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OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking Regarding Building Decarbonization.	Rulemaking 19-01-011 (Filed January 31, 2019)

WILD TREE FOUNDATION
COMMENTS ON STAFF PROPOSAL

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Pursuant to the Administrative Law Judge's Ruling Seeking Comments on Staff Proposal for Building Decarbonization Pilots issued in this proceeding July 16, 2019, Wild Tree Foundation ("Wild Tree") submits the following comments.

Building decarbonization must be undertaken in such a way that it contributes to the achievement of California's greenhouse gas (GHG) reduction goals and climate policy and plays a role in GHG emission reduction in other states and countries. SB 1477 requires that the BUILD and TECH programs decarbonize buildings so that actual GHG emission reductions are accomplished and in such a fashion that utility bills do not increase. Thus, this proceeding should focus on developing programs and policies that pair electrification with measures to increase efficiency and installation of greater capacity solar PV systems.

The BUILD and TECH programs will be successful only if they provide scalable, exportable programs and technologies that can be replicated in other states and countries. The programs should, therefore, support the development of nascent technologies that can help solve existing problems such as the high GHG emissions of most refrigerants used in heat pumps, high cost of installation of solar water heating systems, and the ability of heat pumps to operate at temperature extremes.

Because the title 24 building standards have come so far in decreasing building GHG emissions, greater budget should be given to the TECH program for the development of such technologies. Focus for new building construction should be in incentivizing 6kW or larger PV systems to both offset increased bills and increased GHG emissions resulting from increased electricity loads.

The BUILD and TECH programs should be focused on the Central Valley to maximize potential GHG emission reductions and best improve health in disadvantaged communities. In furtherance of these goals, only the highest efficiency electric technology should be permitted and decommissioning and recycling of replaced appliances must be required.

COMMENTS

To the best of its ability, Wild Tree provides the following comments on the Staff Proposal in the order presented in the Proposal, as requested in the Ruling. Answers to questions posed in the ALJ Ruling seeking comment on the Staff Proposal follow.

A. GHG Emissions from Electricity Generation Must be Properly Accounted For

If the programs are to be successful, the role electricity generation plays in building decarbonization must be realistically portrayed so as to not inflate the role of building decarbonization in addressing the climate crisis nor to discount the impact on the climate of increased electric load from electrification of buildings.

First, GHG emissions from building should be looked at in isolation, as the CARB California's 2017 Climate Change Scoping Plan does ("CARB Scoping Plan"). The Staff Proposal opens by presenting an oft quoted figure regarding building decarbonization, "Building

energy consumption is responsible for a quarter of California's greenhouse gas (GHG) emissions."[1] This is true when building electricity use is taken into account but is a problematic way to view building decarbonization for the purposes of this proceeding. This proceeding is not aimed at decreasing GHG emissions from electricity generation so metrics related to GHG emissions of electricity generation should not be used as the foundation for this proceeding.

CARB's Scoping Plan and all other credible sources make it clear that buildings account for 9-10% of GHG emissions in California [2] and globally, buildings generate 6% of GHG emissions[3]. AB 3232 provides the necessary distinction: "Buildings are responsible for 25 percent of all emissions of greenhouse gases. Direct emissions from the combustion of fossil fuels in buildings, primarily for space and water heating, accounts for 10 percent of all emissions of greenhouse gases in California. Approximately half of all energy used in buildings in California is in the form of on-site combustion of fossil fuels." [4]

When building electricity consumption is taken into consideration, we have already almost achieved the target of 40% reduction from 1990 of GHG emissions from buildings by 2030[5] and thus, the 2030 target will be exceeded with business as usual approach.[6] But when properly viewed as exclusive of electricity consumption, buildings GHG emissions decreased

[1] R.19-01-011, California Public Utilities Commission and California Energy Commission Staff Proposal for Building Decarbonization Pilots – Draft (July 16, 2019) at p.5 ("Staff Proposal").
[2] CARB, California 2017 Climate Change Scoping Plan, available at https://ww3.arb.ca.gov/cc/scopingplan/scoping_plan_2017.pdf .
[3] EPA, Global Greenhouse Gas Emissions Data, available at: https://www.epa.gov/ghgemissions/global-greenhouse-gas-emissions-data as of August 13, 2019.
[4] AB 3232 at Section 1.
[5] See Pub. Resources Code, § 25403.
[6] CARB, 2018 GHG Inventory, available at: https://ww3.arb.ca.gov/cc/inventory/data/data.htm . Taking into account electricity generation, building GHG emissions will have already, with no further action, decreased 37% by 2020. Building GHG emissions with electricity generation 1990 levels = 154.7, 2020 levels = 97.1, 2030 expected levels = between 73.1 and 89.1l.

