



Criteria for a Comparative Assessment of Energy Efficiency Financing Programs



PUBLIC WORKSHOP

**TUESDAY, MARCH 22, 2016
9:30 AM**

**STATE TREASURER'S OFFICE, ROOM 587
915 CAPITOL MALL
SACRAMENTO, CA 95814**

Or via Webinar

**Live captioning is available at:
<https://www.streamtext.net/player?event=caeatfa>**

**Slides and webinar information is available at:
<http://www.treasurer.ca.gov/caeatfa/workinggroup/index.asp>**

Welcome



- In person attendees:
 - Please sign in or leave a business card
 - Come to the microphone for questions and comments
 - Bathrooms:
 - Men: 3-4-1
 - Women: 3-2-5
 - In case of emergency please walk down the stairs and meet in Capitol Park across 10th street
- Webinar attendees:
 - Please submit questions through the webinar by “raising” hand

This webinar is being recorded and will become a part of the public record

Agenda



- Welcome & Introductions (9:30-9:45)
- CHEEF Pilot Programs Evaluation Approach (9:45-10:45)
 - Q&A (10:45-11:00)
- Utility On-Bill Financing Evaluation Approach (11:00-11:15)
 - Q&A (11:15-11:30)
- Public Comment (11:30-12:00)

Background: Legislative Directive



Supplemental Report of the 2015-16 Budget Package, Item 0971-001-0528:

“CAEATFA, in consultation with the CPUC, shall also create a working group that will include key stakeholders to develop criteria for a comparative assessment of energy efficiency financing programs available in California, including Property Assessed Clean Energy financing and legacy utility on bill financing for short-term lending. CAEATFA shall publish summaries of the issues discussed with and recommendations made by the working group. Relevant Senate and Assembly policy committee staff shall be invited to observe meetings of the working group.”

Overview of Workshop Series



Public process to encourage stakeholder participation and input in developing the criteria

CAEATFA will be hosting a series of educational workshops featuring presentations from stakeholders on various metrics for evaluating energy efficiency financing programs.

The process will culminate with a meeting of a working group that will discuss a proposal of potential criteria for a comparative assessment of energy efficiency programs.

- Establish a common vocabulary.
- Learn how administrators evaluate their programs—discuss program goals, structures, and methodologies for evaluating EE financing programs.
- Discuss the pros and cons of criteria.
- Proposal will be drafted based on previous workshop discussion and written comments received.
- Working group will lead discussion on the proposal, making recommendations on the criteria.

CAEATFA will summarize and publish materials, discussions, and any recommendations from the workshops and working group.

Timeline



- February 10, 2016 First public workshop with presentation from LBNL on *Making it Count*. The public may submit written comments on topics/criteria that should be discussed for 7 business days (Feb 22nd).
- CAEATFA will accept general written comments throughout the process on a rolling basis.
- March 15, 2016 CAEATFA Board approved working group participants.
- March 22, 2016 Second public workshop with a presentation on CHEEF and OBF.
- March 29, 2016 Third public workshop with presentations on PACE.
- April 27, 2016 Meeting of the working group to discuss proposal of criteria for a comparative assessment of energy efficiency programs.

Public Comment



Reminder: Written public comment on comparative criteria will be accepted on a rolling basis:

By Email: ashley.bonnett@treasurer.ca.gov

By Mail: Ashley Bonnett, Analyst
CAEATFA
915 Capitol Mall, Room 457
Sacramento, CA 95814

CAEATFA Stakeholder Meeting: Criteria for Comparative Assessment of California's EE Financing Programs

Overview of Statewide Pilot Impact Evaluation Plans

Jen Caron, CPUC

Megan Campbell & Jeevika Galhotra, Opinion Dynamics

Alex Hill, Dunskey Energy Consulting

March 22, 2015



Objectives and Topic Overview

- Objectives:
 - Learn about how the Statewide Financing Pilots will be evaluated
 - Learn about specific techniques that will be applied
- Topics:
 - Statewide Financing Pilots
 - Evaluation types
 - Impact evaluation approach
 - Market-based approach
 - Program-centric approach

Pilots and Evaluators

CPUC hired firms through competitive bid process to evaluate CHEEF Pilots for impact purposes

- Opinion Dynamics Corporation
 - Market research and program evaluation
 - Evaluating energy efficiency programs since 1990's
 - Evaluated multiple programs for the CPUC starting in 2008
 - Evaluated multiple energy efficiency financing programs in the nation, e.g. ME and CT
- Dunsky Energy Consulting
 - Leaders in innovative financing program design and evaluation
 - Assist clients with statewide financing strategies (RI, CT, Can)
 - Members of both the Impact and Process evaluation team for CHEEF Pilots
 - 20+ years experience designing EE/RE programs and policies

CPUC Directive

- In 2013 the CPUC authorized 7 statewide financing pilots with the goals of
 - Expanding financing options for EE improvements across all sectors
 - Incentivizing the private capital market
 - Broadening access to financing
 - Testing on- bill repayment
 - Creating a centralized streamlined process for lenders
- Evaluation is a critical piece of all CPUC authorized programs and pilots and is used to
 - provide early feedback to program implementers
 - evaluate pilot impacts
 - provide input to plan future program cycles

CPUC Evaluation Process

- IOUs and Commission staff jointly prepare an Evaluation Plan (AKA Roadmap)
- Energy Division manages and contracts responsibilities for all impact-related studies
 - Finance Pilots
 - All impact studies are contracted to Opinion Dynamics and Dunsky and vetted by a Peer Coordination Group
- After CAEATFA's public processes are complete
 - Opinion Dynamics and Dunsky will work with the Peer Coordination Group, incorporate feedback, and implement the study
 - Draft study will be posted for comments
 - Final Study will be available on CalMAC.org website

Statewide Pilots Included in Evaluation Scope

■ Residential

- The Residential Energy Efficiency Loan (REEL) Assistance Program
- Energy Finance Line Item Charge (EFLIC) Program

■ Non-Residential

- On-Bill Small Business Lease Pilot
- Off-Bill Small Business Lease Pilot
- Small Business Loan Pilot
- Non-Residential on-Bill Repayment Pilot
- Master-Metered Multifamily Finance (MMMMF) Pilot

Evaluation Types

Energy Efficiency Program Impact Evaluation: Show me the savings!

- Focuses on “energy” outcomes 
 - How much kwh or therms have we saved in total from this program?
- Explores influence on program participants 
 - How much of the savings would have happened without the program?
- Relates program costs to outcomes 
 - What is the program cost-to-benefit ratio of running this program?
- May also measure non-energy outcomes or benefits
- Relates outcomes to program goals

Process Evaluation

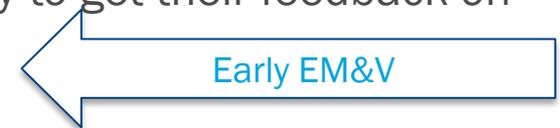
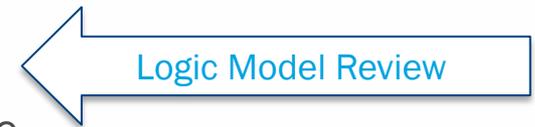
■ Purpose

- To determine how the Pilots are being implemented and provide recommendations for improvement prior to full program roll out (not concerned about determining energy savings)



■ Activities

- Program Theory and Logic Models to establish underlying theory of how Pilots should **ideally** operate.
- Interviews with market actors involved with the program (**contractors, financial institutions, IOUs, CAEATFA**) to assess coordination/implementation
- Customer surveys to measure satisfaction, participation drivers/barriers
- Early evaluation activities include developing panels of contractors (Energy Upgrade CA, HVAC) that will be interviewed quarterly to get their feedback on the Pilots



Impact Evaluation Plan for Pilots

Impact Evaluation Planning Status

- Foundational planning work in anticipation of Pilot launch
- Solidify plans after pilots launch
 - Timing is still uncertain
 - Likely based on timeframe versus participation threshold
- Planning allows for two types of impact evaluation
 - Market-based
 - Program-centric

Market-Based Approach

Market-Based Approach (Baseline and Trending Studies)

- Market studies aim to identify changes in the market that may be attributable to the Pilots
 - Explores an expansion in the use or a change in the role of financing in supporting EE project
- Supply-side
 - Lender interviews: Attempted to characterize currently available financing options for EE projects
 - Mystery Borrower: Assessed options being offered by lenders to customers
- Demand-side
 - Customer surveys: ascertaining the current rate of use of financing, and the type of projects supported
- Integrated Studies
 - Assessing the fit between Supply and Demand side research to describe overall market: Residential and Non-Residential



