



Agenda & Notes

California Technical Forum (Cal TF)

Meeting 46: Technical Forum (TF)

January 24, 2019
10:00 a.m. – 4:00 p.m.
 Pacific Energy Center
 851 Howard Street, San Francisco

Time	Agenda Item	Discussion Leader(s)
10:00 – 10:15	Opening <ul style="list-style-type: none"> • Introductions • Updates 	Annette Beitel, Cal TF Staff
10:15 – 12:00	HVAC Measures <ul style="list-style-type: none"> • High-level measure breakdown • Review notable issues ACT: Cal TF affirmation of consolidated measures	Ayad Al-Shaikh, Cal TF Staff
12:00 – 12:30	Lunch	
12:30 – 2:15	HVAC Measures (Continued)	
2:15 – 2:45	Potpourri of Measures <ul style="list-style-type: none"> • High-level measure breakdown • Review notable issues ACT: Cal TF feedback on approach; Identify issues for subcommittee to address prior to affirmation	Ayad Al-Shaikh
2:45 – 3:45	Stage 2 Recommendations for 2019 <ul style="list-style-type: none"> • Review current status of stage 2 issues ACT: Review and select subset for Cal TF action in 2019	Jennifer Barnes & Tim Melloch, Cal TF Staff
3:45 – 4:00	Close Recap agreements & action items	Annette Beitel



Meeting Materials

- Presentation: HVAC Measures
- Presentation: Potpourri of Measures
- Presentation: Stage 2 Recommendations for 2019
- Stage 2 Issues Spreadsheet



I. Attendees

	<i>In-Person</i>	<i>Via Telephone</i>
<i>Cal TF Staff</i>	Annette Beitel Jennifer Barnes Jennifer Holmes Ayad Al-Shaikh Roger Baker Tim Melloch Maxfield Herrenbruck Tomas Torres-Garcia	
<i>Cal TF Members</i>	Doug Mahone, retired HMG/TRC Steven Long, Lockheed Martin Spencer Lipp, Lockheed Martin Sepi Shahindard, Cadmus George Beeler, AIM Ed Reynoso, SDG&E Mary Matteson Bryan Greg Barker, Energy Solutions Armen Saiyen, LADWP David Springer, Frontier Energy George Beeler, AIM Chan Paek, So Cal Gas Gary Fernstrom, retired PG&E	Pierre Landry, Landry & Associates Larry Brackney, NREL Larry Kotewa, Elevate Energy Chris Rogers, CleaRESULT Mike Casey, Onsite Energy Ryan Hoest, EcoVox
<i>Non-TF Attendees</i>	Jay Madden, SCE Andres Fergadiotti, SCE Bryan Boyce, Energy Solutions Henry Liu, PG&E	Keith Valenzuela, SDG&E Jia Huang, PG&E Tai Voong, PG&E Jim Hanna, Energy Solutions Luke Sun Bing Tso, SBW Akhilesh Endurthy, Solaris Jeremiah Valera, LADWP Ben Lipscomb Paul Thomas Sempra Utilities



I. Key Decisions and Action Items

HVAC Measures

ACT: Cal TF to post measure application type “cheat sheet” on website for convenience

Commercial HVAC Measures

ADD TO STAGE 2 LIST: For air-cooled chillers, examine tiers and performance data to restructure tiers. They are currently not correct (not a linear relationship).

ACT: Add AR MAT to 5.24 Unitary Air-cooled AC, > 65 kBtuh for POUs only.

ACT: Andres Fergadiotti to summarize the scope of SCE’s work on 5.28 Ductless AC < 24 kBtuh, which is in progress, for the February TF meeting.

ACT: Andres Fergadiotti to provide more information about the WP update for 5.50 Cogged V-belt for HVAC Fan, Commercial in the February TF meeting.

ACT: SCE/Andres will confirm Title 24 ventilation requirements for 5.21 Classroom HVAC Occupancy Sensor in February TF meeting

ACT: Cal TF staff to follow up with Armen on control assumptions for 5.07 VFD Demand Control System Retrofit to Parking Structure Exhaust Fan

ACT: Ayad to schedule a meeting to reach decision on the normalized unit, cap-tons or per household or 1,000 sqft, for residential service measures.