16% between 1990 and 2016. While it appears that building emissions have been somewhat stagnant the past few years, the 2030 target is within reach and the implementation of BUILD and TECH can play a role in achieve the full 40% reduction target by 2030.[7]

Secondly, we cannot pretend that our grid is fully decarbonized and that we can electrify buildings at will without a GHG emission toll to pay at the other end of the wire. In fact, if attempts at building decarbonization are not done correctly, including in this proceeding, this can result in increased GHG emissions. By itself electrification accomplishes little to no greenhouse emissions reduction. It is the fact that an electric heat pump is two to three times more efficient than a gas heater that causes the emission reduction, in addition to the construction of new renewable or other zero carbon sources of energy. If building decarbonization is pursued with a myopic eye towards electrification and without sufficiently increasing efficiency and building PV, the result will be an increase in load. In the near term, as electricity generation is still dominated by fossil fuel power plants, this will result in an increase in GHG emissions. In the coming decades, as we transition farther away from fossil fuel generation, this will result in a need to build excessive amounts of unsustainable utility scale generation.

In other words, it is not correct to say that building electrification will result in GHG emissions reduction because the electric appliances will be powered by our current renewable-powered electric grid. A newly installed electric heat pump is not using the existing power mix to the extent that it increases electricity demand. Rather, the heat pump will use the new marginal source of electricity, which in most cases will be natural gas, the main source that can be increased without actually building more energy generation facilities leading to an increase in GHG emissions.

[7] *Ibid.* Buildings GHG emissions without electricity generation 1990 levels = 44.1, 2016 levels = 37.1, 2030 target = 26.5.

B. TECH Should have Greater Share of the Budget

The Staff Proposal recommends spending 40% on BUILD and 60% on TECH, explaining, "The larger amount for TECH is because a successful decarbonization effort will have to address existing buildings, which parties agree will be more challenging to decarbonize due to the number of existing buildings, their diversity, and barriers facing home energy retrofits." [8] Wild Tree agrees that the TECH program should be more highly funded, but for different reasons. While it is certainly true that it is easier to build a more decarbonized home from the ground up than, easier should not be the standard. The money should be spent in such a way so as to maximize GHG emission reductions. Because increasingly improved title 24 building standard have accomplished such high reductions in GHG emissions as shown below, the focus should be on existing structures, not new builds. For new builds, the focus should be incentivizing at 6kw and larger PV systems.

2019 Standards result in significant CO2 reduction in buildings

2700 sf prototype, CZ12		
CO2 Impact of Housing Choices		**Metric Tons of CO2 Emitted/yr**
Mixed Fuel	2000 Compliant Building, No PV	6.5
Mixed Fuel	2016 Compliant Building, No PV	3.26
Mixed Fuel	2019 Standard Design, with 3.1 kW PV	2.29
All-Elect	2019, 3.1 kW PV	1.12
All-Elect	2019, 6 kW PV	0.46

CEC Presentation to En Banc on 2019 Building Efficiency Standards, Data on greenhouse emissions, available at:

[8] Id. at p. 6.

http://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/Utilities_and_Industries/Energy_-_Electricity_and_Natural_Gas/2019%20Stds%20CPUC%20En%20Banc%20final.pdf .

C. Increased Building Efficiency and Solar PV are necessary to meet SB 1477 Requirement that Utility Bills Decrease

SB 1477 requires that utility bills do not increase as a result of building decarbonization efforts. Therefore, the programs must (1) require the use of only the highest efficiency technology (i.e. highest efficiency heat pumps, not just heat pumps in general), (2) provide household participants efficiency measures that complement other electrification efforts, (3) incentivize rooftop solar. Rate structure is not the answer as this will only cause other customers bills' to increase.

The Legislature was very clear in directing the Commission to utilize the BUILD and TECH funding to *decrease* utility bills. "It is also the intent of the Legislature that projects receive incentives under the programs created by this act only if they result in utility bill savings for the building occupant."[9] This requirement is not aspirational; as codified in the Public Utilities Code, any project funded with BUILD money cannot result in increased bills. "In supervising the administration of the program, the commission shall do all of the following . . . Ensure that projects funded with moneys reserved pursuant to subdivision (c) do not result in higher utility bills for building occupants."[10] The expectation is not just the prevention of increased bills, but that BUILD and TECH fund recipients will see utility bill savings. For both BUILD and TECH, program metrics must include "projected utility bill savings."[11]

[9] SB 1477 at Section (1)(c).
[10] Pub. Util. Code, § 921.1, subd. (1)(d)(3).
[11] Pub. Util. Code, § 921.1, subd. (d)(4)(B); 922, Pub. Util. Code, § subd, (c)(2)(B).

The Staff Proposal acknowledges that the Commission must "ensur[e] customers do not experience increased utility bills."[12] But the Proposal says nothing about how that it going to be accomplished. The Staff Proposal also glosses over the definition of near zero emission building provided in SB 1477: "Near-zero-emission building technology includes a single technology, such as heat pumps, solar thermal systems, or advanced energy efficiency systems, and a combination of technologies, such as a solar photovoltaic system with an energy storage system."[13] To the exclusion of solar, advanced energy efficiency systems, and solar photovoltaic system with an energy storage system, the Staff Proposal focuses narrowly on clean heating technologies.[14]

There must be a decrease in overall household energy consumption for fund recipients to meet the mandated requirement that they do not experience increased utility bills. In order to meet the statutory requirement for bill savings, it is necessary to address the fundamental problem with any strategy that narrowly focuses on "electrifying everything", which is the fact that on an equal energy basis electricity is much more expensive than natural gas, especially for customers of investor-owned utilities in California. For example, PG&E's baseline tier residential natural gas rate is $1.29 per therm, while the average residential electric rate is over 24 cents per kilowatt-hour. Table 1 shows the conversion of gas and electric rates to a common unit, the price per million British Thermal Units (mmbtu).