Residential Baseline Study Purpose

- Baseline data to assess Pilots' impact on residential EE financing market
- Captures key market indicators (metrics) from both supply and demand
- Metrics based on Pilots' intended design and goals: **Subject to change**

Supply Side Metrics	Demand Side Metrics
Types of EEFP available	Customer awareness and use of EEFPs
EEFP loan volumes by type	Conventional financing and EEFP awareness
EEFP interest rates and terms	Demand for energy-related home upgrades
EEFP qualification criteria and target markets	Energy-related home upgrades: size and depth
EEFP project sizes and EE requirements	Use of any kind of financing for energy-related home upgrades
Number of Lenders offering EEFPs	Barriers to energy-related home upgrades
Contractor awareness, promotion and barriers related to EEFPs	Future demand for energy-related home upgrades and future demand for financing energy-related home upgrades

Three types of Energy Efficient Financing Products (EEFPs)



Home Equity Loans



Term Loans



PACE Loans

Product Design

60 lenders (primarily FHA PowerSaver registered)

Mortgage lien

D/I ratio, property value, FICO score, equity

23 lenders (primarily credit unions)

Secured through equipment or unsecured

FICO score/ability to pay

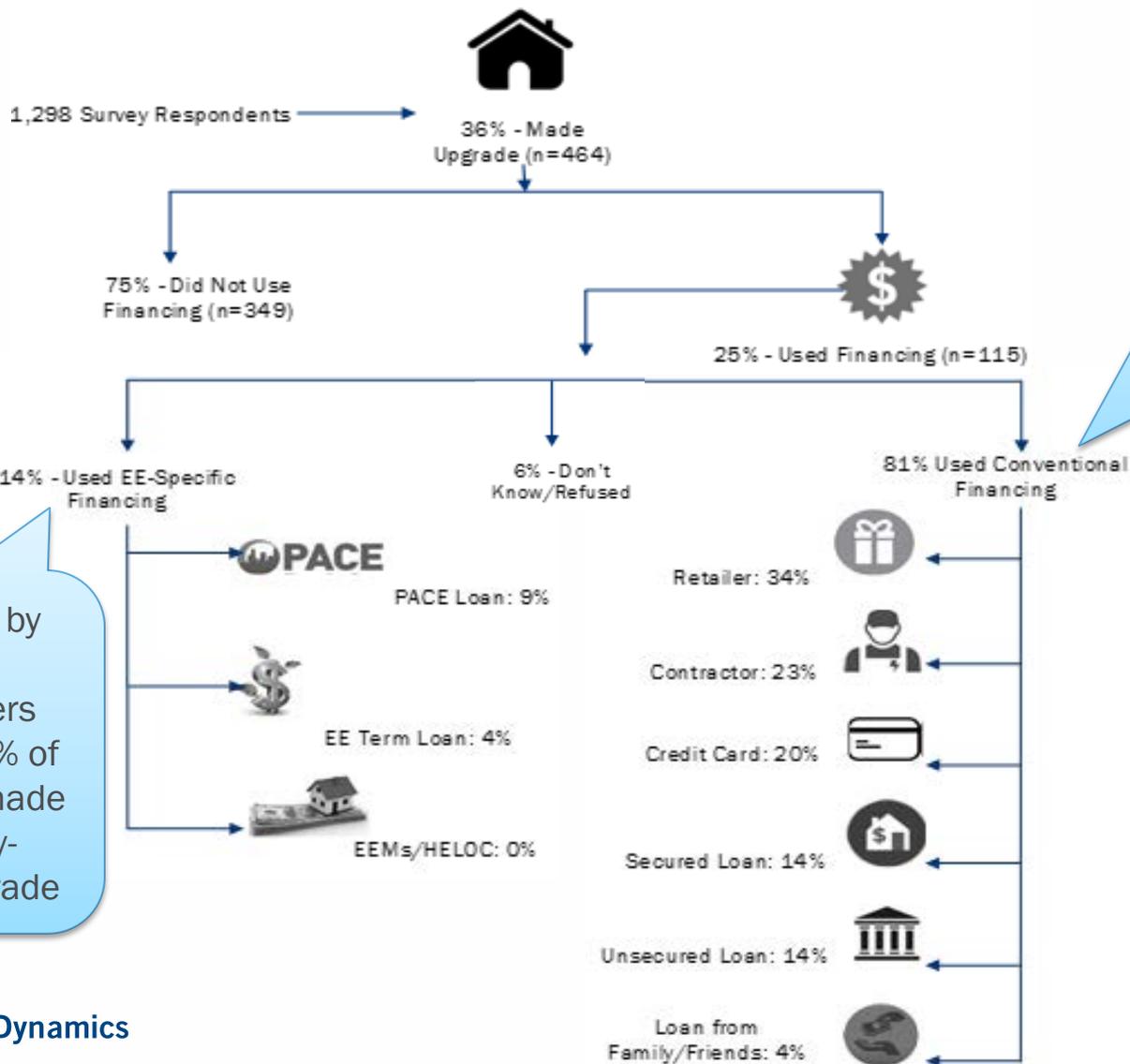
10 lenders (HERO the largest 80%)

Tax Impact – priority lien

Sufficient equity/ payment history



EEFPs represent a small fraction of how homeowners pay for energy-related home upgrades



Vast majority of homeowners used conventional financing for energy upgrades

EEFP used by 1% of homeowners surveyed, 3% of those who made an energy-related upgrade

The Pilots are entering an EEFM market dominated by PACE

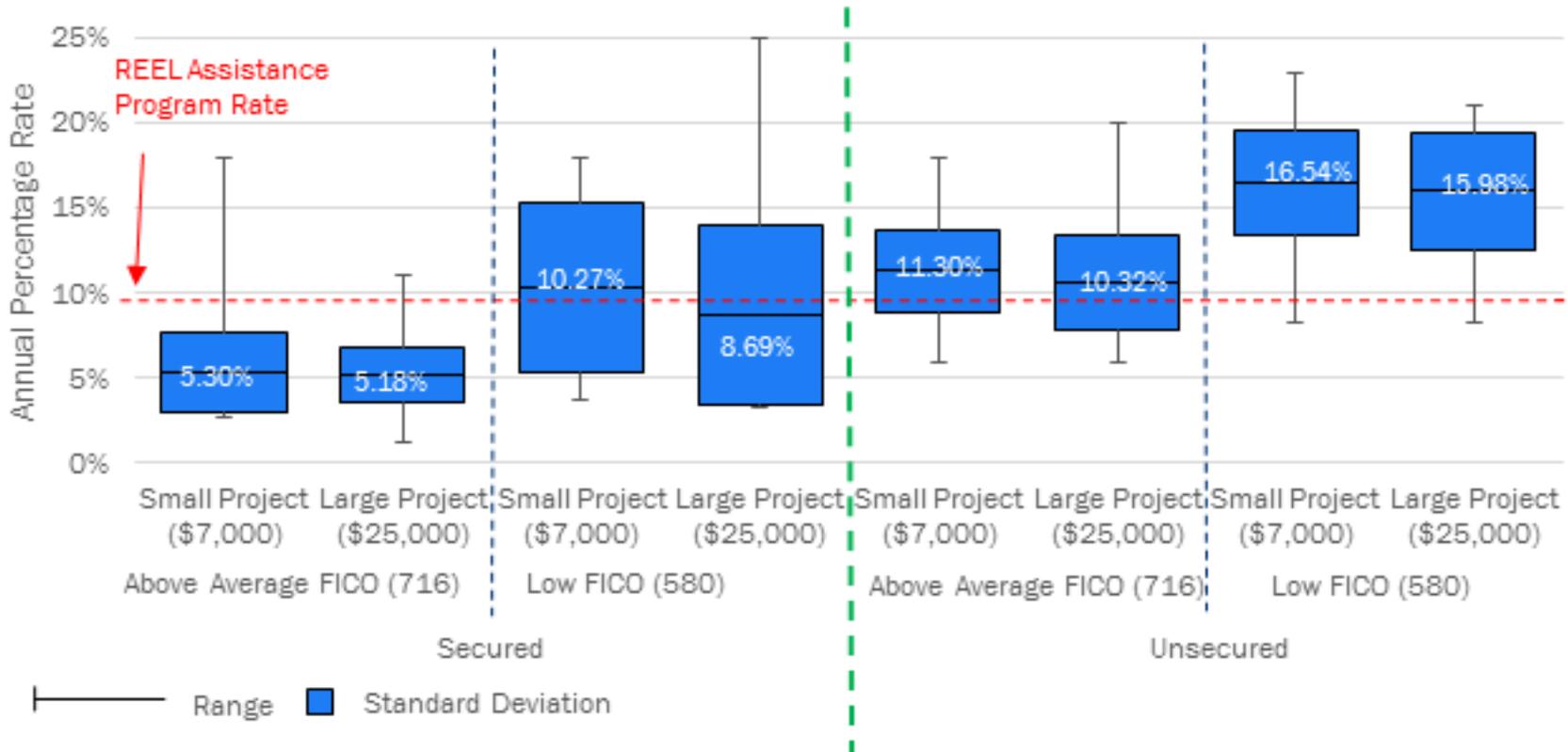


Total

	PACE	\$18M (8%)	\$3M (2%)	Total
Loan volume	\$196M (90%)	\$18M (8%)	\$3M (2%)	\$218M
Number of loans	9,279	1,179	223	10,681
Average loan amount	\$21K	\$15K	\$15K	\$20K
Median interest rate customers are paying	Unknown	6.0%	4.5%	5.5%
Average number of measures per project	3	3	4	3