ADD TO STAGE 2 LIST: For measures moved into the BRO category, had to adopt a 3 year measure life even though measure lives ranged from 5 – 8 and even as high as 18 years previously. A party can propose an alternative measure life if they have proof, but why isn’t the burden on the CPUC to support the change to 3 year (BRO)?

ACT: Shift 5.55 Heat pump electric resistance heater controls to future affirmation

Commercial HVAC Measure Affirmation

Cal TF affirmed the following HVAC measures, with modifications discussed:

- 5.01 Economizer Controls, Commercial
- 5.02 Economizer Repair, Commercial
- 5.15 Supply Fan Controls, Commercial



- 5.05 Water-cooled Chiller
- 5.39 Air-cooled Packaged Chiller
- 5.03 Space Heating Boiler, Commercial
- 5.19 Furnace, Commercial
- 5.24 Unitary Air-Cooled Air Conditioner, Over 65 kBtu/h, Commercial
- 5.25 Unitary Air Cooled AC or Heat Pump, Under 65 kBtu/h, Commercial
- 5.26 Evaporative Condenser, Commercial
- 5.41 VSD for HVAC Fan Controls, Commercial
- 5.44 Adaptive Climate Controller for Guest Room PTAC or PTHP
- 5.45 Energy Management System for Guest Room PTAC or PTHP
- 5.46 Programmable Communicating T-stat for Demand Response, Com
- 5.50 Cogged V-Belt for HVAC Fan, Commercial
- 5.16 Variable Speed Motor for Air Handler, Commercial
- 5.21 HVAC Occupancy Sensor, Classroom
- 5.14 VFD Retrofit for Central Plant System
- 5.07 VFD Demand Control System Retrofit to Parking Structure Exhaust Fan

Residential HVAC Measures

ACT: Andres/Jay to inquire if program would use 5.11 Quality installation for residential split systems and package systems and address in the February TF meeting.

Residential HVAC Measure Affirmation

Cal TF affirmed the following residential HVAC measures, with modifications discussed:

- 5.10a Refrigerant Charge, Residential
- 5.10b Condenser Coil Cleaning, Residential
- 5.10c Evaporator Coil Cleaning, Residential
- 5.10d Air-flow Adjustment, Residential
- 5.10e Duct Seal, Residential
- 5.23 Evaporative Condenser, Residential
- 5.34 Window Evaporative Cooler, Residential
- 5.35 Direct Evaporative Cooler, Residential
- 5.36 Direct-Indirect Evaporative Cooler, Residential
- 5.11 Split System HVAC Quality Installation, Residential
- 5.27 Package Terminal Air Conditioner or Heat Pump, Under 24 kBtu/h
- 5.38 Portable Room Air Conditioner
- 5.40 HVAC Equipment, Upstream, Residential
- 5.17 Whole House Fan, Residential



- 5.29 Air Filter Replacement, Residential
- 5.55 Heat Pump Electric Resistance Heater Controls, Residential
- 5.18 Furnace, Residential
- 5.20 Gravity Wall Furnace, Residential
- 5.57 Intermittent Pilot Light, Residential

Unconsolidated Measures

ACT: Cal TF will review and consolidate these measures with same affirmation process followed for other SW measures. This will need to be done early in 2019 to meet deadline for use of measures by Jan 1, 2020.

ACT: Revise updated lighting measures as follows:

- Outdoor/Parking Garage
- LED high bay/low bay
- LED ambient

Closing

ACT: Jennifer Barnes will market the upcoming Cal TF RFQ to CEDMEC

ACT: Cal TF staff will coordinate with new EAR Team regarding attendance/participation in Cal TF meetings



I. Meeting Notes

A. Opening

Presenter: Annette Beitel

Goal is to have all consolidated statewide measures uploaded and approved in the eTRM by August 2019, for implementation on January 1, 2020.

eTRM phase 1 development is complete. Team is in the process of defining phase 2 updates to be complete by August 1, 2019.

Also working on a solicitation for new Cal TF members.

