Technical Forum Meeting

CALIFORNIA
TECHNICAL FORUM

APRIL 25, 2024
LACI

Cal TF will record the meeting for notetaking purposes

Agenda

Time (PST)	Agenda Item & Action	Discussion Leader(s)
10:00 – 10:15	**Agenda Review and Quick Updates**	Annette Beitel
10:15 – 10:45	**Deemed Initiative Subcommittee Overview** Provides an understanding of how the subcommittee will include: • eTRM Roadmap, • Deemed Measure Permutation Streamlining, and • Deemed Measure Process Improvement	Ayad Al-Shaikh Annette Beitel
10:45 – 12:15	**eTRM Roadmap Workplan – Overview of tasks** **ACT:** Vote on Tasks / SubTasks; Provide input on additional issues by Task; eTRM Roadmap Workplan Affirmation	Ayad Al-Shaikh Annette Beitel
12:15 – 1:15	Lunch	n/a
1:15 – 2:00	**Measure Permutation Streamlining** **ACT:** • Feedback on the approach • Feedback on adding / removing areas where reductions can be made • Discussion of statistical analysis that can be used	Ayad Al-Shaikh
2:00 – 2:15	Break	n/a

Meeting Materials: http://www.caltf.org/tf-meeting-materials

Agenda

Time (PST)	Agenda Item & Action	Discussion Leader(s)

2:15 – 3:00	**Deemed Measure Process Improvement**
	
	ACT:
	• Feedback on the current state; What are largest current challenges
	• Feedback on the approach to identifying remaining key challenges and proposed solutions, including:
	    • Survey questions,
	    • Approach to identifying solutions,
	    • Deliverable
		Annette Beitel
		Ayad Al-Shaikh

3:00 – 3:45	**New Measure Type – Load Shifting** **ACT:** • Feedback on the proposed methodology and other likely load shifting measures	Chau Nguyen Ayad Al-Shaikh Martin Vu / RMS
3:45 – 4:00	**Closing and Next Steps**	

Meeting Materials: http://www.caltf.org/tf-meeting-materials

Cal TF Quick Updates

- May meeting has been cancelled.
- eTRM release v2.8.0 planned for week of May 13th

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Deemed Initiative Subcommittee Overview

- Business plan goals covered:
  - eTRM Roadmap
  - Deemed Measure Permutation Streamlining
  - Deemed Measure Process Improvement
- Monthly Subcommittee meetings
- 3rd Thursdays, afternoon
- 2-½ hr meetings

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Monthly Deemed Subcommittee Meeting Topics

- May
  - Roadmap (RM) Task 3 - Overarching Integration Vision
  - RM Task 8 - New measure types
  - Measure Streamlining - start claims analysis
- June
  - RM Task 2 - Security
  - RM Task 2 - Performance/Stability
  - RM Task 3 - Use and Usability **survey**
  - RM Task 8 - New measure types
  - Measure Streamlining - analysis of BT, DT
- July
  - RM Task 4 - Training and support
  - RM Task 6 - Validation approach initiate
  - Deemed process review **survey**
  - Measure Streamlining - analysis of CZ
- Aug
  - RM Task 6 - Data analytics / Data visualization

- Sept
  - RM Task 3 - Use and Usability survey review
  - RM Task 3 - Update Overarching Vision
  - Deemed process review memo
  - Measure Streamlining - interactive effects and water temperature
- Oct
  - RM Task 7 - Market Applications (validation of data, alley tool, finance)
  - Measure Streamlining - Offering ID
- Nov
  - RM Task 6 - Update Field data/ Data analytics / Data visualization
  - Measure Streamlining - summary memo
- Dec
  - Roadmap affirmation
  - Measure Streamline memo affirmation
  - Deemed measure process improvement memo affirmation

Blue text – Roadmap Section / Memo Deliverable
Task 1 – Governance, managed through PAC
Task 5 – Custom Module, manage through custom subcommittee

Meeting is recorded for notetaking purposes

eTRM Roadmap

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AYAD AL-SHAIKH

eTRM Roadmap Workplan

- Review each Task today in the workplan
  - Available on Cal TF website
- Survey
  - Name and contact information is optional, but highly desired so that we can be sure to connect with best people for each Task
  - We will complete throughout the presentation, so you can open a copy now if you are able
  - You can also submit it later
- Goal: Affirmation of Workplan

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3/28/2024

eTRM Roadmap Workplan Tasks

DRAFT eTRM Roadmap Workplan

Prepared by:
Ayad Al-Shaikh
Annette Beitel

Version 1.0
(April 10, 2024)

- **Task 1:** Finalize eTRM Governance and Oversight

- **Task 2:** Update and Memorialize eTRM Security and Quality Assurance Requirements and Practices

- **Task 3:** Enhance eTRM Integration with External Databases and Other Applications

- **Task 4:** eTRM Documentation, Training and Support

- **Task 5:** Custom Measure Project Development, Tracking and Review

- **Task 6:** Field Data Collection / Data Analytics / Data Visualization

- **Task 7:** Market-Facing Applications

- **Task 8:** Adding New Measures and Measure "Types" to the eTRM
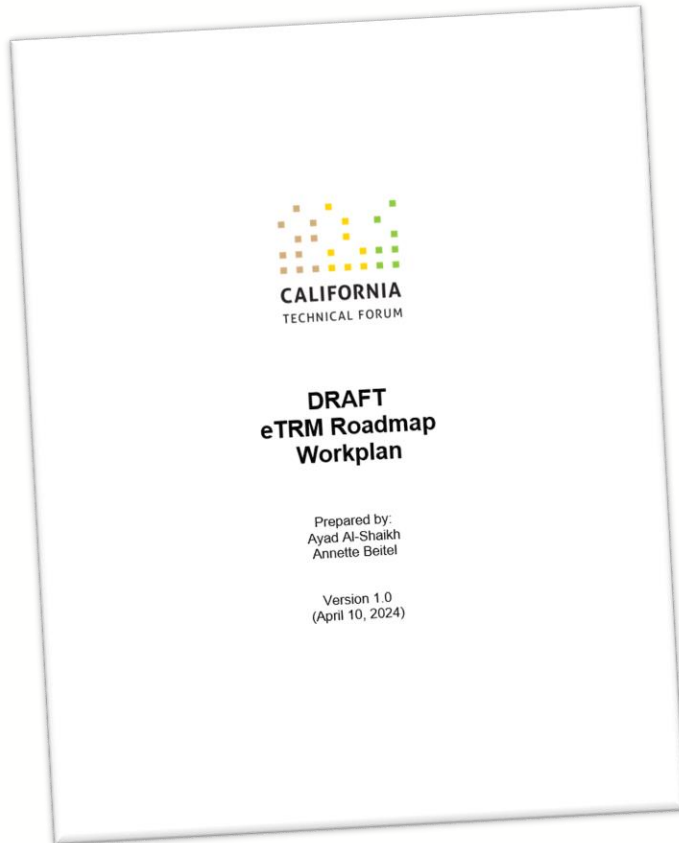
Task 1: eTRM Governance

Deliverables:

Description Overview

Reference: eTRM Governance Document

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- Goal
  - Update and review the eTRM governance document
  - Establish maintenance / approval cycle for document

Task 1: eTRM Governance

Survey code

- Question 1: Should we include or exclude this Task from the Roadmap?
  - Yes, include; No, exclude

- Question 2: What is the priority for each SubTask item?
  - High, Medium, Low

Task	Description
eTRM Governance Document	Finalize governance document that describes how eTRM will be governed. Ideally, this document will be developed in coordination with other systems that are used by the CPUC and CEC to develop, track and report on energy efficiency data.