Pilot interest rates likely competitive with term loan rates

- Affordable EE lending options are needed for LMI and marginally creditworthy borrowers
 - 11% of IOU customers have FICO scores that will not qualify for loans
 - Low FICO score customers are often rejected from most banks for term loans or they are offered high interest rates
 - 19% of survey homeowners reported being turned down for a loan in the past two years



EEFP's tend to support larger projects (higher value)

Project Type	Average Cost for Project
All Energy-Related Upgrades	\$14,220
Non-Financed Energy-Related Upgrades	\$13,816
Financed Energy-Related Upgrades	\$17,873
Using EEFPs	\$25,714
Using Conventional financing	\$16,599

Upgrade Types	EEFP	Conventional
Renewables	47%	27%
Weatherization	47%	35%
Refrigerator/Freezer	47%	41%
Heating System	47%	31%
Central Cooling System	40%	28%
Windows	40%	29%
Water Heater	13%	40%
Washing Machine / Dryer / Dishwasher	7%	59%

EEFPs used more often for larger energy saving measures

Program-Centric Approach

Program-Centric Impact Evaluation Plan

- Gross savings
 - How much kwh, KW and therms were saved in one time period
- Net savings (attribution, net-to-gross ratio)
 - How much of the savings were influenced financing and/or rebate program incentives
- Cost-effectiveness
 - What are the program benefits in relation to the program costs

Measuring the Gross Savings

- Methods will depend on multiple factors:
 - Program database tracking
 - Overlap with rebate programs where analysis is already planned
- Method options:
 - DEER values for specific measures (population)
 - Telephone verification that records are accurate and measures are still installed (sample then extrapolate)
 - On-site visits for verification and/or measurement (sample then extrapolate)
 - Billing analysis (population)

Measuring Gross Savings Continued....

- REEL Program Example:
- PG&E electric-only customer installs wall insulation, HVAC and a roof
- Customer receives financing through REEL pilot and a rebate from PG&E Whole House program

Method	Illustrative outcome example
DEER Analysis	DEER gives an estimate of kwh and KW savings for each measure; sum is gross savings, e.g. 1,500 kwh
Telephone verification	Customer says all measures in records are correct and installed, installation rate is 100%
On-site verification	Inspector visually examines all measures and home characteristics in the home and records are correct, installation rate is 100%
Billing analysis	Measuring pre and post usage shows customer saved 90% of what DEER estimated. Realization rate for savings is 90% or 1,350

Methodology for Net Savings (Attribution)

- Data Collection Methods:
 - Primary data collection through surveys
 - With program participants
 - With non-participants
- Most Likely Analytical Methods:
 - Self-report
 - Latent Class Discrete Choice (LCDC) modeling
 - Nested Logit modeling
- We will select the specific method based on the final design and scale of the Pilots (residential and non-residential)
 - If we use multiple methods, results from various methods will be combined to get one attribution estimation

Methodology for Net Savings continued.....

- Self-Report: ask participants directly
 - Anticipated to include this method for all Pilots
- LCDC: ask non-participants about preferences (stated preferences)
 - To be completed early in the program to provide clean apportionment of attribution between finance and rebate programs
 - To provide early results
- Nested Logit Modeling: ask participants (revealed preferences)
 - Anticipated to be used for REEL Assistance Program – but dependent on participation levels
 - Can also be supplemented by multi-level modeling to assess impact on project size

Measuring Net Savings

- Continuing with the same example as for gross savings

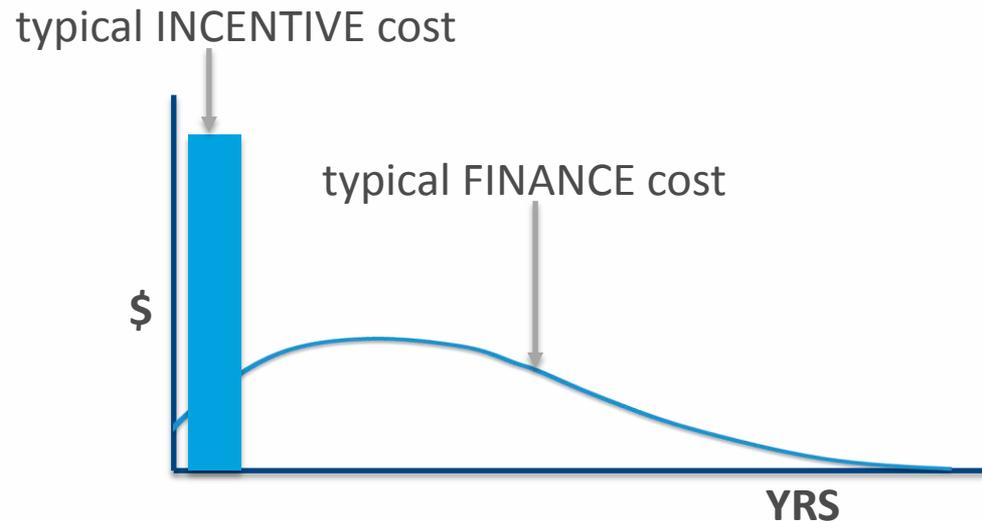
Method	Illustrative outcome example
Determine Method	Self-report selected based on program design and scale
Collect Data	Survey the customer – asked a series of questions to help determine what they would have done in the absence of the program
Estimate Attribution	Survey analysis shows customer is a 20% freerider (i.e. would have taken some sort of action without the program) – 80% is attributable to the REEL program Thus realization rate for savings is (80% of 1,350) now 72% or 1,080

CHEEF Pilot Cost-Effectiveness

- CHEEF Pilots are deemed to be **Resource Programs**
 - Must obtain *net savings* (kWh) and be *cost-effective*
- Two Cost-Effectiveness Tests Applied in California
 - Program Administrator Cost (PAC) Test = **utility's** costs and savings only
 - Total Resources Cost (TRC) = **utility and participant** costs and savings
- Dual purpose
 - Ex-ante: screening / plan approval: $TRC > 1$, $PAC > 1$
 - Ex-post: performance measurement / shareholder incentive