B. HVAC Measures (Ayad Al Shaikh)

A1. Overview

- 10 subcommittee meetings, 53 measures, largest end use for portfolio savings
- Seeking Cal TF affirmation for some but not all HVAC measures at this meeting
- Many measures but a small number account for a large portion of HVAC savings
- Some measures are “POU only” because they are inactive in the IOU portfolios
- Savings for measures have been declining, some measures discontinued, code, and ISP affects a lot of measures
- Stage 2 issues for HVAC measures
- Spencer Lipp: For each measure, identify where the ISP comes from (studies, other)?
- Reviewed new terminology/acronyms for measure application type and delivery types (as per Resolutions E-4818, E-4952)
 - ACT: Cal TF to post measure application type “cheat sheet” on website for convenience
- DEER 2020 Updates – stage 1 issue for all measures
 - Peak period, measure app type, delivery type, vintage

A2. Commercial Measures – Service / Quality Installation (6)

5.30 Refrigerant Charge, Commercial

- DEER 2020 updates
- New WP submitted end of 2018. Will not know status until March. Not yet consolidated.
- Norm units (for commercial measures) - capacity-tons
- Henry Liu: New DEER vintage weighting factors shift weighting to newer building vintages.



- Henry Liu: Saving change due to DEER changes due to vintage, LPD, and occupancy factors
- MASControl3 – do not see vintage data anymore; only possible if re-run. Finding vintage data in workbooks difficult.
 - “DEER2020 Prototype Changes” on DEER website
- Spencer Lipp: losing transparency
 - Annette Beitel: eTRM would make all measures transparent. But for modeled measures, need to establish what documentation is needed to be retained so measures are transparent.
 - Spencer Lipp: From implementer perspective, what if I wanted to target older vintage measure buildings? Need to be smarter with targeting and new vintage weighting reduces implementer ability to do this.
 - Annette Beitel: Stage 2 /white paper, could take hybrid approach, would require site specific information
 - Henry Liu: Reviewed DEER update policy and estimated change of savings, will explore further if request from ED would be needed.
 - Ayad Al-Shaikh: Our work over the summer sought to identify key drivers of savings of HVAC measures. Many measures could not reproduce savings. Can keep deemed but find parameters that most influence savings.

5.31 Evaporator Coil Cleaning, Commercial

- WP submitted end of 2018
- Similar to 5.30

5.32 Condenser Coil Cleaning, Commercial

- WP submitted end of 2018
- Similar to 5.30

Gary Fernstrom: Noticed significant changes of claimed savings

- ISP or dispositions change how savings can be claimed

5.01 Economizer Controls, Commercial

- Savings for all com building types and climate zones
- Unit = cap-tons
- Stage 2 issues – convert PA-specific values to statewide, consider enthalpy controls
 - Jay Madden: Article by Steve Taylor re: enthalpy controls might not be appropriate for dry CA climate



- Measure Permutations sheet shows data spec by IOUs and the consolidated factors
 - Jay Madden: Specifying possible delivery types for SW measures so more options are available for 3P proposals
 - Annette Beitel: Work out short form approval path with EAR team to add new delivery type to a measure
 - Steven Long: How are these types of changes accounted for in rolling portfolio? Cost data, baseline data, etc. Can that be added mid-year, or bus-stopped for following year? Phase 1 vs Phase 2 measures.
 - Annette Beitel: No clear process for measure updates have been discussed with EAR team. Measures approved by Aug 1, 2019 for Jan 1 2020. ED Staff concerned about workload on EAR team, but seem to want to accommodate.
 - David Springer: Consider packages of measures for next wave of consolidated measures. (Jay, for example VFDs w/ packaged rooftop)
 - If no policy that prevented combining DR and EE, could look at these together

5.02 Economizer Repair, Commercial

- Steven Long: Inconsistency of how measures are classified. Should this be BRO? Two measures: Add economizer, or repair economizer.
 - Henry Liu: This one moved to BRO-RCx

5.15 Supply Fan Controls, Commercial

- Stage 2 issue – examine EUL

A3. Commercial Measures – HVAC Units (12)

5.05 Water-cooled Chiller

- Important measure
- Requirements for this measure have changed significantly. Now must meet part load and full load requirements to qualify, limiting number of systems that could qualify.
 - Andres Fergadiotti: The way DEER structured tiers is incorrect, not a linear relationship. Working to fund a multi-phase project to examine tiers and performance data, then will submit revised measure (2021)
 - Same for air-cooled chiller
 - Add to stage 2 issue list.



