Technical Forum Meeting

CALIFORNIA
TECHNICAL FORUM

OCTOBER 26, 2023
LOS ANGELES

Cal TF will record the meeting for notetaking purposes

Morning Agenda – Updated

Time (PST)	Agenda Item & Action	Discussion Leader(s)
10:00 – 10:30 (30 min)	**Agenda Review and Quick Updates** • 2023 TF Calendar Updates • eTRM v2.7.0 Release • Measure Property Data Update	Annette Beitel
10:30 – 12:15 (105 min)	**ISP White Paper: Presentation & Discussion (6B)** • Key findings • Draft recommendations **ACT**: TF feedback on findings and recommendation	ISP White Paper Working Group
12:15 – 1:15 (60 min)	**Lunch**	n/a

Afternoon Agenda – Updated

Time (PST)	Agenda Item & Action	Discussion Leader(s)
1:15 – 1:45 (30 min)	**Hybrid Measure Concept** • Definition, framework, examples **ACT:** Feedback on Hybrid measure definition, scope	Arlis Reynolds
1:45 – 2:00 (15 min)	**Custom Measure Package and Tool Development Workflow (5C-2)** **ACT**: TF Affirmation of CMP develop/update workflow	Arlis Reynolds
2:00 – 3:30 (90 min)	**Custom Measure Characterizations (5C-1)** • PG&E HVAC Tool (Updated) • Chiller Systems Upgrade • HVAC Retrocommissioning **ACT**: TF input on technical issues **ACT**: TF Affirmation on Custom Measure Characterizations and HVAC Tool	Spencer Lipp Danny Ng
3:30 – 3:45	Break	n/a
3:45 – 4:30 (45 min)	**Custom Initiative – Next Steps and Open Discussion**	Arlis Reynolds
4:30+	No-host happy hour at: **TOAST Kitchen & Bar Downey** (467 Stonewood St Downey, CA 90241)	n/a

Quick Updates

- TF Calendar Updates
- Other Business Plan Updates
  - eTRM 2.7.0 Release
  - Measure Property Data

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TF Calendar Updates

- November 16
  - Remote
- December 14
  - LACI, Los Angeles
  - End-of-Year Celebration
- January 25
  - TBD
  - Data Charette #3

eTRM 2.7.0 Release – *Live on 11/9/2023*

When comparing any two measure packages:

- Cover Sheet
  - *Shows how the measure is being used, how the data has changed, and the impact on cost-effectiveness*
  - Portfolio impact of measure package
    - Ex: List of programs, net lifetime savings, and % of portfolio
  - Changes to data parameters
    - Ex: Changing delivery types, building types, etc.
  - Changes to savings, cost, life, TRC, and TSB
    - Weighted values at the measure level and offering level
- Characterization Redlining
  - *Visually identifies where the text was revised*
  - Identifies additions and removals occurring in the Characterization
    - Text, tables, references, etc.

Measure Property Data

- Get involved in external review – broken up by end-use:
  1. Appliance/Plug Load, Bldg Envelope, Compressed Air, Comm Refrig
     - *Last Meeting on Oct 5th*
     - *Data available now through SharePoint*
     - *Comments due by end of Nov*
  2. Lighting, Miscellaneous, Service, Whole Bldg, Food Service
     - *Next stakeholder meeting Nov 17th*
     - *Comments due by end of Dec*
  3. Process, Recreation, HVAC
     - *2024*
  4. Service and Domestic Hot Water, Water Pumping/Irrigation
     - *2024*
- *Contact Ayad if you're interested*

Custom Initiative Overview

- Custom Initiative Workplan
- Custom Subcommittee
  - Meets monthly on the first Wednesdays, 1-3pm
- Custom Initiative SharePoint Site
  - Resource Library
  - Custom Subcommittee Meeting Slides
  - Working Group Meeting Materials and Work Products
- Activities Update
  - 5A-1 – Resource review and recommendations
  - 5A-2 – Statewide Custom Measure Names (moved to 2024)
  - 5A-3 – List of Hybrid Measures
  - 5A-4 – List of Custom Tools
  - 5B – Custom Roadmap
  - 5C-1 – Custom Measure Characterizations
  - 5C-2 – Custom Measure Package Workflow
  - 5D – eTRM Templates for Custom
  - 5E-1 – eTRM Custom Library and Measures Modules
  - 5E-2 – eTRM Custom Vision & Modules (moved to 2024)

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6B ISP White Paper

- White Paper Objectives
  - Streamline ISP Process
  - Make ISPs accessible, transparent, informative, and up-to-date
  - Proactively identify ISP research needs
  - Support clarifications of ISP Guide and coordination of SP process (E-4939)
  - Identify/develop specific technical and technical policy recommendations

- Activities of ISP Working Group
  - Data Collection, incl. Stakeholder Survey – **42 completes**
  - Developing recommendations
  - Drafting White Paper

- Today's Discussion
  - Summary of findings
  - **Tiered Baseline Proposal**
  - **Baseline Database**
  - **Proactive Research Proposal**
  - **Baseline Applicability**
  - **ISP Guidance/Training**
  - Other Baseline Issues **–** where are conflicts, inconsistencies, barriers happening?

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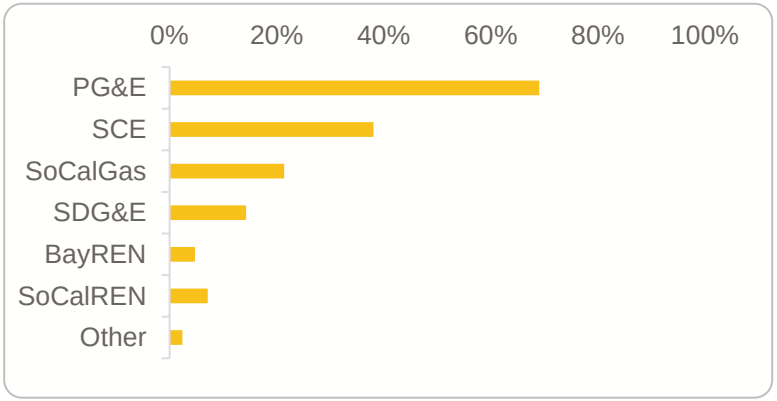
ISP Stakeholder Survey

- Audience
  - Stakeholders who have experience with custom ISP studies and Standard Practice baseline selection as part of the custom project development process in the last 3 years
- Survey Period
  - 7/17/23 – 8/20/23
- Completes: **42 completes**

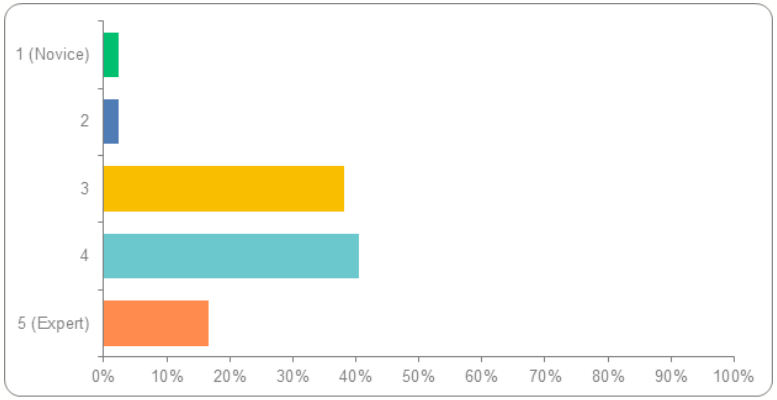
  - Experience with all PAs, sectors, aspects of ISP process
  - **13** PA respondents (all IOUs represented)
  - **29** implementers from **17** unique implementer firms

Respondent Profiles

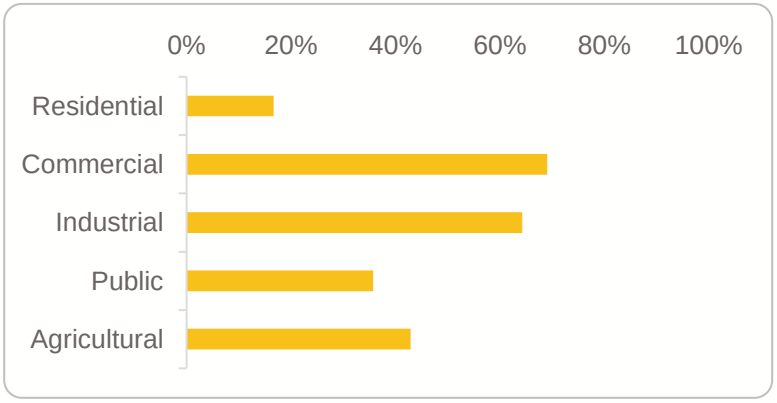
For which PA(s) have you developed, submitted, and/or reviewed custom projects?



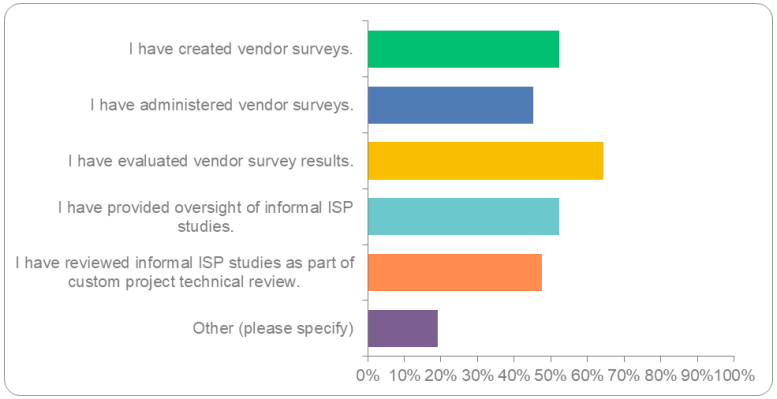
Rate your familiarity with CPUC policy and guidance related to Standard Practice assessments for Custom measures.



For which sector(s) have you developed and/or reviewed custom projects?

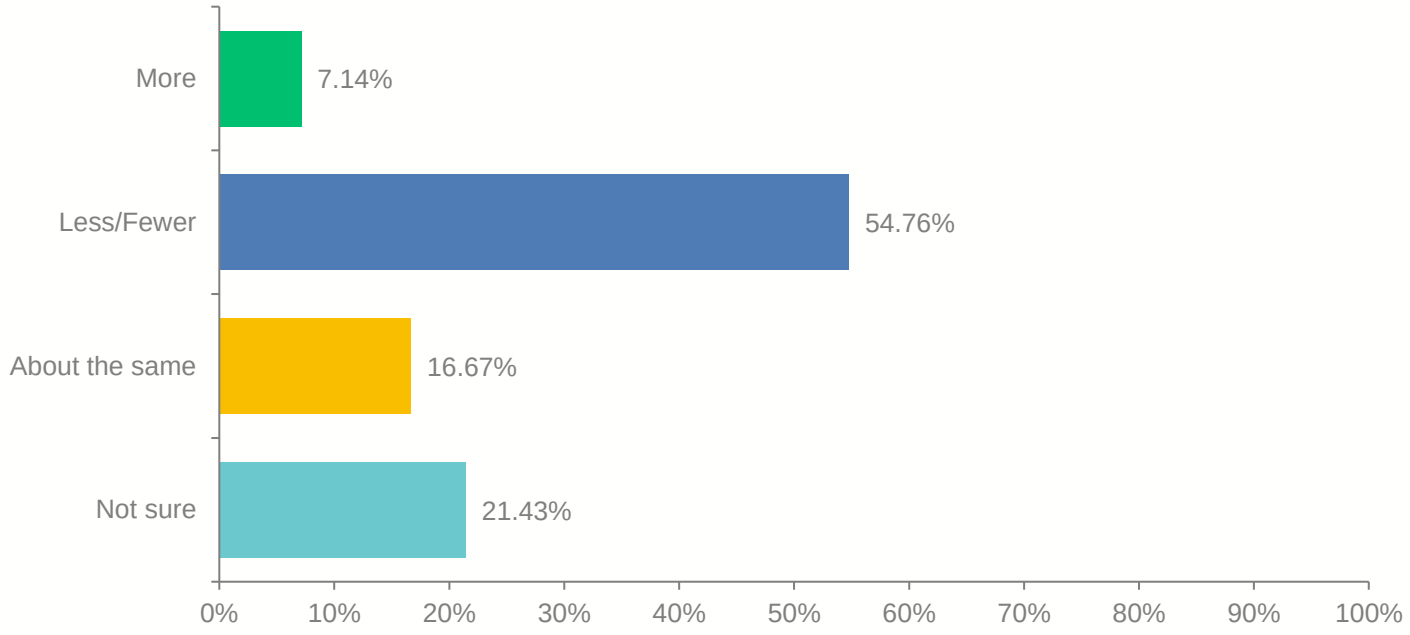


Indicate your experience related to Informal ISP studies conducted within the custom project development activities