Cost-Effectiveness Approach

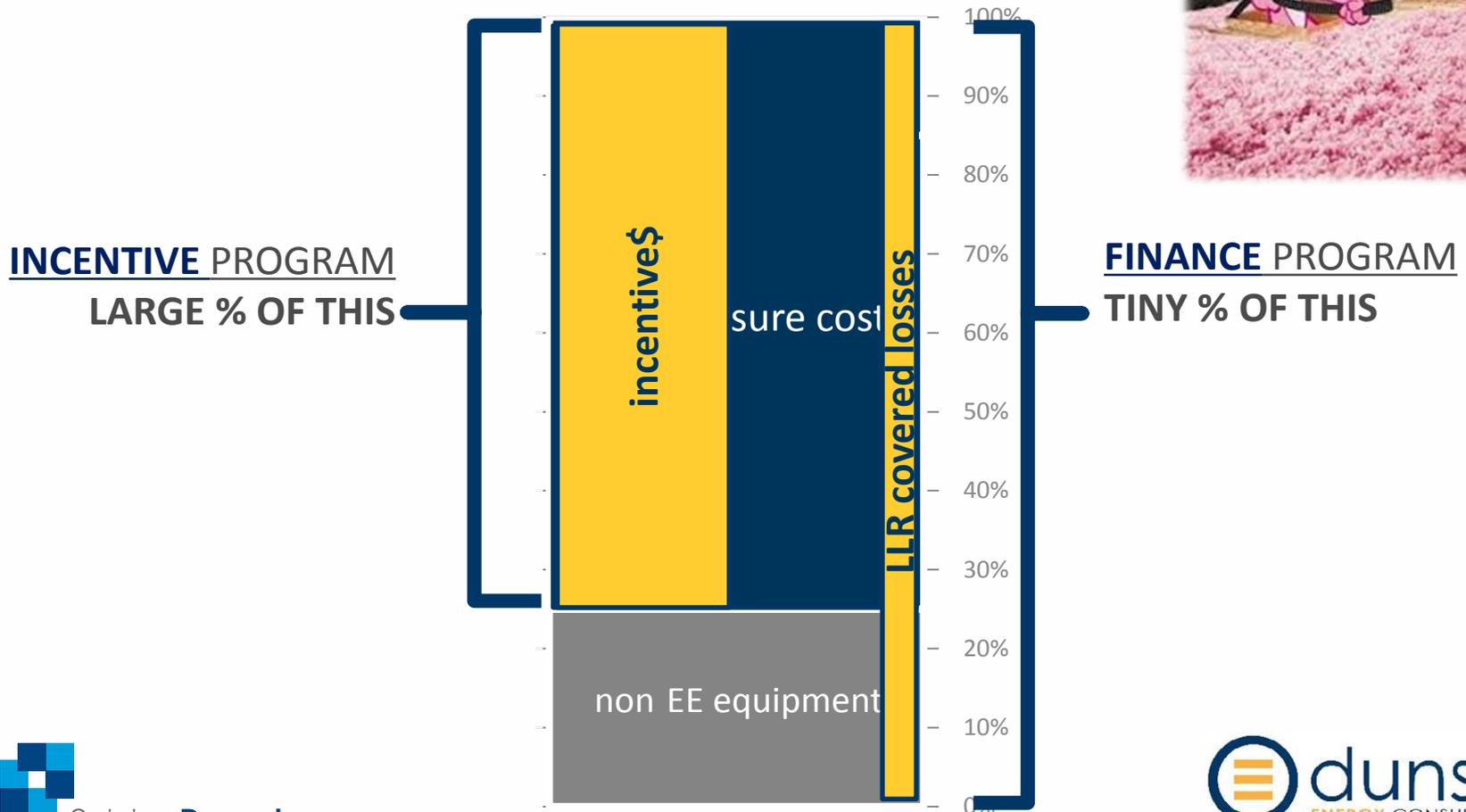
- Fundamental difference between finance and incentives = **TIME**



- Other issues include the **scope** of measure costs/benefits considered
- **Attribution** of savings between financing and incentives key to result

MEASURE SCOPE

■ Discretionary (e.g. whole-home retrofit)



Cost-Effectiveness Scope: FINANCE \neq INCENTIVES

TEST COMPONENTS

COSTS

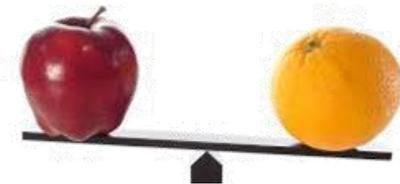
- Admin / marketing
- Participant costs
- Incentive costs
- Setup costs
- **Loan Loss Reserve Funds**
- Collection

BENEFITS

- Short-term savings
(resource acquisition)
- **Long-term savings**
(market transformation)
- **Non-energy benefits**
(up to 30% of loan value)
- **Reduced borrowing costs**

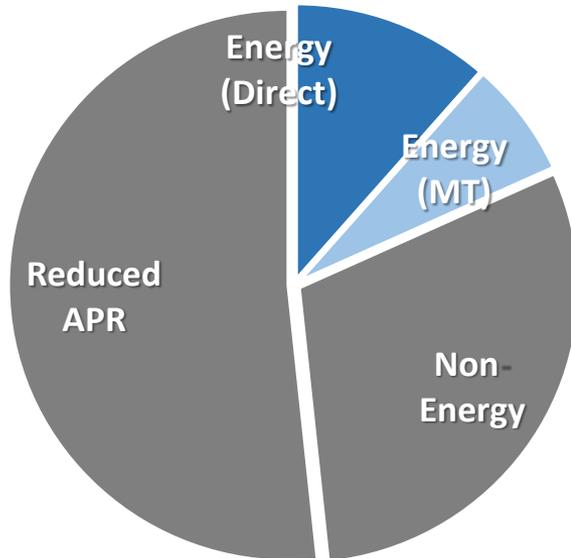
DISCOUNTING

- Utility WACC
- **Loan rates**
- **LLR fund returns**

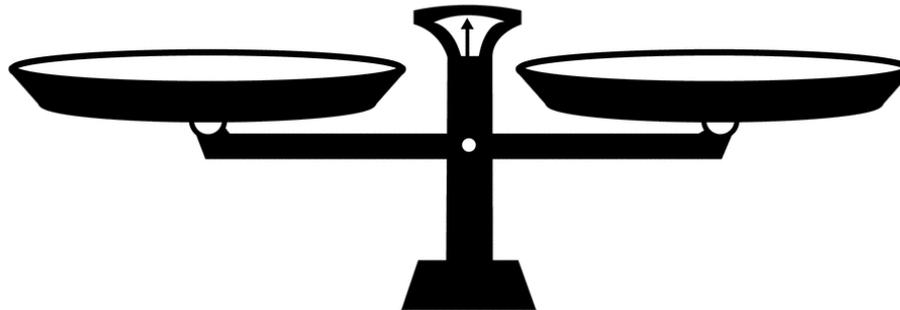
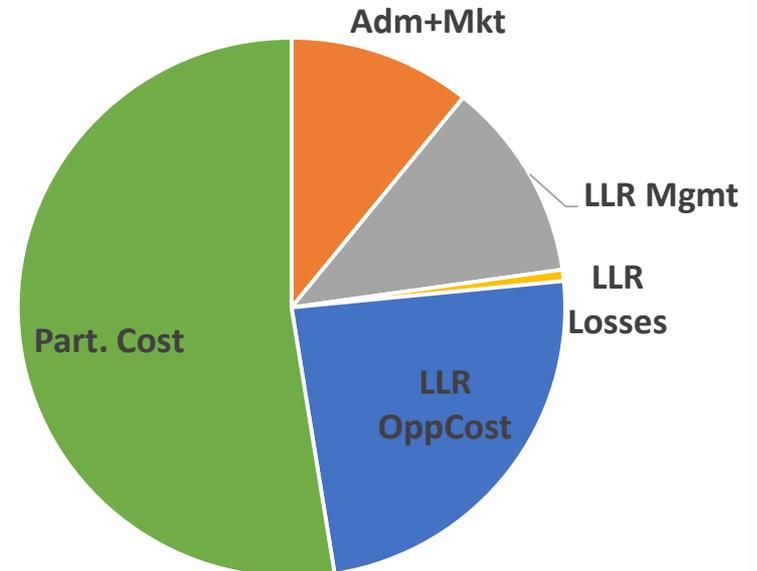


