



Findings, Challenges and Lessons Learned from the Evaluation of ARRA-Funded Programs for the Colorado Governors Energy Office

Lynn Roy, Nexant Inc

Ryan Bliss, Research Into Action

February 9, 2012

Agenda

- Background
- Methodology
- Challenges
- Preliminary findings
- Lessons learned

Background

- Feb. 13, 2009, Congress passed the American Recovery and Reinvestment Act of 2009 (ARRA) with the goal of spurring economic growth and creating or saving jobs.
- The Colorado Governor's Energy Office (GEO) has allocated to spend more than \$63M, applied across three funding streams:
 1. State Energy Programs grant (SEP)
 2. State Energy Efficient Appliance Rebate Program (SEEARP)
 3. Energy Efficiency and Conservation Block Grant (EECBG).
- Main goal of each Program is to encourage the installation of energy efficiency and renewable energy projects while maintaining or adding jobs to the economy.

Evaluation Team & Methodology



- Purpose was to conduct an ARRA program M&V project for each ARRA funding stream - to determine actual energy savings associated with each funding stream



Impact Evaluation Objectives

- Immediate Objectives:
 - To document and measure the effects of a program and determine whether it met its goals with respect to being a reliable energy resource.
 - To help understand why those effects occurred and identify ways to improve
- Long-Term Objectives:
 - Ensure consistent methodologies between project tracking
 - Develop transparency in M&V activities
 - Ensure standard templates for common efficiency measures
 - Ensure clear citation of external and secondary sources, both for stipulated parameters and guidelines

Impact Evaluation Methodology

1. Obtain Records
2. Design the Sample

Program	Total Sample Size	Primary Data Collection		Secondary Data Collection	
		Method	Sample Size	Method	Sample Size
SEP	112	Site Visits	78	Desk Review	34
SEEARP	82	Site Visits	30	Tel Surveys	52
EECBG	68	Site Visits	34	Desk Review	34

3. Verify the Sample
 - i. Level 1 Audits
 - ii. Develop Site Specific M&V Approach
 - iii. Level II Audits

Impact Evaluation Methodology

4. Establish the Baseline Condition
 - i. Triangulation approach
 - ii. Calculate Impacts and Load Shape Analysis
 - iii. Entirely Stipulated and Deemed Savings
5. Final Cost Effectiveness
6. Qualitative Analysis
 - i. Water Savings
 - ii. Participant Satisfaction
 - iii. Total Influenced Energy Benefits
 - iv. Quantity of People and/or Agencies Reached

Attribution Analysis Objectives

- Determine program contribution to energy savings
- Self-report instrument
- Avoid survey burden – few questions
- Avoid self-report biases

Attribution Analysis Methodology

- Two components:
 1. Intention (likely behavior if no program)
 2. Program influence
- Each a “check” on the other
- Each has value ranging 0 to 50
 - Total FR score sum of components (0 to 100)



CHALLENGES

Challenge 1: Program Structure & Budget Allocation

- Variation in distribution of funds within each funding stream
- Partner funding allocation
 - Made it difficult to track sources of funds for each program
- **Goal was to ensure that the energy savings were/are being appropriately allocated to the proper funding streams based on the funding source.
- **Challenge affected the *sampling strategy*, calculation of *gross savings* and determination of *net savings*

Challenge 1a: Sampling Plan

Challenge:

- Inconsistency in reporting procedures made it difficult to track savings and budgets to all projects within a funding stream
- Challenging to develop a nested sampling metric to meet 90/10 confidence/precision

Solution:

- Program budget was utilized as a proxy to stratify savings weights within the funding stream
- Focus on projects in GEO programs with high impact

Challenge 1b: Gross Savings

Challenge:

- Identifying which measures were installed in a project that was funded through GEO's program
- GEO sometimes provided funding for activities that were funded with other dollars as well – overlap in funds was often unclear

Solution:

- Important to clearly delineate which measures/projects were GEO-funded during the interview process with administrators and participants

Challenge 2: Quantifying Energy Impacts

Challenge:

- Wide range of program types, delivery mechanisms and measures
- Aggressive schedule for the release of programs
- Inconsistency in program savings calculation methodology
- Few cases of programs reporting zero energy saving (i.e. Energy Monitors, NEED Grant, New Homes).

Solution:

- Program budget utilized as a proxy to stratify savings weights within each funding stream
- Implementation of detailed interviews with program team members who designed and/or are implementing the programs.
- Use of stipulated savings values and then conducted on-site verification to validate stipulated values.