[12] Staff Proposal at p. 11.
[13] Pub. Util. Code, § 921, subd. (e)(2).
[14] Staff Proposal at p. 20.

Table 1. Comparison of PG&E gas and electric rates

natural gas	baseline	high tier	care baseline	care high tier	
schedule charge	$1.29	$1.84	$1.03	$1.47	per therm
ppp surcharge	$0.09	$0.09	$0.06	$0.06	per therm
total rate	$1.38	$1.93	$1.10	$1.54	per therm
therm	100,000	100,000	100,000	100,000	btu
rate on common energy basis	$13.80	$19.31	$10.95	$15.36	per million btu
electricity	avg. res.	peak res	avg. care res	peak care res	
rate	$0.24	$0.38	$0.14	$0.23	per kwh
kwh	3,412	3,412	3,412	3,412	btu
rate on common energy basis	$71.66	$112.72	$42.06	$67.83	per mmbtu
electric/nat gas rate ratio	5.2	5.8	3.8	4.4	

Natural gas ranges between roughly $10 to $20/mmbtu, depending on customer and tier, while electricity is between 4 and nearly 6 times higher cost on an equal energy basis. With the potential for electrification to result in such drastic utility bill increases, first and foremost, the Commissions must set a standard for the use of only the highest efficiency technology. The Staff Proposal does not require the use of the most efficient technology. High efficiency HVAC heat pumps should be required, rather than "encouraged wherever possible."[15] The Staff Proposal recommends the use of kicker incentives for "very-high efficiency heat pumps for space cooling" and "heat pump water heaters that use low global warming potential (GWP) refrigerant."[16] There should not be kicker incentives used for these technologies, they should be required as part

[15] Staff Proposal at p. 26.
[16] Staff Proposal at p. 35.

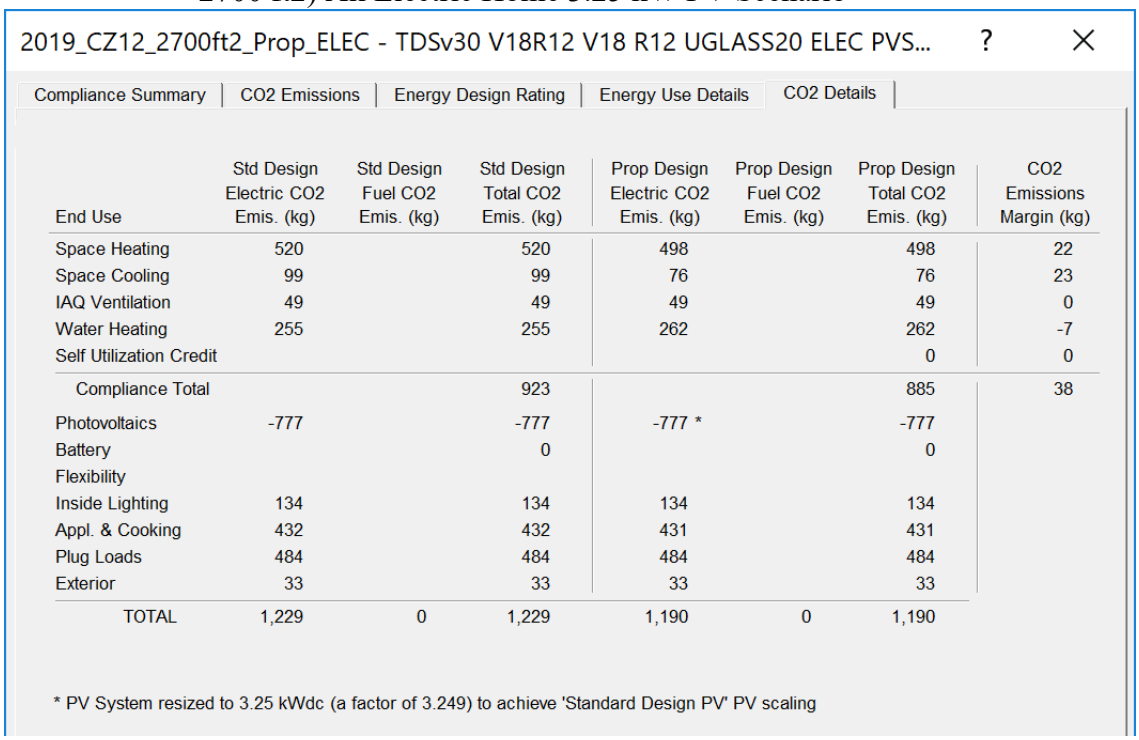
of the standard set by the Commission. Electric heat pumps, for example, should reduce energy consumption by a factor of three or more compared to a natural gas space or water heating appliance.