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Task 2: Security and QC Practices

Deliverables:

Description Overview

Memo on Performance / Stability practices

Memo on Security practices

Reference: Software Development Standards and Practices

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- **Goal**
  - Establish guidance and best practice documents to solidify security, performance/stability, and development standards

- **Examples**
  - Understand product limits that can impact system performance for various user types
  - Document and operationalize SOC2-Type 2 processes
  - Update software development standards documents

Task 2: Security and QC Practices

Survey code

Task	Description
Performance / Stability	Maintaining the Performance and Stability of the eTRM remains a top priority because of the key role that the eTRM has come to play as the Data Source of Record in California. Stress testing to understand product limits and an analysis of the impacts of growth will secure Performance and Stability but also allow for the most informed choices as the product continues to grow.
Security	Security relates to the security of the eTRM application as well as the data contained in the eTRM. Security will be particularly important if the eTRM houses any Personally Identifiable Information (PII). Ensuring the security of the eTRM and eTRM data has several elements, including, but not limited to: 1) External certification (SOC2), 2) "Defense in Depth" – multiply layers of security protection for the system and data, 3) Requirements and guidelines that are regularly monitored and enforced to ensure ongoing security, 4) Regular third party review of system security, including but not limited to penetration testing and 5) Breach and restore plans so that if the application and/or data is compromised, the intrusion and any resulting damage is addressed and restored within a reasonable time frame.
eTRM Software Development Standards and Practices	Development Standards are documented within the eTRM Technical Guidelines. This guideline sets a high standard for software development, documentation, and maintenance practices. The guideline intends to make it clear how and when proprietary code can be used.

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Task 3: Enhance eTRM Integration

Deliverables:

Description Overview

Schematic of EE data ecosystem

Business Requirements (BR) for integration with:

- CEDARS,
- CET,
- PA/3P systems,
- ESPPortfolios™
- CEC Snowflake

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- **Goals**
  - Map and understand the flow of data through the EE data ecosystem
  - Create BRs to improve integration which may require new features

- **Examples**
  - Align data fields between Ex Ante / Ex Post
  - Define an API for the CET
  - Add CET features for future load shapes
  - Streamline data flow to PA/3P systems due to changes, PA Codes, Measure Property Data
  - Standardize flow to ESPPortfolios™

Task 3: Enhance eTRM Integration

Survey code

Task	Description
CPUC Systems CEDARS	Develop Business Requirements (BRs) to describe how eTRM can better support and be integrated with the current features of CEDARS (including program/budget filings, program updates, and claims) but also connects or integrates the data lake (EDSC), DEER database, ATR (All Things Reporting), and P4 (Portfolio Parameter Prioritization Project).
CPUC Systems CET	Develop Business Requirements (BRs) to describe how eTRM can better support and be integrated with the current features of the CET. Explore whether shifting the CET benefits calculation to accept base and measure case usage load shapes changes the methodology and inputs to the calculation significantly.
Other Databases and Applications (PA, implementer, other third party)	Develop Business Requirements (BR) to describe how various databases and applications are allowed to pull data from eTRM or "push" data into eTRM. Currently, data is uploaded into the eTRM from various external databases and systems, and several systems need to download data from eTRM. This activity will involve characterizing the types of databases and applications that need to push or pull data into/from the eTRM, under what terms, and through what form (e.g. flat file and/or API).
POU C-E Tool (EnergyPlatforms™)	EnergyPlatforms™ is the POU system for cost-effectiveness tracking and reporting. The task is to ensure eTRM data is transferred in a form that is used and useful for the POU C-E Tool.
CEC Snowflake Database	Discuss and memorialize rationale and approach for whether eTRM data combined with Snowflake data could provide useful insights for portfolio and program planning and analysis. CEC's Snowflake database contains IOU and POU AMI data in 15 minutes intervals for all customers (for what time period). Being able to access the CEC Snowflake database and combining with measure data in eTRM could help improve measure targeting as well as measure analysis.
Schematic of Streamlined EE Data Ecosystem	Diagram and accompanying description of how to better integrate and streamline databases and applications that either "push" or "pull" data into eTRM. Diagram may include recommendations for streamlining data flow and data bases.

Task 4: Documentation, Training, and Support

Deliverables:

Description Overview

Memo on eTRM Release Documents

Memo on Document Maintenance Policy

Reference: Cal TF Website and SharePoint Training Materials

- Goal
  - Build on guidance and best practice for eTRM documentation
- Examples
  - Review standard eTRM release documents
  - Identify different training needs and requirements for various eTRM roles
  - Document how documents are maintained, stored, versioned, and shared

Task 4: Documentation, Training, and Support

[Survey code](#)

Task	Description
eTRM Documentation Summary	Description of eTRM documentation and updating process. The eTRM Documentation includes: • User Guide • Administrator Manual • eTRM Release Packet Updated after each release.
Training and Support Plan	Document describing eTRM Training needs and obligations, which would be updated no more than annually. Will identify: • Different training needs • Training materials available, including written resources and videos. • Training requirements to use eTRM. • Live support, such as office hours This document would describe current training but would need to be updated as eTRM expands. Would include general discussion of support needs for statewide tool to be used and useful by a wide variety of market actors.
Document Maintenance Policy	Policy describing how different documents related to the eTRM and information contained in the eTRM will be: • Stored, accessed, maintained, and updated. • Includes standardized and transparent versioning. • Linked to measures (deemed and custom measure packages) as appropriate. Examples could be regulatory guidance, templates, measure development guidance, references, etc. Storage options could include, and may vary depending on the nature of the document: • The eTRM reference library (any documents that support a measure) • The eTRM website • An internal SharePoint site, etc.

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Task 5: Custom Measure

Deliverables:

Description Overview

Business Requirements (BR) for a custom module

- Goals
  - Supports the custom process entirely to:
    1. Consolidate, organize, and streamline the flow of custom data throughout its life cycle;
    2. Facilitate QA/QC and reviews; and
    3. Facilitate measure, project, and portfolio level tracking and analytics.
  - Covers functionality for projects, measure packages, tools, and documentation
  - Provides the right security to mitigate PII concerns

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Task 5: Custom Measure

[Survey code]

Task	Description
Custom Projects in eTRM	Develop Business Requirements (BPs) to allow PAs and implementers to develop projects in the eTRM, have Custom Projects reviewed in the eTRM, and support custom measure, project and program tracking and analytics. Time permitting, this task will include developing Functional Requirements (FR) for some or all of the Custom Projects

This task is intended to support streamlining of the custom process development and review, such as:

• Consolidate, organize, and streamline the flow of custom data throughout its life cycle
• Facilitate QA/QC and reviews
• Facilitate measure, project, and portfolio level tracking and analytics.

The task covers functionality for projects, measure packages, tools, and documentation and provides the right security to mitigate PII concerns. Discussions should build upon prior Cal TF work documented as part of the May 2020 eTRM Custom Module Memo. |

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**Task 6:
Field Data
Collection,
Data Analytics /
Data Visualization**

<u>Deliverables</u>:

Description Overview

Reference: List of databases

- Goal
  - Create standards for types of data to store from the field and requirements for storing
  - Document data sources and commercially available tools that support analytics / visualization

- Examples
  - Investigate storage of data items, such as HVAC system with refrigerant, fuel substitution costs, permits on projects
  - Document what are the most relevant data sources and questions to be answered
  - May develop business requirements for combining customer-side resources (EE, DR, batteries, solar, EV, etc)

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**Task 6:
Field Data
Collection,
Data Analytics /
Data Visualization**

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Tasks	Description
Program Data Collection & Storage	Description of the process and storage approach for collecting data related to deemed Measure Packages and/or Custom Projects that could be analyzed to meet programmatic and/or regulatory requirements or to improve measure development or targeting. This would include examples of how collecting and storing data from the field might be useful to support programs, evaluation, and regulatory policy development.
Data Visualization / Data Analytics	Description of data sources that could be combined with data from the eTRM using existing commercially available tools (such as PowerBI and ArcGIS) to support: • Improved measure development and measure targeting • Comparison of different measure package solutions to identify most cost-effective ways for customers and communities to reduce energy, greenhouse gases and manage grid constraints • Broader statewide policy questions on how to achieve state's energy goals

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Task 7: Market-Facing Applications

Deliverables:

Description Overview for:

- Web-based data collection / validation

- Web-based program ally tool

- Web-based financing tool

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- Goal
  - Describe the value uploading data from the field to a central location that includes immediate data validation.
  - Describe the value of a mobile app that gives Program Allies information on various demand side options (EE, DR, solar, battery, etc).
  - Describe the value of a mobile app that could make financing and instant rebates possible, particularly for low and moderate income customers.