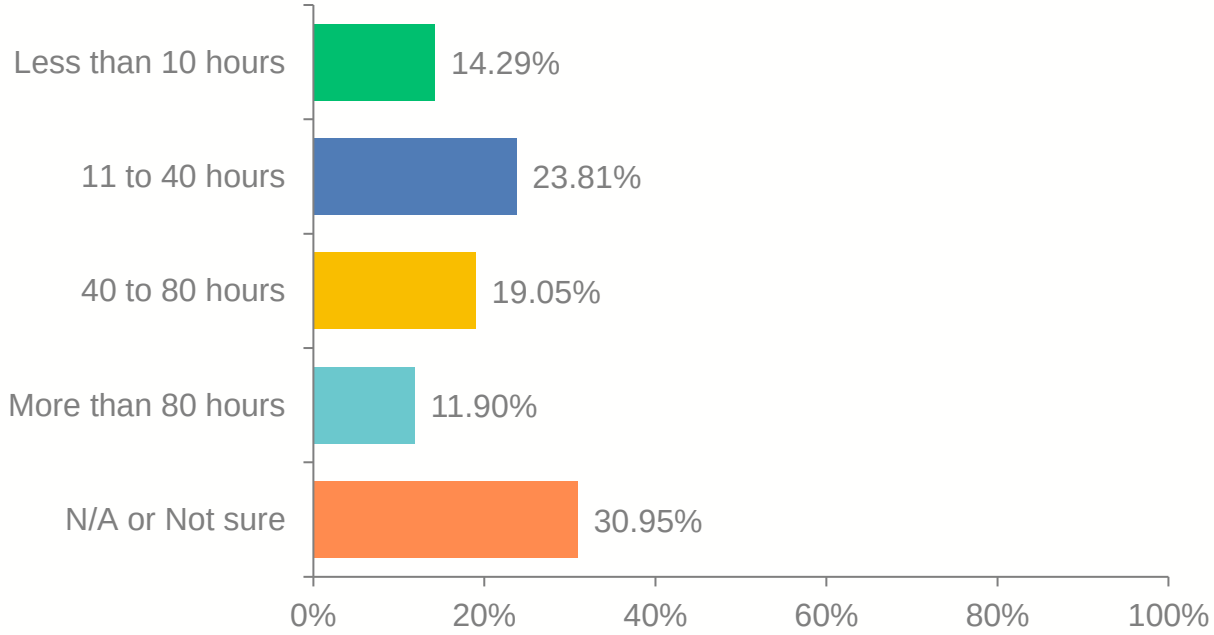
Survey Responses

Do you expect to implement more, less, or approximately the same number of unique, non-lighting NEW, NR, AR, and applicable AOE custom measures in 2023?



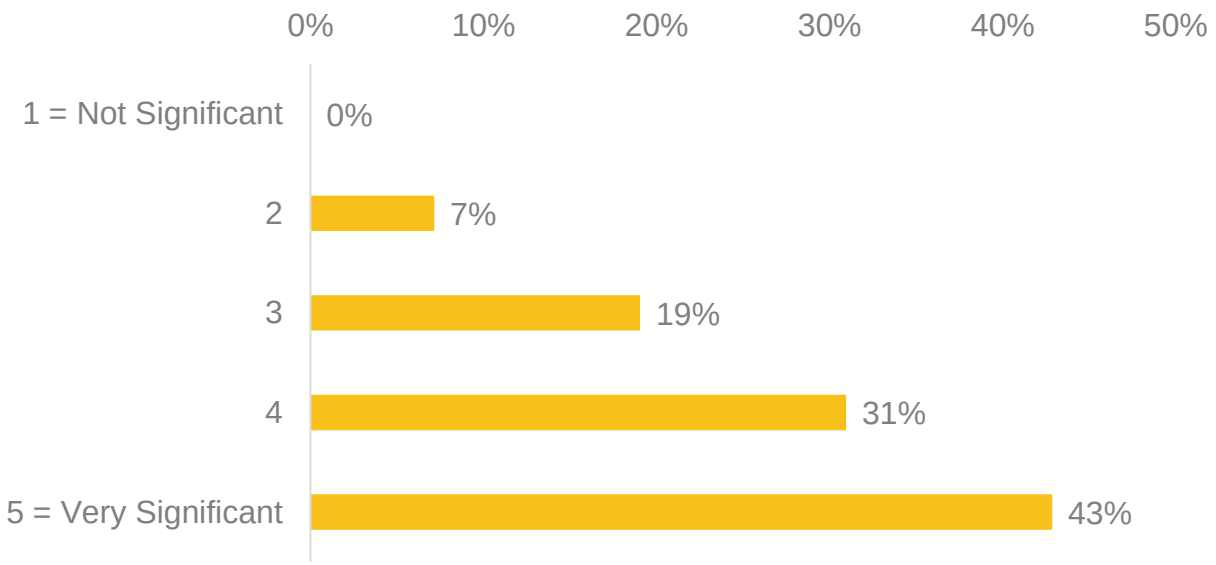
Survey Responses

When considering a new SP baseline for custom projects (including developing, administering, and evaluating vendor questionnaires and work related to the feedback from technical reviewers), **please estimate the average number of hours it takes to complete the Standard Practice baseline selection process for a single custom measure.**



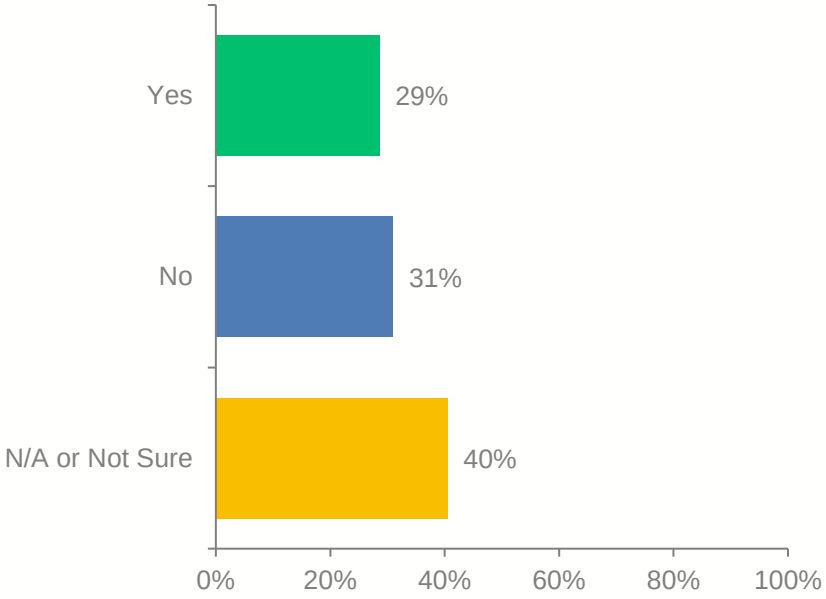
Survey Responses

Standard practice baseline selection is one component of developing a custom project (when applicable). Based on your experience, please **rate the current Standard Practice baseline selection process in terms of a customer deterrent to doing custom EE projects** (1 = Not significant and 5 = Very significant).

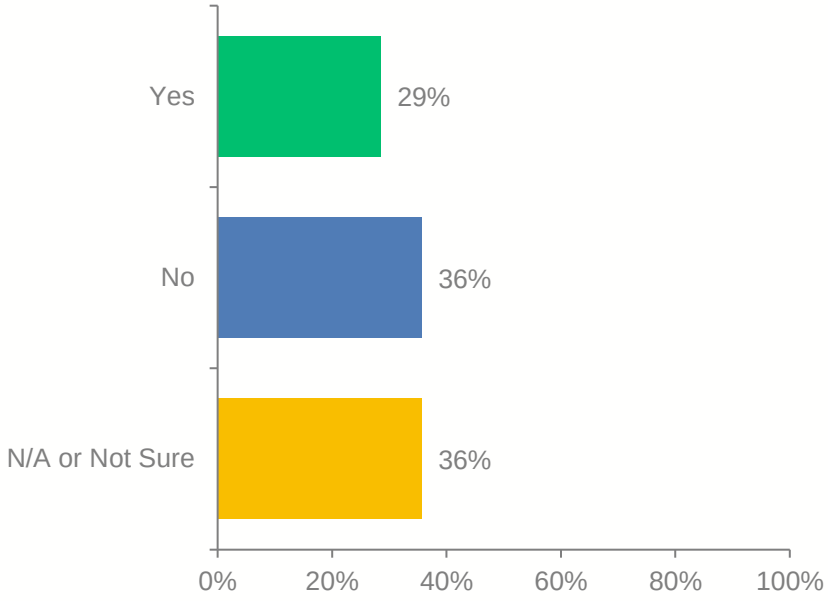


Survey Responses

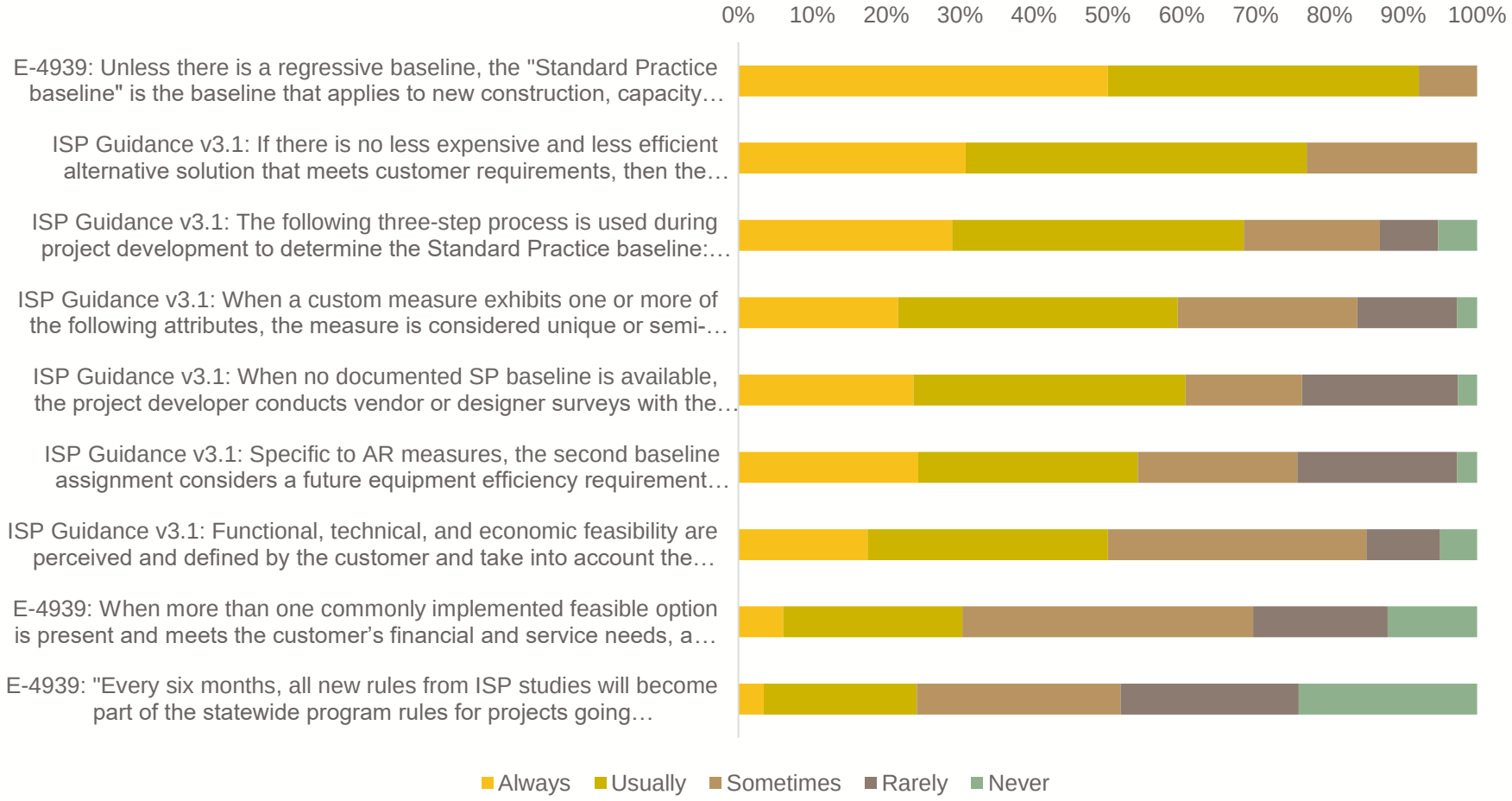
Have you had a Standard Practice baseline **rejected or modified by a PA technical reviewer** in the last three years?