But, even a factor of three-fold efficiency improvement for an electric heat pump versus natural gas heat will not be adequate to compensate for the 4 to 6-fold higher electric rate. Buildings that are provided technology funded by BUILD or TECH must also be provided necessary efficiency upgrades to prevent the electrification of waste. Additional efficiency retrofits in the building to reduce demand for space heat and hot water include, but are not limited to, low flow shower heads and faucets, double paned windows, insulated pipes, and innovative design of air ducts that reduce thermal loss, etc.

Finally, the installation of 6kW and larger PV systems should be also incentivized on both new builds and existing buildings to offset the final slice of the pie of increased electricity load that results from electrification. This is necessary to address both increases in utility bills and increases in GHG emissions. By itself, electrification accomplishes little to no GHG emissions reductions and even the use of the highest efficiency electric technology and other building efficiency measures will not entirely offset increased electric load from full building electrification.

Today's electric grid is far from fully decarbonized, so energy drawn from the grid will carry a GHG emission burden. According to the CEC's 2019 Building Calculator, converting from mixed fuel to all electric appliances will still result in about 2 tonnes of annual GHG emissions per home. As you can see in Table 2, it is the 3.25 kilowatt-dc solar photovoltaic system that brings the emissions down to 1190 kilograms (1.2 metric tonnes) per year, because it reduces emissions by 777 kilograms (~0.8 metric tonnes).

Table 2. CEC 2019 Building Calculator CO2 Details Standard Home (Climate Zone 12 2700 ft2) All Electric Home 3.25 kW PV Scenario



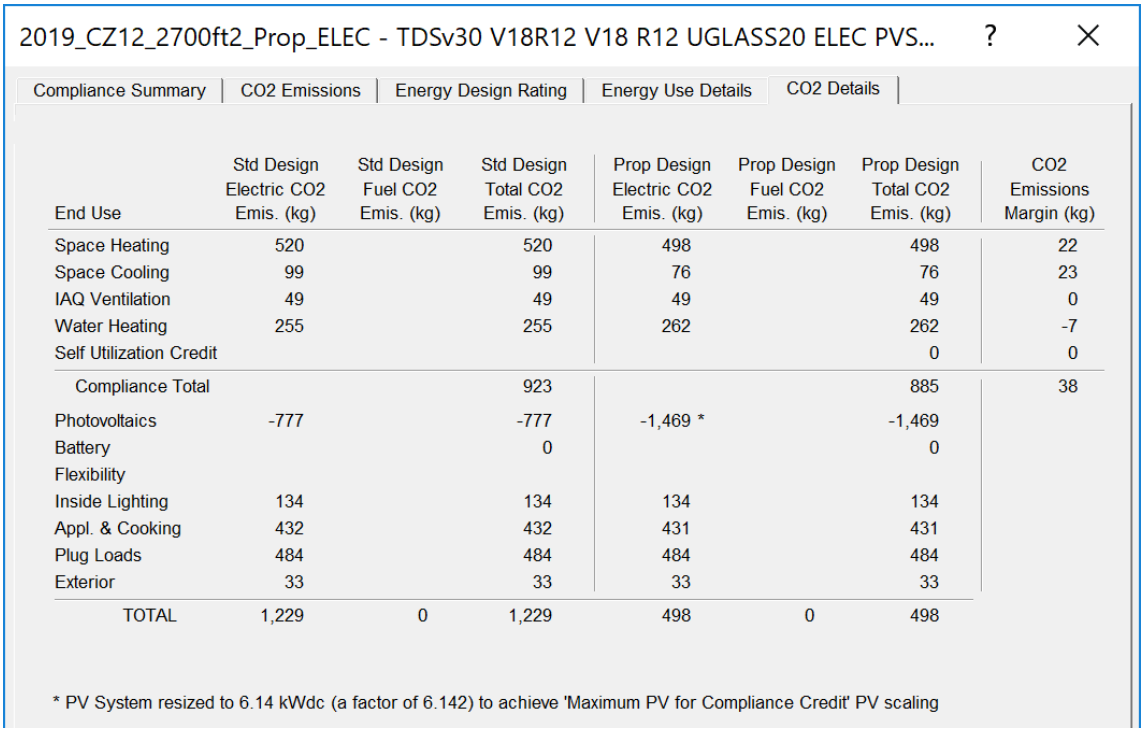
2019_CZ12_2700ft2_Prop_ELEC - TDSv30 V18R12 V18 R12 UGLASS20 ELEC PVS...