- Examples
  - Validate measure property data live.
  - Avoid the need to re-evaluate or ship measure property data between customer/implementer/PA/CPUC.
  - Make it easy to access the combination of demand side measures for a customer.
  - Make it easy to finance or apply rebates immediately to limit out-of-pocket expense

Task 7: Market-Facing Applications

Survey code

Modules	Description
Web-based Feature to Allow Customers and/or Program Allies to Report and Validate Site-Specific Information	Description (including value of) a mobile application that would allow customers and Trade Allies to upload information collected in the field, and to validate the information. Information may include: • Pictures (e.g. nameplate data), • Pre-existing conditions (such as age of equipment) • Cost documentation • Spec sheets • Qualified Product List information The description would also include approach to data validation, where applicable.
Web-Based Tools for Program Allies to Offer Comprehensive Solutions to Mass-Market Customers	Description (including value of) mobile application that would allow Program Allies to see all EE, DR, solar, and battery options they could offer a customer, including list of deemed measures, costs, savings, incentives, and financing options.
Financing and Instant Pay Module	Description (including value of) mobile application that would allow financing options and instant rebate/contractor payments for eTRM measures and projects to facilitate project implementation, particularly for low and moderate income customers.

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Task 8: Adding New Measures and Measure "Types" to the eTRM

<u>Deliverables:</u>

Description Overview for:

- New measure development tool
- Low income measures
- POU measures

Business Requirements for New Measure Development Tool and Low-Income measure expansion

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- Goal
  - Develop the business case for creating a New Measure Development Tool
  - Develop the business requirements to integrating Low Income measures efficiently into the eTRM
  - Describe how POU measure should be integrated into the eTRM

- Examples
  - Create a methodology for a streamlined input into the eTRM
  - Provide feedback on information missing, quality of data, and cost-effectiveness metrics
  - Provide feedback on strategies to improve cost effectiveness
  - Consider streamlined ways to leverage market-rate measures to efficiently establish and maintain low-income measures.
  - Consider the value of streamlined POU data and a simplified portal

Task 8: Adding New Measures and Measure "Types" to the eTRM

Survey code

Modules	Description
New Measure Development Tool	Description and Business Requirements describing a new eTRM interface to make new measure creation far more accessible to any innovator. Ideally, the interface would support new measure developers and/or those who are not familiar with California regulatory processes (such as innovators) to successfully describe a new measure that could then be further reviewed. The interface might include identifying the type of measure, the data that may be missing, the quality of data, relationships to other existing measures packages, and the expected cost-effectiveness based on initial data provided.
Low Income	Description of and Business Requirements for how low-income measures could be developed and maintained based on market-rate measures in the eTRM as a starting point and how the eTRM database structure could be used to develop and manage low-income measures. The description would include how low-income measures may need to be different from market-rate measures, such as baseline and expected useful life.
POU Measures	Description of project underway to facilitate POU use of eTRM.
Other Measure Types	Description of and Business Requirements for how other measure types could be added to the eTRM, potentially including load-shifting measures, solar, batteries, codes and standards, market transformation and electric vehicles.

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eTRM Roadmap Workplan

- Please submit your surveys if you have them complete
  - You can always submit a supplemental one later

- Reviewed each Task today

- Affirmation of Workplan
  - Verbal affirmation – I will ask for those who oppose first; then those who affirm

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Measure Permutation Streamlining

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AYAD AL-SHAIKH / CHAU NGUYEN
CAL TF STAFF

Deemed Measure Permutation Streamlining Goals

Methodology Feedback

- Simplify planning and reporting
- Reduce the administrative overhead of managing permutations
- Simplify the process of choosing the right permutation during implementation
- Topics to cover:
  - *Offering ID collapse*
  - Delivery type, Climate Zone, Building Type
  - Interactive Effects, Water Temperature
  - Others?

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Offering ID Collapse - Overview

- Offerings are segmented to distinguish products, but sometimes the impact on savings is insignificant.

Parameter: A data field that characterizes the different products and/or installation types that are eligible for the measure				Offering: Unique combination of the parameters (products and installation types) that are eligible for the measure.	
EQUIPMENT TYPE	COOLING CAPACITY RANGE (KBTU/HR)	SEASONAL ENERGY EFFICIENCY RATING (SEER OR SEER2)	MEASURE APPLICATION TYPE	STATEWIDE MEASURE OFFERING ID (TEXT)	MEASURE OFFERING DESCRIPTION (TEXT)
SEER-Rated HP	18 - 65	SEER >= 16	AR	DN	Residential legacy-rated split/pkg HP, SEER >= 16 (EER >= 12.8), HSPF >= 9.0, AR
SEER-Rated HP	18 - 65	SEER >= 16	NC	DO	Residential legacy-rated split/pkg HP, SEER >= 16 (EER >= 12.8), HSPF >= 9.0, NC

Parameter label: Distinct name or description of the parameter

- Data quality: More offerings = more distinction = more permutations

- Goal:
  - ❏ Identify the sensitive parameters
  - ❏ Quantify when the choice of an additional offering is valuable

Offering ID Collapse - Data

- **Independent Variables**
  - Parameters (ex. Equipment Type) that define the offering IDs and their Labels (ex. SEER-rated HP, SEER2-rated HP, and SEER-rated AC)

- **Dependent Variables**
  - Non-Fuel Sub
    - Energy: GasBen, ElecBen, and TSB
    - Costs: TRCCostNoAdmin
  - Fuel Sub
    - Energy: GasBen, ElecSupplyCost, and TSB
    - Costs: TRCCostNoAdmin with the energy-related costs removed

Complexity of how ElecBen are handled differently for FuelSub not included in this analysis

Independent Variables:	Dependent Variables:	Influencing Factors:
• Measure Specific Parameters (ex. Equipment Type) • Shared Parameters (ex. MeasAppType)	• GasBen • ElecBen or SupplyCost • TSB • TRCCostNo Admin	• NTG • GSIA • Norm Unit • Unequal # of perms that skews the average

- ## When evaluating one Measure Specific Parameter (ex. Equipment type)

  - ❑ Average impacts when a Label is held constant are computed

  - ❑ Average of the Label averages & other statistical values to describe the variation among the parameter labels

  - ❑ Tornado Chart helps visualize variation among all Measure Specific Parameters

Equipment Type	Avg of Gas Benefits	Avg of Electric Benefits	Avg of Total System Benefit	Avg of TRC Cost - No Admin
SEER2-Rated AC	-6.08	169.64	163.56	510.24
SEER2-Rated HP	0.00	216.99	216.99	510.24
SEER-Rated HP	0.00	216.99	216.99	510.24

	Gas Ben	Electric Ben	TSB	TRC Cost - No Admin
Average of Averages	-	201.21	199.18	510.24
StdDev of Averages	-	22.32	25.19	0.00
CV	-	11.09%	12.65%	0.00%
Min (as % decrease from avg)	-	-15.69%	-17.88%	0.00%
Max (as % increase from avg)	-	7.85%	8.94%	0.00%