5.39 Air-cooled Chiller

- Similar to water-cooled chiller, savings have dropped
- Gary Fernstrom: Looking at gross savings is misleading, also look on a per-unit basis. Drop in savings due to number of units or savings per unit?
- Henry Liu: Prior to 2016 could meet full or part load, more systems qualified. After, few units qualified. Currently, the market can't make the full load requirement in DEER, but the part load they can exceed. The manufacturers believe full load is so hardly used (IE the part load equation), it doesn't make sense to make full load efficiency so much more efficient.
- Spencer Lipp: Look at sales data from distributors to see if there is a relationship. Henry has provided this data to the Commission. Christian Weber has presented to CPUC
- Henry Liu: Challenge is to document program influence
- Steven Long: 10%-15% above code includes majority of units. Is there a study that justifies this? Is it arbitrary?

5.03 – Space Heating Boiler, Commercial

- Challenge was to define offerings to align with how programs were running.
- 2018 claims data shows mix of buildings into which this measure is installed.
- Bryan Boyce: Concerned that the way DEER rates gas-fired hot water boilers >2,500 kBtu/h is at odds with how both DOE/Title 24 codes rate them and how the industry understands this equipment. The federal standard for this type of equipment is based on combustion efficiency (82% requirement), and Title 24 follows DOE. In their DEER2016 boilers workbook, DEER converted from combustion to thermal efficiency & expressed this measure in thermal efficiency. The PG&E workpaper follows DEER. Recommend that combustion efficiency be used for this equipment, as our midstream program cannot incentivize any equipment because nothing in the field is rated to thermal efficiency in that size category. DEER used a straightforward 2% decrement between the two ratings.
- Henry Liu: DOE standard for January 2020 to bring up to 94-95%, but stakeholders saying not achievable, in legal battle. Probably further out than 2020. This would eliminate tier 1 completely. Utilities might start adjusting tiers.

5.19 Furnace, Commercial

- Changed norm units to be consistent with category
- Methodology builds upon residential measure, but operation between residential and commercial is significantly different

5.24 Unitary Air-cooled AC, > 65 kBtuh



- Multiple tiers
- Stage 2 issue to better understand/document performance curves
 - Henry Liu working to provide information to new EAR team
 - Annette Beitel: Manufacturer or actual performance curves? Bryan Boyce: Technology driven. Benefit of establishing for every technology not worth the cost.
- ACT: Add POU only for the AR MAT
- Henry Liu: E4818 specifies how measure application types can be delivered
- Weighted average of claims data by building type matched COM building type values, but shows opportunity for higher savings with specific building types (or conversely over estimating of savings)

5.25 Unitary Air-cooled AC, ≤ 65 kBtuh

- Similar to 5.24
- Savings have remained fairly consistent since 2016
- High volume measure

5.26 Evaporative Condenser, Commercial

- Stage 2 issues for evaporative measures – cost methodology
- IOUs not likely to offer this measure; PG&E will sunset because of low adoption rate, SCE determined not cost-effective
- Jay Madden: Evaporative pre-cooling AOE submitted to CPUC yesterday
- Armen Saiyen: POUs will keep offering even if not picked up by IOUs

5.28 Ductless AC < 24 kBtuh

- Re-examine, IOUs want to support, but will need to address stage 2 issues.
- Disposition required collection of actual performance data.
- Doug Mahone: IMC high, but building owner may choose to install anyway for other reasons. If using PAC test, would not care about IMC.
- Henry Liu: Consider examining the measure definition so see if it can/should include fuel switching
- ACT – Andres to summarize the scope of SCE's work on this measure which is in progress

5.56 Single Package Vertical Heat Pump, K-12 and Community Colleges

- New WP submitted end of 2018, not yet consolidated
- Building prototype for K-12, would need to run with different prototype for other markets



5.22 VRF for Heat Pump or Heat Recovery System > 65 kBtuh, Commercial

- Measure on hold for IOUs, keep as POU-only until stage 2 addressed
- VRF disposition required 1) IOUs to reach out to market on how incentive motivated customer to go from duct system to VRF. 2) examine technology shift and fuel switching 3) questions regarding initial modeling
- PG&E conducted rough analysis to pass the 3-prong test. Passing IMC portion of 3-prong test is biggest challenge. Bryan Boyce – having difficulty getting OEM cost data.
- Doug Mahone: Do energy savings include duct losses? Henry Liu: Have not conducted detailed data collection/analysis, trying to pass 3-prong test at high level before investing more resources in this measure.

