California Alternative Energy and Advanced Transportation Financing Authority

Criteria for a Comparative Assessment of Energy Efficiency Financing Programs

PUBLIC WORKSHOP

TUESDAY, FEBRUARY 10, 2016
1:30PM

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

Or via Webinar

Live captioning is available at:
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Agenda

- Introduction Presentation by CAEATFA
  - Background: Legislative Directive
  - Coming up with Comparative Criteria
  - Overview of Workshop Series
    - Timeline
- Presentation by Chuck Goldman: "Making it Count"
  - Q&A
- Public Comment

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."

CHEEF Finance Pilots

September 2013: through a formal decision, the California Public Utilities Commission requested that CAEATFA operate as the California Hub for Energy Efficiency Financing (CHEEF).

The CPUC authorized the development of 7 finance pilots

- PG&E, SDG&E, SoCalGas, SCE
- 2 residential pilots, 1 multi-family, and 4 non-residential pilots

All of the pilots will be evaluated

- The results of CAEATFA's workshops and working group process will directly inform one of several CPUC studies on the finance pilots.
- All of the finance pilot evaluation plans are in The Energy Efficiency Evaluation, Measurement and Verification Plan which is posted on the CPUC's energy data web website (www.energydataweb.com/cpuc)
- The public will be able to view the draft and final evaluations through the energy data web.

Criteria for a Comparative Assessment of Energy Efficiency Financing Programs

Apples to Oranges to Lemons?

Different Program Structures and Regulatory Context

PACE Financing	CHEEF Pilots	On Bill Financing	Other Programs
•Authorized by local agencies, administered by local agency or private entity •Direct financing •Available in PACE jurisdictions (can be state-wide) •Available for energy efficiency, water, renewables, seismic	•Administered by CAEATFA, authorized by CPUC •Open-market, leveraging private capital •Credit enhancement with OBF component •Available in IOU territory only •Available for eligible energy efficiency measures	•Administered by IOUs, regulated by CPUC •Direct financing •Available in IOU territory only •Available for eligible energy efficiency measures	•Local Government Programs •Prop 39 & ECAA (CEC) •SWEEP (I-Bank) •Etc.

Criteria for a Comparative Assessment: Is The Program Achieving Our Policy Goals?

Are EE financing programs enabling us to conserve more energy and do it cost effectively?

State of California's Environmental Goals	
Energy conservation	GHG emission reductions

PACE Goals

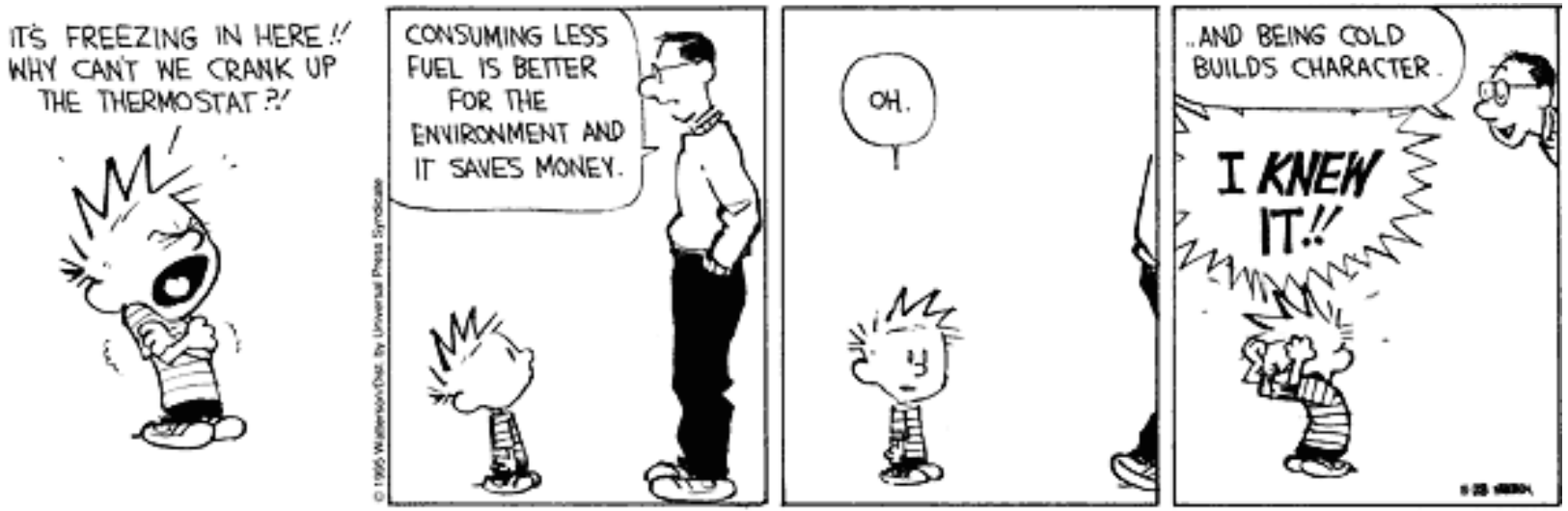
- Remove investment barrier of upfront costs of EE retrofits
- Reduce energy and water use and greenhouse gas emissions
- Promote local economic development