- ## Sensitive Parameter Selection Criteria: CV ~ 15%
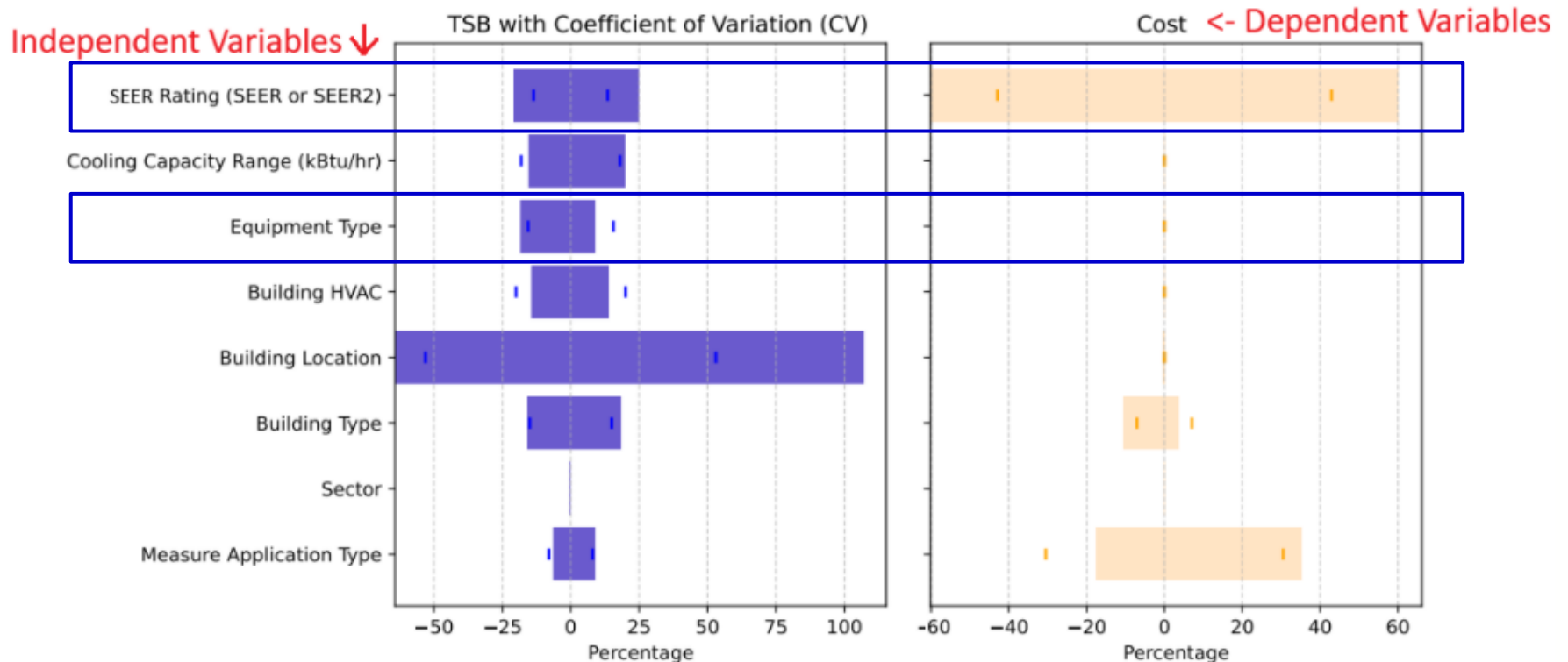
Offering ID Collapse – Methodology
Example of Parameter that is Sensitive

Average of Impacts per SEER Rating
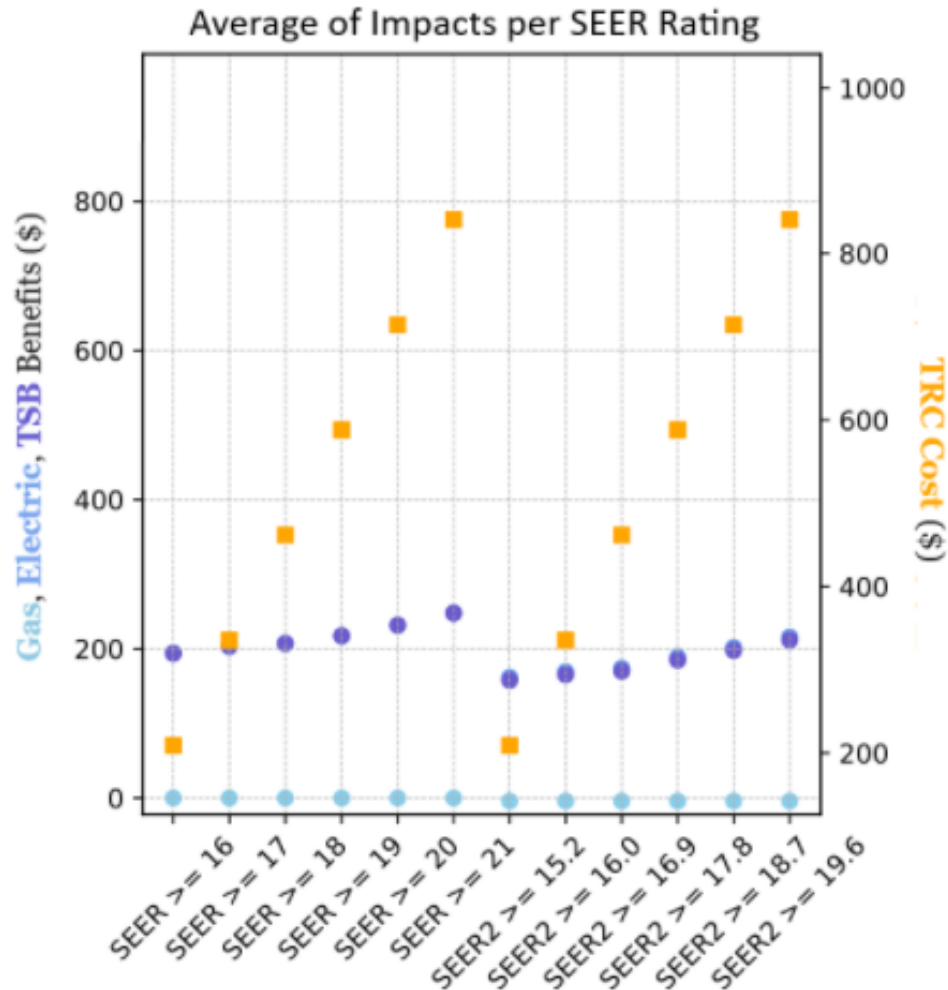
Result:
X-axis displays all the SEER and SEER2 labels independently, but parameter is dependent on Equipment Type

High variation (CV ~ 42%) among the parameter labels for costs. Parameter is less sensitive for energy.