Compliance Summary | CO2 Emissions | Energy Design Rating | Energy Use Details | CO2 Details

End Use	Std Design Electric CO2 Emis. (kg)	Std Design Fuel CO2 Emis. (kg)	Std Design Total CO2 Emis. (kg)	Prop Design Electric CO2 Emis. (kg)	Prop Design Fuel CO2 Emis. (kg)	Prop Design Total CO2 Emis. (kg)	CO2 Emissions Margin (kg)
Space Heating	520		520	498		498	22
Space Cooling	99		99	76		76	23
IAQ Ventilation	49		49	49		49	0
Water Heating	255		255	262		262	-7
Self Utilization Credit						0	0
Compliance Total			923			885	38
Photovoltaics	-777		-777	-777 *		-777	
Battery			0			0	
Flexibility							
Inside Lighting	134		134	134		134	
Appl. & Cooking	432		432	431		431	
Plug Loads	484		484	484		484	
Exterior	33		33	33		33	
TOTAL	1,229	0	1,229	1,190	0	1,190	

* PV System resized to 3.25 kWdc (a factor of 3.249) to achieve 'Standard Design PV' PV scaling

Table 3. CEC 2019 Building Calculator CO2 Details Standard Home (Climate Zone 12 2700 ft2) All Electric Home 6.14 kW PV Scenario



2019_CZ12_2700ft2_Prop_ELEC - TDSv30 V18R12 V18 R12 UGLASS20 ELEC PVS...

Compliance Summary | CO2 Emissions | Energy Design Rating | Energy Use Details | CO2 Details

End Use	Std Design Electric CO2 Emis. (kg)	Std Design Fuel CO2 Emis. (kg)	Std Design Total CO2 Emis. (kg)	Prop Design Electric CO2 Emis. (kg)	Prop Design Fuel CO2 Emis. (kg)	Prop Design Total CO2 Emis. (kg)	CO2 Emissions Margin (kg)
Space Heating	520		520	498		498	22
Space Cooling	99		99	76		76	23
IAQ Ventilation	49		49	49		49	0
Water Heating	255		255	262		262	-7
Self Utilization Credit						0	0
Compliance Total			923			885	38
Photovoltaics	-777		-777	-1,469 *		-1,469	
Battery			0			0	
Flexibility							
Inside Lighting	134		134	134		134	
Appl. & Cooking	432		432	431		431	
Plug Loads	484		484	484		484	
Exterior	33		33	33		33	
TOTAL	1,229	0	1,229	498	0	498	

* PV System resized to 6.14 kWdc (a factor of 6.142) to achieve 'Maximum PV for Compliance Credit' PV scaling

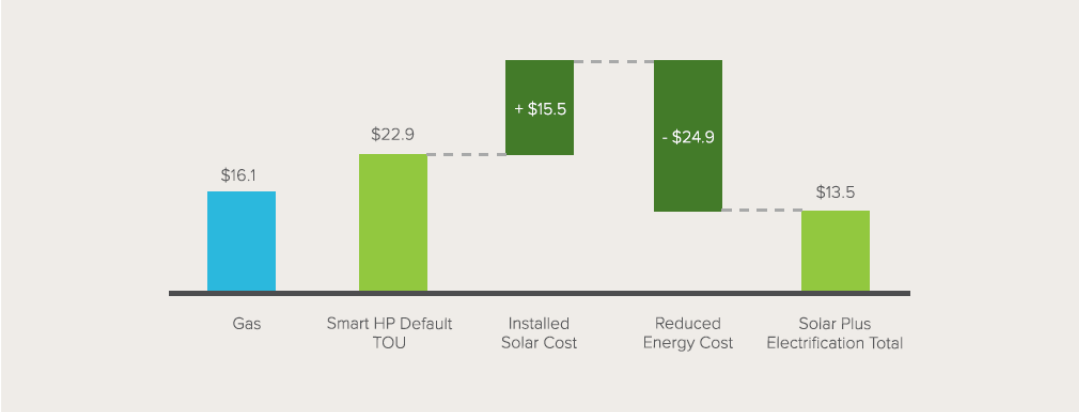
Adding a larger solar PV system can reduce emissions of the building to near zero. Table 3 shows that modeling the maximum compliance size solar PV installation for the CEC model results in 0.5 metric tonnes greenhouse gas emissions.

Rocky Mountain Institute, in its study of building electrification,[17] shows that a retrofit with heat pumps in a model Oakland, CA home results in substantially higher lifecycle costs. However, if a solar PV system is added that offsets 90% of the customer's electricity demand (including electrification), then the customer saves significant money overall. In fact, adding net meter solar is the only way shown in RMI's study to save money overall in the Oakland retrofit scenario.

[17] Rocky Mountain Institute (Billimoria, Sherri, Mike Henchen, Leia Guccione, and Leah Louis-Prescott), *The Economics of Electrifying Buildings: How Electric Space and Water Heating Supports Decarbonization of Residential Buildings* (2018) available at: http://www.rmi.org/insights/reports/economics-electrifying-buildings/.