CHEEF Goals

- Remove investment barrier of upfront costs of EE retrofits
- Reach underserved consumer segments
- Stimulate deeper EE projects than previously achieved with traditional programs
- Attract more private capital into EE retrofit lending space and improve credit terms

Implementation and Best Practices	
Deal Flow	Energy Savings
Program Controls	Leveraging Existing Structures
Quality Assurance/Quality Control	Filling a Gap /Under-served populations
Streamlined Process / User Friendly	More Attractive Financing (terms, rates)

Importance of Looking at Policy Goals



Process for Developing Criteria for a Comparative Assessment

What do you look at to compare programs?

What are the policy goals the program seeks to achieve?

- Why EE?
  - Energy Savings
  - Co-Benefits
- Why financing?

Are we designing and implementing a program that helps achieve those goals?

Best Practices:

- Consumer Protections
- QA & QC Requirements
- Contractor Management
- Consumer Satisfaction

Are we actually achieving those goals?

- Evaluate the program's processes and impact
- Is the necessary data available?

The Challenge: Finding a balance among policy, implementation and evaluation

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.

- 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.

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.

- 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.
February 17, 2016	Deadline for those interested in participating as a member of the working group to contact CAEATFA.
March 15, 2016	CAEATFA Board considers and approves working group participants.
March 22, 2016	Second public workshop with a presentation on CHEEF and OBF.
Week of March 28, 2016	Third public workshop with presentations on PACE.
Mid April 2016	Meeting of the working group to discuss proposal of criteria for a comparative assessment of energy efficiency programs. Public may submit written comments on proposed criteria for 7 business days.

Public Comment

Reminder: written public comment on what topics and criteria should be discussed during the workshop series must be received by Monday, February 22, 2016, at 5:00 PM (PST).

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

Overview of "Making It Count" and Evaluation Issues for EE Financing Programs

Chuck Goldman, Lawrence Berkeley National Laboratory

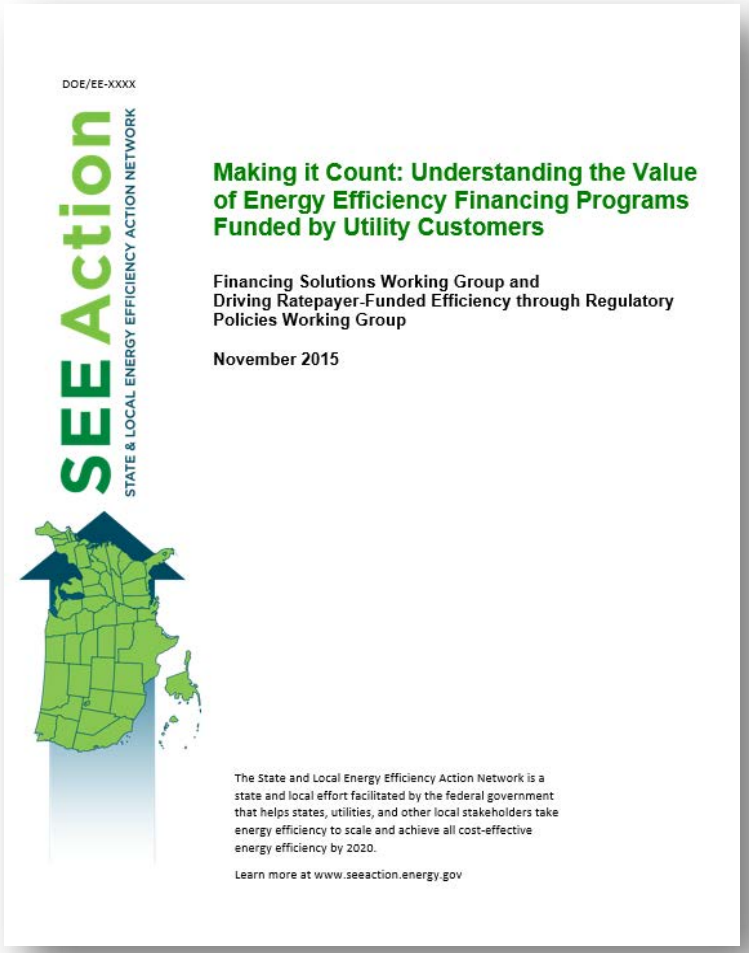
Chris Kramer, Energy Futures Group

February 10, 2016

Topics

- ❑ Overview of "Making It Count" report
- ❑ EM&V 101
- ❑ Evaluation Issues for EE Financing Programs
- ❑ Comparative Assessment Framework: Criteria & Other Metrics

Making It Count: Report Objectives



1. Explore options for placing EE financing in an appropriate regulatory context.

2. Explore ways of adapting EE program planning and evaluation tools to the unique features of EE financing.

Questions Addressed

1. Can financing be placed in a regulatory context that would preserve accountability while providing sufficient flexibility to program administrators and customers?

