

Cost Effectiveness Overview

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ENERGY AND UTILITIES COMMITTEE

**SPENCER LIPP – CAL TF STAFF
AUGUST 5, 2026**

The views expressed in this presentation are those of Cal TF Staff and do not represent official positions of the Policy Advisory Committee, Technical Forum members, or Cal TF as an organization.

California Technical Forum (Cal TF)

Cal TF: Creates **technically rigorous solutions** to **streamline, reduce costs, and create statewide efficiencies.**

California Technical Forum: Independent subject matter experts who review and make recommendations on technical and technical policy issues related to California's IDSM portfolios.

Policy Advisory Committee (PAC): Funds and oversees Cal TF work.

Cal TF Staff: Manages the TF and PAC processes; develops software, tools, guidelines, and other technical and technical policy resources to support CA's IDSM Portfolio.

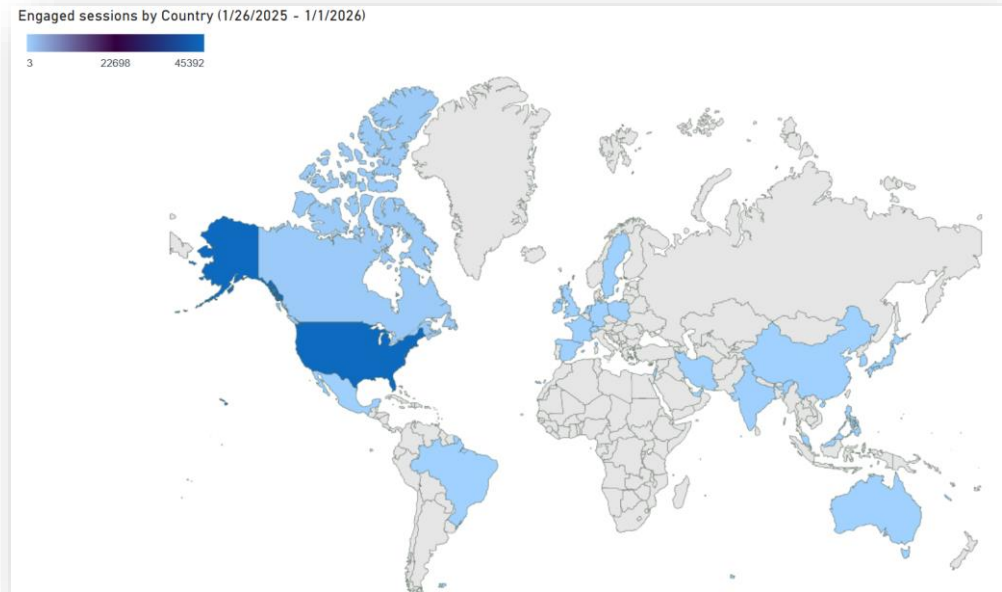
Cal TF Funders and PAC Members



Cal TF Staff developed, administers, and maintains the CA eTRM database, California's official data source for energy efficiency (EE) measures. The eTRM ensures the accuracy, transparency, and accessibility of all deemed measure values, and streamlines the program design and reporting workflow.



Electronic Technical Reference Manual (eTRM)

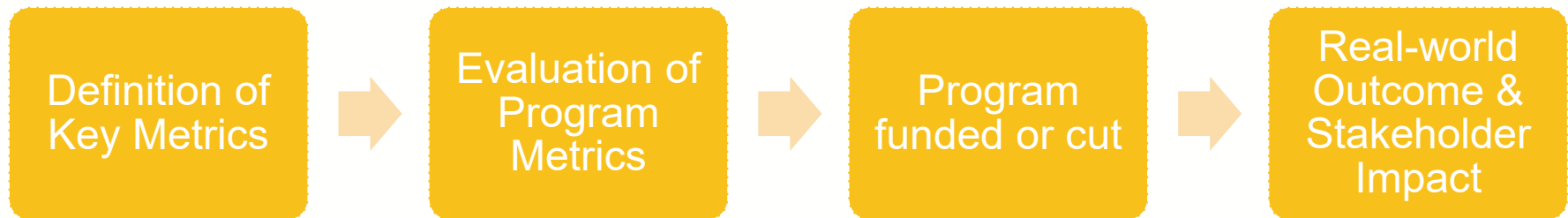


The CA eTRM is used extensively by energy practitioners across the globe with more than 4,500 active users

Why EE/IDSM Metrics Matter

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- How we define the key metrics informs investment decisions around energy efficiency programs.
- There are multiple options for how to measure each metric, reflecting different stakeholder perspectives and new research and data.
- Reflecting periodically on the current metrics and potential alternatives helps ensure we are using the right data to drive key decisions.