5.51 Water Sourced Heat Pump, Commercial

- Retired

A4. Commercial Measures – HVAC Controls (11)

5.06 Demand Controlled Ventilation for Single Zone Packaged HVAC

- New WP submitted end 2018, not yet consolidated

5.49 Enhanced Ventilation for Packaged HVAC with Gas Heating or Packaged Heat Pump, Commercial

- New WP submitted end 2018, not yet consolidated
- Andres Fergadiotti: DEER2020 changes reason for differences in savings between years

5.41 VSD for HVAC Fan Controls

- Could not replicate savings of this 2005 DEER measure in MASControl
- More substantial measure, so stage 2 issue is to continue analysis

5.44 Adaptive Climate Controller for Guest Room PTAC or PTHP

- Stage 2 issues, need supporting documentation for savings
- Henry Liu: Not much interest in this measure

5.45 Energy Management for Guest Room PTAC or PTHP

- Substantial measure, but likely to drop off for IOUs because of ISP
- Spencer Lipp: ISP can vary within the hotel/motel sector



- Henry Liu: ISP manual currently being revised, reviewed by Commission. How should ISP be initiated. Is there adoption of measure? Is it cost-effective? Does ISP represent the entire sector or only applicable to a sub-sector?

Armen Saiyen: General comment re ISP, does the measure accelerate adoption?

Andres Fergadiotti: Recommend how ISP is determined and applied.

5.46 Programmable Communicating Thermostat for DR, Commercial

- WP sunset at end of 2018 due to ISP
- Savings based upon no thermostat previously, adjustment of setpoints as part of CQM. SCE retired last year, signaled this is being done during maintenance.
- Armen Saiyen: Would like to keep offering, depends upon how savings are quantified. Henry Liu: Savings not based upon DR event

5.50 Cogged V-belt for HVAC Fan, Commercial

- Andres Fergadiotti: SCE is updating this WP for 2020. Running with latest prototypes for MASControl3, otherwise unchanged.
 - ACT: Andres to confirm the details of this update in the February TF meeting.

5.16 Variable Speed Motor for Air Handler, Commercial

- No claims in 2017/2018, but IOUs are still including this measure

5.21 Classroom HVAC Occupancy Sensor

- No claims in 2017/2018, but IOUs still including this measure
- George Beeler: Good for this measure to be tied with ventilation control with CO₂ sensor. This combination might exist in another measure.
- Andres Fergadiotti: Should confirm Title 24 ventilation requirements; SCE dropped because of code requirements.
 - ACT: SCE/Andres will confirm in February TF meeting

Armen Saiyen: Any particular requirement to use DEER loadshapes? CEC recently updated loadshapes.

- Ayad Al-Shaikh: For SW seeking consensus on load shapes that all IOUs have access to.
- Armen Saiyen: CEC has them for forecast climate zones.
- Henry Liu: Team prioritizes DEER load profiles, then IOUs will default to their IOU-specific load shapes. CEC/ADM work is being explored.



- Armen Saiyen: Some measures are mapped to specific load shapes, can they be mapped to others?
- Ayad Al-Shaikh: Load shapes designated when submit measure to CPUC, choosing best available, this is high on the list to address for Stage 2

5.14 VFD Retrofit to Central Plant System

- SCE already sunsetting VFD for cooling tower fan because of ISP; now sunsetting chill water pump VFD
- Spencer Lipp: Look at what is triggering code requirement. An existing plant will not trigger chilled water T24 requirements. EUL is not representative of what is happening in terms of turnover.
- Keep as POU measure
- Spencer Lipp: Is NTG an indicator of ISP? Sunsetting measures is eliminating them for everyone and for customers.
- Henry Liu: This is not a high-impact measure, so not likely evaluated in recent years
- Stage 2 issues – review ISP policy, EUL, ISP assumptions, standard process for making decisions
- Andres requested documentation/available data for keeping measure
- Henry Liu: Referenced ISP document currently under review

5.07 VFD Demand Control System Retrofit to Parking Structure Exhaust Fan

- To be sunset by IOUs, but significant measure
- Armen Saiyen: This is a big measure for POUs
- ACT: Cal TF staff to follow up with Armen on control assumptions

Commercial HVAC Measure Affirmation:

- Cal TF affirmed the following HVAC measures, with modifications discussed:
 - 5.01 Economizer Controls, Commercial
 - 5.02 Economizer Repair, Commercial
 - 5.15 Supply Fan Controls, Commercial
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- 5.44 Adaptive Climate Controller for Guest Room PTAC or PTHP
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David Springer: Asked about precooling for commercial

Residential Overview

- Decrease in refrigerant charge savings (disposition)
- Decrease in duct sealing savings (EUL)
- Blower measure is strong
- Smart thermostat savings is huge, but other controls are small
- Supply fan blower motor measure – DEER measure for 2020

A5. Residential Measures – Service (6)

For service measures, biggest stage 1 issue is to agree on same normalized unit - cap-tons or per household or 1,000 sqft?