TRC: Accounting for Costs and Benefits

TRC: Benefits

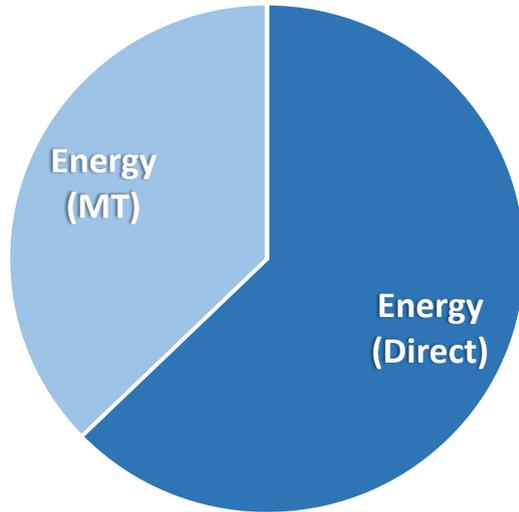


TRC: Costs

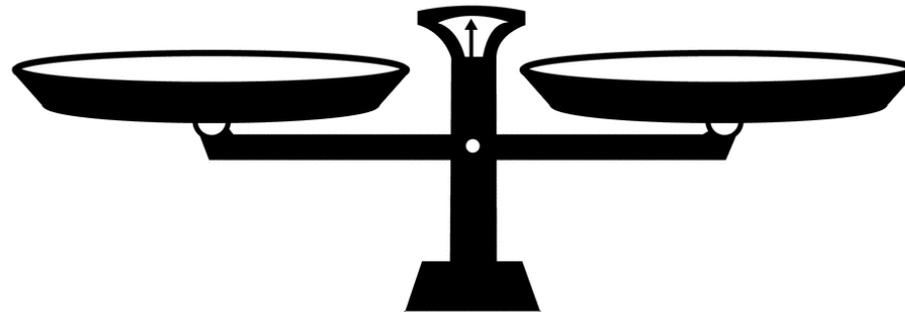
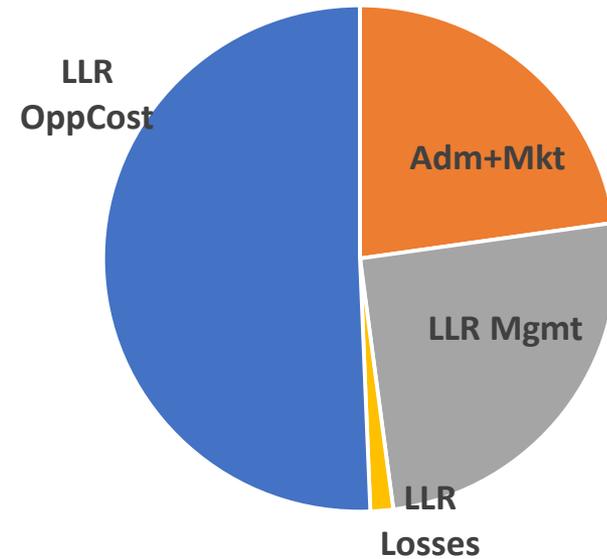


PAC: Accounting for Costs and Benefits

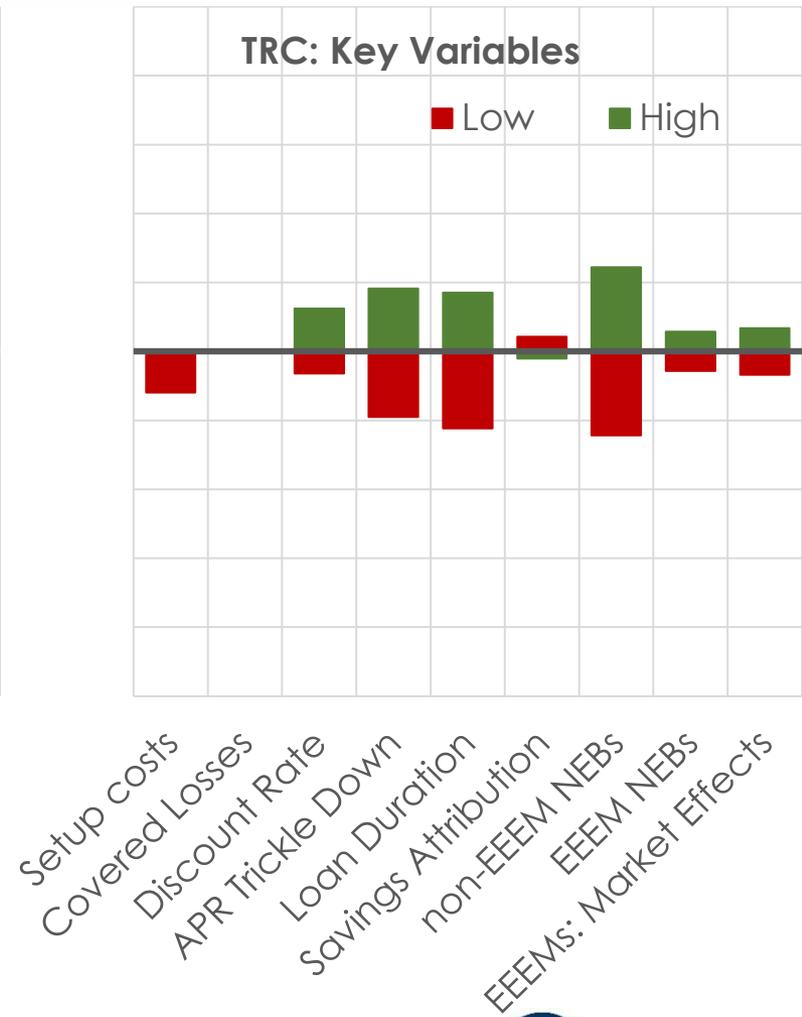
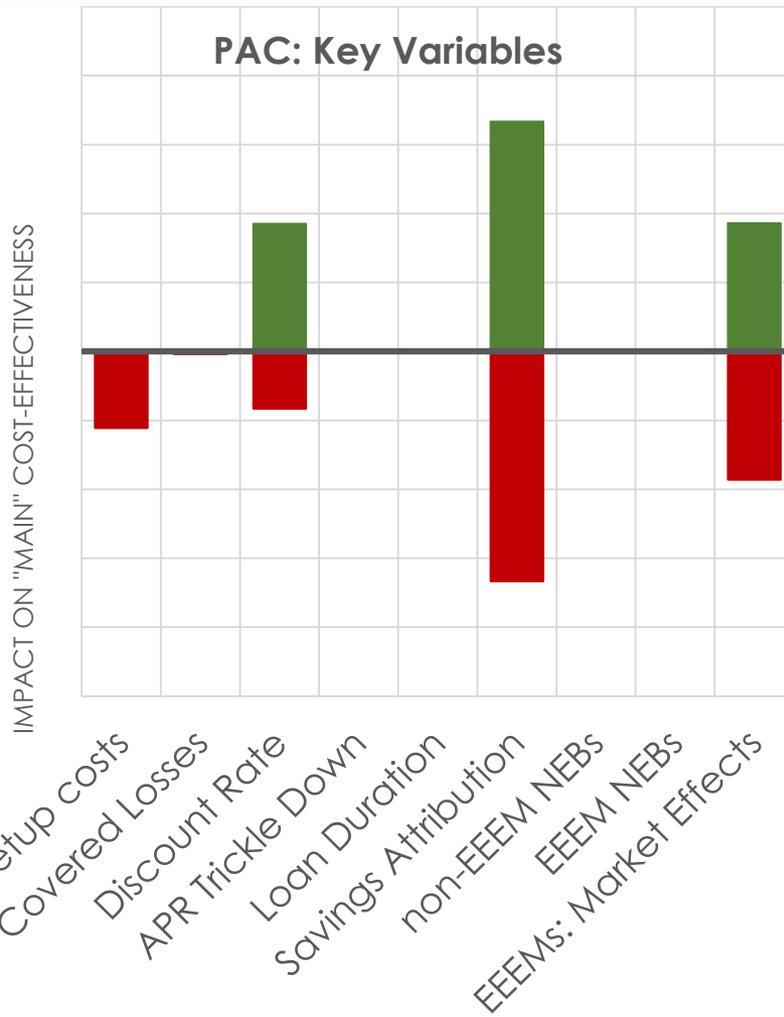
PAC: Benefits