Challenge 3: Schedule

Challenge:

- GEO programs were being offered simultaneously with the evaluation project
- Some services offered have yet to commence at all
- Program designs were evolving and changing even after the initial roll out
- Several larger projects had implementation schedules that extend beyond the evaluation horizon

Solution:

- Program research and interview process included detailed interviews with program staff
- Helped to fully understand the history and future of each funding stream, program, and intended delivery mechanism
- Provided GEO with the tools to conduct their own on-going M&V and evaluation

Challenge 4: Data Collection

Challenge:

- Programs utilize different reporting processes, databases and spreadsheets to track and report energy savings
- Receiving consistent program and project level information was difficult.
- Outside consultants often used by the GEO to track and report progress of the programs

Solution:

- We reviewed and quantified as much data as was available in the early stages of the project
- Gained a better understanding of available/non-available data early
- However, throughout the project, there was still the need to amend approaches and sample sizes based on what data became available

Challenge 5: Attribution Identification

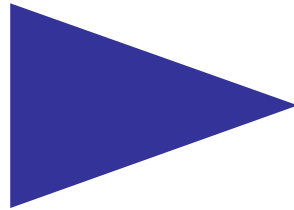
Challenge:

- Identifying the counterfactuals – what the customer would have done without the program
- Making individual assessments meaningful while also maintaining a consistent approach

Solution:

- Develop comprehensive and systematic surveys
- Asking the right questions
- Offer the right responses

**SAVINGS
REPORTED**



GROSS/NET

SITE/SOURCE

ANNUAL/LIFETIME

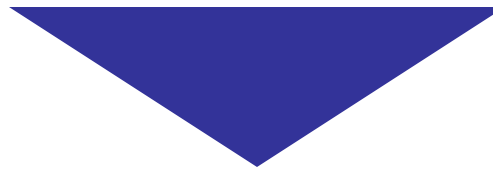
**ENERGY/OTHER
METRICS**



PRELIMINARY FINDINGS

Preliminary Findings

Net Source Energy Savings



Funding Stream	Net Electricity Savings (kWh)		Net Gas Savings (MMbtus)		Total Net Energy Savings (MMbtus)	
	Annual	Lifetime	Annual	Lifetime	Annual	Lifetime
State Energy Program	48,929,195	5,027,111	151,323	2,366,789	318,269	5,027,111
Energy Efficiency & Conservation Block Grant	6,193,910	132,952,419	38,207	763,918	59,340	1,217,552
State Energy Efficient Appliance Rebate Program	7,288,821	81,127,533	32,476	636,012	57,345	912,819
Total	62,411,927	219,107,064	222,005	3,766,719	434,955	7,157,482

Cost Effectiveness

**Cost Effectiveness Test:
10 MMBtu/\$1000 (0.01 MMBtu/\$1)**



Funding Stream	Budget	Committed Expenditures (11-10-11)	Expenditures of Evaluated Programs (12-13-11)	Net Energy Savings – Source (MMbtus)	Cost Effectiveness
State Energy Program	\$48,833,151	\$42,533,774	\$22,226,951	318,269	0.014
Energy Efficiency & Conservation Block Grant	\$9,593,500	\$8,955,781	\$7,559,791	59,340	0.007
State Energy Efficient Appliance Rebate Program	\$4,739,000	\$4,705,291	\$4,705,291	57,345	0.012
Total	\$63,165,651	\$56,194,846	\$34,492,033	434,955	0.013

*** Target is .01**



LESSONS LEARNED

Lessons Learned..What Works..

- Direct communication with GEO staff and any outside program implementers
 - ✓ Key role in understanding program structures, funding allocations, and energy savings impacts
- Need for consistent and centralized reporting and tracking tools across all programs
 - ✓ While often time consuming and costly up-front, will save time and \$\$ down the line
- Importance of training the program implementers about M&V protocols and standards
 - ✓ Allows for on-going evaluation after the 'evaluators' leave...
- Asking the right people the right questions
 - ✓ Example: EPC Program: Surveyed customer and ESCO, since both subject to program influence



Save the Date

May 15-17, 2012

**AESP's Spring Conference
Baltimore, MD**

Oct. 15-17, 2012

**AESP's Fall Conference
Long Beach, CA**

Jan. 28-31, 2013

**AESP's 23rd National Conference
Orlando, FL**

www.aesp.org