2. Can the tools that have been used to screen traditional EE programs for cost-effectiveness and assess potential savings and impacts be adapted in ways that make them work for EE financing programs?

Report Approach

- Interviewed approximately 20 stakeholders in 5 states (California, New York, Connecticut, Massachusetts, Maryland)
- Reviewed public filings and other documents
- EE financing plays an increasingly significant role in each selected state:
  - CA: Suite of EE Financing Pilots across C&I, MF, SF sectors
  - NY & CT: Recently launched Green Banks
  - MA: HEAT Loan Program has reached ~ $100 MM annual volume
  - MD: MHELP financing program has sought customer funding (and recent Green Bank bill introduced)

Programs Reviewed

	CA	NY	CT	MA	MD
Financing program reviewed	Statewide Financing Pilots	NY Green Bank	Connecticut Green Bank	HEAT Loan	MHELP Loan Program
Utility customer funds sought or used?	Yes	Yes	Yes	Yes	No, but requested
Regulated program administrator?	Yes, California Alternative Energy and Advanced Transportation Financing Authority (CAEATFA)	Yes, NYSERDA	No, Connecticut Green Bank	Yes, utilities' third-party administrator	No, Maryland Clean Energy Center
Part of resource acquisition portfolio?	Yes	No	N/A	Yes	No, but under discussion
Treated as a distinct program?	Yes	Yes	N/A	No	Potentially
Tied to performance incentives?	Yes, at the portfolio level	TBD	No	Yes, via linkage to other EE programs	No
Financing envisioned as a complement?	Yes	Yes	Yes	Yes	Yes
Financing envisioned as a substitute?	Potentially	Yes	Yes	No	Potentially
Utility customer funds dedicated to selected financing program	$75M	$947M ($165M initial funding, $150M additional funding approved in July, $631.5M follow on request)	$27.6M (2014)	Approx. $15M (2013)	$4.6M proposed (2013 and 2014)
Type of financing or credit enhancement offered by program	Loans, leases, energy savings agreements, LLRs and debt service reserves	Guarantees, loan capital (credit facilities, subordinate capital, senior capital)	IRBs, LLRs, and loan capital	IRBs	IRBs

Conceptual Framework: Financing as a "Complement" or "Substitute"

Role of Financing	Description	Key Questions
Financing as a Complement	Deployment of financing strategies to enhance existing efficiency programs	- Effectiveness of financing relative to other existing EE program strategies - Ability of financing to enhance existing programs and market activity - Optimal mix of program budgets/resources to allocate to financing versus other program strategies (e.g., rebates)
Financing as a Substitute	Eventual transition from rebates to financing-only strategies	- Effectiveness of a paradigm shift away from traditional rebates and toward financing. How much participation is achieved? Energy savings realized? Hard-to-reach market segments accessed?

These two approaches are not mutually exclusive in the short-term; even in jurisdictions where policymakers have made statements supporting an eventual substitution.

Financing currently operates as a complement in the five selected states (e.g., consumers may make use of existing EE programs and new financing-focused offers).

