Background

This Health, Comfort and Safety Evaluation (previously referred to as an Equity Evaluation) was recommended by the Energy Savings Assistance (ESA) Cost Effectiveness Working Group in their 2013 deliverable[[1]](#footnote-1) and subsequently ordered by the Commission.[[2]](#footnote-2) The IOUs[[3]](#footnote-3) were also directed to seek comments and alternate ratings on their evaluation from interested parties. Parties reviewing these results or providing alternate ratings are encouraged to read the context provided by the Working Group on pages 10 through 11 in the 2013 deliverable cited above. The following excerpt from that document provides a description of each of the criteria and rating values:[[4]](#footnote-4),[[5]](#footnote-5),[[6]](#footnote-6)

“1. *Eliminates combustion-related safety threat* – Prolonged exposure to high levels of carbon-monoxide (CO) can have adverse effects on human health, including CO poisoning that can lead to severe headaches, fatigue, shortness of breath, dizziness, and nausea. Extended and severe exposure can lead to permanent neurological damage and even death. Ambient air readings in participant homes should not exceed certain maximum ambient air CO levels, both in the center of the room(s) and near combustion appliances. A Natural Gas Appliance Test (NGAT) is performed to check for dangerous levels of CO. Any or all faulty natural gas-fired water heaters or furnaces that contribute to excessive levels of CO in the room(s) are shut off, becoming candidates for ESA repair or replacement. If ventilation/infiltration measures have been installed, a second NGAT will be conducted to ensure that tightening the building envelope did not adversely affect operation of any gas appliances.

2. *Eliminates fire safety threat/Improves home security (crime prevention) and building integrity* – While not necessarily within the scope of the ESA program at present, non-resource measures may address specific safety issues such as fire safety and improved home security/building integrity. This would include fire safety from hazards in the home, with the exception of natural-gas combustion. An on-site property assessment, similar to what is performed as part of the ESA program, would identify fire safety threats and home security issues, including poor exterior lighting, broken/unsecure windows and doors, inadequate/makeshift heating and cooking devices, and structural deficiencies.

3. *Reduces or eliminates extreme temperatures and temperature variations inside the home/improves customer ability to manage in-home temperatures* – Extreme temperatures in the home can lead to significant adverse health effects, including cold stress/hypothermia and heat stress/hyperthermia. Infiltration measures can help reduce temperature variation by minimizing air leakage into and out of the building envelope. Additionally, measures that reduce or eliminate extreme temperatures may also mitigate issues that arise from the use of inadequate, faulty and makeshift heating and cooling devices, leading to increased safety/security and decreased incidences of fire and asphyxiation. Attic insulation may help by decreasing the amount of conditioned air lost in the summer and the winter. Additional measures that address extreme temperatures may include new windows and heating/cooling units.

4. *Improves air quality, ventilation and/or air flow (e.g., reduces drafts and leakage)* – Poor air quality, ventilation and air flow can lead to increased health risks from mold, dust mites, and other contaminants. These risks may be mitigated by reducing the number of entry points for pollen, insects, rodents and other pests. Improved air quality and ventilation may also diminish condensation. Measures in this category, such as new windows and doors, duct sealing, and improved temperature/humidity control, may address one or more air quality issues, and can help reduce temperature variation by minimizing air leakage into and out of the building envelope. Reducing temperature variation within the home may also minimize the flow of warm air to cool spaces.

The Working Group recommends that the Equity Evaluation be performed by rating the extent to which every ESA measure achieves each particular health or safety improvement. A rating of “5” indicates that the measure almost always results in that particular improvement. In other words, almost all homes which receive the measure will see that improvement. For example, a measure which replaces faulty natural gas appliances would receive a “5” on criteria #1. Another way to think about a score of “5” is that it indicates that a measure has an extremely high probability of achieving the improvement in a home when it is installed.

 A rating of “3” indicates that the measure results in that particular improvement for about half the homes which receive it. For example, if a measure which provides insulation will likely reduce the occurrence of extreme temperatures in about half the homes where it is installed, that measure would receive a “3” on criteria #3. For certain measures, a more useful way to think about a score of “3” is that it indicates that a measure has about a 50% probability of making the improvement in a home when it is installed. For other measures, it may be more appropriate to think of a score of “3” as a result of a measure that partially achieves the improvement. For example, a measure may result in moderate, but not extreme, improvements in temperature variation in each home.

A rating of “1” indicates that the measure results in that particular improvement for only a small number of homes which receive it. For example, if a measure which replaces non-energy efficient appliances results in the replacement of appliances which are actually fire hazards about 10% of the time, that measure would receive a “1” on criteria #2. For certain measures, a more useful way to think about a score of “1” is that it indicates that a measure has less than 25% probability of making the improvement in a home when it is installed. For other measures, it may be more appropriate to think of a score of “1” as a result of a measure that somewhat achieves the improvement. For example, a measure may result in a small improvement in temperature variation in each home.”