Additional note: SEER and SEER2 are identical

Average of Impacts Per Equipment Type
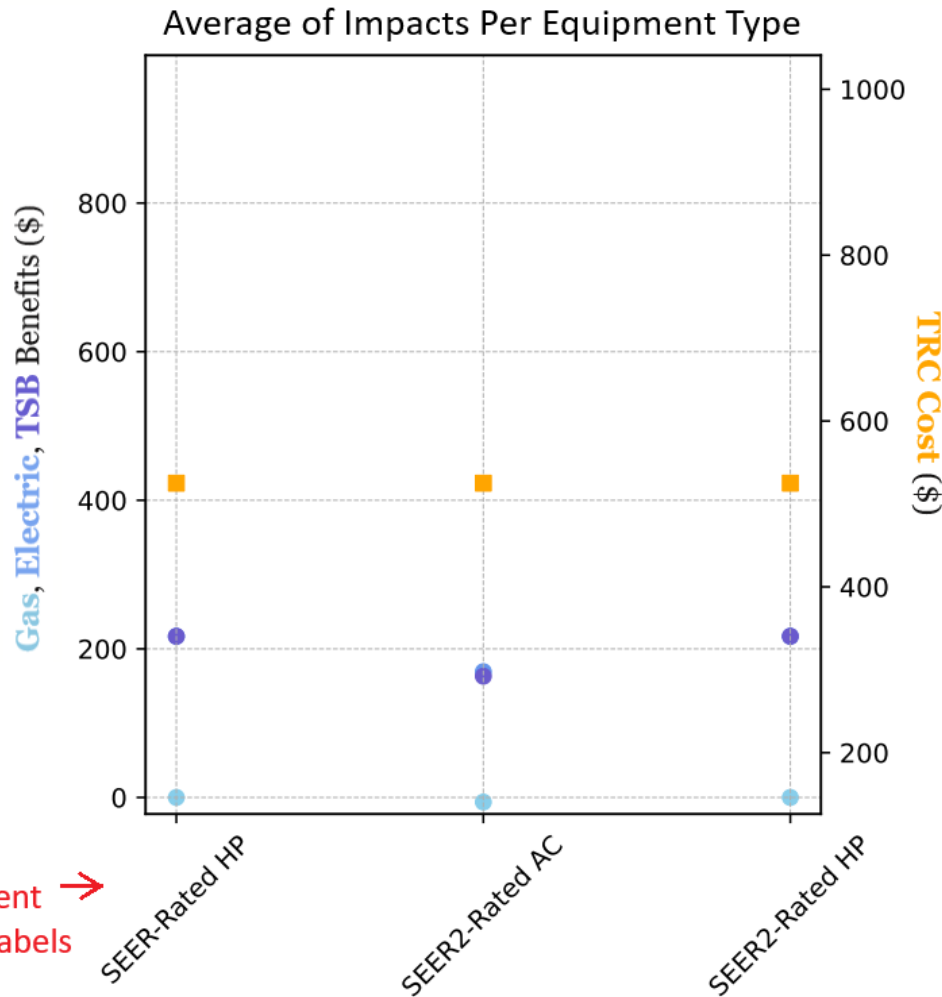
Result:
Parameter can be collapsed since little variation (CV ~ 12%) among the parameter labels

Can collapse group of labels:
- No variation between SEER and SEER2
- Variation comes from AC v HP

Offering ID Questions

- Correct metrics
- Analysis questions:
  - ❑ What coefficient of variation (CV) to use for cut-off to remove parameters?
  - ❑ How to choose the final value (median value vs average or weighted average)?
- Establishing rules:
  - ❑ Any rules about standard parameters (ie, MAT)
  - ❑ What should process be to remove an offering
- Measure specific questions:
  - ❑ Any other reason that we need a parameter (like SEER/SEER2, MAT, etc)

Parameters

- Would it be valuable to some users to change delivery type?
- Are there additional parameters similar to this?

- Delivery Type
  - Influences NTG, BT
    - Typically, has no influence
  - Using "Any" delivery type
    - Avoid future complication of added detail for Midstream Distributor/Retail and Upstream Manufacturer
    - Breakout in eTRM will only occur when important
    - Allow programs to choose their delivery without the measure package having to account for it first
  - This change will not help all PA systems
    - Sempra will still need to distinguish these permutations within their system
    - Consider alternatives like a multiple value separated by "|"

Parameters

How should climate zone temperatures be weighted?

Are there regulatory reasons that define the 16 climate zones?

- Climate Zone
  - Many jurisdictions use far simpler systems
    - IECC – 8 climate zones (5 in CA)
    - UAT – Coastal, Inland, Mountain, Desert
  - Investigate
    - Variation with other approaches
    - Build on successes with vintage reduction
  - Stay sensitive to critical measures (ie, Fuel Substitution)

Climate Zone Group	Title 24 Climate Zone
Desert	15
Inland	8, 9, 10, 11, 12, 13, 14
Mild/Coastal	1, 2, 3, 4, 5, 6, 7, 16

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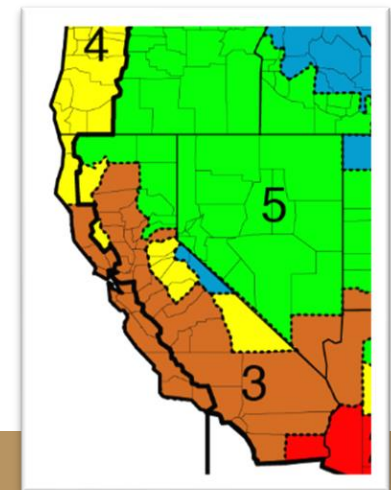
Calculated Values

- Can interactive effects be collapsed by CZ, BT, and/or Vintage?
- How should water inlet temperatures be weighted?

- **Interactive effects**
  - Change to a single average value
  - Interactive effects are often included in a calculation along with other parameters that could vary much more (ie, operating hours).

- **Water temp data**
  - Change to a single average value
  - Could be simplified if the variation due to OAT is much smaller than other parameters (ie, gal/household).

Groundwater Temperature (F)
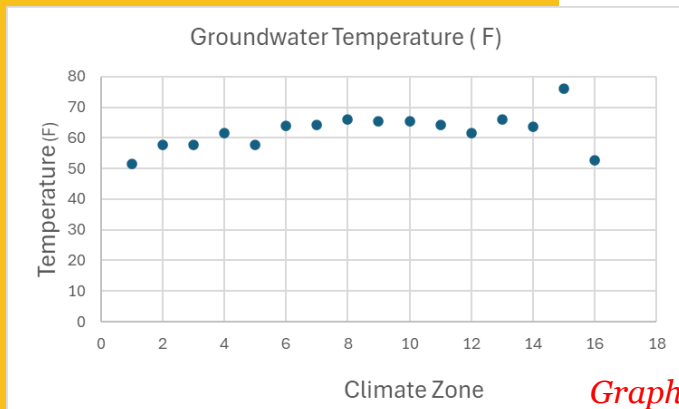
Graphic corrected, 4/29/2024)

Parameters

- What is the right way to think about collapsing building types (ie, NAICS)?

- Building Type
  - Many jurisdictions use far simpler systems
    - CBECS – 14 building types
  - Investigate
    - Variation across building
    - Approach to collapse by NAICS code

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Next Steps

- Create a funnel chart
  - Understand which elements of simplification are most impactful
- Create recommendations for collapsing
- Understand the value of permanent versus temporary collapsing
- Determine if/how the claims (proposed or actual) of a measure should impact collapse

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LUNCH
12:15 – 1:15 pm

Deemed Measure Process Improvements

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ANNETTE BEITEL
AYAD AL-SHAIKH

Process Improvement Strategy

Goal: We want your feedback on questions and survey participants.