FIGURE 25

NET PRESENT COST OF SOLAR PLUS ELECTRIFICATION COMPARED WITH GAS AND ELECTRIC FOR OAKLAND DEFAULT TIME-OF-USE SCENARIO (THOUSAND $)



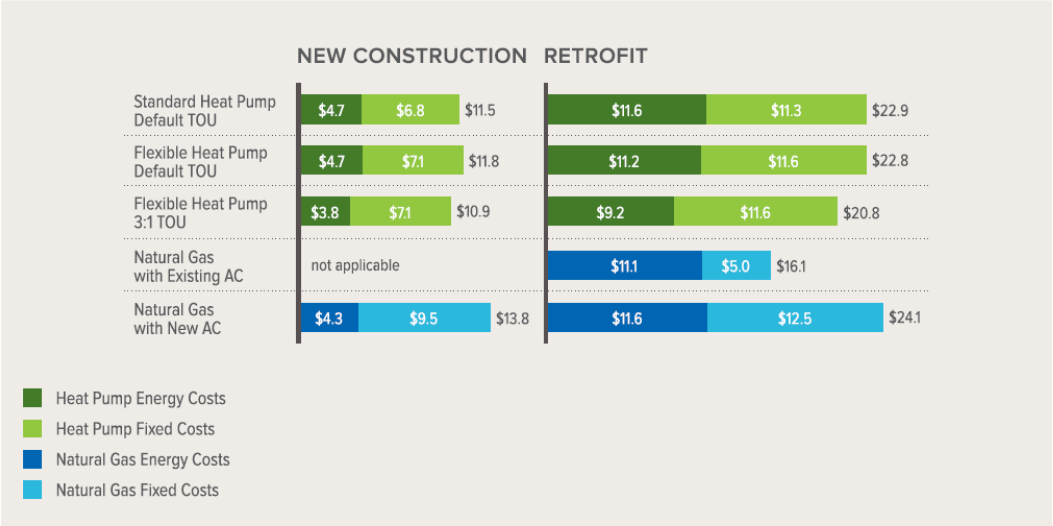
The situation is different in a new building, insofar as it can avoid the cost of natural gas hookup. However, the benefit of a solar installation can result in decisive savings for the customer.

The difference in energy costs is less dramatic than differences in total lifecycle costs, but in general it costs more for a customer to buy electricity than natural gas, even accounting for the efficiency of the heat pump, unless specific criteria are met: 1) the customer also purchases a new AC rather than using the existing AC, which greatly increases the fixed cost, or 2) the customer can take advantage of a 3:1 peak to off-peak rate structure, which includes the ability to program the devices to use power during off peak rates, and would require changes to the rate structure. RMI found that optimally taking advantage of demand response packaged with the heat pumps could save $1000 in lifetime energy costs. However, this must be part of the program and project design in order to work.

Heat Pump vs. Natural Gas Heating Costs in Oakland, CA[18]

[18] RMI, p. 29.

FIGURE 14
NET PRESENT COST OF WATER AND SPACE CONDITIONING, OAKLAND (THOUSAND $)



The same measures that result in bill savings—high efficiency heat appliances, additional efficiency measures, and rooftop solar—are also what causes reductions in emissions.

D. Full Life Cycle of Replaced and Replacement Technology must be Accounted For

The Staff Proposal identifies the replaces of gas furnaces and water heaters as priority but fails to address the GHG emissions from the complete life cycle of the heaters that will be replaced under the TECH program. For example, page 25 of the Staff Proposal addresses upstream and midstream but leaves out consideration of downstream. What happens to gas furnaces and water heaters that are replaced with heat pumps? Building electrification attempts should not be conducted in a vacuum; the full life cycle of both the replaced and replacement appliances need to be taken into consideration in measuring GHG emissions changes and program implementers must be required to plan and provide for the recycling and permanent decommissioning of replaced gas heaters.

An anecdote is useful here. A ratepayer whose interests Wild Tree represents recently replaced a gas stove with an induction stovetop and electric convection oven. She replaced the stove in an effort to improve her home's indoor air quality and to decrease her family's reliance on fossil fuel. When she inquired of the appliance store what would happen to the functioning gas range and oven that it would haul away, she was told that, because it was in good working order and had held its value, it would likely be taken by a store employee and used at his or her home or passed onto a friend. When she inquired about the store recycling the gas range/oven, it was suggested that she could attempt to make it unworkable so that it would be scrapped instead of reused. She was not comfortable, as the average consumer would not be, with attempting to disable an appliance in this manner. Ultimately, the ratepayer donated the stove to Habitat for Humanity. This "solution" was inadequate as it did not actually serve to decrease fossil fuel consumption, as the replaced gas stove was not decommissioned. The GHG gas emission can was thus kicked down the road. Replacing a gas stove with an electric stove where the gas stove is not decommissioned and where electricity is not 100% renewable actually serves to increase GHG emission when the increased electricity load and life cycle GHG emission are taken into account. Even worse, the unhealthy stove was made available for use by a likely lower income family.

The problem of appliance disposal is not hypothetical or only anecdotal - one can buy, or get for free, a wide variety of used gas furnaces and water heaters on Craigslist and elsewhere (see attachment A). Equity is also not served if used appliances that are replaced find their way into a used market for use in lower income homes. Any proposal accepted by the Commissions for implementation of the TECH program must include decommissioning and recycling of replaced heaters. Any program that fails to provide for the decommissioning and recycling of

replaced gas heaters will both fail equity and decarbonization goals of SB 1477. In addition, accurate GHG emissions metrics must include the full life cycle of both replace and replacement heaters.