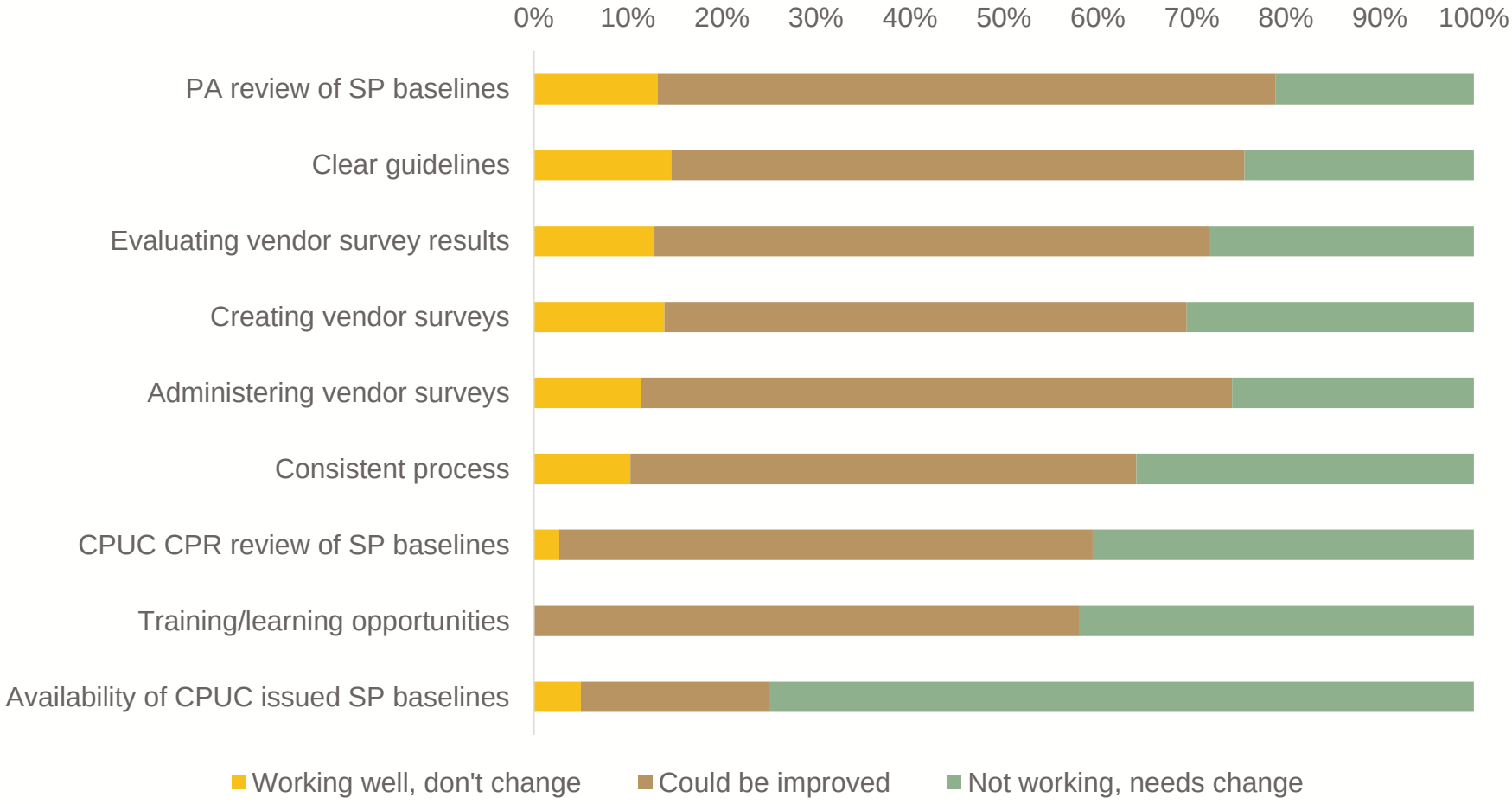
Have you had an SP baseline **approved by the PA technical reviewer and rejected or modified by a CPUC technical reviewer**?



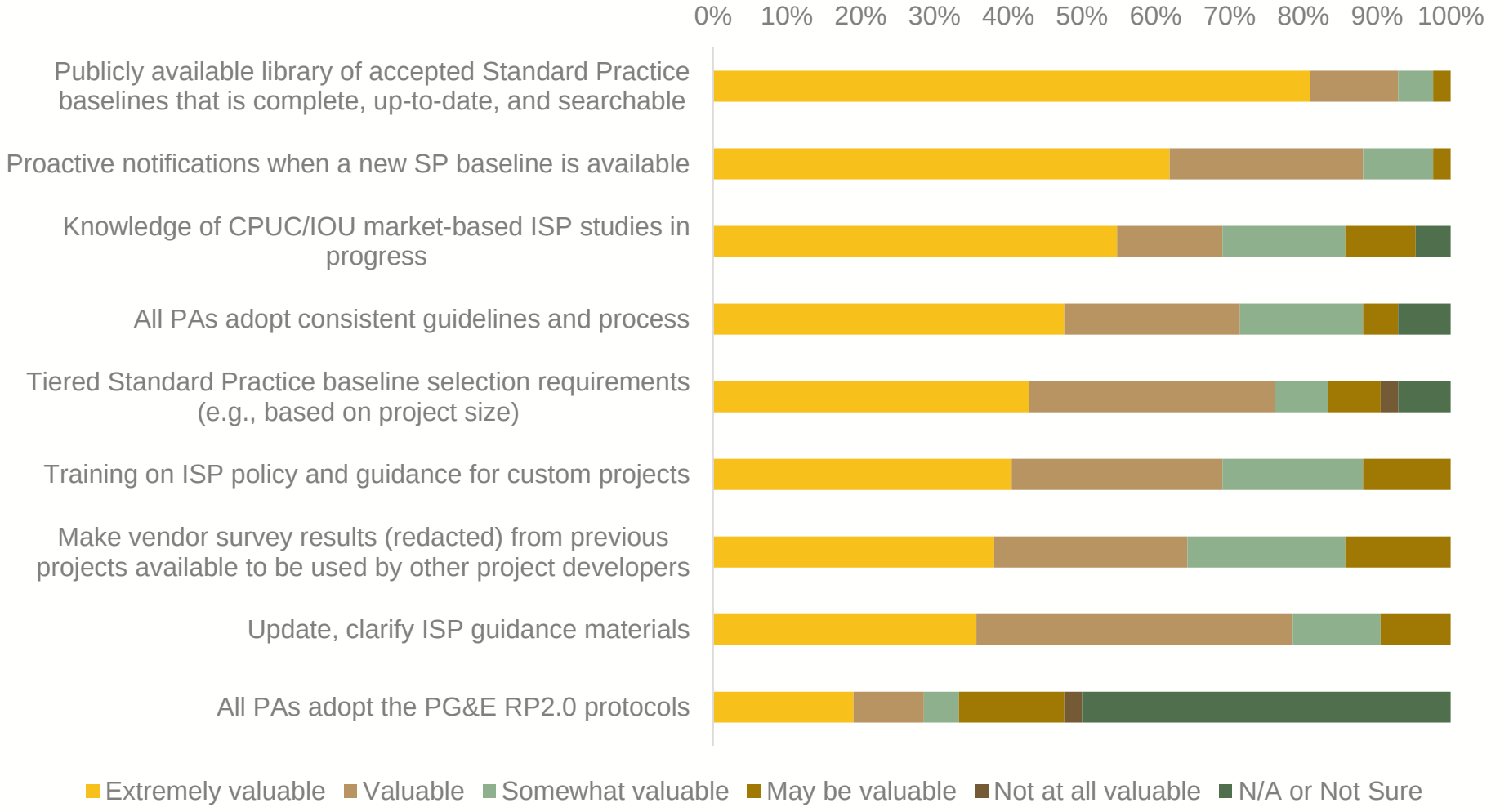
Rating how consistently specific policy is applied



Rating aspects of the current SP baseline selection process



Rating potential improvement activities



Additional input on improvements (from 9/13 meeting)

- Resources
  - Define and make transparent applicability of SP research and baselines
  - Support proactive research of baselines for measures, markets
  - Statewide template to improve consistency in studies and reviews
  - Alternative considerations/approaches for establishing SP baseline (e.g., beyond vendor surveys)
  - Provide sample project scenarios in ISP Guidance
- Process
  - Establish timelines for review SP baselines (outside of CPR)
  - Engage appropriate market/sector expertise for reviews
  - Maintain continuity in assigned reviewers
  - Employ sector-specific considerations for baseline selection process
- Policy
  - Coordinate SP/Code/Influence
  - Prospective application of ISP

Summary of Key Findings (1)

1. PAs and implementers expect to implement fewer custom measures in 2023 compared to previous years.

2. SP Baseline Selection process adds significant workload to process (38% of implementer respondents indicate more than 40 hours on average); Cost of SP requirements is unclear; PAs estimate of hours was 2/3 implementer estimate

3. Every aspect of the process surveyed needs improvement or needs change. No category has higher than 15% respondents indicate “Working Well.” … More than a 64% of respondents indicated all improvement areas would be “extremely” valuable” or “valuable” for all but one area listed

4. PAs and Implementers indicate SP baseline is a significant customer deterrent to doing custom EE projects.

Summary of Key Findings (2)

5. PAs and implementers indicated gaps in familiarity with policy and guidance.

6. Policy is not consistently interpreted and/or followed.

7. Almost 1/3 of implementers indicate they have had a baseline rejected or modified by a PA (another third N/A or unsure)

8. Almost 1/3 of respondents indicate they have had a baseline approved by PA technical reviewer and rejected by CPUC reviewer (another third N/A or unsure)

9. PAs and implementations say a baseline database will be a valuable resource.

10. Stakeholders offered a variety of areas where proactive research would be helpful. Common areas include Electrification, Agricultural/Industrial Measures, and Horticulture lighting.

Draft Recommendations

1. Tiered Baseline Proposal
2. Baseline Database
3. Defining applicability
4. Proactive Research Proposal
5. ISP Guidance/Training
6. Other Baseline Issues

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Tiered ISP: Background

- Over 70% of survey respondents indicated tiered ISP process would be Extremely Valuable or Valuable
- Tiered approach used for POE and M&V
- Considerations for proposed tiered process
  - NTG decreasing
    - 50% NTG in 2024 (Reduced from 60%)
  - Project development cost the same (increasing?)
    - Baseline determination only one component of project development effort
    - Others - customer interactions, influence documentation, audit, solutions engineering, M&V, project submittal organization