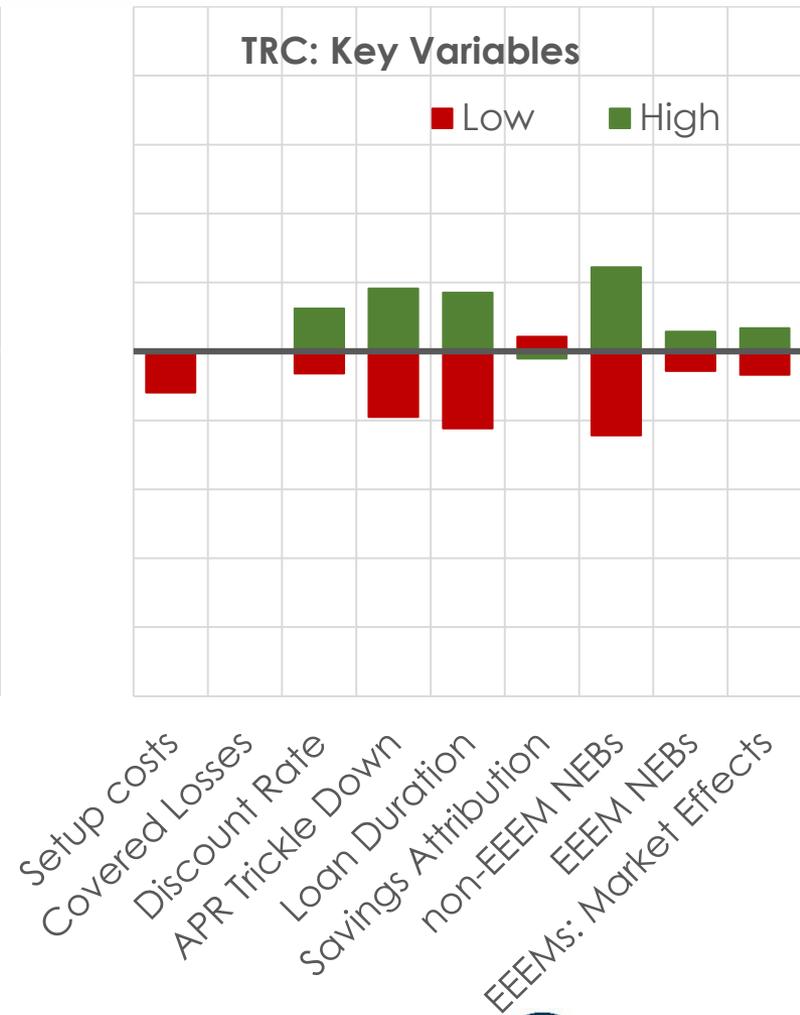
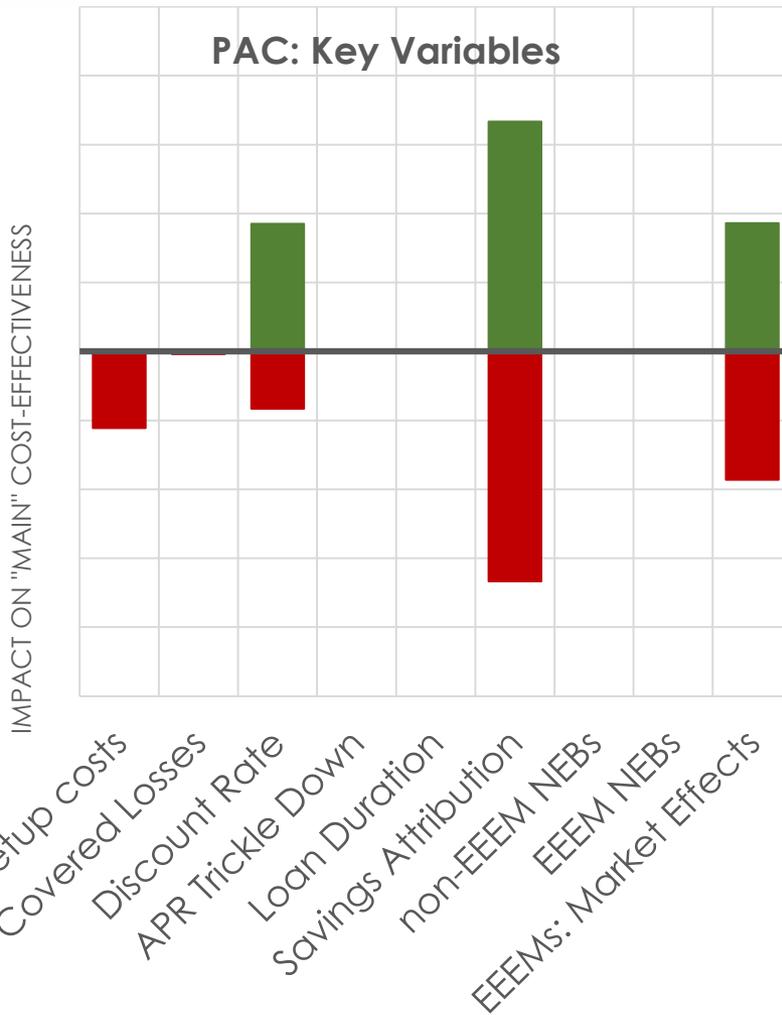
PAC: Costs



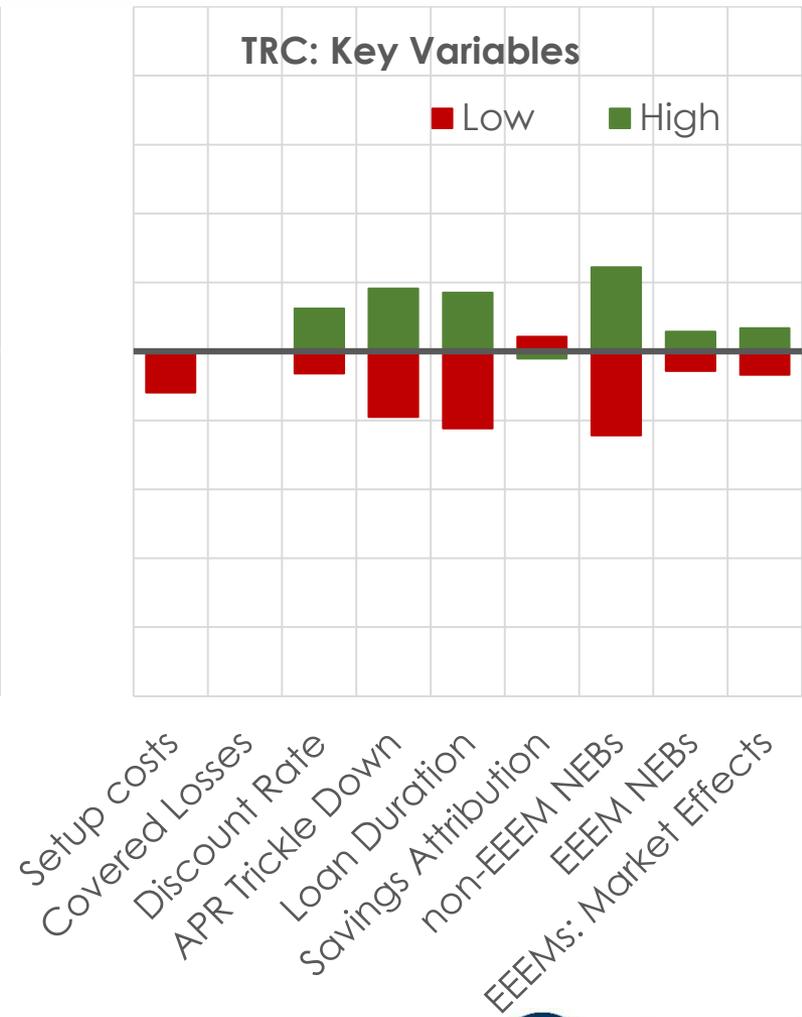
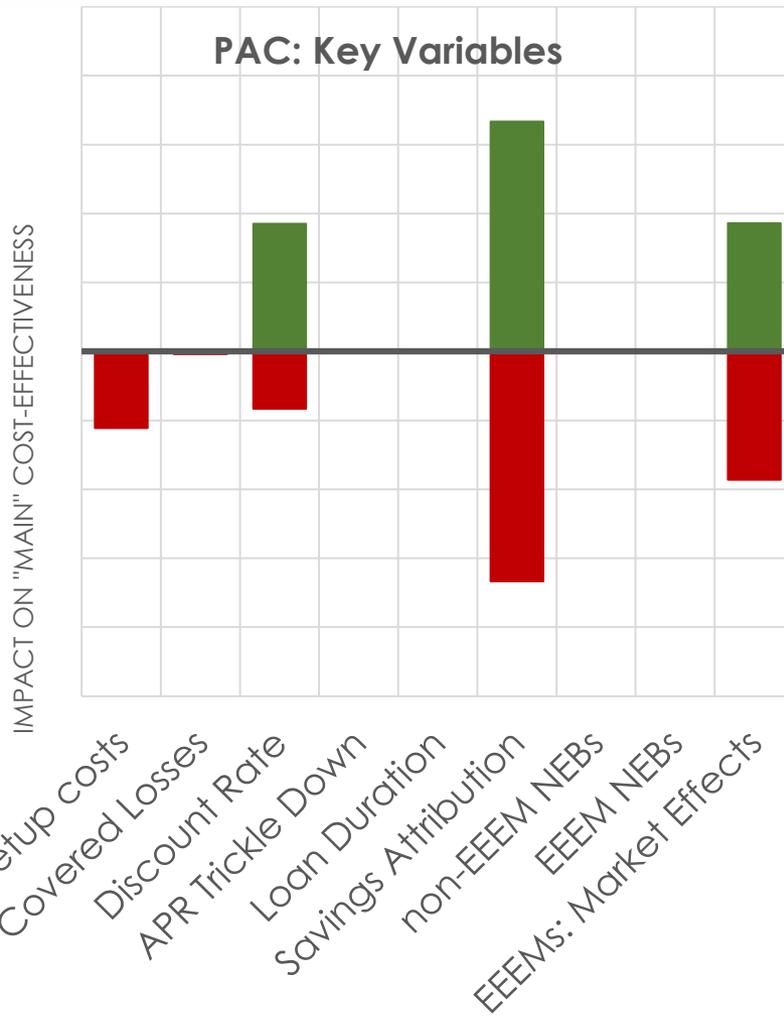
CE Test Sensitivities to Inputs