- Program staff advocate for per-hh
- DEER measures are per 1,000 sqft. DEER gives capacity per hh and vintage
- Gary Fernstrom: Consider base savings on per AC unit, and assume size assumption
- Doug Mahone: per unit
- Andre Fergadiotti: cap-ton.
- ACT: Ayad to schedule a meeting to reach decision.

5.10a Refrigerant charge, residential

- DEER measure, changing to BRO-RCx, EUL value to 3 years

5.10b Condenser coil cleaning, residential

- BRO-RCx
- Disposition derives savings as portion of RCA measure savings
- Would like to document savings



5.10c Evaporator coil cleaning residential

- BRO-RCx
- Disposition derives savings as portion of RCA measure savings

5.10d Air flow adjustment, residential

- BRO-RCx

5.10e Duct test & seal, residential

- BRO-RCx
- Savings decreased from 2016, potentially due to EUL change to 3 years when assigned BRO.
- Henry Liu: PG&E will likely sunset this measure
- Henry Liu: PG&E looking at duct replacement measure (sections only, so as to not trigger code, and potentially only mobile homes), but this would still fall under BRO-RCx so might not be cost effective
 - Chan Paek: Will PG&E challenge the BRO assignment?
 - Henry Liu: Couldn't find data to substantiate different EUL. Aeroseal application cost prohibitive (increase full measure cost)

Doug Mahone: (General question) By changing MAT from AOE to BRO there is assumption of EUL drops to 3 years??

- Steven Long: Most of the measures had measure lives of 5 – 8 years. Duct Test and Seal was extreme. It went from 18 years to 3 years.
- A party can rebut the default 3 year lift, but must provide documentation to substantiate a different EUL
- Counter argument – existing EUL should be default and burden should be on party making the MAT change to justify the change to 3 years
 - ACT: Add as stage 2 cross cutting issue

5.10f / 5.42 Brushless Fan Motor for Residential AC (two measures: motor, controller)

- On hold, but significant measure
- SCE updated WP
- Gary Fernstrom: Asked for eligibility requirements
 - Henry Liu: Program requirements in SW WP are minimal to ensure savings assumptions apply; IOUs or implementers may add additional restrictions
- Andres Fergadiotti: QM disposition suggested higher motor capacity does not reflect higher savings



A6. Residential Measures – HVAC Units

Small savings

5.27 High eff PTAC and HP units < 2 tons

- Cannot reproduce DEER savings

5.37 / 7.14a Room AC, residential

- Already affirmed with appliance measures
- Henry Liu: Paying retailer to stock high eff units

5.38 Portable Room AC

- Retired, probably not wanted by POUs either

5.40 Upstream HVAC

- PG&E will retire, confirm if SCE will retire, but POUs interested

A7. Residential Measures – HVAC Controls (5)

Large savings

5.17 Whole house fan, residential

- DEER measure

5.29 Air filter replacement w/ alarm

- SCE no longer supporting
- No claims in 2017/2018
- Chan Paek: Was interested in gas savings, but measure does not affect gas usage
- Gary Fernstrom: Increasing air flow should increase combustion efficiency and therefore reduce gas usage. Chan Paek: EnergyPlus model does not show gas savings.

5.47 Smart thermostat, Residential

- Accounts for significant savings for this group of measures
- New workpaper submitted end of 2018, not yet consolidated
- Henry Liu: CPUC disposition stated 2018 savings approved through March 2019. Still have WP revisions underway, planning to submit mid-February.
- Sepi Shahindard: Looking at EUL, results will help to address disposition point regarding EUL of at least 5 years. Study results available next week.