- Overview of 2024 TPP identifying key remaining challenges and developing solutions
- Review of eTRM submittal data
  - Statistics
  - Observations
- Plan for Review
  - Survey of measure developers, PAs, CPUC
  - Interview key stakeholders
- New eTRM Tool
  - eTRM Measure Development Report

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Review of Submittal Data

2022 – 2024 Data Review

- Statistics
  - Number by year
  - Type (Easy, Medium, Hard)
  - By Use Category
- Observations
  - Concentration of submittals
  - Outliers that take the longest

  - *What else should we be looking for and asking about?*

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Average of Days before Approval

Year of Submittal	Month of Submittal	(avg)	AP	BE	CA	CR	FS	HC	LG	MI	PR	RE	SV	WB	WH	WP	Number of Measure Packages Submitted
1900	1													#DIV/0!			1
2021	10														185		1
	12														133		2
2022	1														100		1
	2					113											1
	3					36	133					137			140		10
	4		74			49	153	59	35			128			115		14
	5		78		49	52	54	96			115	87	47		93	94	47
	6		54			55	65	65	109		49				103		32
	7		36				41	256	320					237			5
	8			59				56		110					47		7
	9		38	19			162	45					38				10
	10		6					15				4			5		12
	11							22	6						86		4
	12			126			85	210									3
2023	1						97	108									2
	2						67	190							71		3
	3						81	156							-		5
	4						63	64									2
	5						90	89									2
	6							68					19	88			4
	8							52		#DIV/0!	41						6
	9					15	53				0						6
	10					22	47	6							#DIV/0!		8
	11		35	31	70	51	40	43			34	41	137	35			39
	12		63	8		24	27	31	49	14			25		66	9	55
2024	1		24				18	48									5
	2	####	#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!				#DIV/0!			#DIV/0!		35
	3		#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!			#DIV/0!				8	#DIV/0!	26
	4					#DIV/0!		#DIV/0!							#DIV/0!		5

Number of Days = CPUC Approval Date – Submittal Date

Plan for Process Review - Survey

- Who – Understanding population of measure contributors
  - ❑ Type of role: Developer, Reviewer, Approver
  - ❑ Number of measures updated
  - ❑ Self rating of expertise (deemed rules, eTRM rules)
- Process Phase – Understanding causes for delays
  - ❑ Measure Initiation
  - ❑ Development
  - ❑ Approval
- What would you change in the process?
- What would you track to ensure process is working?

Follow-up Interviews

- Collect and compile survey responses
- Identify 5-10 survey groups or individuals to schedule follow-up meetings:
  - PAs
  - CPUC/Deemed EAR Team
  - Developer companies
  - Individuals
- Goals:
  - Discuss survey results to identify solutions
  - Discuss metrics for tracking improvement

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- Available with release of v2.8.0
  - ❑ Coming early May 2024

- Any base-user can track upcoming development
  - ❑ From creation of draft
  - ❑ To approval/publishing of measure package

- Base-user can see a "*draft*" summary of changes through a Cover Sheet link (prior to approval)

- Will we have all of the data to effectively track process improvements?

New Measure Development Report
(also makes relative change visible)

Draft/Develop

Submit for Approval

Publish in eTRM

Energy Efficiency Measure Life

Visibility through
Cal TF
"New Measure"
Webpage

Live in eTRM
Implementing / Claiming

Visibility through
Approval Report

Load Shifting

51

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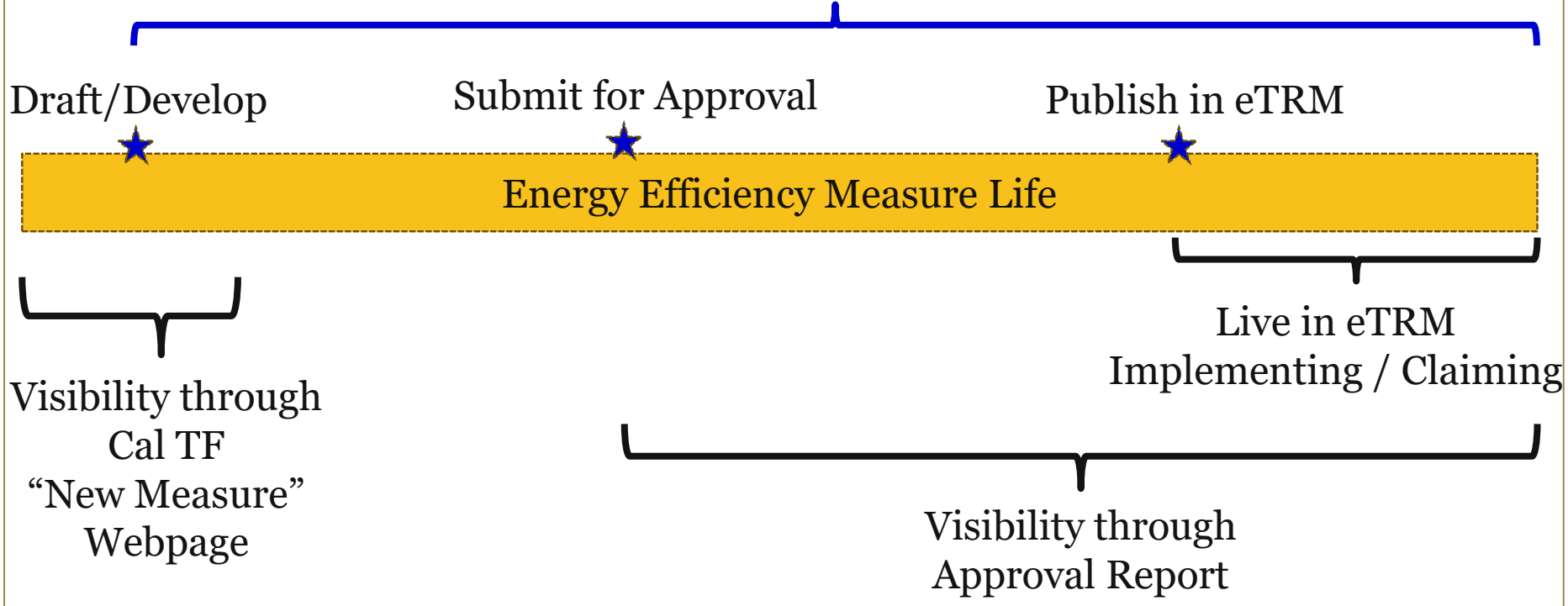
AYAD AL-SHAIKH / CAL TF STAFF
CHAU NGUYEN / CAL TF STAFF
MARTIN VU / RMS

New Measure Type: Load Shifting

- Interest across several PA / Measure Developers
  - PG&E
  - SCE
  - SCR

- Example measures
  - Commercial HVAC – Phase Change Material, Martin Vu / RMS
    - EE + Load Shifting
  - Thermal Harvest – Residential CO2 HP (water heating/space heating & cooling)
    - EE + Load Shifting + Low GWP

Action: Feedback on whether approach should:
- Capture benefits more accurately
- Claim kWh/kW separately

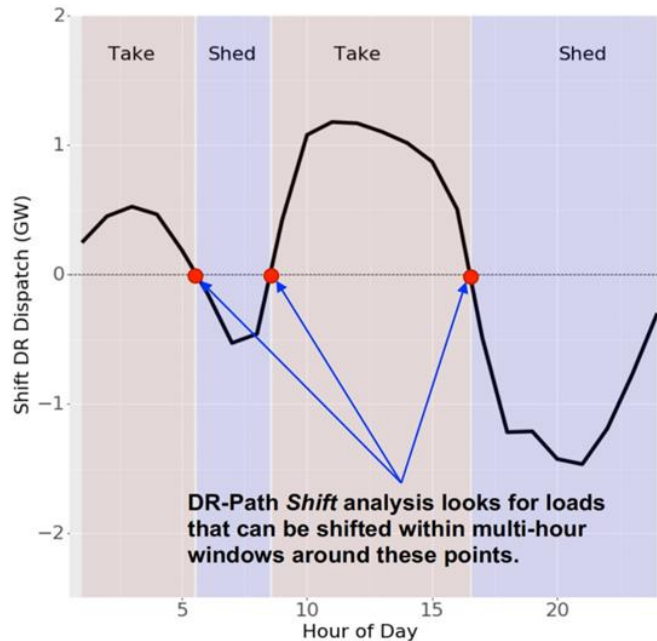# Thermal Energy Storage System (TESS) New Measure Type – Load Shifting/Flexibility Proposal

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MARTIN VU AND DAVID WYLIE | RMS ENERGY CONSULTING
APRIL 25, 2024

What is Load Flexibility?