EM&V 101

Definitions – EM&V

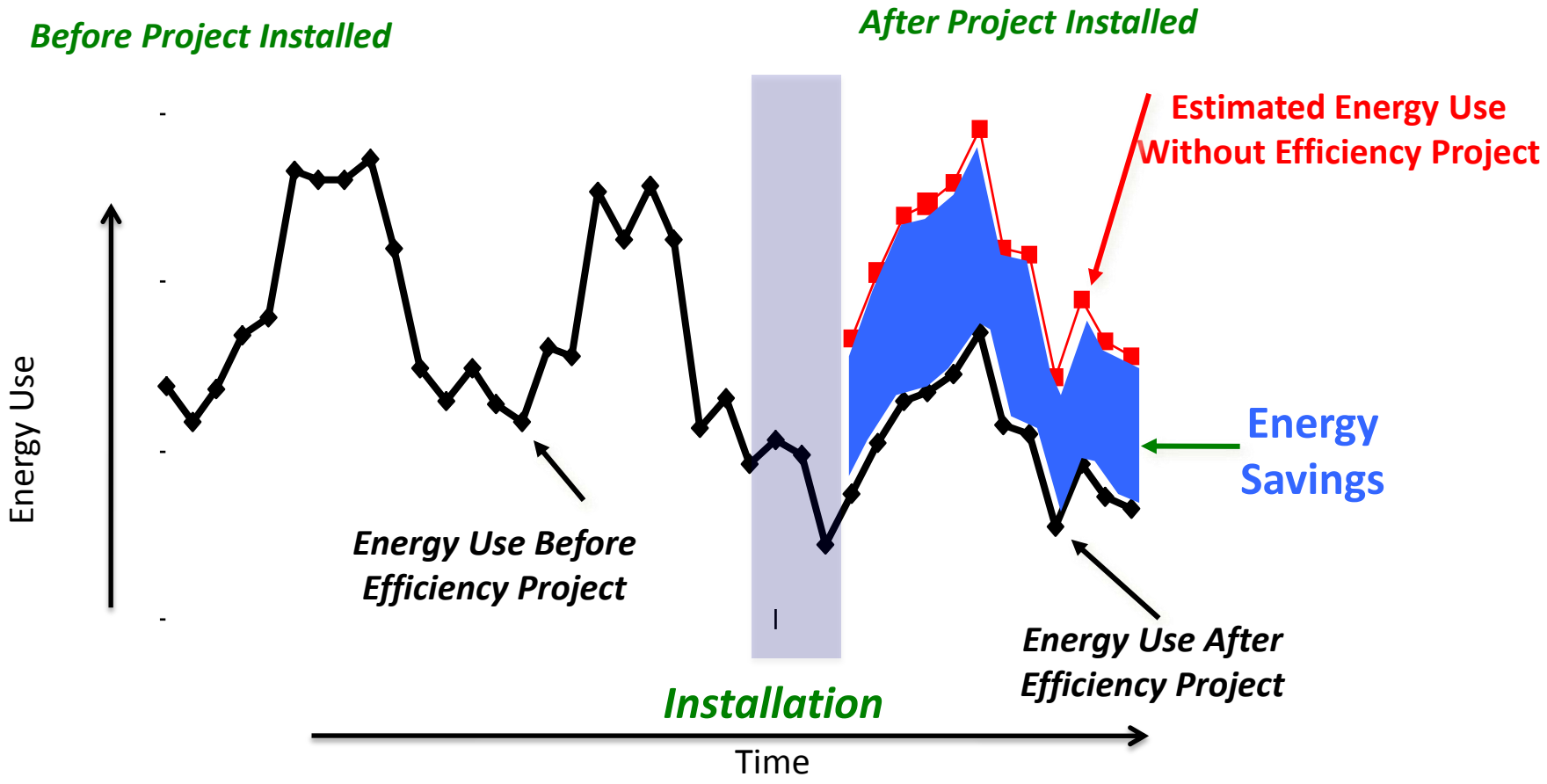
- **Evaluation** - The performance of studies and activities aimed at determining the effects of a **program or portfolio**
- **Measurement and Verification** - Data collection, monitoring, and analysis associated with the calculation of gross energy and demand savings from **individual sites or projects**. M&V can be a subset of program evaluation.
- **EM&V** - The term “evaluation, measurement, and verification” is frequently seen in efficiency evaluation literature. EM&V is a catchall acronym for determining both program and project impacts.

Why Evaluate?

- **Quantify Results**: Document and measure the energy savings of projects and programs in order to determine how well they have met their goals; e.g., has there been a good use of the invested money and time? Provide PROOF of the effectiveness of energy management.
- **Understand why the effects occurred:** Identify ways to improve current and future projects and programs as well as select future projects. "You can't manage what you don't measure" and "Things that are measured tend to improve."
- **Resource Planning:** To support energy resource planning by understanding the historical and future resource contributions of energy efficiency as compared to other energy resources. Provide data to support efficiency as a reliable resource.

Savings Cannot Be Measured,

They Are Estimated



Graph of Energy Consumption Before, During And After Project Is Installed

The Big Issues of EM&V

How good is good enough?

- Fundamental issue of EM&V
- How certain does one have to be of savings estimates and is that certainty balanced against the amount of effort utilized to obtain that level of certainty?
- EM&V investments should consider risk management principles - balance the costs and value of information derived from EM&V (i.e., EM&V should be cost-effective).

As compared to what?

- First - Defining a baseline against which efficiency actions are compared for determining energy savings and whether attribution should be considered – the counter-factual
- Second – Establishing level of performance confidence and risk for efficiency relative to other options for reducing savings and risk of not getting the savings

EM&V is About Risk Management

Determining Net Savings

- **Net Savings:** The total change in load that is attributable to an energy efficiency program
- Attribution is obviously challenging
- Approaches Used:
  - Self-reporting surveys
  - Enhanced self-reporting surveys
  - Statistical models that compare participants' and non-participants' energy and demand patterns
  - Stipulated net-to-gross ratios