E. The Central Valley Should be Prioritized

The recommendation that the program implementer should develop programs that prioritize California's hotter climate zones is illogical.[19] Understanding that there are limited funds in the program and thus geographic or demographic prioritization is probably necessary, Wild Tree recommends that the programs focus on the Central Valley. The Staff Proposal bases the recommendation for a focus on the hottest climate zones upon cost effectiveness:

> According to E3s study, *Residential Building Electrification in California*, the most cost-effective target audiences for electrification retrofits are homes in California's hotter climates that already have air conditioning. According to the study, "High capital costs of electric heat pump retrofits in existing homes are often perceived as a barrier to electrification, but this assumption was not borne out for homes that are otherwise upgrading their air conditioning system….87 percent of the simulated single family retrofit single family retrofit homes [sic] (all of which are assumed to have air conditioning) see lifecycle savings from switching from a gas furnace and air conditioner to an electric heat pump HVAC system." One factor E3 cites is that these homes are not as likely to need an expensive electrical panel upgrade. As such, we expect the TECH program to take a regional approach in its initial targeting of customers who are most likely to see bill savings, and where first costs are minimized.[20]

Cost effectiveness is not what BUILD and TECH are aimed at. These programs are not about electrifying at the lowest cost but addressing building GHG emissions through development of new technology that is not being widely used, most likely due to lack of cost effectiveness. As explained in SB 1477, "The bill would require the commission, as a part of the initiative, to identify and target key low-emission space and water heating equipment

[19] Staff Proposal at p. 26.
[20] Staff Proposal at p. 43.

technologies that are in an early stage of market development and that would assist the state in achieving its greenhouse gas emissions reduction goals."[21] Technologies that are in the early state of market development are almost certainly not cost-effective and it is the intent of these programs to enable these technologies to become cost effective. Focusing on single family homes that have existing HVAC in the hottest climate zones will not decrease GHG emissions, will not serve to improve the market for building decarbonization technology through innovation, and would be inequitable.

The Staff Proposal's appendices show that the hottest climate zone – Southern Desert – has the least new homes[22] and the lowest annual per-house GHG emissions in the state.[23] The recommendation that there should be a focus on space heating in the hottest climate zone is especially confounding. The hottest climate zones, such as those in the Southern Desert, use de minimis space heating and, therefore, have negligible GHG emissions from space heating.[24] The Staff Proposal's appendices show that there is 91 times more GHG emission for space heating in the Mountain climate zones than in the Southern Desert for 2100 sq ft home up to 4303 times more GHG emissions for space heating in the Mountain climate zones than in the Southern Desert for multifamily homes.[25] Focusing on the hottest climates zones would not, therefore, serve to decrease GHG emissions. Focusing on existing single family homes that are looking to replace existing HVAC would also be inequitable as this excludes the most disadvantaged community members. The ownership of a single family home with an existing HVAC system is a measure of advantage.

[21] SB 1477 preamble.
[22] Staff Proposal at Appendix Table 4.
[23] Staff Proposal at Appendix Tables 5-9.
[24] *Ibid.*
[25] *Ibid.*

Wild Tree recommends that BUILD and TECH focus on the Central Valley climate zones (11, 12, 13,14) because programs in this region can target many, high GHG emission building and improve the health and air quality in the most polluted and most disadvantaged part of the state. According to the Staff Report appendices, the Central Valley has the second highest home GHG emissions and the highest GHG emissions from climate control (space heating plus space cooling.)[26] According to the CEC's climate zone descriptions, because the Central Valley can have both extreme heat and cold, there is proportionately high energy use throughout the region in comparison to the rest of the state.[27] While the Mountain climate zones have the highest per house GHG emissions and highest GHG emissions from space heating, the Mountain region is sparsely population and is not growing.[28]

A significant portion of California's population lives in the Central Valley and the region's population is growing.[29] The Staff Proposal appendixes show that 29% of new single family homes, and 25% of new multi-family homes are being built in the Central Valley.[30] The Central Valley has the largest portion of disadvantaged communities in the state (see attachment B) and has the most polluted air, not just in the state, but in the country for all measured types of pollutants.[31] The Central Valley population suffers from the highest asthma and other air

[26] *Ibid.*
[27] See for example, CEC, California Climate Zone 13, available at: https://www.pge.com/includes/docs/pdfs/about/edusafety/training/pec/toolbox/arch/climate/california_climate_zone_13.pdf ("There are almost as many CDD as HDD in this high energy consuming Climate Zone 13.")
[28] See US. Census, *Numeric Population Change by County and Municipio, 2010-2018*, https://www.census.gov/library/visualizations/2019/comm/num-pop-change-county.html.
[29] *See, supra* US. Census, *Numeric Population Change by County and Municipio, 2010-2018.*
[30] Staff Proposal at Appendix 3.
[31] See American Lung Association, *Most Polluted Cities*, https://www.lung.org/our-initiatives/healthy-air/sota/city-rankings/most-polluted-cities.html, as of August 13, 2019.

pollution – related illnesses rates in the state.[32] The BUILD program requires a focus on disadvantaged communities and it makes sense, therefore to focus on the Central Valley.

