FILED
08/20/19
04:59 PM

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

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

WILD TREE FOUNDATION
REPLY COMMENTS ON STAFF PROPOSAL

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Dated: August 20, 2019

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

COMMENTS

A. The BUILD and TECH Program Should Spur Innovation

The TECH program is a "a statewide market development initiative" intended to fund research and development into "low-emission space and water heating equipment technologies that are in an early stage of market development" to transform the market for such technology to assist in the reduction of GHG emissions.[1] The BUILD program is, likewise, a program intended

[1] SB 1477 Preamble; Pub. Util. Code, § 922, subd. (a)1).

to decrease GHG emissions by spurring innovation by "providing incentives to builders to design *innovative*, low-emission buildings."[2] The Staff Proposal and some commenters seem to misunderstand the clear intent of SB 1477, viewing the BUILD and TECH programs as simply opportunities to spend money to install already existing technology in homes. The focus on cost effectiveness[3], recommendation that programs be targeted in the hottest climate zones[4], focus on space heating to exclusion to all other technologies[5], dismissal of efficiency as critical component of the programs[6], contention that BUILD and TECH monies should be spend on gas appliances[7], and plan to award a prize based upon number of installations contradict the plain meaning of the Code.

The Legislatures was clear in its intent in SB 1477 that BUILD and TECH are about market transformation and innovation. Additionally, the statute is unambiguous that:

a) "It is the intent of the Legislature to . . . make low-emission heating equipment readily available and affordable in California."[8]

b) "Near-zero-emission building technology" means technology that reduces both of the following: (A) The energy demands of a building on the electrical or gas distribution system. (B) The direct and indirect emissions of greenhouse gases from buildings."[9]

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[2] SB 1477 at Section 1, subd. (b) (emphasis added).
[3] R.19-01-011, California Public Utilities Commission and California Energy Commission Staff Proposal for Building Decarbonization Pilots – Draft (July 16, 2019) at p.26 ("Staff Proposal").
[4] Staff Proposal at p. 26, see also POA Opening Comments at p. 22.
[5] *Ibid.*
[6] Staff Proposal at p. 26, see also Sierra Club, NRDC, CEJA ("Sierra Club") Opening Comments at pp. 11-12.
[7] SoCalGas Opening Comments at p. 6; SWG Opening Comments at p. 5, SBUA Opening Comments at pp. 11-12.
[8] SB 1477 at section 1, subd. (1)(b)
[9] Pub. Util. Code, § 921, subd. (e)(1).

c) "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.[10]

d) Projects funded with SB 1477 moneys must not result in higher utility bills for building occupants.

e) TECH is intended to "advance the state's market for low-emission space and water heating equipment."[11]

f) "As a part of the TECH Initiative, the commission shall identify and target key low-emission space and water heating equipment technologies that are in an early stage of market development."[12]

Taking this into account, it is clear that the intention of SB 1477 is to transform the market for technologies that can decrease building GHG emissions and decreasing utility bills. Therefore, the BUILD and TECH programs should seek to make highly efficient technologies that solve existing problems such as high installation costs of non-gas water and space heating technologies, reliance on high global warming potential refrigerants, and limited use in extreme climate conditions affordable, widely available, and desired.

[10] Pub. Util. Code, § 921, subd. (e)(2).
[11] Pub. Util. Code, § 922, subd. (a)(1).
[12] Pub. Util. Code, § 922, subd. (b).