Evaluation issues for EE Financing Programs

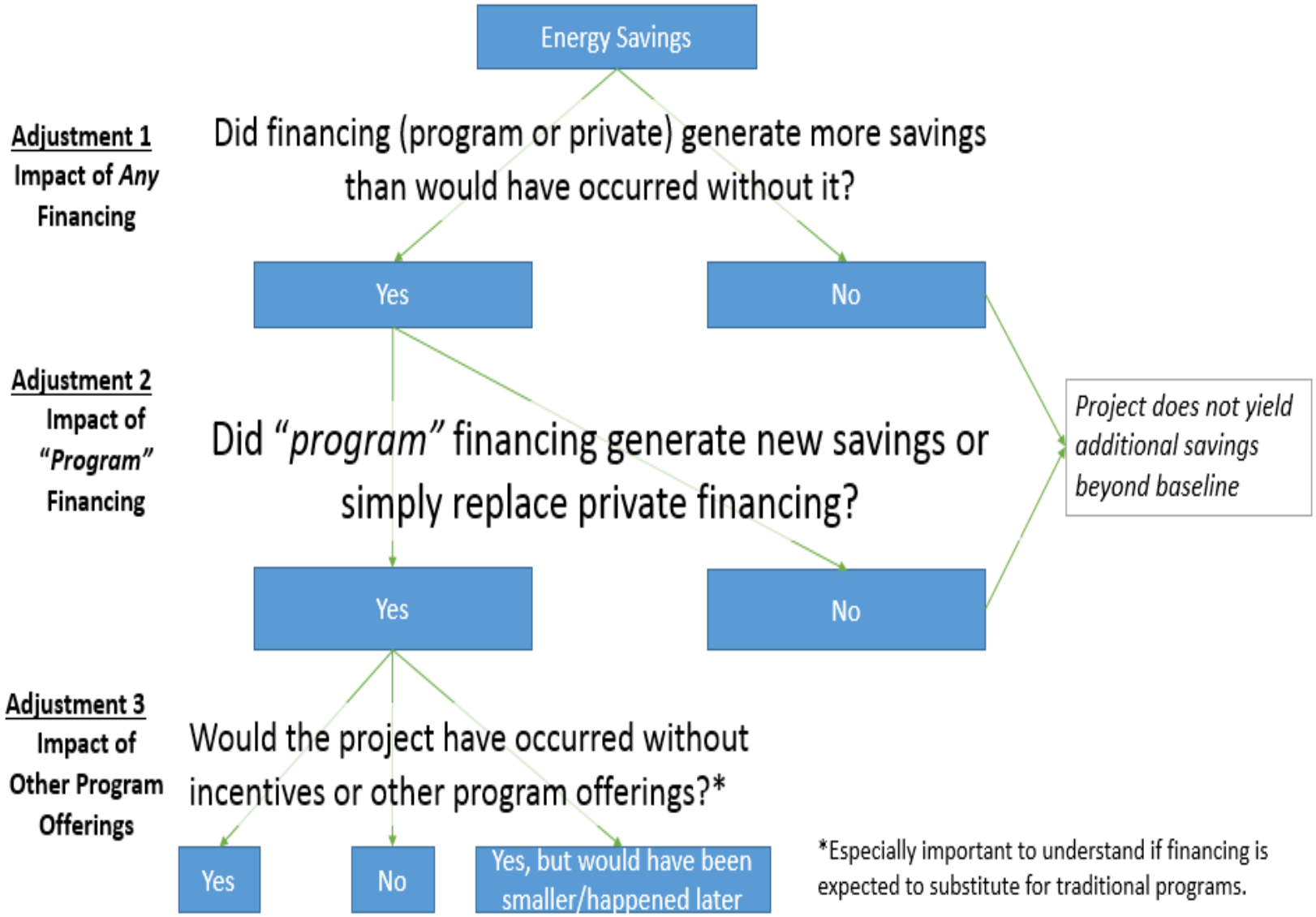
Evaluation of EE Financing Programs

- Key evaluation questions include:
  - Savings levels that are directly *attributable* to financing strategies.
  - Financing's influence within *specific markets and project types.*
- Attribution analysis should consider:

  Whether *program* financing was essential (compared to private options).

  Influence of financing relative to influence of *other program offerings*.
- Financing can be evaluated through the lens of *resource acquisition (RA)* and *market transformation (MT)*
  - Not mutually exclusive.
  - Immediate RA results may inform longer-term MT prospects

Evaluation: Savings Attribution and EE Financing



Financing Attribution in CA Context (cont'd.)