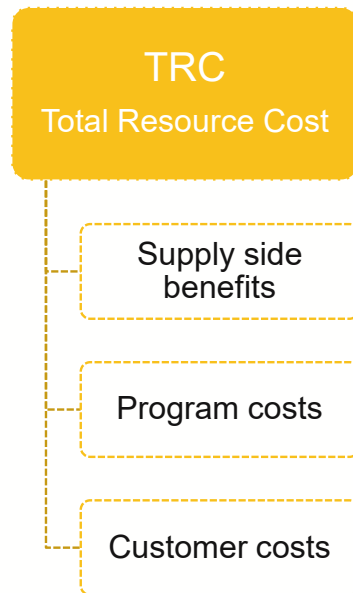
Key EE/IDSM Metrics: Cost Effectiveness (C/E)

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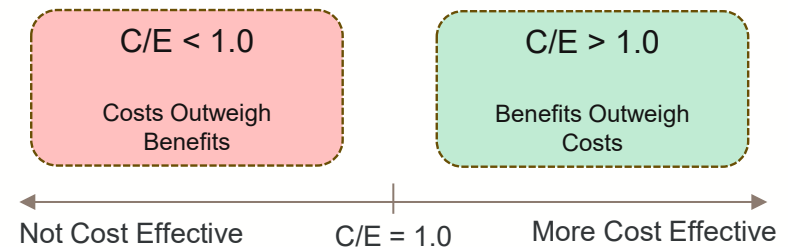
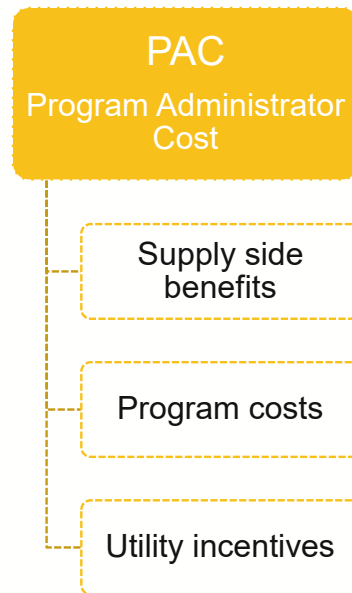
Key question for C/E Metric:

“Do benefits outweigh costs?”

(Primary C/E Test Currently)



(Potential Alternative C/E Test)



Context: CPUC is currently evaluating C/E tests in multiple proceedings including EE and Distributed Energy Resources (DER)

Key EE/IDSM Metrics: Total System Benefit (TSB)

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Key question for TSB Metric:

“How much money is saved, based on what it would otherwise cost utilities to supply that energy?”

- In 2021, the CPUC replaced energy savings goals (kWh, kW, therms) with TSB goals
- TSB allows utilities to claim savings for applying grid optimization strategies

Avoided Energy Costs:

Dollar value of the electricity or natural gas saved or deferred

Avoided Capacity Costs:

Capacity deferred by discharging or reducing load during grid peak hours

Avoided GHG & Environmental Costs:

Value of CO2 offset metrics and avoided cost of high global warming potential from refrigerant leakage

Ancillary Services:

Value of grid stability and frequency regulation benefits

Solution: Maintain TSB; it counts **additional benefits** that result from load shifting and other DER strategies that **more comprehensively values grid benefits**.

Key EE/IDSM Metrics: Net-to-Gross Ratio

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Key question for Net-to-Gross (NTG) Ratio:

“Of all the measured energy savings, how much did the program actually cause?”

Issues with use of NTG Ratio Metric:

Inconsistency

- CPUC EE uses net for goals and C/E
- Other CPUC DERs and Public Utilities use gross (Low income, solar, demand response, storage, new decarbonization pilots)

To Consider: Count savings from grid/customer perspective, back out savings from codes and standards and allow program to claim credit.

Subjectivity

- NTG determinations based on interviews and judgement

To Consider: Use NTG to improve, not punish, programs; use NTG evaluations to improve IDSM portfolios and programs.