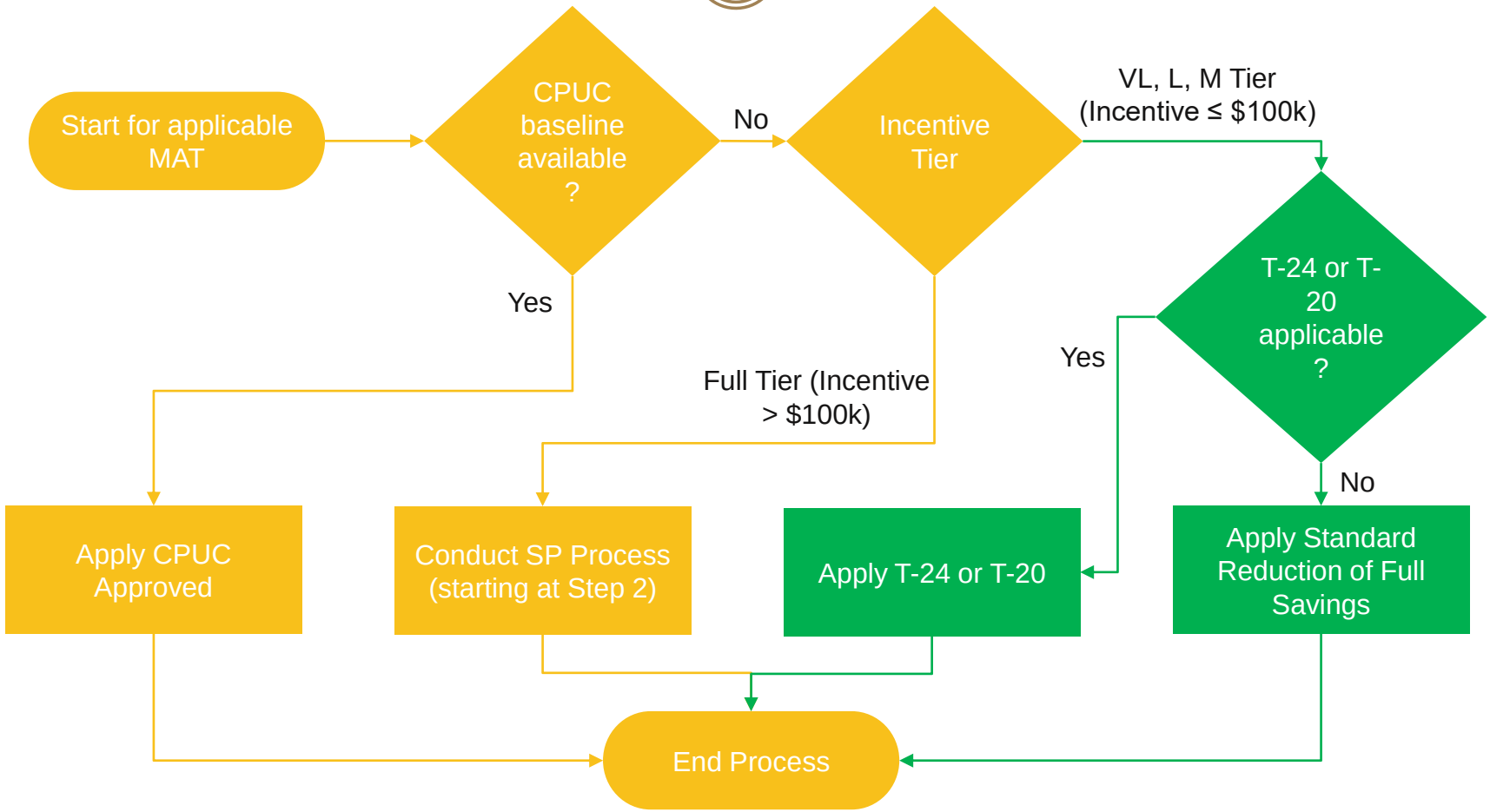
Tiered ISP: Analysis

- Cost of conducting an informal ISP
  - From survey, Informal ISP takes 43 hours
  - @$120/hour = ~$5,200
  - Informal ISP compliance = 3.58 out of 5 = 72%

	Very Low	Low	Medium	Full
Min Incentive	$0	$7,501	$25,001	$100,001
Max Incentive	$7,500	$25,000	$100,000	None
AVG Incentive [1]	$1,253	$15,065	$51,515	$382,576
Full Compliance Informal ISP Cost %	416%	34.6%	10.1%	1.4%
Survey Compliance Informal ISP Cost %	298%	24.8%	7.2%	1.0%

[1] From 3 years of bi-monthly CMPA upload data

Tiered SP: Proposed Process



Green – Modification of current process via revised CPUC ISP Guidance Document

Tiered ISP: Discussion

- We have proposed a reduced ISP process for Very Low, Low, and Medium tiers.
  - **Is this the right tiers and balance of cost?**
- We have proposed T-24/T-20 or a stipulated % reduction in savings.
  - **Are there any other options for reduced ISP for consideration?**
- Determination of stipulated percent reduction. Claims data and CMPA data is not helpful
  - **Are there other data sources for consideration?**
  - **Absent of data, how should the percent reduction be determined?**

Baseline Database

- **Survey Feedback**
  - 75% say availability of CPUC-issued baselines is “Not working, needs change”
  - 80% say “Public library of accepted SP baselines that is complete, up-to-date, and searchable” would be “Extremely valuable”

- **Purpose**: Compile approved baselines in a public, searchable database that is easy-to-use, up-to-date, and useful.

Baseline Database

Data Sources

Market Based ISP Studies

- ISP Study Summary Form →
- ISP Study Summary Form →

Informal ISP Studies (CPR-Reviewed)

- Modified Disposition Form →
- targeted data collection, <5 yrs →

Informal ISP Studies (PA Approved, no CPR)

- TBD →
- targeted data collection, <5 yrs →

Baseline research planned & in progress

- TBD →

BASELINE DATABASE

Information Fields
Baseline
Measure
MAT
Issue Date
Source
Search Fields (Measure **Approved/Rejected** Category, Sector, End Use, Measure Code)

"Applicability" (e.g., Effective Dates)

2

Baseline Database: Discussion

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- Will this database be useful?
  - If not, why not?
  - What would make it more useful?
- Should we include informal ISPs approved by PAs, not selected/reviewed for CPR?
- Is it valuable to “back-populate” existing baselines?
- Should we include baseline research planned and/or in-progress?

3

Applicability (1 of 2)

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- **Determining Applicability**
  - Market Based ISP Studies
    - included as part of study (though can be made more clear)
  - Informal ISP
    - study/review determines baseline for project; broader applicability not determined.
    - T**here is no existing process or framework to define applicability for existing baselines established through informal ISP studies.**

- **Purpose**: Determine **how** to existing baselines can be used to support current/future measures. (I.e., to what measures, customers, markets, sectors, regions, etc. can an existing standard practice be applied and for how long?)

- **Discuss**: Is it worthwhile to proactively define applicability for baselines from informal ISP studies?

Applicability (2 of 2)

Discuss: How can we shape objective, reliable guidelines to define applicability for existing baselines and baseline research – to help stakeholders determine whether an existing baseline is appropriate for their customer/project?

- Effective dates – how long is a baseline / baseline data still valid?
  - Default to 5 years? Shorter or longer based on market?
  - Triggers requiring change – code/law change
- Geography – how broadly does the baseline / baseline data apply?
  - Default to statewide application
- Markets – to what other customers, markets, etc. does the baseline apply?
  - Customer size, income considerations
- MAT – Applies for the same MAT
  - Treat NR and AR 2nd baseline the same

4

Proactive Research

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- **Survey input:**
  - "Proactive research" raised in multiple open-ended additional recommendations
  - Knowledge of CPUC/IOU MB ISP studies in progress – 55% "Extremely Valuable"
  - Desire to eliminate the time/cost/risk impacts of mid-project ISP studies
  - Challenges getting timely responses from market actors to support informal ISP

- **Current State**
  - IOUs typically have a portfolio of ongoing research to support program requirements, including baselines. **This is currently not a transparent process**.

- **Purpose**: Make research portfolio more transparent and useful by identifying baseline gaps/needs and proactively defining baselines to support known EE opportunities.

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Proactive Research

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- **Approach:** Model after statewide new measure screening, measure development, and/or technical research activities

- **Identify and Prioritize Baseline Gaps/Needs**
  - Cal TF develop intake process for suggested research – ongoing
  - Cal TF facilitate review and prioritization process – quarterly (?)
  - Cal TF via TF affirmation? PA Leads?

- **Conduct Baseline Research**
  - Cal TF (e.g., White Paper)
  - Funded studies (e.g., Measure Package)

- **Communicate Baseline Research**
  - Public posting of requested, prioritized, scheduled, in-progress, completed research – maintained up-to-date
  - Notifications of status change (in-progress, completed) for baseline research

4

Proactive Research: Discussion

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- Will this approach improve awareness, value of proactive baseline research?
- How can we make it more useful?
- Other considerations?

ISP Guidance

- **Survey Feedback**
  - Clear Guidelines: 24% say “not working” and 61% say “could be improved”
  - “Update, clarify ISP Guidance”: 36% say Extremely valuable and 43% say Valuable
- **CPUC Staff plan to update ISP Guidance Document**
- **Cal TF will facilitate stakeholder input to support guidance update**
  - What is not clear? Where are points of confusion?
  - How do we maintain guidance up to date?
  - Incorporate other ISP recommendations as appropriate
  - Process for updating and maintaining

5

ISP Training

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- **Survey Input**
  - 70% say “Training on ISP policy and guidance for custom” would be Extremely Valuable or Valuable
- **Existing Training Resources**
  - PG&E Wiki: ISP Process flowcharts, 9-minute video, RP2.0 Protocol
  - Others?
- Cal TF can help develop, centralize, make accessible, update (as needed) statewide training material. First, clarify and update guidance.
- **Discuss**: Best way(s) to provide stakeholder training?

6

Other ISP Issues/Challenges

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SP v Influence: “If the project has established influence there should not be a need for ISP.”

Value of effort: “SP is a moving target and requires extensive program resources to evaluate. A more cost-effective approach would be to assume some [FR] through a modified NTGR to mitigate the need for extensive SP research.”’

Laggers: Programs should “assist the laggers in the market, but the current policy and guidance are leaving them behind, creating stranded market potential… The current design seems to only support customers on the leading edge.”

Customer reality: “We have many instances where we deal with customers whose realistic alternative is not our ISP and their project drivers and metrics are much different than our programs.”

Customer reality: We should “go with the customer's idea of SP. Each facility operates differently; [it’s wrong] to put a blanket standard practice over a measure when each customer's business practice is different.”

Customer reality: “recommend that the customer’s SP has influence on final selection – if no conclusive technology in market is outperforming the other technologies, the customer’s existing nominal technology to be considered SP baseline.

Sector reality: “SP baselines for MF should be specific to those property types. The buildings, systems, and decision-making process for MF buildings is unique and different from SF res., business/com, or sector-agnostic vendor surveys.”

Market engagement: “One of the biggest challenge we faced is finding SMEs for interviews. I wonder if Cal TF can [help make] introductions. Many folks we tried reaching out to in the past tend to ignore small companies like us.”

Prospective ISP. “When ISP was first launched, [ISP] only applied when it was determined that a technology application was well established … and it appeared that it may now be a standard in the market. In these cases, … the CPUC would commission a study and the results of that study would be applied after a 6-month grace period.”

Next Steps

- Cal TF Staff:
  - Update draft recommendations
  - Draft White Paper
  - Continue outreach to complete ISP Library and baseline database

- TF Members, Custom Stakeholders:
  - Share input/ideas on recommendations
  - Identify/share existing ISP studies to help populate ISP Studies Library and baseline database
  - Share baseline research in progress

LUNCH
12:15 – 1:15

Metric 5A-3

List of Measures for Statewide Methods

- **Objective**
  - Identify and prioritize custom measures for statewide standardization and hybrid methods
- **Approach**
  - Identify common custom measures
    - Custom program activity and claims data
    - Existing methods guidance documents
    - Stakeholder input on potential new custom measures
  - Identify “hybrid” opportunities
  - Prioritize measures for statewide development
- **Deliverables**
  - List of custom measures recommended for SW standard and/or hybrid methods

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EE Measure Types

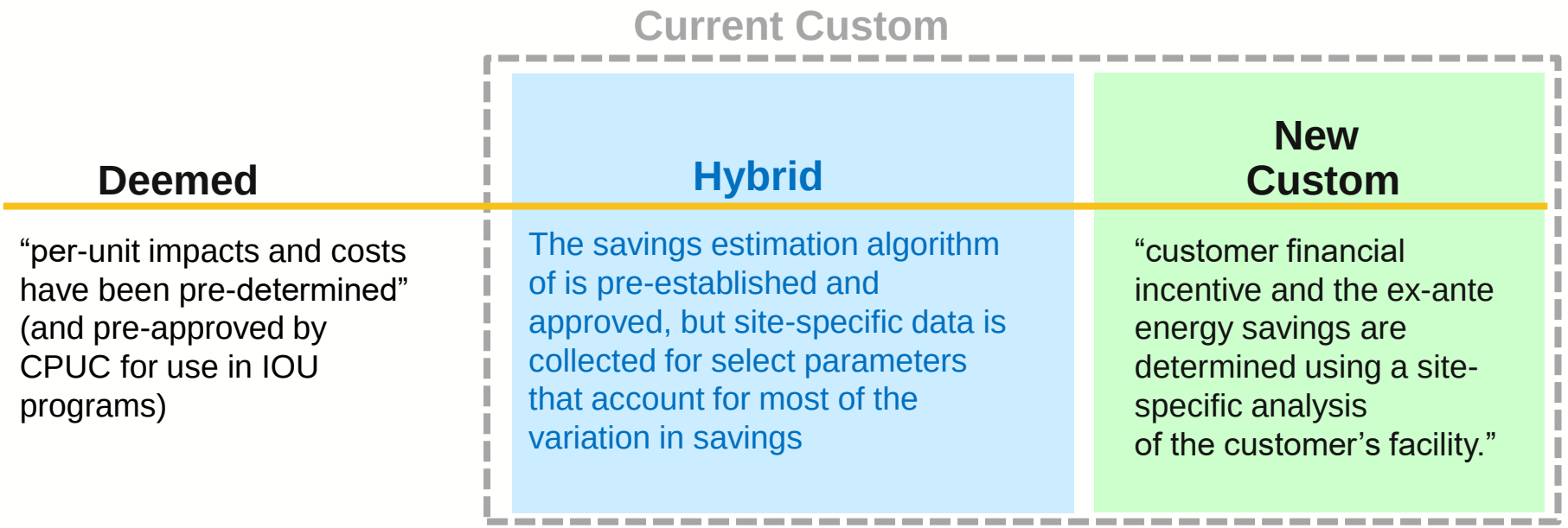
How a measure is classified has implications for **implementers** (ease and usability of a measure), **customers** (speed of project development/certainty of savings/certainty of incentive), **program administrators** (ex post evaluation risk, review, and claims process), and the **regulatory approval** process.