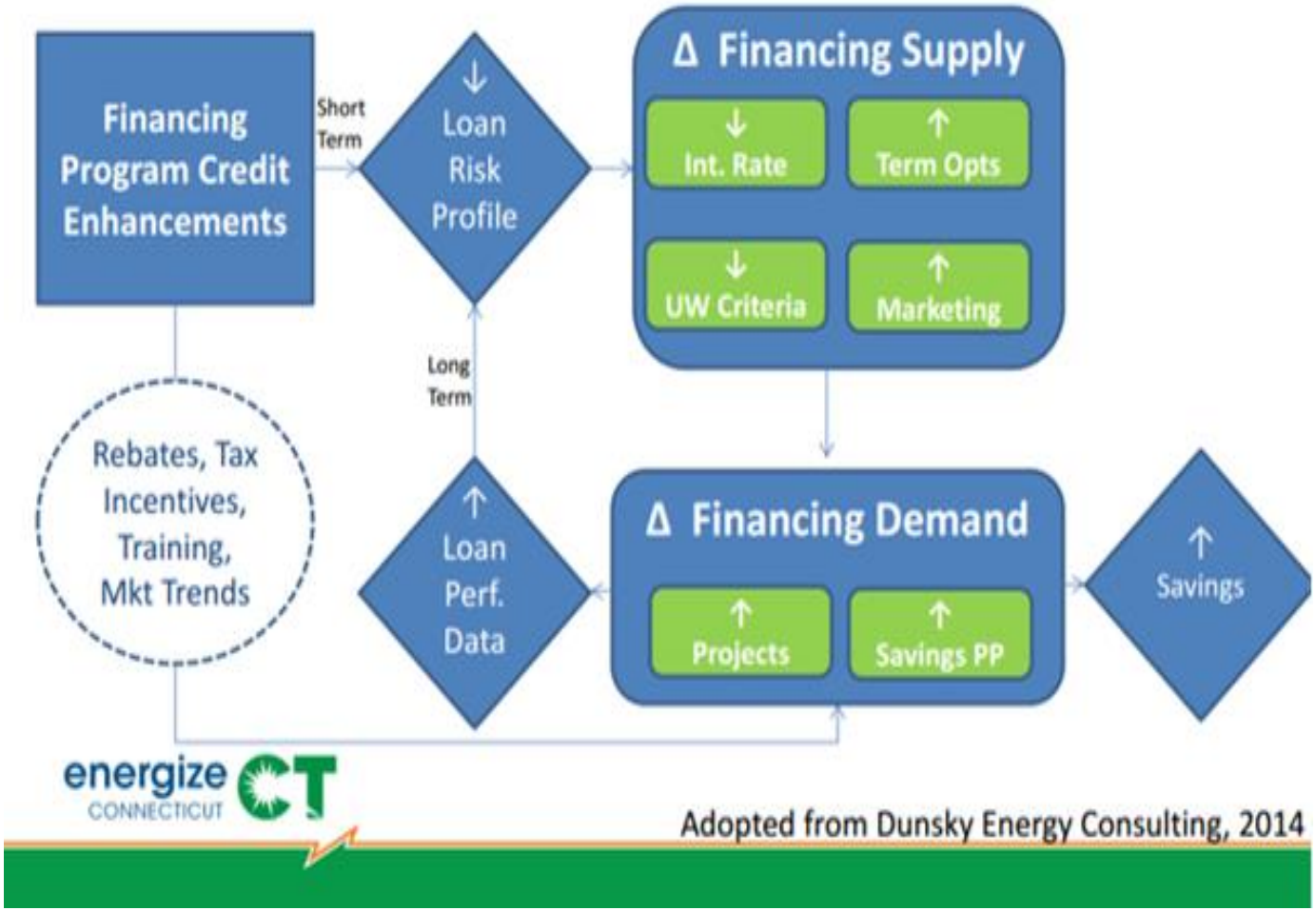
Issue/Metric	Questions These Metrics May Help Answer
Attribution to *any* EE financing products	• What level of EE savings do specialized EE financing products collectively generate above and beyond what would be achieved in the private market alone?
Attribution to *pilots*	• What level of additional savings do pilots generate above and beyond existing products? (Private market and PACE) • Do the benefits of these additional savings outweigh any costs spent on the pilots?
Attribution to *PACE*	• What level of additional savings do PACE programs generate above and beyond existing products? (Private market and pilots) • Do the benefits of these additional savings outweigh any costs spent on PACE (e.g., LLR costs)?

Evaluation – Market Transformation Perspective

- Best practices for evaluating programs that have market transformation objectives include:
  - Developing a logic model that describes the "program theory" (how the financing program will reduce market barriers and transform existing markets)
  - Establishing market activity baselines against which progress will be measured;
  - Agreeing upon interim metrics to show progress;
  - Committing to a timeline of progress indicators; and
  - Measuring ultimate results attributable to the EE finance program over an extended period of time.
- Not to the exclusion of RA evaluation, which may inform MT prospects.

Market Transformation Evaluation – Logic Model Example

- One example of a logic model for EE financing (not currently adopted anywhere, but has been explored in some jurisdictions):



Market Transformation Evaluation – Interim Metrics Example

Time	Data Category	Metrics

T_0	Baseline data:
	-Private market
	-Existing programs
		- Private market:
		  - Naturally occurring EE savings
		  - Estimated % attributable to private financing
		- Existing programs:
		  - Net savings levels
		  - Estimated % attributable to program financing

T_1	Data on new program financing options	- Rates, terms, underwriting criteria - Credit enhancements - Other incentive levels
T_2	Initial data on financing demand	- Availability, awareness, knowledge, attitudes toward financing options -Promotion and uptake of EE financing
T_3	Data on loan and project performance	- Delinquencies, defaults - Cash flows generated - Net savings achieved
T_4	Changes in perceived risk of EE financing	- Changes in credit enhancement and other incentive amounts needed to achieve desired terms and interest rates -Lender surveys
T_5	Changes in financing supply	- Number of lenders in the market - Changes in rates, terms, and underwriting criteria for EE projects
T_6	Updated data on financing demand	- Availability, awareness, knowledge, attitudes toward financing options -Response to more favorable loan terms and increased access to capital - Promotion and uptake of EE financing
T_7	Changes in overall savings levels and savings attributable to EE financing	- Additional savings achieved (market and program) and % attributable to financing