B. Focus Should Be On Making The Most Efficient Technologies Available And Affordable

The focus on cost effectiveness in the Staff Proposal and some comments is upside down – technologies that are already cost effective do not need to be made "readily available and affordable."[13] For example, Wild Tree strongly disagrees with Sierra Club that "The BUILD program should be designed to move as broad a share of the market as possible to low-emissions all-electric homes, not to move the market to the most efficient technology possible, which comes with a much higher price tag. While that is a worthy long-term goal that we support, requiring that level of efficiency given the early stage of technology adoption in California will be counterproductive."[14]

Utilizing inefficient technologies in the BUILD program would not just be counterproductive but also counter to the Code. To serve the goals of SB 1477 to decrease GHG emission and utility bills, the best technologies are the most efficient. If buildings are actually going to be decarbonized, rather than just moving around emissions around from home generation to power plant generation, electrification must be done as efficiently as possible with the best – most efficient - technologies. Likewise, for building decarbonization to prevent utility bill increases, energy consumption must not increase and the most efficient technology are needed to prevent increase in electricity load that will result in increased bills.

[13] SB 1477 at section 1, subd. (1)(b).
[14] Sierra Club Opening Comments at pp. 11-12.

Sierra Club asserts that "BUILD should set equipment efficiency requirements at federal efficiency standard levels to encourage the broadest possible participation in the program. Setting an eligibility criterion of Heating Seasonal Performance Factor (HSPF) > 10 for BUILD would considerably restrict eligibility for the program: minimum federal efficiency standards are set at 8.2 HSPF. Most of the existing market products are at or close to 8.2 HSPF. Products with HSPF > 10 represents a small share of the market and comes at a considerable price premium."[15]

This thinking is flawed in a number of respects. The HSPF for permitted technologies in the BUILD program should be no lower, and perhaps higher than 10. As discussed above and in Wild Tree's Opening Comments, the SB 1477 requirements for decreased GHG emissions and utility bills cannot be achieved without the use of the most efficient electric technology. BUILD is about "providing incentives to builders to design innovative, low-emission buildings" not just installing the cheapest and least efficient electric appliances in as many homes as possible.

Secondly, there are abundant technologies with HSPF of 10[16] and the price differential between the heat pumps with lower HSPF and higher HSPF is made up for in decreased cost of electricity. Furthermore, the difference is insignificant in comparison to the cost of installation for heats pumps regardless of HSPF. For example, a Carrier brand heat pump with 3 ton outdoor condenser appropriate for an average size home of 1600-1900 sq ft, 1300-1500 cfm air handler, and programmable air source heat pump thermostat model 25HHA4 with a HSPS of 8.2 costs

[15] *Ibid.*
[16] See Energy Star, *ENERGY STAR Most Efficient 2019 — Central Air Conditioners and Air Source Heat Pumps,* available at: https://www.energystar.gov/products/most_efficient/central_air_conditioners_and_air_source_heat_pumps .

approximately $2650.[17] For the same specification model 25VNA8 HSPS of 11, cost is approximately $3550. Carrier brand is one of the most expensive on the market and these prices are retail. While the $900 difference in price may seem significant at first blush, this difference would quickly be made up in the decreased cost of utility bill due to lower number of kWh required to run the more efficient model.

C. Innovation in the cost of installation is needed

The difference in the cost between less and more efficient heat pumps is lessened by the fact that the the majority of costs for heat pumps is not the equipment, it is the installation. High cost of installation is an issue that must be addressed for space and water heat pumps, solar thermal water heat systems, and PV rooftop solar. SB 1477 provides funding to innovate in regards to installation process and cost. As an illustrative example, for a home with existing central ducts, the average Carrier 8.2 HSPS model system with installation is estimated to be approximately $7305 and the 11 HSPS model $9700.[18] On average, with California prices almost certainly landing on the more expensive end of the scale, installed heat pumps systems can run $12,000 - $20,000.[19] Installation of ducts in an average home can cost an additional $15,000 to $30,000.[20]

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[17] PickHvac, *Carrier Heat Pump Prices, Reviews and Buying Guide 2019*, https://www.pickhvac.com/heat-pump/carrier/ ; see also Carrier website, available at: https://www.carrier.com .
[18] *Ibid.*
[19] Energy Sage, *Costs and benefits of air source heat pumps*, https://www.energysage.com/green-heating-and-cooling/air-source-heat-pumps/costs-and-benefits-air-source-heat-pumps/
[20] Ibid.