5.55 Heat pump electric resistance heater controls

- No claims in 2017/2018
- Needs to be extended to IOUs
- ACT: shift to future affirmation

A8. Residential Measures – Evaporative Units (4)

Small savings (low adoption, high unit savings)

For this group, seeking consistent approach to cost analysis methodology (treatment of water costs)

5.23 Evaporative condenser, residential

- SCE updated WP
- Stage 2 issues
 - Based on DEER 2005, models potentially not available
 - Locations should be restricted to ensure benefits
 - Update program requirements

5.34 Window evaporative cooler, residential

- AOE, behavior component
- SCE updated WP includes requirements of customers to submit data to help to sharpen human error adjustment factor
- Remaining stage 1 issue to update EUL

5.35 Direct evaporative cooler, residential

- Similar to 5.34
- Need to review baselines

5.36 Direct-Indirect evaporative cooler

- Similar to 5.34

5.11 Quality installation for residential split systems and package systems

- SCE no longer supports this measure, WO32 cut savings but program was still offering res QI, not cost effective. Even if revived, programs might not adopt.
 - ACT: Andres/Jay to inquire if program would use this measure
 - Gary Fernstrom: TURN supported this measure as a low-cost measure for its constituents
 - Jay Madden: 3Ps might submit program with this measure, will run into same issues



- POU's may keep

A9. Residential Measures – Gas Units (3)

Small savings

5.18 High eff furnace

- Includes high eff motor offerings
- Reduced to 95, 97 AFUE

5.20 Gravity wall furnace

- This is a new measure with little claims data, and no harmonization issues because there was only one workpaper.

5.57 Intermittent pilot light, residential

- For gravity wall furnace, from ET study

Residential HVAC Measure Affirmation:

- Cal TF affirmed the following residential HVAC measures, with modifications discussed:
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 - 5.57 Intermittent Pilot Light, Residential

Potpourri of Measures



Presenter: Tim Melloch

Unconsolidated measures – measures were in the process of being updated by IOUs when consolidation was occurring in 2017 and 2018, so delayed consolidation till new or updated workpapers were completed.

Cal TF reviewed list and identified candidates for consolidation. Currently there are 24 measures on this list. Many of these measures have been approved by the CPUC.

Overview of New Measures

1. Efficient Fan Controller for Residential Furnaces – retrofit add-on for gas furnaces, extends blower run time, further dispersion of heat into conditioned space. Run cycles per year reduced.
2. Conveyor Broiler – SCG submitted WP at end of 2017
3. Refrigerated Chef Bases – Exist in all commercial kitchens, keep food close to prep area, increases kitchen efficiency. Savings result from high efficiency units compared to maximum daily energy consumption allowed per Title 10 of Electronic CFR.
4. Undercounter Dishwasher – found in bars or restaurants w/ bars, account for ~40% dishwasher market share. Significant water savings → energy savings. Addresses both low-temp and high temp units resulting in both gas and electric savings.
5. Flow control valve (res and non-res), flow restriction adaptor – applied upstream from the fixture point. similar savings to faucet and showerhead measures.
6. Dual setpoint boiler control for MF space heating – boiler serving both space and domestic water heating loads. EE based on addition of advanced electronic controller responding to hot water demand and weather conditions.
7. Commercial gas dryer modulating valve – two stage valve replaces single stage valve, higher fire rate initially (when max moisture content) followed by lower fire rate when moisture content is lower.

Cal TF will review and consolidate these measures with same affirmation process followed for other SW measures. This will need to be done early in 2019 to meet deadline for use of measures by Jan 1, 2020.

- Measures can be pulled out in subcommittee if there are points need further review.

Gary Fernstrom comments:

- PG&E worked with SCG to test savings for commercial gas dryers; the commercial gas dryer modulating valve was found to not be a good technology.



- DC circulation pool pump has limited application and not capable of filtering much pool water in compliant way. Does not provide for cleaning the pool with skimmer or auto cleaning system like other pool pumps.
- LED parking garage lights has already been addressed (baseline issue).
- Tim Melloch: These issues should be considered during affirmation

Greg Barker and Henry Liu provided feedback on LED outdoor lighting, exterior, parking garage offerings

- ACT: Revise updated lighting measures as follows:
 - Outdoor/Parking Garage
 - LED high bay/low bay
 - LED ambient

Stage 2 Recommendations for 2019

Pushed to February 2019 Cal TF meeting

Closing Comments

Presenter: Annette Beitel

- Next meeting in LA
- Upcoming RFQ for new Cal TF members, identify current members that will drop out.
 - ACT: Jennifer Barnes will market the Cal TF RFQ to CEDMEC
- ACT: Will coordinate with new EAR Team regarding attendance/participation in Cal TF meetings