Health Comfort Safety Evaluation Results

The following results are provided by the IOUs in compliance with Ordering Paragraph 43(d) of Decision 14-08-030. Brief descriptions of measure characteristics that support the scoring rationale for key measures are provided below.



1. Furnace repair/replace improves combustion efficiency and quality, reducing CO production in most instances. Any deficiencies with existing combustion air vent system must be corrected when installing this measure, potentially improving indoor air quality and combustion safety in some homes. The measure may improve safety by eliminating a makeshift heating device.

2. Furnace pilot light conversion provides no significant benefits from changing from always-on pilot to electronic ignition pilot.

3. High efficiency furnace replacements improve combustion efficiency and quality, reducing CO production in most instances. Any deficiencies with existing combustion air vent system must be corrected when installing this measure, potentially improving indoor air quality and combustion safety in some homes. The measure may improve safety by eliminating a makeshift heating device.

4, 5 and 6. Central AC Replacement, Room A/C replacement, and Heat Pump Replacement require an existing functioning unit so there are minimal non-energy benefits from installing a more efficient unit.

7. Efficient fan control / Smart Fan Delay have minimal impact on the defined health, comfort and safety criteria.

8. Evaporative coolers improve ventilation and airflow in 100% of homes. Incoming air is likely negligibly filtered by wet media, nominally improving air quality.

9. Duct sealing balances conditioned airflow throughout house, reducing temperature variation in all instances. Sealing pathways for leaks, dust, and dirt improves air quality, ventilation and air flow in some instances.

10. Air sealing between conditioned living space and unconditioned garage may eliminate infiltration of gas appliance (e.g. water heater or clothes dryer in garage) combustion products in less than 25% of installations. The minor home repairs associated with this measure (e.g. replacing broken window glass, broken doors, sealing holes in exterior walls) improves home security and/or building integrity in approximately 50% of homes.

11. Attic Insulation reduces leakage of conditioned air from inside to outside the home, reducing temperature variation and reducing drafts and leakage (improves air quality ventilation and/or air flow).

12. Hot water conservation measures have no impact on the defined health, comfort and safety criteria.

13. Water Heater Repair / Replacement provides combustion safety benefits as units must be vented.

14. Heat pump water heater has no impact on the defined health, comfort and safety criteria.

15. Interior lighting improves home security by allowing occupants to more efficiently light the household when away to deter crime (whether on a timer or when manually left on while occupants are away). It also provides a non-zero (<25%) reduction in local heating effects resulting from the removal of incandescent lamps.

16. Exterior lighting improves safety in most installations.

17. Vacancy Sensor measures have no impact on the defined health, comfort and safety criteria.

18. High Efficiency Clothes Washers have no impact on the defined health, comfort and safety criteria.

19. Refrigerator installations include grounding the existing outlet in up to 25% of cases, reducing the risk of electrical fire. More efficient units produce less heat and are better insulated, resulting in a small reduction of unwanted heating in the kitchen.

20. Microwaves require outlets to be grounded before installing measure. Using microwave instead of full sized oven greatly reduces unwanted heating of kitchen and reduces exposure to combustion gases produced during cooking on either an electric or gas oven or stove.

21. Furnace clean and tune improves combustion efficiency and quality, reducing CO production. Cleaning the burner and adjusting the burner flame is included, and any deficiencies with existing combustion air vent system must be corrected. There is potential improvement of indoor air quality for some homes as replacing or cleaning the filter, heat exchanger, fan blades, and/or air handler may be included.

22. For central A/C tune-up there is an existing and working unit; cleaning and adjusting the equipment provide temperature variation benefits.

23. Variable Speed Pool Pumps have no impact on the defined health, comfort and safety criteria.

24. Smart power strips provide a small reduction in electrical fire risk via surge suppression function and turning off unused plug loads. Advanced Power Strips also provide a small reduction in electrical fire risk via surge suppression function and turning off unused plug loads. Advanced Power Strips also completely turn off equipment when not in use, eliminating heat produced by vampire load, resulting in roughly 1% -25% improvement in 100% of homes.

1. “Addendum to ESAP Cost-Effectiveness Working Group White Paper: Working Group Final Recommendations.” This document appears as Appendix C to the *Administrative Law Judge’s Ruling Seeking Comments*, issued October 9, 2013, in A.11-05-017 et al. [↑](#footnote-ref-1)
2. D.14-08-030, Ordering Paragraph 43(d). [↑](#footnote-ref-2)
3. Pacific Gas and Electric, Southern California Edison, Southern California Gas Company, and San Diego Gas & Electric. [↑](#footnote-ref-3)
4. Addendum, pages 10-12. [↑](#footnote-ref-4)
5. Per the California Statewide Energy Savings Assistance Program Policies and Procedures Manual: “For owner occupied, furnace repairs and replacements are provided only when necessary to mitigate

NGAT fails and pursuant to the installation of infiltration-reduction measures. Water heater repairs and

replacements are also provided only to mitigate NGAT fails or to replace leaking water heater tanks.” [↑](#footnote-ref-5)
6. NGAT Costs are funded outside the ESA Program. [↑](#footnote-ref-6)