Market Transformation: CA Context

- Financing market is constantly evolving
- Pilots may have an *intentional* theory of change
- At the same time, *organic* changes may also take place
  - PACE expansion may alter the market
  - Market may experience growth of EE financing more broadly
- If the goal is just to see market change, may not matter why—don't have to track each development separately
- If the goal is to understand whether *investments in a particular program are effective*, then it may be important to isolate program's impact relative to other market trends
- This is a relatively new and undeveloped area in context of EE financing

EE Financing and Cost-Effectiveness

- Key Concept: Benefit Cost Ratio vs. Net Benefits
  - Ratios: Program administrator benefit-cost *ratios* may improve if a shift toward financing is accompanied by a shift of project costs onto customers
  - Net Benefits: However, *total* net benefits may diminish if participation rates or attributable savings decline in an EE Finance Program. This would be *less* cost-effective.
- Hypothetical example:

	EE Program	Financing as a Substitute
Program Administrator Costs	$1,500,000	$800,000
Benefits	$3,000,000	$2,000,000
Program Administrator Test (B/C Ratio)	2.0	2.5
Total Net Benefits	$1,500,000	$1,200,000

Comparative Assessment Framework: Other Potential Metrics

Comparative Assessment Framework: Criteria and Other Metrics

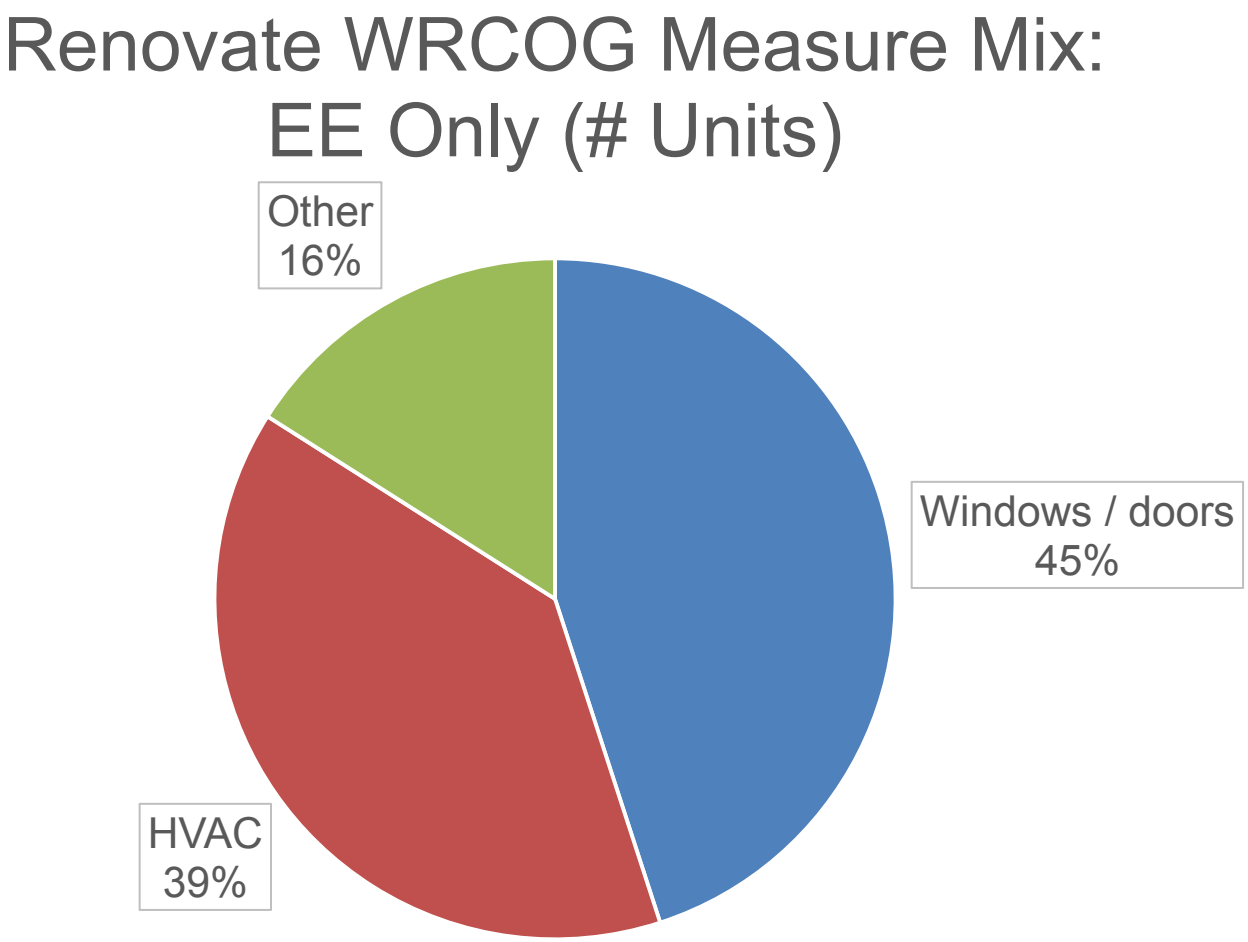
- Other policy objectives or public benefits
  - Local Economic Development
  - Water conservation to mitigate drought
  - Consumer Protection: Lending practices/Contractor Performance
- "Breadth" – market penetration
  - Demographics – who is being targeted? and reached?
  - Geography – urban vs. rural
  - Access to credit – "under-served" markets?
- "Depth" – comprehensive
  - Savings per home
  - Measure mix & # Measures installed per home
- Loan Performance