Deemed	Hybrid	Custom
"per-unit impacts and costs have been pre-determined" (and pre-approved by CPUC for use in IOU programs)	The savings estimation algorithm of is pre-established and approved, and site-specific data is collected for select parameters that account for most of the variation in savings	"customer financial incentive and the ex-ante energy savings are determined using a site-specific analysis of the customer's facility."

Cal TF White Paper: EE Measure Classification

Hybrid v Custom

- Cal TF White Paper: “The custom program is best suited for **unique or low volume** energy efficiency measures that generate a **sufficient amount** of savings to warrant the additional site-specific data collection.”



Hybrid Measure Type

- Definitions
  - Cal TF: The savings estimation **algorithm of a hybrid measure is deemed** (i.e., pre-established and approved) and **site-specific data is collected** for select parameters that account for most of the variation in savings
  - CA POU TRM: **Semi-custom measures** are measures for which the savings estimates can vary significantly depending on how or where the measure is used. Savings estimates are calculated using standard methodologies based on project-specific parameters. For semi-custom measures, the manual documents the savings methodology and may also provide a standardized savings calculator for use in estimating energy savings

- Advantages
  - **Greater customer certainty** of requirements, application timeline, and incentives than custom measures.
  - **Streamlined, shorter approval process**, similar to deemed measures.
  - Greater simplicity than custom measures and greater accuracy than deemed measures in savings and/or cost estimates.
  - **More limited in-situ field verification requirements** or a pre-defined site-verification plan that clearly identifies the inputs that require field verification.

Identifying Hybrid Measures

- What should go hybrid?
  - Common engineering approach / calculation method
  - Enough volume (to warrant effort)
  - Small savings (too small for custom)

- Sources of hybrid measures
  - Custom claims analysis **– 80+% of custom measures?**
  - Measures not pursued due to cost/complexity **– known stranded savings**
  - Missing permutations from Deemed MPs **– known stranded savings**

Next Steps

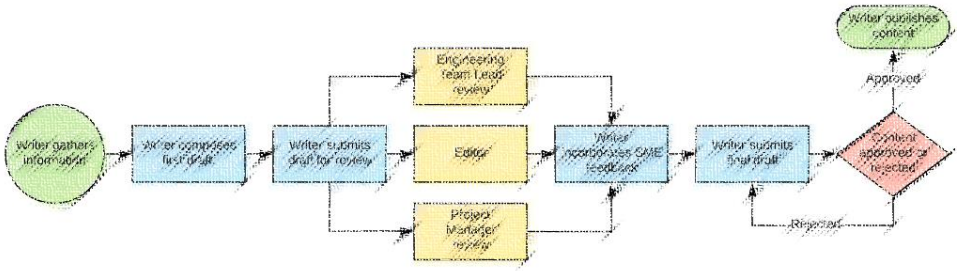
- Next Steps
  - Compile list of hybrid candidates
  - Assess/prioritize list of hybrid candidates for statewide development
  - Develop “hybrid” proposal (e.g., streamlined pathway for hybrid/semi-deemed measures)

- Other thoughts?

Metric 5C-2

Custom Measure Package and Tool Development and Update Workflow

- **Objective**
  - Formal workflow and process for **developing**, **reviewing**, and **updating** SW Custom Measures and Tools
- **Approach**
  - Adapt deemed MP workflows to custom
  - Seek CPUC buy-in to provide input and review proposed SW custom measures and tools



- **Deliverables**
  - Custom Measure Package Development and Update Workflow, presented to TF for affirmation
  - Assessment of potential to implement approved workflow in eTRM (Paused to 2024)

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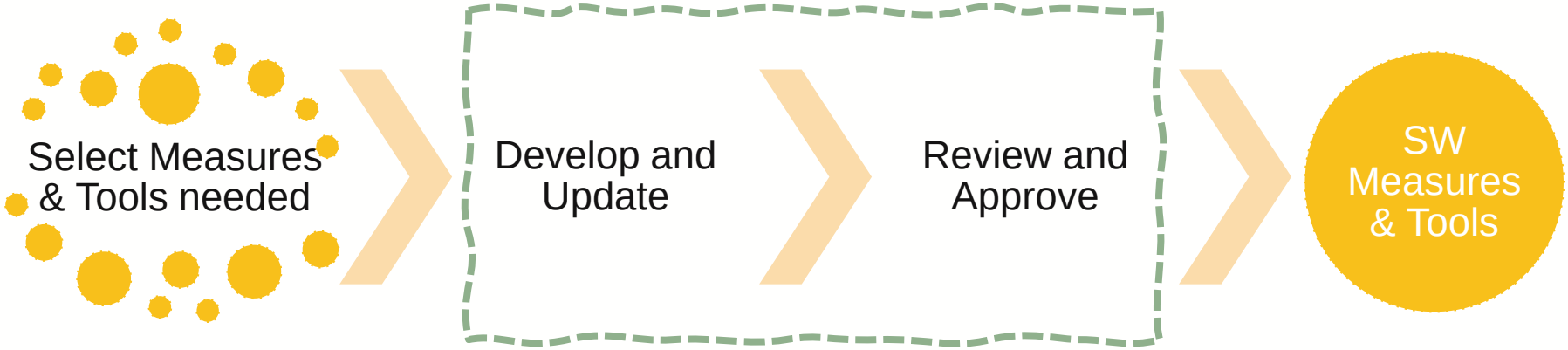
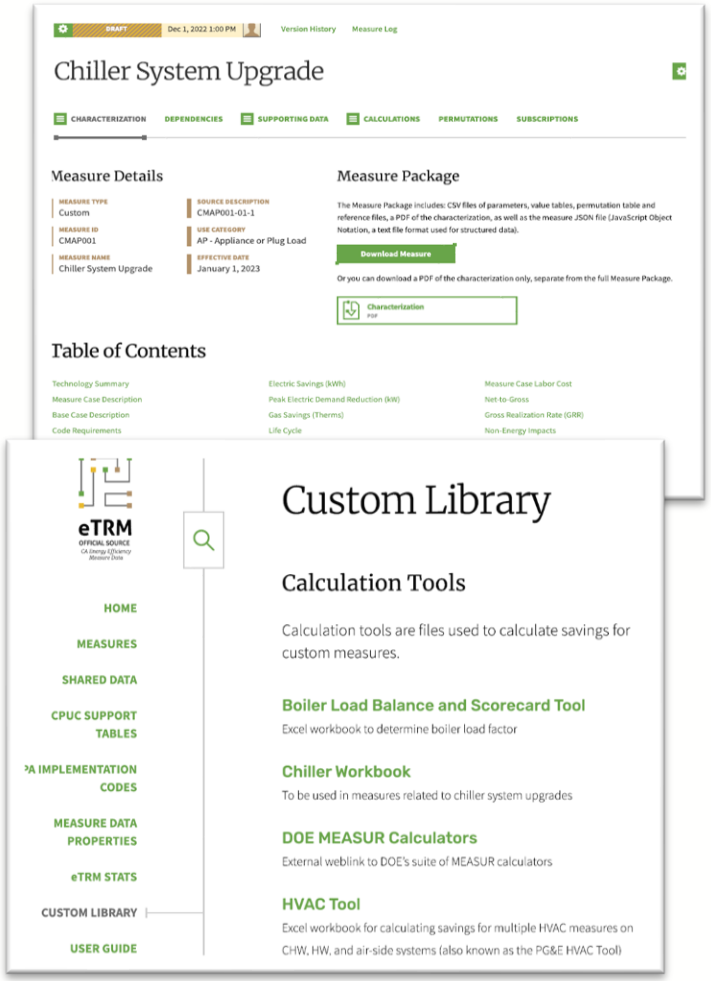
TF Discussion Questions



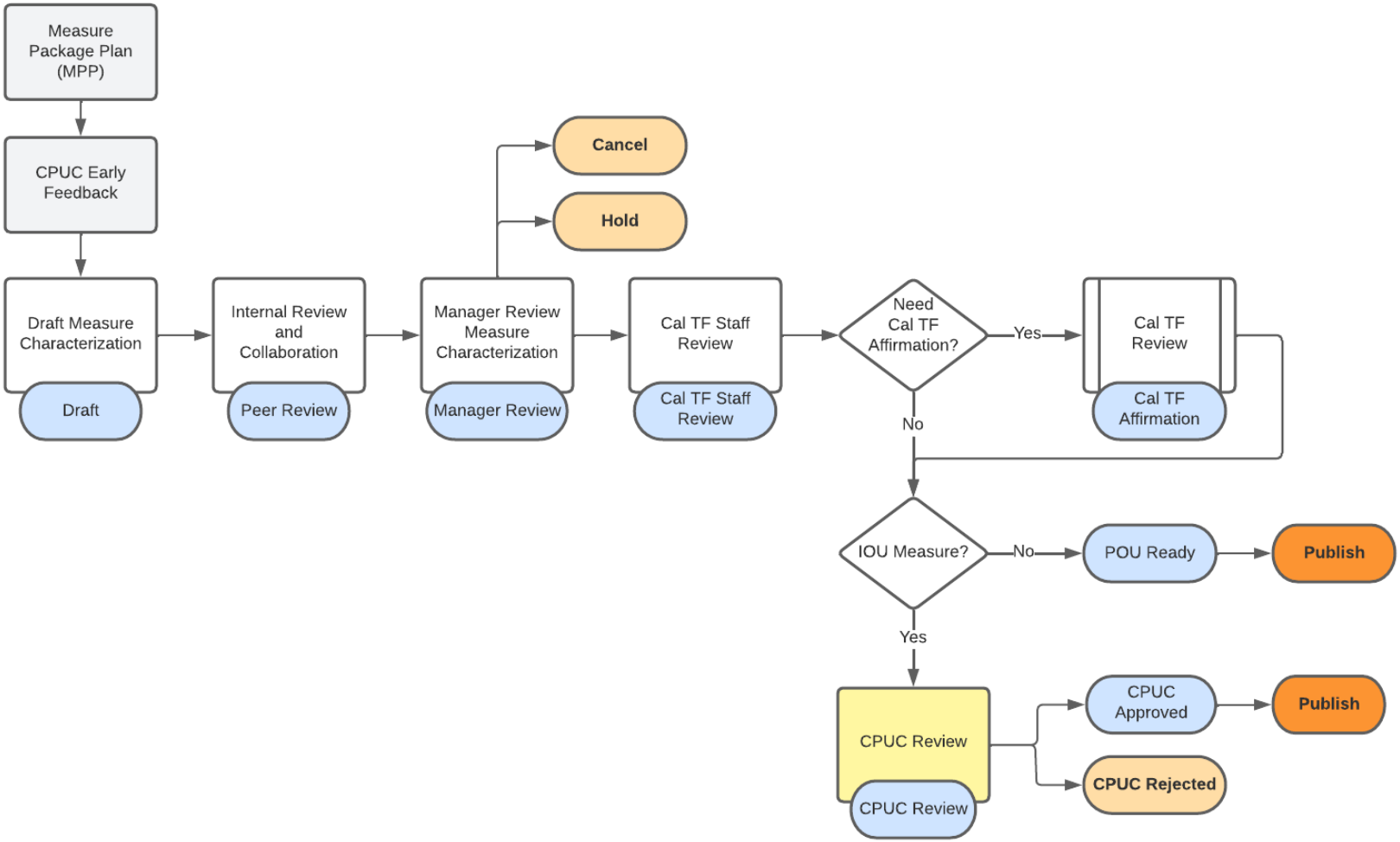
- How do we **develop** SW measures and tools?
- How should we **review** and **approve** SW measures and tools? What earns the “Cal TF Affirmation”?
- How should we **update** measures/tools as needed?