Applicability

- Historical NTG applied to new programs
- Program not evaluated independently, so one program's poor NTG can be unfairly applied to a similar program

Further Improvements to EE

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- **Commission is reviewing C/E tests, inputs, and application**
 - **Reviewing C/E is high-priority issue** that merits careful review to ensure alignment with current state policy objectives and to ensure EE benefits to both the grid and customers are correctly valued.
- **Clearly establish state policy objectives**, so DER/EE portfolio and program objectives are clearly aligned to **support affordability, grid resilience/reliability, and decarbonization**
- **Programs should get credit for all savings that they are influencing**
 - Program savings counted in “Codes and Standards” should be backed out and credited to the programs that cause the savings.
 - Consider aligning use of NTG with other DERs so all DERs are treated consistently in cost benefit analysis.

Appendix

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Key Cost Effectiveness Definitions

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- **Total Resource Cost (TRC)** – EE’s primary C/E test. Compares program benefits to program costs (administration and customer costs).
- **Program Administrator Cost (PAC)** – Compares program benefits to utility costs (administration and incentives). Customer costs are not counted.
- **Total System Benefit (TSB)** – The dollar value of energy saved, based on what it would otherwise cost utilities to supply that energy.
- **Net to Gross (NTG)** – The share of savings actually caused by the program, not savings a customer would have gotten anyway.

TRC Impacts on Decarbonization Measures

When programs are required to be cost effective under the TRC, they cannot include most decarbonization measures.

Measure and Base Case	TRC Basis Cost Effective Permutation (%) [1]	PAC Basis Cost Effective Permutation (%) [1]
Residential Ducted Heat Pump from Gas Heating	41%	74%
Residential Ductless Heat Pump from Gas Heating	32%	78%
Residential Heat Pump Water Heater from Gas Water Heating	17%	99%
Commercial Heat Pump from Gas Heating	42%	82%
Commercial Heat Pump Water Heater from Gas Water Heating	98%	100%
Commercial Large, Central Heat Pump Water Heater from Gas Water Heating	85%	100%

[1] Permutations vary by building type, climate zones, installed equipment parameters, and other factors affecting energy savings estimates.

TRC Impacts on Replacing Inefficient Equipment

When programs are required to be cost effective under the TRC, they have less incentive to promote the replacement of inefficient but operational equipment.

Scenario	Replacement Scenario	Measure Cost	Incremental Measure Cost [1]	TSB [2]	TRC	PAC
SFm gas tankless to 45-55 gallon HP storage water heater	Accelerate	\$5,988.43	\$2,823.74	\$1,216.89	0.54	1.62
	Upon Failure	\$2,823.74	N/A	\$1,073.61	0.65	1.54

[1] Incremental Measure Cost is the difference between the high efficiency equipment cost and the Code compliant equipment cost.

[2] Note TSB benefits will always be higher for the accelerated replacement scenario. For this example, the benefits (i.e., numerator of the TRC and PAC) are similar meaning that the lower TRC for the accelerated replacement scenario is based on the how the customer costs (i.e., part of the denominator) are handled. The accelerated replacement scenario cost will always be higher than the replacement upon failure cost which produces a lower TRC value.

TRC Impacts on High Efficiency Equipment

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When programs are required to be cost effective under the TRC, they often have less incentive to promote the installation of high efficiency equipment.

Retrofit Equipment Efficiency [1]	TSB	TRC [2]	PAC
14.4 SEER	\$1,744.66	1.39	4.25
17.3 SEER	\$1,786.87	0.91	4.62

[1] SEER is an efficiency rating for HVAC equipment. The higher the rating, the more efficient the equipment.

[2] Since TRC is a ratio of benefits over costs and costs include the customer costs, TRC will be lower for high efficiency equipment because at higher efficiencies, costs generally rise faster than benefits.

California EE TRC, PAC and TSB calculations

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$$TSB = (NTG) \left(\sum \text{Benefits} - \sum \text{Increased Supply Costs} \right)$$

Benefits

= Utility Costs for Avoided Energy + Avoided Capacity Costs + Avoided Environmental + Ancillary Services

Increased Supply Costs = Electric supply costs for electrification measures only

$$NTG = \frac{\text{Net Benefits}}{\text{Gross Benefits}}$$

$$TRC = \frac{TSB}{\text{Program Costs (excluding utility incentives) + Net Customer Costs}}$$

$$PAC = \frac{TSB}{\text{Program Costs (including utility incentives)}}$$