Comparative Metrics: Loan Volume vs. Other (MA Example)

- Volume:
  - $100 MM/yr (one of highest-volume programs in country)
- Program Penetration:
  - Used by only 9% of res program participants
  - Did not look at market penetration, but this can also be a useful metric
- Measure Mix:
  - Only 10% of loans used for weatherization
  - 80% single-measure equipment replacement

Conclusion: Other metrics may be helpful for placing loan volume in context.

Comparing Financing Programs: Measure Mix



Non-Energy Benefits: Utility & Societal

Value	Impact
Hedge value	Reduction of consumer exposure to volatility in electricity/gas commodity costs
Reduced commodity prices resulting from reduced demand	Reduction in aggregate demand puts downward pressure on wholesale market electric and gas commodity prices
Easing electricity/gas distribution/transmission capacity constraints and enhancement of reliability	(localized) Reduced line losses, voltage support (reliability), and power quality improvements Reduces the likelihood of gas curtailments, and may eliminate or delays the need for local capital intensive system upgrades
Avoided transmission and distribution capital and operating costs	(localized) Particularly valuable in areas with high energy use, high demand growth, and/or constrained distribution systems
Environmental benefits	Production and consumption of electricity/gas has environmental impacts.
Customer bill collection and service-related savings	Avoiding shut-off notices, shutoffs/reconnects, and carrying costs on arrearages
Can provide access to energy savings opportunities for all markets	Virtually all consumers can participate in energy efficiency programs
Economic development	EE programs can support greater net job growth than electricity/ gas supply and delivery

Discussion/Questions

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BACKGROUND SLIDES

Unique Features of Financing: Implications for Cost-Effectiveness Tests

- Differing impacts on PACT vs. TRC/societal tests
  - EE Financing programs typically intend to increase participant cost share; this program design strategy impacts PACT more than TRC or societal tests
- Types of Costs and Methodological Measurement Issues
  - Not all budget allocations should be treated as costs (e.g., funds that will be returned or are not expected to be expended: loan principal, excess loss reserve funds)
  - Administrator costs may exceed energy-related costs because loans may support whole measure cost (and losses, buy-downs, etc. tie back to loan principal amounts)
  - Cost-effectiveness screening tests require predicting expected losses over time and may require accounting for costs of uncertainty
  - Treatment of other costs (interest expenses, opportunity costs of below-market lending of customer funds) remain unsettled; may be areas for further research.

Financing Attribution in CA Context

- "Making It Count" focused on program vs. private financing generally
- CA context is unique
  - Private market overall
  - PACE programs
  - Financing pilots
  - CEC Prop 39 and ECAA (Energy Conservation Assistance Act)
  - CA I-Bank SWEEP
- In this context, attribution analysis may need to be further adjusted
  - Attribution to *any* EE financing product (pilots *or* PACE)
  - Attribution to *pilots* only
  - Attribution to *PACE* only

Determining Attribution Rates: Illinois Example

- Self-report may not be most reliable method of estimating financing attribution. Evaluation community has been discussing alternatives.

	Illinois
Self-Report Free Ridership Estimate	13%
Other Data Points	37% of partial financing participants (denied or withdrew) installed the same high-efficiency measure
Why Not Factored Into Free Ridership?	Partial participants may have been influenced by the financing program, even if they didn't end up using the financing

- Other examples: Maine
  - 10% self-report free ridership estimate based on several questions
  - But in one question, 44% said they would have installed same measure without the program.
  - Not factored in: "often" would have been less efficient or installed later.

Complement/Substitute Framework in CA Context

- Complement
  - Are legislative and ratepayer funds being well spent on financing programs?
- Substitute
  - What is the potential of financing relative to other program types in the context of achieving broader EE goals?

Non-Energy Benefits: Jobs

- **Direct.** Jobs are in firms that are actually receiving the efficiency program dollars and doing the energy efficiency work
- **Indirect.** Jobs in firms supplying goods and services to energy efficiency firms
- **Induced.** Those created by the demand generated by wage and business income from energy efficiency investments and by energy bill savings.

Non-Energy Benefits: Participant Benefits

- Indoor air quality improvements, improved comfort (e.g., quality of light, less noise, fewer drafts, better building temperature control), higher productivity and lower rates of absenteeism through better-performing energy using systems (e.g., ventilation, building shell, lighting)
- Reduced equipment operations and maintenance (O&M) costs because of more efficient, robust systems (although more complex systems could require more maintenance)
- Water and wastewater savings
- Positive personal perceptions (e.g., “green,” environmental consciousness) and for commercial businesses and public entities, improved public perceptions and the ability to market products and tenant leases
- Avoided capital cost for equipment or building component replacements whose capital costs can be paid from savings