, moisture, pest control
  - Water consumption savings

Is It Critical To Resolve Savings Estimates Now?

- If the energy savings estimates are used to
  - √ Quantify program achievements for year
  - √ Program Reporting 2012 – 2014
- Lessens usefulness of
  - Monthly & Annual Program Reports
  - Understanding of cost-effectiveness
  - Standardized measure selection
- Applications Utilize *Different* Estimates From Draft, Not Final, Impact Report
  - Planning assumptions in A-2, cost-effectiveness tables inconsistent with Final Report

Alternatives

- Estimates from 2005 Impact Evaluation
- Re-run raw data using different model
- Target (isolate) particular estimates for refinement
- Leverage estimates from external evaluations if relevant
  - 2006-2008 High Impact Measure Report
  - 2004-2005 Limited-Income Refrigerator & Lighting



DIVISION OF RATEPAYER ADVOCATES

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