Overarching Goal

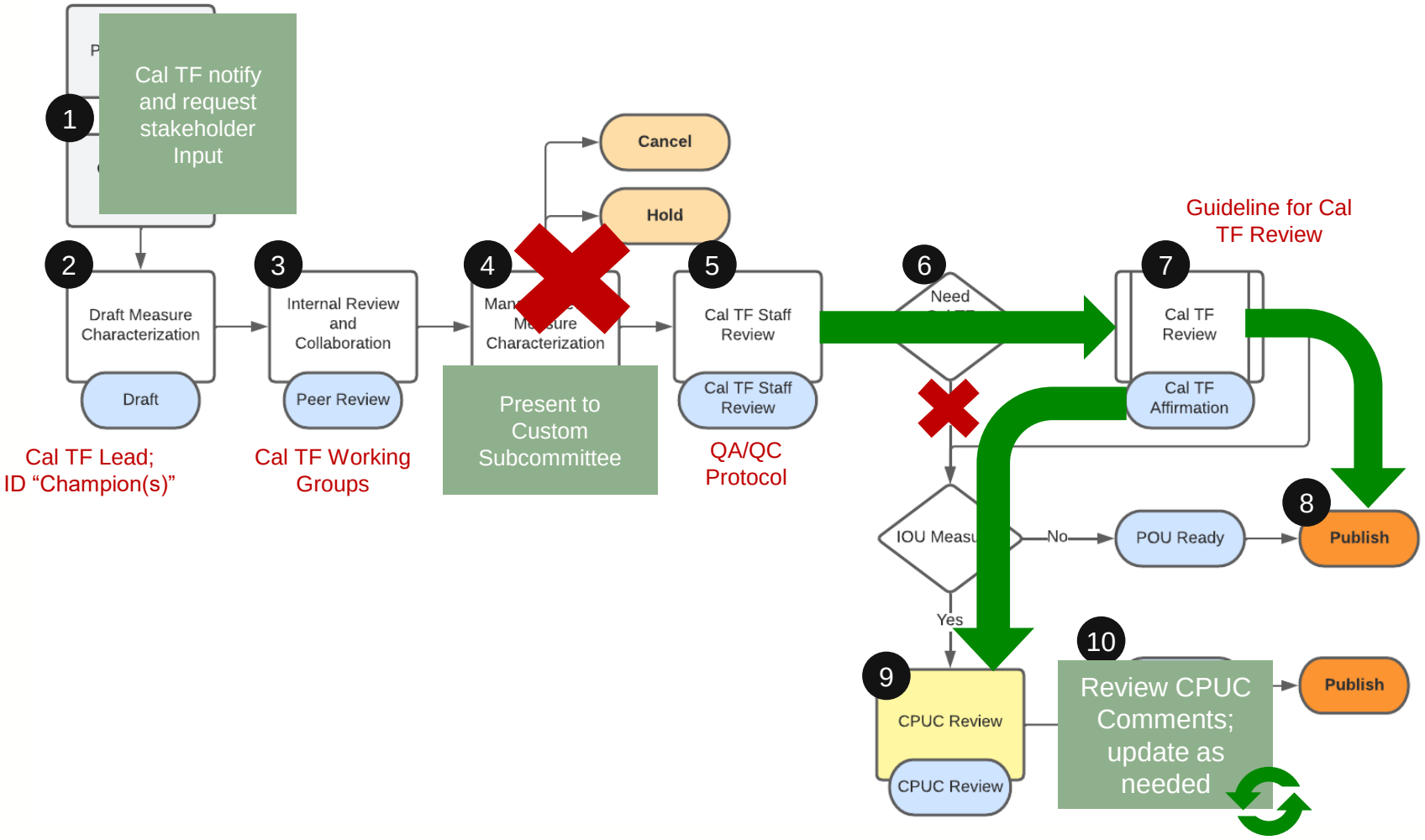
- Public library of Custom Measures and Custom Tools that are:
  - Complete
  - Clear, easy-to-read/understand
  - Consistent
    - Format
    - Development/update process
  - Well-documented
    - Include Training materials
    - Policy/guidance references
    - Changes/updates/bugs/needed updates
  - Meet appropriate technical rigor
  - Maintained up-to-date
  - Versioned
  - Reliable (ideally CPUC-approved)
  - Useful (worth the effort to develop)



Deemed MP Development, Simplified



Adapt Measure Package Development and Review Process for Custom Measures and Tools



Summary of Key Points

Develop

- **Cal TF Manage**
- **No PA Lead/Manager requirement**
- ID Stakeholder Champion(s)
- **Solicit all stakeholder early input**
- Public/transparent development process
- Present to Custom Subcommittee

Review

- Cal TF Manage
- QA/QC Checklist
- Cal TF Review Guide
- **Require Cal TF Affirmation**
- **Publish after Cal TF Affirmation**
- Seek CPUC Comments

Maintain

- Identify update triggers
- **Cal TF annual review of update needs**
- Cal TF collect feedback on “bugs” and other requests
- Cal TF Manage update process (or coordinate with tool lead)
- **Require Cal TF Affirmation on updates**
- Version control, notification, documentation of updates

Next Steps

- Formalize workflow to guide process for developing statewide Custom Measure Packages (measure protocols and tools).

Custom Measure Packages

SPENCER LIPP

For TF affirmation

Definitions

- Custom Measure
  - Any EE measure that is not deemed
  - Requires site-specific data to estimate/validate savings
- Custom Tool
  - Any tool used to calculate energy savings and/or other key parameters for a custom measure
  - Example: PG&E HVAC Tool, EnergyPlus
- Custom Measure Characterization (CMC)
  - Comparable to Deemed Measure Characterization
  - Description of measure, eligibility requirements, savings calculation methods, data collection and M&V requirements for a defined measure or measure group
  - Developed using Statewide Custom Measure Characterization Template
  - Methods/approach are encouraged; not mandatory
- Custom Measure Package (CMP)
  - Comparable to Deemed Measure Package
  - Combination of Custom Measure Characterization and any supporting Tools, References, and other Resource

Custom Measure Package Topics

- PG&E HVAC Tool (seeking affirmation)
  - PG&E HVAC Tool Methodology Document
  - Brief demo
  - Input on VFD driven chiller performance curves
  - Input on pump penalty for CHWST Reset
- Chiller Systems Measure Package (seeking affirmation)
- RCx Measure Package (seeking affirmation)
- Custom Measure Characterization Template (seeking input)

Metric 5C-1

Statewide Custom Measure Packages

- **Objective**
  - SW Custom Measure Packages **(CMP)**
    - Definitions
    - Eligibility
    - Savings methods
    - Data collection requirements
    - M&V requirements
    - Calculation Tools/Resources

    Custom Measure Characterization
- **Approach**
  - Custom Measure Subgroups
  - Solicit CPUC input
  - Custom Subcommittee approval
  - Cal TF affirmation
  - Solicit CPUC feedback
- **Deliverables**
  - Custom Measure Packages, presented to Cal TF for affirmation

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PG&E HVAC Tool

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For TF affirmation

PG&E HVAC Tool

- Ranked 5th highest priority in stakeholder tool survey
- Originally developed in 2018
- PG&E update in 2023
  - Weekly meetings
  - Discussions in measure working groups
  - Cal TF Staff review
  - CalNEXT review (in progress)
- Three modules
  - Air-side systems
  - Chilled water systems
  - Hot water systems
- Models baseline system and common EE measures

PG&E HVAC Tool

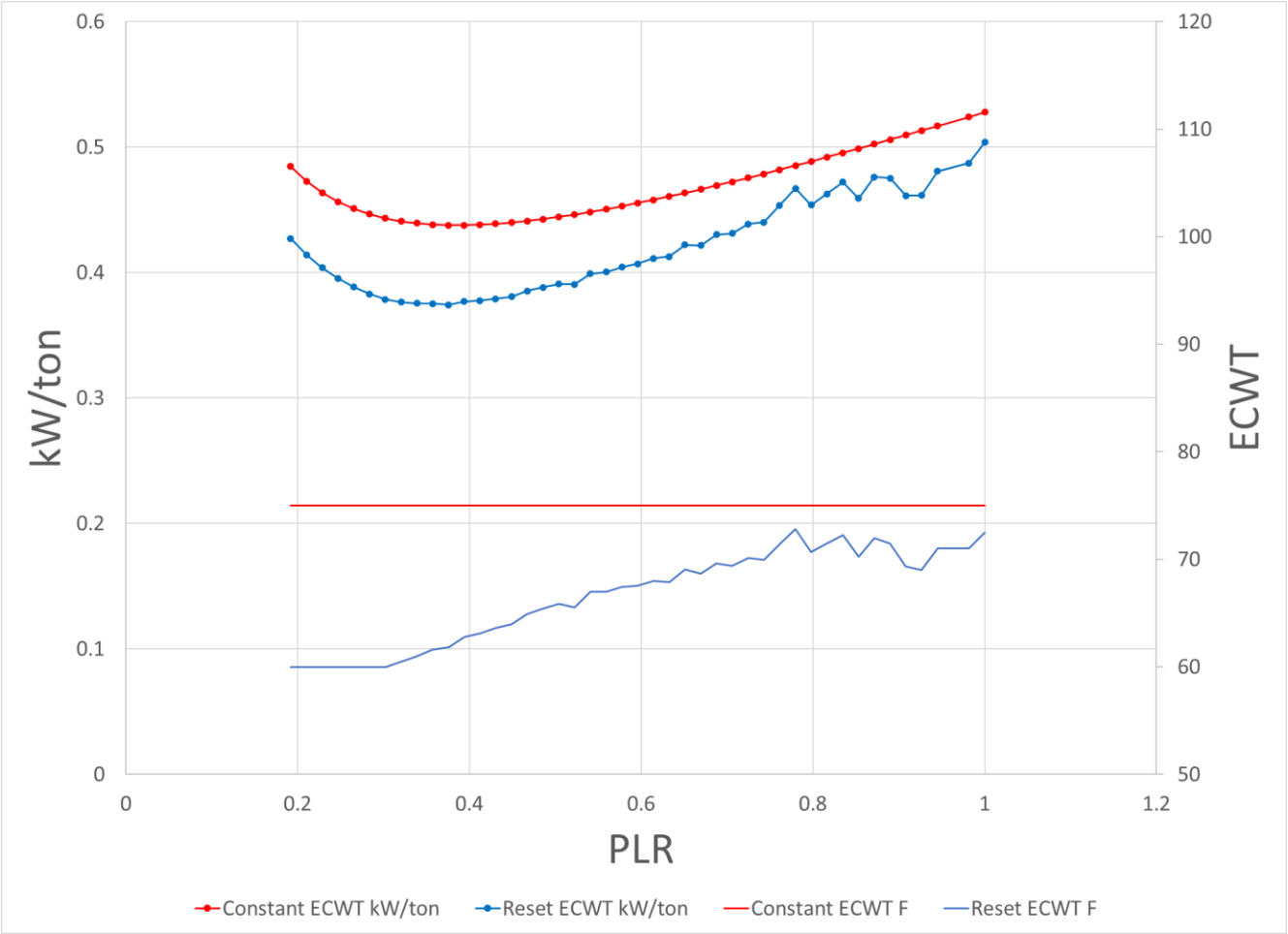
DEMO

Chiller Curve (TF Input)

- References 2019 ACM Manual biquadratic
  - Constant speed centrifugal (Path A)
  - Variable speed centrifugal (Path B)
- Entering condenser water temperature (ECWT) reset has small impact on VFD chiller
- Can be offset by cooling tower fan increase

- **TF Questions**
  - Is 2019 ACM Path B curve representative of VFD driven centrifugal chillers under ECWT reset strategies?
  - If not, what would be better?