Shift DR

DR-Path *Shift* analysis looks for loads that can be shifted within multi-hour windows around these points.

Source: LBNL Shift Demand Response: A Primer

- **AB 846**: 7000 MW by 2030

- **CEC Resolution:**
  - ❑ **23-0531-08**

- **CalFlexHub Leadership**

- **Real Time Pricing**

- **Develop and Support New Technologies that Can Help**

Introducing TESS: Thermal Energy Storage System

1) Charging the TESS:

- Thermal energy storage media stores latent energy from supply air during normal cooling operations.

2) Energy stored inside TESS:

- Aluminum plates containing phase change material that "freezes" at 64˚F.

3) Discharging the TESS:

- During peak period, automated controls limit compressor operations.
- Cooling is provided by thermal storage and compressor is used to supplement, as necessary.

4) Financial Benefits:

- Grid benefits significant while ratepayer benefits are nominal under existing tariffs
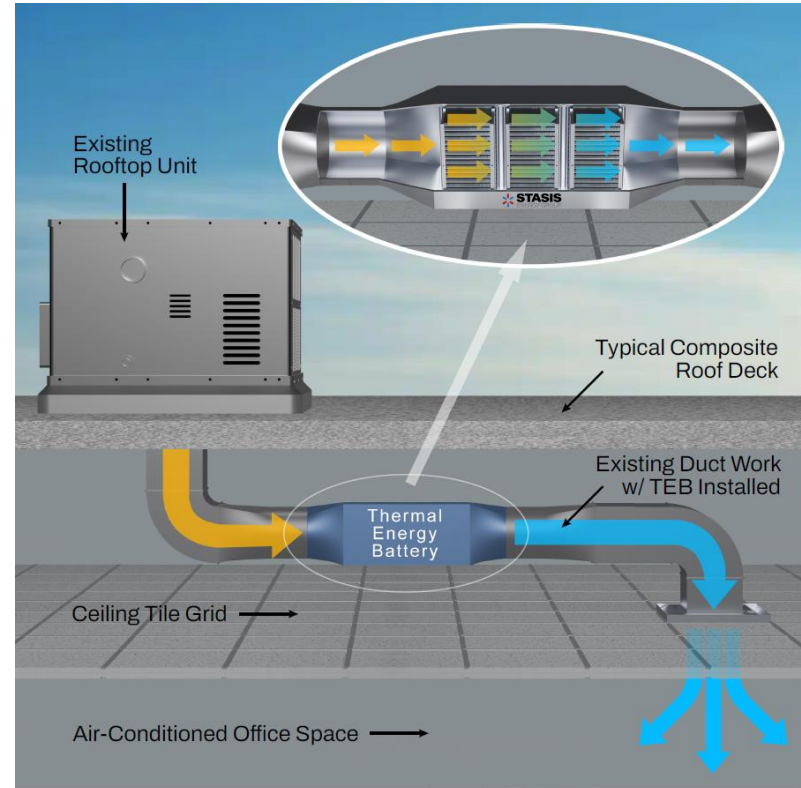
Full Side View

End View

Installed View
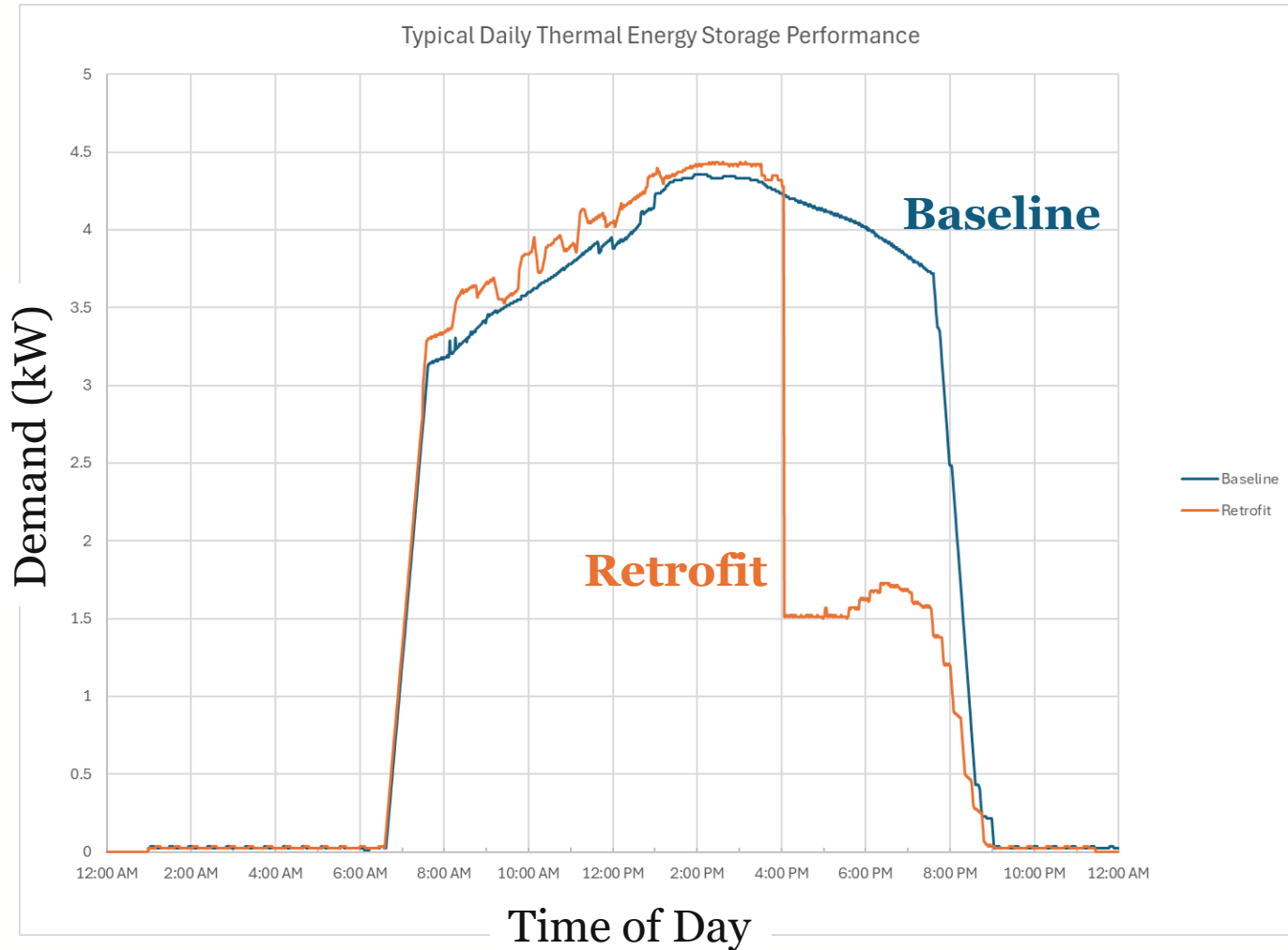
Energy Efficiency Where?