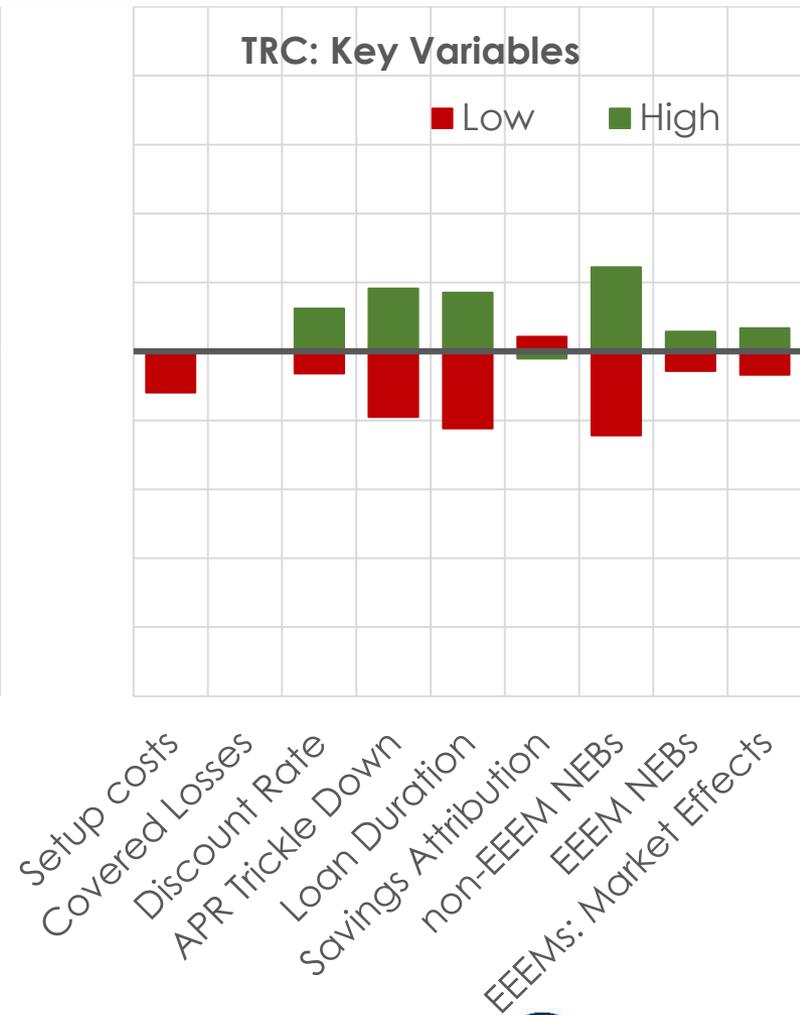
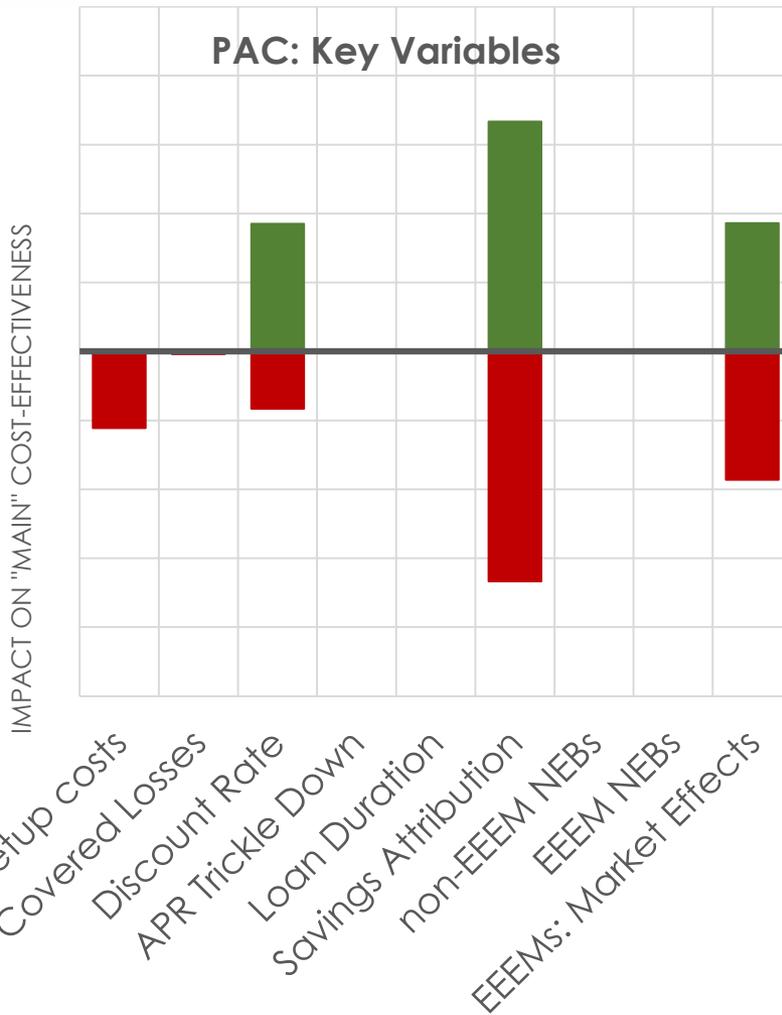
CE Test Sensitivities to Inputs



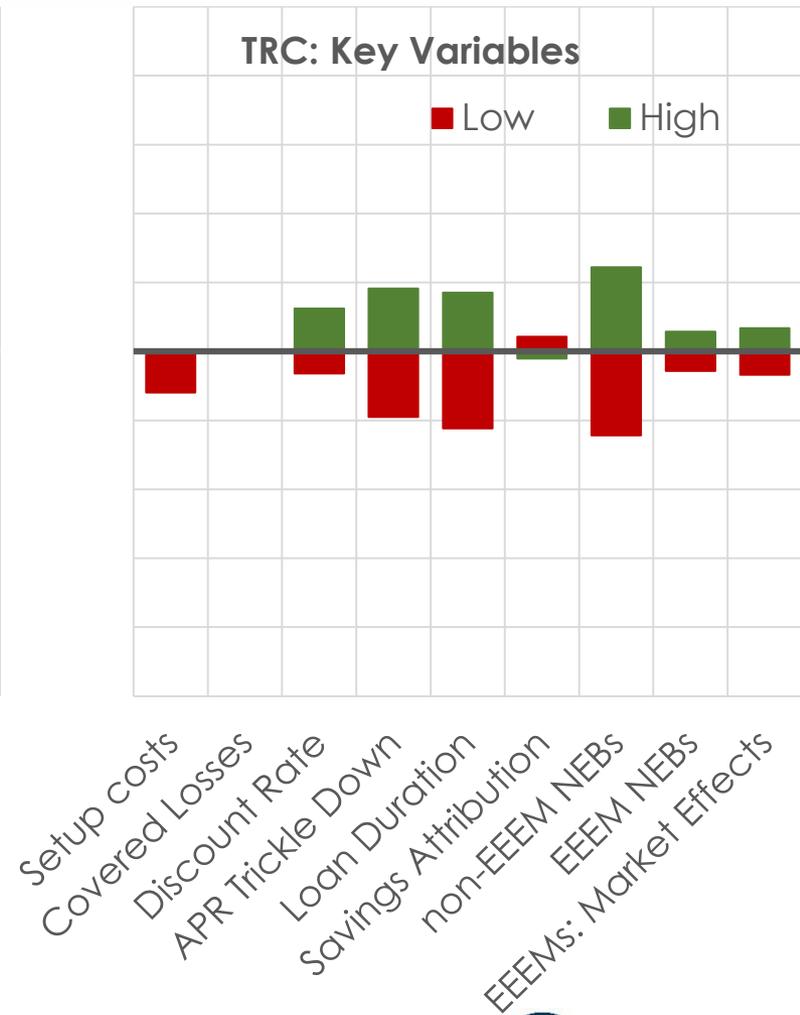
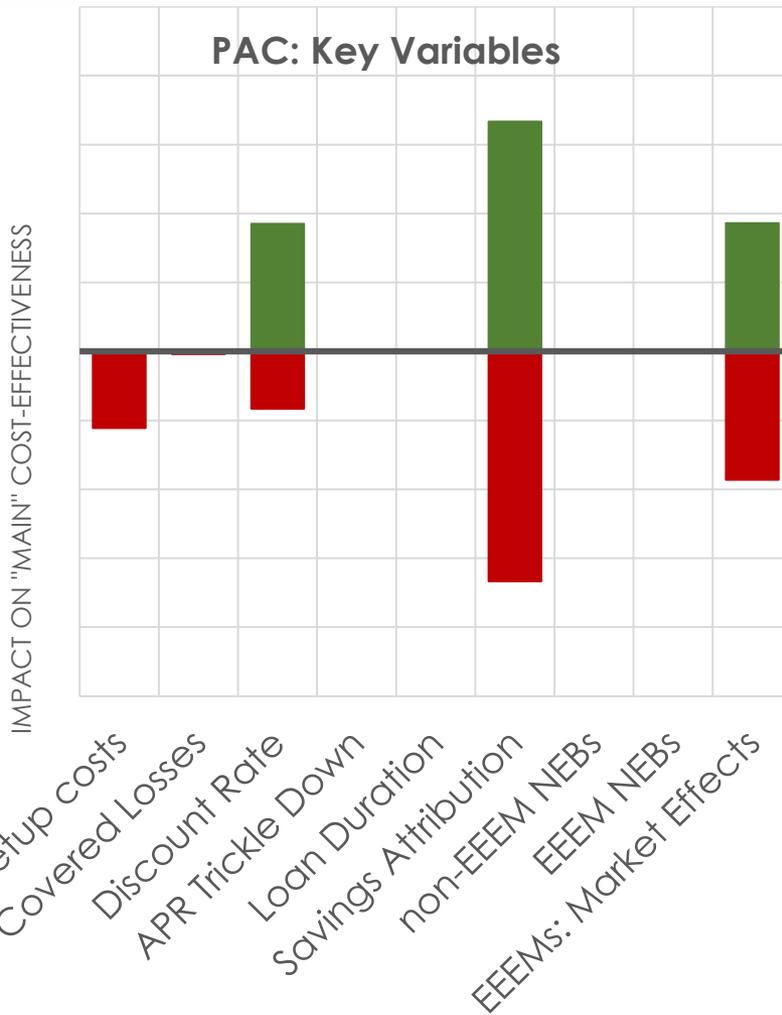
CE Test Sensitivities to Inputs