Performance Curves



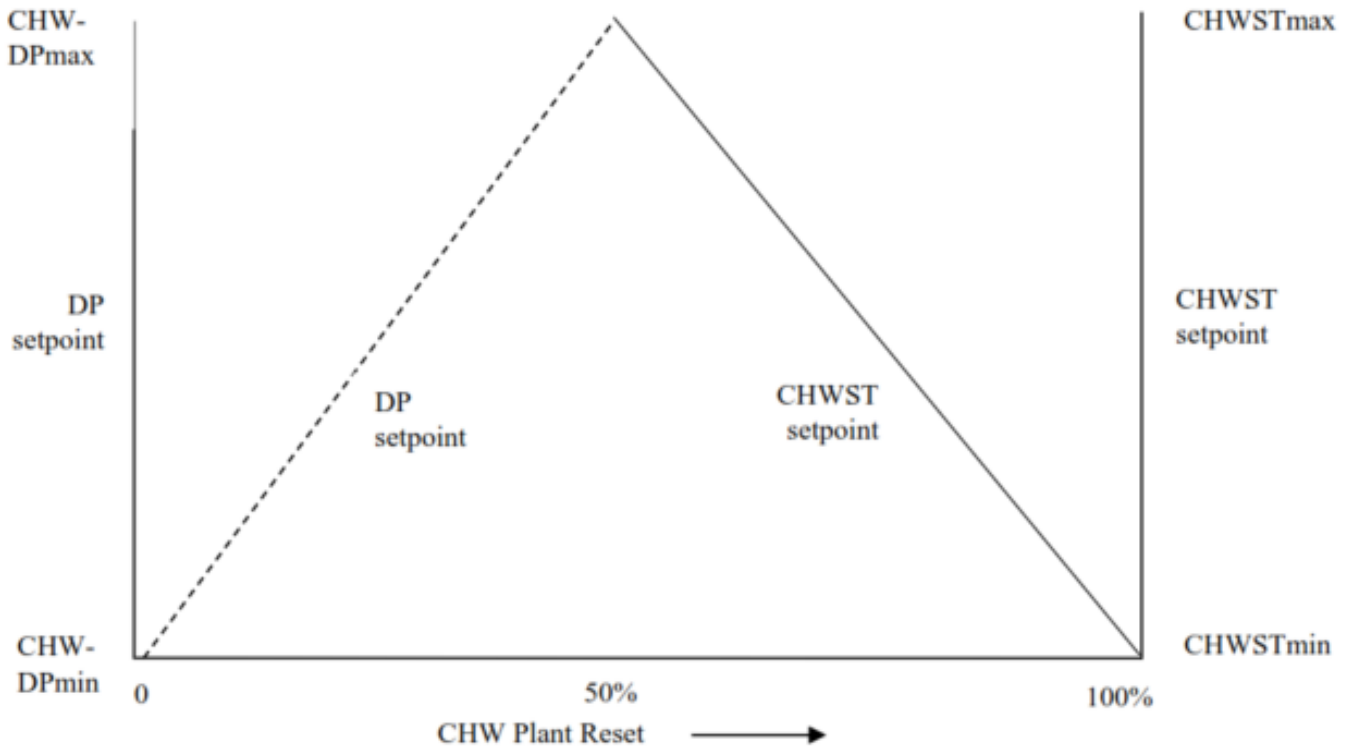
Pump Consumption for CHWST Increase

- Raising chilled water supply temperature (CHWST) impacts other equipment in the systems
- Current method
  - **SCHWP Penalty:** This is calculated as a % flow penalty multiplier for the secondary chilled water flow.
    - $SCHWP\ Penalty\ (Flow\ \%\ change) = \frac{EAT_{Base} - CHWST_{Base}}{EAT_{Prop} - CHWST_{Prop}}$
    - Where $EAT_{Base} = EAT_{Prop}$
- EAT = temperature of air entering the coil (mixed air temperature)
- With 60F EAT, raising CHWST from 45F to 50F
  - Additional 50% flow penalty
  - 10% per degree CHWST

CHWST Reset in ASHRAE Guideline-36

- Acknowledges the pump penalty
- Promotes CHWST reset to 60°F or as low as possible
- Ties the CHWST reset to distribution pumps differential pressure (DP) reset

ASHRAE G-36 Recommendation



- <12DT chillers with pump head >120ft recommend overlapping the DP and CHWST the resets

Pump Penalty Options (TF Input)

- Maintain current method
- Require ASHRAE G-36 compliance for this measure
  - Eliminate any pump penalty
  - Fix the percent flow penalty with a maximum
  - Pump penalty based on percent of chiller savings
- Other?

slido

How should we approach pump penalty?

ⓘ Start presenting to display the poll results on this slide.

Chiller Systems Measure Package

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Chiller Systems

Materials

- Measure Package
  - Measure Characterization
  - PG&E HVAC Tool
  - PG&E HVAC Methodology

Hyperlinks require access to the Custom Initiative SharePoint site; email spencer.lipp@futee.biz to request access.

Group Members

- Armen Saiyan* (LADWP)
- Myrna Dayan* (Cascade)
- Babak Yazdanpanah* (LADWP)
- Andres Fergagiotti* (SCE)
- Ajay Wadhera (SCE)
- Efren Villasenor (SCE)
- Shane Sugiyama (SCE)
- Danny Ng (PG&E)
- Sean Lim (LADWP)
- Bernie Perez (LADWP)
- Jamie Gustafson (Willdan)

* TF member

Chiller Systems

Custom Measures

- Water-cooled chiller replacement (AR)
- Plant controls with replacement (BRO/AOE)
  - CHW plant lockout
  - Chiller sequencing
  - CHW supply temperature reset
  - CW supply temperature reset
  - Water side economizer optimization
  - Cooling tower sequencing
  - CHW differential pressure reset

Air-cooled chillers will be incorporated in future update

Related Deemed Measures

- SWHC005 – Water cooled chiller replacement (NR/NC)
- SWHC052 – Air cooled chiller replacement (NR/NC)
- SWHC052 – Air-cooled chiller replacement, path B (NR/NC)
- SWHC008 – VSD on CHWP and CWP

Measure Application Types

- Chiller replacement – AR
- Controls – BRO or AOE
- AOE
  - Improvement with additional energy functionality
  - Can replace components in a restorative manner

*AOE #5: An existing controls system with scheduling features only is replaced with a new system capable of multiple **additional functions** including optimized start/stop, local occupancy override, and other functions that are not present in the old system. The implementation plan includes the replacement of existing on/off actuators and temperature sensors.*
*This measure is largely an AOE since controls are an add-on measure and the proposed system is a **nominal improvement over the old system with additional energy functionality**. However, the replacement of like-with-like components (actuators and sensors) is restorative.*
-CPUC Track 1 Working Group Report

Measure Baselines (TF Input)

- BRO and AOE measures use existing conditions
- Standard Practice applicable for chiller replacement measure
  - DEER compliant chiller above Path A (10%) and Path B (7% and 12%) Title-24 efficiencies.
- Policy Review
  - E-4952 (Page A-64) – Reconfirmed(?) established DEER 10% criteria. Staff considered updates for “Path B” compliant machines but did not conduct the necessary research.
  - E-5082 (Page 13, 25, A-42-43) – **Not applicable to custom**. Air cooled chillers, 7% (full) and 12% (part load) more efficient than T-24.
  - E-5152 (Page 19, A-23) – Reconfirmed E-5082 air cooled. Added water cooled at 7% (full) and 12% (part load). No savings platform mentioned.
- **TF Input** – What is the appropriate custom chiller Standard Practice Baseline?

Eligible Products and Program Exclusions

Eligibility

- Largely driven by PG&E HVAC Tool modeling
  - CHW plant operation must be reasonably modeled by the PG&E HVAC Tool
- Specific system criteria
  - Space conditioning
  - Water cooled chillers
  - Pumping configurations
  - Integrated water side economizers

Exclusions

- Active deemed measure
- Air-cooled (temporary)
- Absorption/adsorption chillers

Data Collection/M&V

- Equipment information for inputs into the PG&E HVAC Tool
- Tiered requirements based on measure savings
  - <$25,000 or 250,000 kWh
    - Generally, relies on BAS screenshots or pictures
    - Trend data for not enabled or unoptimized CHW and CW resets
  - ≥$25,000 or 250,000 kWh
    - Pictures verifying equipment specifications
    - Trend data for operational aspects (e.g., cooling load, sequencing, temperature resets)

Calculation Tools and Methods

- PG&E HVAC Tool (Excel)
  - Temperature bin analysis
  - Simple or trend data inputs
  - Use embedded charts to check model vs. operation

- PG&E HVAC Tool Methodology document details input parameters and tips

Chiller System Final Affirmation

- Final questions and comments

- **TF affirmation**

HVAC RCx Measure Package

SPENCER LIPP

For TF affirmation

HVAC RCx Measure Package

Materials

- Measure Package
  - Measure Characterization
  - PG&E HVAC Tool
  - PG&E HVAC Methodology

Hyperlinks require access to the Custom Initiative SharePoint site; email spencer.lipp@futee.biz to request access.

Group Members

- Armen Saiyan* (LADWP)
- Adan Rosillo* (PG&E)
- Babak Yazdanpanah* (LADWP)
- Michael Green* (Willdan)
- Ajay Wadhera (SCE)
- Shane Sugiyama (SCE)
- Danny Ng (PG&E)
- Sean Lim (LADWP)
- Jessie Wang (SDG&E)
- Glen LaPalme (TRC)
- Mohit Shah (TRC)
- Felix Monterroso (Willdan)

* TF member

HVAC RCx Measures

Custom Measures

- **Chilled Water Plant**
  - CHW plant lockout
  - Chiller sequencing
  - CHW supply temperature reset
  - CW supply temperature reset
  - Water side economizer optimization
  - Cooling tower sequencing
  - CHW differential pressure reset

Related Deemed Measures

- SWHC008 – VSD on CHWP and CWP

HVAC RCx Measures

Custom Measures

- **Air Side Systems**
  - Scheduling optimization
  - Economizer optimization
  - Static pressure reset
  - Supply temperature reset
  - Fan airflow optimization
    - VAV minimum settings
    - Air change rate settings
  - Space temperature optimization
    - Deadband optimization
    - Unoccupied space temperature setpoints

Related Deemed Measures

- SWSV010 – Economizer controls by adjusting the changeover setpoint on commercial DX and split systems

HVAC RCx Measures

Custom Measures	Related Deemed Measures

• **Hot Water Systems**
  ○ Hot water plant lockout
  ○ Hot water temperature reset
  ○ Hot water differential pressure reset
	• None

Measure Application Types

- All MATs are BRO

Measure Baselines

- All measures use existing conditions baseline

Eligible Products and Program Exclusions

Eligibility

- Largely driven by PG&E HVAC Tool modeling
  - System operation must be reasonably modeled by the PG&E HVAC Tool
- Specific system criteria
  - HVAC systems
  - Chiller – Same as Chiller Systems CMP
  - Air – single duct with zone reheat
  - HW – max 3 boilers with specified pumping configurations

Exclusions

- Active deemed measure
- Buildings or systems less than 3 years old
- Coinciding with major equipment replacements

Data Collection/M&V

- Equipment information for inputs into tool
- Tiered requirements based on measure savings
  - <$25,000 or equivalent of 250,000 kWh or 25,000 therms
    - Generally, relies on BAS screenshots or pictures
    - Trend data for not enabled or unoptimized CHW and CW resets
  - ≥$25,000 or equivalent of 250,000 kWh or 25,000 therms
    - Pictures verifying equipment specifications
    - Trend data for operational aspects (e.g., cooling load, heating load, sequencing, temperature resets)
    - Multiple measure projects and individual measures in lower tier, conduct higher tier M&V for at least 30% of the savings

Calculation Tools and Methodology

- **PG&E HVAC Tool**
  - Temperature bin analysis
  - Simple or trend data inputs
  - Use embedded charts to check model vs. operation

- **PG&E HVAC Tool Methodology** document details input parameters and tips

HVAC RCx Final Affirmation

- Final questions and comments

- **TF affirmation**

BREAK
3:15 – 3:30

Custom Initiative

- Custom Initiative Workplan
- Custom Subcommittee
  - Meets monthly on the first Wednesdays, 1-3pm
- Custom Initiative SharePoint Site
  - Resource Library
  - Custom Subcommittee Meeting Slides
  - Working Group Meeting Materials and Work Products
- Activities Update
  - 5A-1 – Resource review and recommendations
  - 5A-2 – Statewide Custom Measure Names (moved to 2024)
  - 5A-3 – List of Hybrid Measures
  - 5A-4 – List of Custom Tools
  - 5B – Custom Roadmap
  - 5C-1 – Custom Measure Characterizations
  - 5C-2 – Custom Measure Package Workflow
  - 5D – eTRM Templates for Custom
  - 5E-1 – eTRM Custom Library and Measures Modules
  - 5E-2 – eTRM Custom Vision & Modules (moved to 2024)

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Detailed Policy Review

- Comprehensive policy review related to custom measures/programs
  - Understand current policy (e.g., what has been superseded)
  - Identify any overlapping/conflicting policy
  - Identify any gaps in current policy and practice
  - Seek clarification where needed
  - Make recommendations to address policy pain points

- Discussion/Input:
  - What specific questions do you have about custom policy/guidance?
  - Where might there be gaps in policy and practice?
  - What are key policy pain points?

Policy Review Brainstorm

- What policy/guidance/requirement/practice do you want to bring attention to (e.g., question/concern)?