- Improved COP with TES charging in the cooler morning hours

  - ❑ 5-10% EE saving due to improved COP with TES charging in the cooler morning hours

  - ❑ 60% of AC kW peak demand reduction

  - ❑ Load Shifting by 50% peak to off peak

  - ❑ Reduce GHG by 80%

  - ❑ CEC Study Findings available June 2024

Load Shift Profile Example

## Methodology for Including Load Shift Benefits in EE

Issues

- 2 Components of Energy Benefits

- CET only accepts an approved Savings Load Shape

- CET only accepts one Savings Load Shape for both base and measure case

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- **Step 1: Calculate custom avoided cost data set**
  - Utilize actual base / measure case **usage** load shapes
  - Need *Python tool from DNV*

- **Step 2: Quantify benefits of Load Shifting**
  - Careful not to double-count with EE
  - Need *Local copy of CET*

- **Step 3: Calculate full cost effectiveness values**
  - **Two methodologies**...we want your input
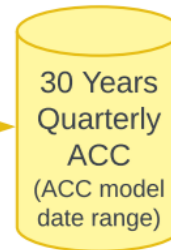 - Use *standard CEDARS CET*
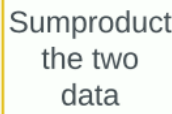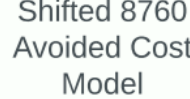
Inputs: Outputs:

- CEDARS Python Tool
  - Inputs
    - **E3 Hourly 8760 Avoided Cost Model**
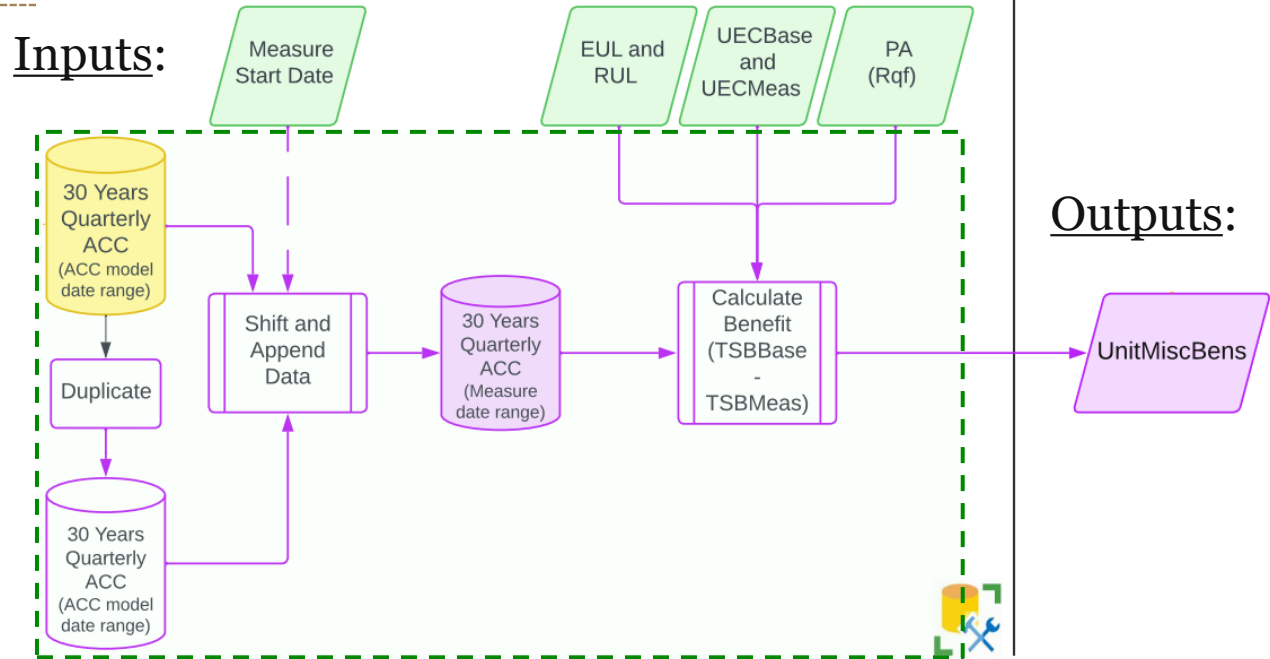   - **Includes avoided cost for: Generation and Transmission / Distribution**
    - **Measure's normalized 8760 base case and measure case impact profiles**
  - Outputs:
    - **30-Year Quarterly Avoided Cost – Base Case**
   - **30-Year Quarterly Avoided Cost – Measure Case**

Step 2: Calculating TSB Benefits

Inputs:

Measure Start Date

EUL and RUL

UECBase and UECMeas

PA (Rqf)

Outputs:

30 Years Quarterly ACC (ACC model date range)

Duplicate

Shift and Append Data

30 Years Quarterly ACC (Measure date range)

Calculate Benefit (TSBBase - TSBMeas)

UnitMiscBens

30 Years Quarterly ACC (ACC model date range)

- CEDARS CET SQL Database – Local CET copy
  - Inputs:
    - Quarterly avoided cost model from Python Tool
    - Measure data in form of the CET Input Measure.csv
  - Outputs:
    - TSB – Base usage
    - TSB – Measure usage
- "UnitMiscBen" field = TSB (Base) – TSB (Meas)

Step 3: Calculate TSB and TRCRatio
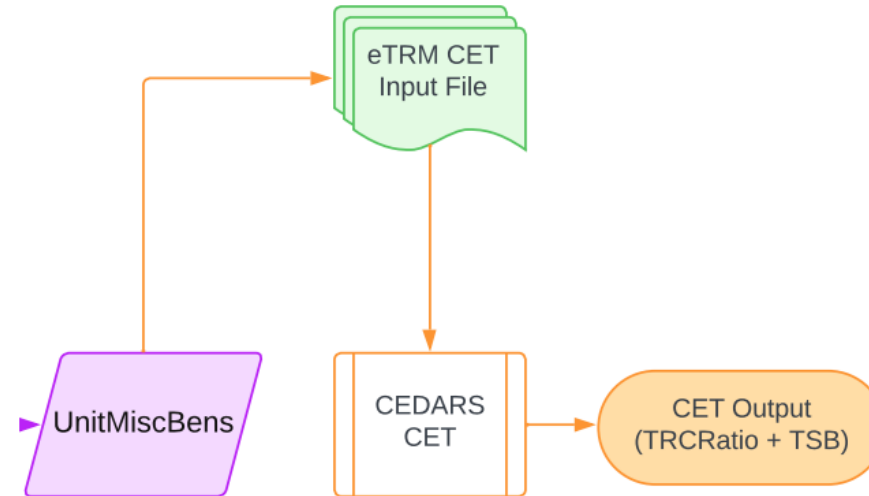
- ## CEDARS CET Tool
  - Inputs:
    - CET Input File (Measure.csv and ProgramCost.csv)
  - Outputs:
    - TotalSystemBenfit and TRC Ratio

Comparing Option 1 vs Option 2

$$Ben = Ben_{LS} + Ben_{EE} = UECBase * ACCProfile_{Base} - UECMeas * ACCProfile_{Meas}$$

$$= UECBase * ACCProfile_{Base} - (UECBase - UES) * ACCProfile_{Meas}$$

$$= UECBase(ACCProfile_{Base} - ACCProfile_{Meas}) + UES * \cancel{ACCProfile_{Meas}}$$

DEER Impact Profile(s)

	Option 1	Option 2
Methodology	• Run the CET manually for load shifting with custom avoided cost profiles • Run the CEDARS CET for EE with an approved Electric Impact Profile ID • Replace ACCProfile$_{meas}$ with DEER Impact Profiles	• Run the CET manually, combining both load shifting and EE • Report zero for EE savings when running the CEDARS CET
Plus / Minus	• **+** kWh and kW are reported correctly • **-** DEER Impact Profile does not correctly account for savings profile	• **+** Load shifting and EE benefits captured correctly • **-** kWh is reported as zero

Next Steps

- Consider effects of Fuel Substitution
- Feedback on:
  - Option 1 – Maintain ability to claims kWh/kW
  - Option 2 – More accurate benefits
- Agreement on methodology
  - Follow RACC and CET Process
  - Alternative Approach: Recurve Tool

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Next Steps

- **Action Items**
  - Please submit your survey that you started during the eTRM Roadmap Workplan review!

- **Next TF Meeting**
  - Thursday, June 27, 2024
  - LACI, Los Angeles

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