The BUILD and TECH programs can have a positive impact on human health, especially with a focus on the region that already suffers the greatest from respiratory effects of pollution as well as greater risk to health due to factors that deem a community to be disadvantaged. Improvement of human health should be a priority of the implementation of BUILD and TECH. The Staff Proposal acknowledges the non-GHG benefits of building decarbonization: "Energy Commission and CPUC Staff recommends that bidders to the RFP for TECH articulate the cobenefits of building decarbonization, beyond the reduction of greenhouse gas emissions. For instance, non-combusting space-conditioning equipment (e.g., heat pumps instead of furnaces) can also result in improved indoor air quality for the building occupant by eliminating the by-products of natural gas combustion entirely."[33] Unfortunately, the Staff Proposal does not require any action in regards to human health. This is a missed opportunity and one that be easily remedied by focusing on the Central Valley and requiring improvement of indoor air quality as part of BUILD and TECH proposals.

F. Target Technology Should Solve Existing Problems

As explained above, cost effectiveness should not be a consideration in regards to the technology selected for the programs. Also explained above – efficiency must be not only a consideration, but a requirement. The Staff Proposal has missed the boat in regards to efficiency

[32] See California Health Data Project, *Asthma Emergency Room Visits*, http://asthmastoryca.org/#, as of August 13, 2019.

[33] Staff Proposal at p. 27.

as the highest efficiency technologies are not required but only "encouraged wherever possible."[34] Anything less than very-high efficiency technologies fails to meet the SB 1477 requirement that utility bills be decreased as a result of the BUILD and TECH programs. If the full life cycle of replaced and replacement appliances is taken into account for GHG emissions metrics, the use of heat pumps with GHG-emitting refrigerants will fail the requirement that GHG emissions be reduced.

What these programs should seek to do is to solve problems that the current technology has not and make it possible for such technologies to be scaled up so as to become cost effective for consumers. This should include the following: (1) Highly efficient space and water heat pumps utilizing natural, non-GHG emitting refrigerants; (2) Low cost solar thermal water heating systems – effective, low cost systems are possible with current technology but installation is, inexplicable, overpriced; (3) Efficient space heat pump that works in climate extremes of both heat and cold

SCOPING QUESTIONS

Wild Tree reserves the right to comment on all questions in its reply or elsewhere in the proceeding regardless of whether it provides an answer herein.

3.□ Are the annual budgets proposed for the BUILD and TECH program reasonable? Why or why not? 4.□ Is the proposed budget allocation of 40 percent of the budget for the BUILD program and 60 percent for the TECH program appropriate? Why or why not?

[34] Staff Proposal at p. 26.

As discussed above, because the improvements in title 24 standards have already accomplished significant reduction in GHG emissions from new buildings, there should be a great proportion of the funding directed to the TECH program.

6. Are the proposed elements of the BUILD program reasonable and sufficiently comprehensive?

As explained above, program implementation should be focused on the Central Valley and should focus on incentivizing greater than 6kW PV systems.

7. Which elements of the BUILD program should be established by the Commission in a decision, and which should the BUILD program administrator have the flexibility to modify in implementation, with oversight by Commission staff?

Commission should require highest efficiency technologies, implementation in the Central Valley, increased in overall building efficiency and incentivized solar PV.

8. Comment on whether the Staff Proposal's analysis and recommendations for the BUILD program's technology eligibility criteria, process for evaluating new technologies, guidelines and evaluation metrics, and criteria for scoring and selecting projects are reasonable.

As discussed above, the technology eligibility criteria are not reasonable. Only the highest efficiency technologies should be permitted.

10. Are the proposed elements for the TECH program appropriate? Are there any elements that should be removed, changed, or added prior to initiating the solicitation process? Specific questions to consider: a. The staff proposal describes a four-pronged effort which includes an upstream strategy, a mid-stream strategy, a grants program, and a prize program. Is this four-pronged approach appropriate? Why or why not?

As discussed above, upstream and midstream strategy must be paired with downstream strategy of decommission and recycling. Wild Tree continues to support the concept of a prize program, as discussed in our comments on the OIR. Wild Tree does not support a prize program as described in the Staff Report that seems to imply that prizes will focused on action rather than technology i.e. number of installed units.[35] Prizes should be offered and awarded for advances in technology, as discussed above, including, but not limited to the development of highly efficient, potentially low cost no/low GHG-emitting refrigerant heat pumps; low cost solar water heating installation programs; and highly efficient, potentially low cost heat pump space heating effective at temperature extremes.

13. Other Questions: a. The staff proposal includes a list of GHG metrics and sub-metrics to measure the success of the BUILD and TECH programs. Are these metrics appropriate? Why or why not? Are there any additional or different metrics that should be considered? Why or why not?

As discussed above in GHG metrics must include full life cycle of replaced and replacement appliances. Other critical metrics are utility bills savings, change in electrical load, installation of greater than 6kW PV systems, and building efficiency improvements.

(signature page follows)

[35] Staff Proposal at p.43.

Respectfully submitted,

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