- Brainstorm
  - Identify specific policy, guidance, requirement, practice (provide specific reference if possible).
  - Describe question or concern
    - Question/clarification
    - Possible conflict/inconsistency in policy/practice
    - Policy concern (e.g., creates barriers to EE goals)
    - Other
  - Rank importance / impact
    - 1 = low impact
    - 5 = mission critical

Next Steps

- Action Items
  - TBD
- Upcoming Meetings
  - Custom Subcommittee – Wednesday, November 1, 1-3pm (remote)
  - Cal TF Meeting – Thursday, November 16, 10am – 4pm (remote)

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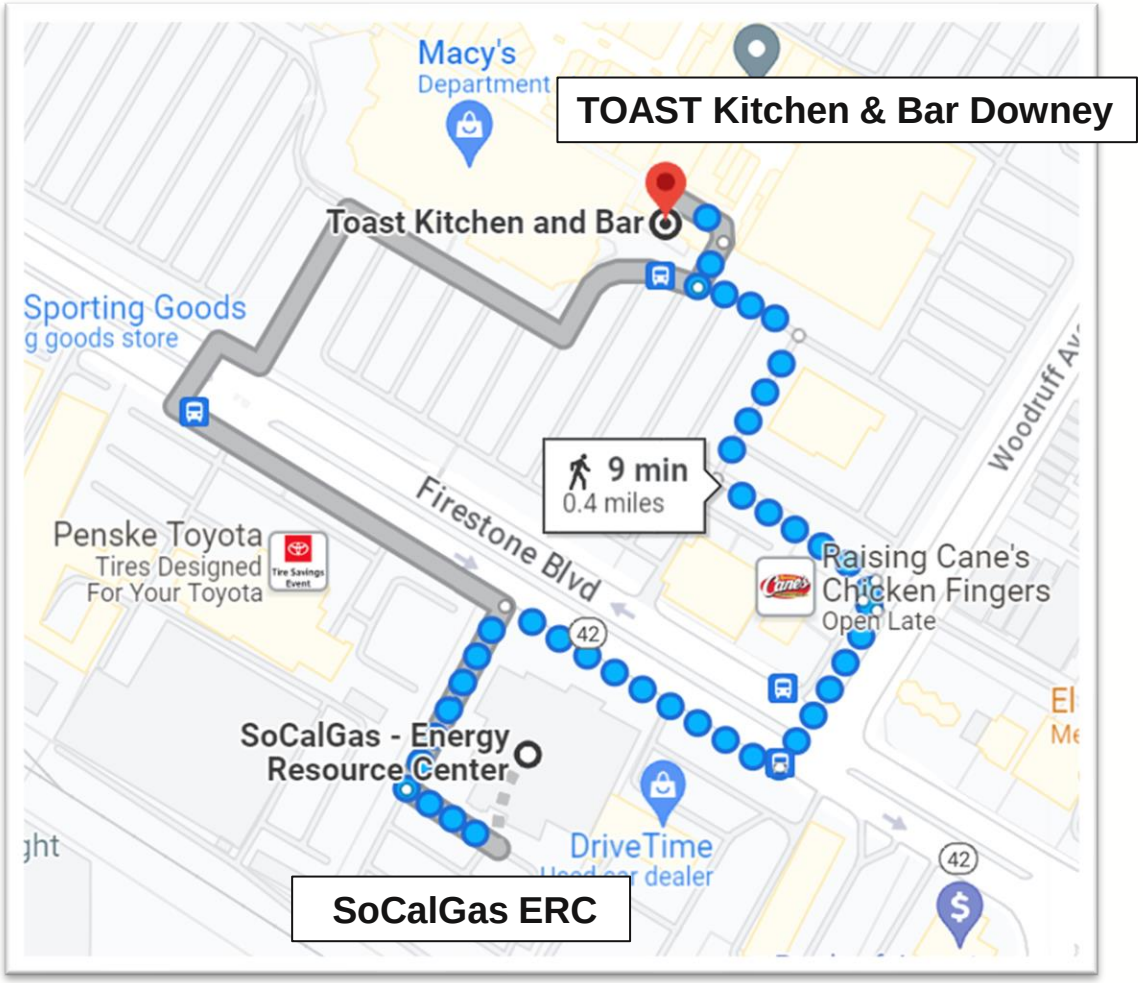
No-host Happy Hour

9-minute walk

0.4 miles



Custom Working Groups

- Custom Subcommittee
  - General updates/discussion on Work Plan activities
  - Meets monthly on 1st Wednesdays, 1-3pm (remote)
- Active Working Groups
  - Measure Subgroups
    - Develop Custom Measure Characterizations for selected measure measure types
    - Meetings vary based on membership (typically 1hr, biweekly)
    - Steam Boiler, HVAC RCx, Chiller Systems, Pump Systems
  - Industry Standard Practice
    - Research & analysis to support Cal TF White Paper on ISP
    - Meets weekly on Mondays, 11am
- TBD Future Working Groups
  - Policy Review
  - Tool Subgroups
  - eTRM Custom Modules

5A: Gather/Organize/Prioritize

5A-1: Custom Regulatory Summary Review

- **Objective**
  - Summarize the sources and scope of existing custom regulatory guidance
  - Develop recommendations to improve access and clarity for all stakeholders
- **Approach**
  - Gather and summarize existing resources
    - *Need support from CPUC, IOUs to identify/access*
  - Characterize resources (e.g., accessibility, update status, update frequency, clarity, and usefulness)
  - Identify potential overlap, conflicts
  - Develop, prioritize recommendations
- **Deliverables**
  - Summary of custom regulatory resources, policy, and guidance resources
  - Proposal to improve approach to summarizing and providing clear guidance on custom projects

5A-2: Statewide Custom Measure ID

- **Objective**
  - Establish a Statewide Measure ID structure for custom measures
- **Approach**
  - Review existing PA-specific measure codes
  - Model deemed measure code structure
  - Map existing PAC codes to proposed new code structure
- **Deliverables**
  - Proposed SW Custom Measure ID Convention for Custom Measures
  - Table to map existing PA-specific measure codes to proposed SW Measure ID

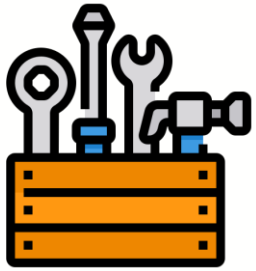
5A: Gather/Organize/Prioritize

5A-3: List of Measures for Statewide Methods

- **Objective**
  - Identify and prioritize custom measures for statewide standardization and hybrid methods
- **Approach**
  - Identify common custom measures
    - Custom program activity and claims data
    - Existing methods guidance documents
    - Stakeholder input on potential new custom measures
  - Identify “hybrid” opportunities
  - Prioritize measures for statewide development
- **Deliverables**
  - List of custom measures recommended for SW standard and/or hybrid methods

5A-4: List of Custom Tools

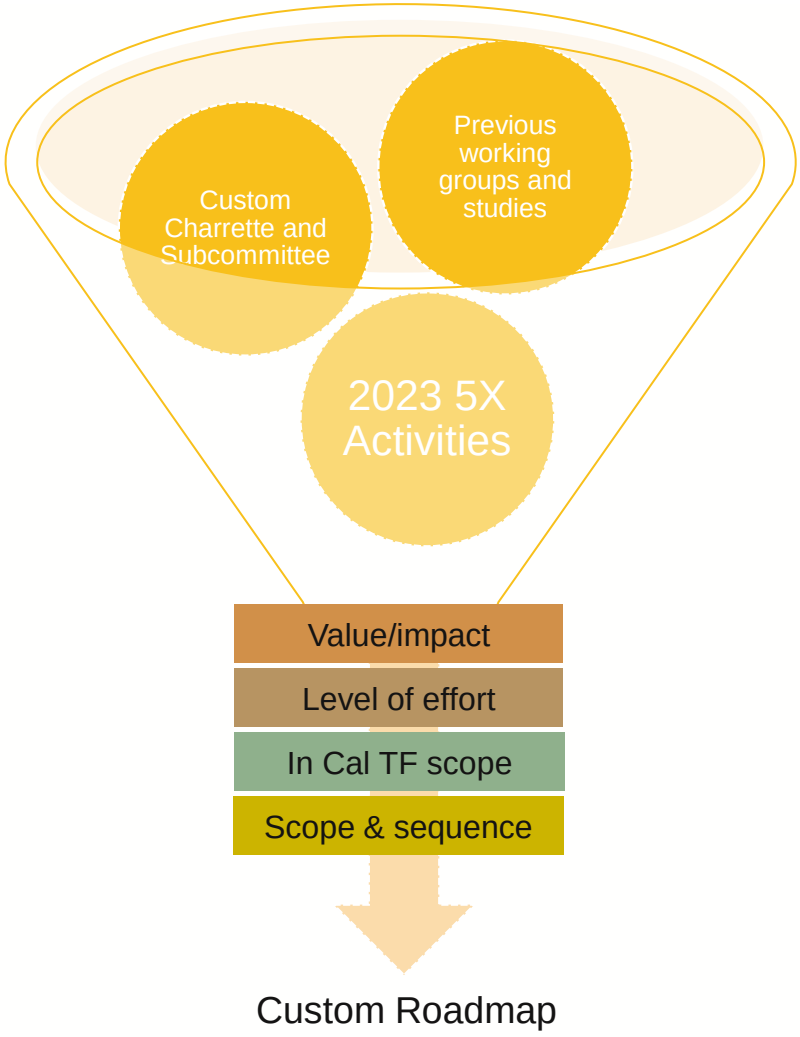
- **Objective**
  - Identify and characterize custom tools that stakeholders may use to develop custom projects
- **Approach**
  - Identify and gather existing tools
    - *Need support from CPUC, IOUs, implementers to identify/access*
  - Characterize tools (e.g., use, status)
  - Identify and prioritize needs to improve the library of useful tools
- **Deliverables**
  - List of characterized custom tools used in past five years.
  - Public library of custom tools with summary information
  - Prioritized list of needs to update, seek approval, and/or develop new custom tools.



5B: Custom Roadmap

- **Objectives**
  - High-level scope, priorities, and schedule for future Cal TF activities
  - Framework for Custom Initiative tactics in the annual Business Plan

- **Deliverables**
  - Summary of characterized custom improvement goals and activities
  - Draft and Final Custom Roadmap
    - Requires PAC approval



5C: Develop/Implement SW Methods

5C-1: Statewide Custom Measures (3)

- **Objective**
  - SW Custom Measures
    - Definitions
    - Eligibility
    - Savings methods
    - Data collection requirements
    - M&V requirements
    - Calculation Tools/Resources

  Custom Measure Characterization

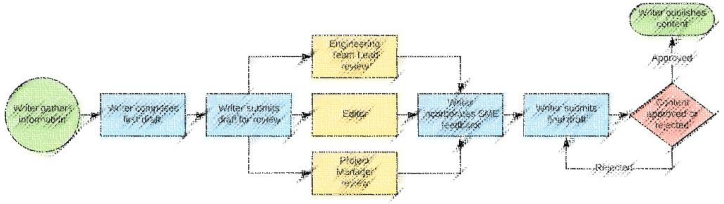
- **Approach**
  - Custom Measure Subgroups
  - Solicit CPUC input
  - Custom Subcommittee approval
  - Cal TF affirmation
  - Solicit CPUC approval

- **Deliverables**
  - Custom Measure Packages, presented to Custom Subcommittee for affirmation

5C-2: Custom MP Develop/Update Workflow

- **Objective**
  - Formal workflow and process for developing, reviewing, and updating SW Custom Measures and Tools

- **Approach**
  - Adapt deemed MP workflows to custom
  - Seek CPUC buy-in to provide input and review proposed SW custom measures and tools



- **Deliverables**
  - Custom Measure Package Development and Update Workflow, presented to TF for affirmation
  - Assessment of potential to implement approved workflow in eTRM

5D: Update eTRM Documentation

- Objectives:
  - eTRM documentation as needed to support custom measures and resources in the eTRM
- Deliverables:
  - eTRM Custom Measure Characterization Template
  - TBD based on 2023 Enhancements

5E: eTRM Implementation

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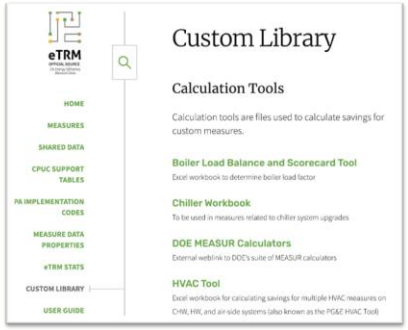
101

5E-1: eTRM Custom Phase 1

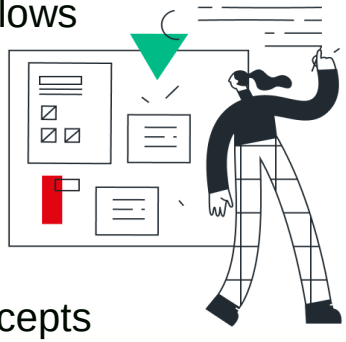
- **Objective**
  - Custom Measures
  - Custom Library



- **Deliverables**
  - Functional specifications and wireframes **(Complete)**
  - Implement eTRM Custom Phase 1 (TBD)

5E-2: Additional eTRM Custom Modules

- **Objective: Leverage the eTRM for Custom**
  - Data intake
  - Calculations
  - POU tools
  - Develop custom projects
  - Project review workflows



- **Deliverables**
  - Custom module concepts
  - Custom eTRM Visioning Charrette
  - Business requirements and functional specifications for select modules (TBD)