CE Test Sensitivities to Inputs



CE Test Sensitivities to Inputs



Cost-Effectiveness Conclusions

- CE results are extremely sensitive to attribution of savings between incentive and financing program
 - Need to ensure that these are properly assessed
 - Will impact CE of incentive programs
- Financing programs subject to a range of benefits that may not be captured in existing frameworks
 - Non-energy benefits
 - Reduced borrowing costs
 - Our approach will be to compare CE test results by applying the current CPUC framework vs. adding all costs and benefits
- PAC Test seems to fit financing programs reasonably well
- TRC Test may not be appropriate for assessing Financing programs in general

Wrap-Up

What this means for Comparative Criteria

- Timing and methods will be finalized in a program-centric evaluation plan after Pilots launch and gain some participation
 - Each pilot will have its own evaluation plan
- Impact evaluation efforts for SW pilots will provide the following information:
 - Gross savings from program (based on database records and/or billing analysis)
 - Net savings from program or the NTGR (based on LCDC approach)
 - Cost-effectiveness: TRC and PAC (with and without non-energy benefits)
- Consider the following for comparative criteria
 - Not all databases will be comprehensive, may need to rely on billing analysis
 - May take participant surveys for all to determine NTGR, methods need to align



CAEATFA, March 22, 2016
Energy Efficiency Financing, OBF

Frank Spasaro

CALIFORNIA Electric and Gas Utility Service Territories



T:\Projects\CEC\Service Area\Web Maps\Service Area 8.5x11web.mxd



EE Finance Programs in CA

» Existing Programs:

- On-Bill Financing (OBF), since 2006
- American Recovery and Reinvestment Act (ARRA)
- California Energy Commission (CEC)
- Regional Energy Networks (RENs)
- Property Assessed Clean Energy (PACE)
- Other (e.g. PowerSaver)

» New Pilots

OBF Program Design: 2013-2016

- » Utility is the Lender
- » Businesses only; easy credit (billing history)
- » Energy savings covers the loan installment
- » **Zero-percent interest, unsecured, non-transferable**
- » Minimum loan \$5,000
Maximum \$100,000 / \$250,000 / \$1,000,000
- » Monthly loan payment is included on the utility bill
- » Loan Default = Meter shut-off

OBF Program Data

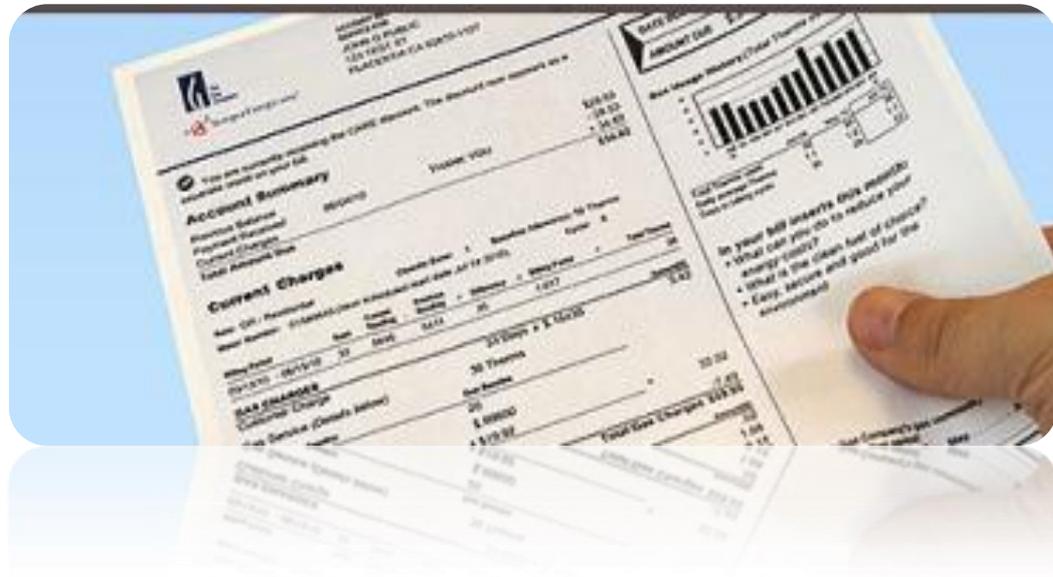
California Statewide On Bill Financing Activities by Market Segments

As of December 31, 2014

	PG&E		SoCal Edison		SDG&E		SoCal Gas		Total	
	# of Loans	Loan Amt Issued	# of Loans	Loan Amt Issued	# of Loans	Loan Amt Issued	# of Loans	Loan Amt Issued	# of Loans	Loan Amt Issued
Agricultural	22	\$1,567,769	5	\$73,683	10	\$496,762	13	\$579,069	50	\$2,717,283
Commercial	778	\$25,042,003	1,168	\$22,042,084	1,128	\$26,950,095	11	\$183,096	3,085	\$74,217,277
Industrial	18	\$577,390	54	\$1,903,509	77	\$2,973,148	11	\$582,200	160	\$6,036,247
Institutional	152	\$14,091,433	181	\$12,224,863	201	\$15,085,037	12	\$1,335,701	546	\$42,737,034
Multi-Family	1	\$48,053	0	\$0	2	\$26,775	3	\$49,765	6	\$124,593
Total	971	\$41,326,648	1,408	\$36,244,139	1,418	\$45,531,817	50	\$2,729,831	3,847	\$125,832,435

OBF Program Data (cont.)

....and DEFAULTS < 1%!



OBF EM&V

» EMV Plan for 2013-2015:

- EMV Evaluation Plan (2013-2015) — (Finance Plan starts on **section 2.12 Page 196**, **page 199 includes a table with the 2013-2014 EM&V studies that were budgeted with the TBD/Completion date**)

» Prior OBF Studies:

- SCG Process Evaluation Final Report, Volume 2 (2006-2008)
- OBF Process Evaluation (2010-2012)



THANK YOU!

Frank Spasaro (fspasaro@semprautilities.com)