For heat pump water heaters, SMUD has reported that the average cost of the equipment is $1300 but additional installation costs ranged from $1500 to $4500.[21]

Installation costs can be significantly lowered. For example, the average cost of a residential solar hot water system is much lower in the UK, despite an equivalent or lower cost of living than California. The average installed cost of residential solar hot water systems in California has been about $9000 during this decade[22]. In the UK, average cost is approximately $5000 to $6000.[23] Some sources have reported even lower costs in other countries. For solar hot water systems in particular, the cost of the actual hardware is only a fraction of the total cost. The BUILD and TECH programs should invest in the development of systems for streamlined and much lower priced installations as the majority of the cost of existing building decarbonization technology is in the installation, not the equipment. There should also be opportunities to reduce the cost of equipment through innovation and program scale.

D. Staff Should conduct market studies and draft white paper to better define baseline

Wild Tree agrees with PAO that "the Commission should conduct a market potential study to determine the current rate of adoption for the targeted technologies and the baseline for current practices and market shares" although Wild Tree does not believe it is necessary to not begin work on BUILD and TECH while this information is gathered (PAO at p. 4.) The staff

[21] Green Tech Media, *Sacramento Utility Pushes All-Electric Homes: 'California Is Wasting Money to Build Homes With Gas'* (June 27, 2018), available at: https://www.greentechmedia.com/articles/read/sacramento-utility-pushes-all-electric-homes#gs.xoxx3s .

[22] CSI Thermal Data, https://www.californiadgstats.ca.gov/downloads/.

[23] Energy Saving Trust, https://www.energysavingtrust.org.uk/renewable-energy/heat/solar-water-heating .

proposal should be informed by a market study and a white paper regarding known data so that an accurate baseline can be developed. The information availbel in regards to use of technoglly in buildings is limited and flawed.

For example, the US census has long collected information home heating fuel and EIA relies on this date as well. (See https://www.eia.gov/state/print.php?sid=CA) This data shows that electricity has been consistently replacing natural gas as source of home heating since the 1960's. Unfortunately, the data suffers from flaws in the collection method.

For example, the following is the U.S. Census data for home heating fuel for 2017. It shows that 80,261 households use solar for home heating. This data point makes no sense. First, solar home heating does not exist. Second, even if this data point were intended to capture homes that operated electric home heating by electricity generated from rooftrop solar, this figure is off by an order of magnitude on how many households in California have rooftop solar. This is likely due to an error in the survey methodology as the U.S. Census Bureau has reported itself. The Bureua has found that the question regarding home heating fuel is the most wrongly answered question in this survey.

HOUSE HEATING FUEL Occupied housing units
2017 American Community Survey 1-Year Estimates

	United States		California	
	Estimate	Margin of Error	Estimate	Margin of Error
Total:	120,062,818	+/-161,148	13,005,097	+/-17,539
Utility gas	57,687,289	+/-100,856	8,370,720	+/-30,345
Bottled, tank, or LP gas	5,629,120	+/-44,634	420,817	+/-9,554
Electricity	46,773,138	+/-74,559	3,452,150	+/-27,556
Fuel oil, kerosene, etc.	5,649,048	+/-34,800	32,051	+/-2,694
Coal or coke	114,295	+/-4,650	1,464	+/-683
Wood	2,120,937	+/-21,939	197,217	+/-6,921
Solar energy	187,622	+/-6,722	80,261	+/-4,398
Other fuel	575,122	+/-10,599	40,946	+/-3,081
No fuel used	1,326,247	+/-16,246	409,471	+/-10,408

U.S. Census Bureau, Data, State Population Totals and Components of Change: 2010-2017, Annual Estimates of the Resident Population for the United States, Regions, States, and Puerto Rico: April 1, 2010 to July 1, 2017 (NST-EST2017-01) available at: https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

Respectfully submitted,

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