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Comments of Environmental Defense Fund

Additional submitted attachment is included below.

June 29, 2020

Environmental Defense Fund (EDF) is pleased to offer these comments in response to the staff workshop held on June 15, 2020 regarding implementation of the Building Initiative for Low Emissions Development (BUILD) program. EDF thanks Energy Commission Staff for their efforts in putting the workshop together and offers the following comments so that the BUILD program can serve the largest number of customers to help decarbonize California's built environment. Our comments focus on the Application Process, the incentive structure, changes to the CARE discount, and bill savings.

Application process:

As suggested during the workshop, the two-step process may pose a barrier to low-income housing developers and production builders who need early funding to develop their projects. EDF suggests that the Energy Commission look to other best practices that are more customized to the affordable housing community may be more appropriate; one example includes progress payments as designed in the Solar on Multifamily Affordable Housing (SOMAH) and that program's financing model. Because of the financing models are different for low-income housing, EDF suggests that the funding must be available upfront – as soon as funding application is submitted. EDF is concerned that a delay until the second step as proposed may result in making the funds unavailable for financing.

Incentive structure:

As indicated on slide 25, the BUILD program rollout will exclusively serve eligible applicants developing low-income residential housing for the first two years. Yet, low-income residential housing projects are mostly multi-family projects where a centralized water heating system

123 Mission Street
San Francisco, CA 94105
T 415 293 6050
F 415 293 6051
edf.org
New York, NY / Austin, TX / Bentonville, AR / Boston, MA / Boulder, CO / Raleigh, NC
Sacramento, CA / San Francisco, CA / Washington, DC / Beijing, China / La Paz, Mexico

creates all the heat distributed throughout the building. Looking at a more diversified range of appliances and a broader market change is essential during the four years of the BUILD program.

Because the definition of new residential housing allows for both the retrofit of existing residential buildings and the adaptive reuse of non-residential building, EDF suggests prioritizing a portion of the funds to transform existing buildings to affordable housing. This solution would enable to get more clean energy affordable housing quickly and to leverage the money to go farther to get more affordable units.

When considering the incentive structure itself, EDF is concerned that as proposed that the modeling requirements for new construction will create a new barrier to entry. The evaluation and qualification process should be simplified so that no new unique modeling is required. BUILD is a pilot programs and we should focus on deployment, not on modelling efforts.

Bill Saving calculations and the CARE Discount:

EDF notes that in its slides, Energy Commission staff inadvertently indicate the wrong numbers for the California Alternative Rates for Energy (CARE) discount. To clarify, the correct discounts should be 35% for electricity and 20% for natural gas. The nature of these discounts and the allocation of funding to low income eligible households almost by definition means that switching from gas to electric will result in customer bill savings. As we outline below, EDF suggests that Energy Commission staff focus more on minimum thresholds of efficiency that result in bill savings and not focus on eligibility for every single piece of equipment.

For bill estimates, tools could be used to avoid affordable housing developers to go through extra hoops. Bill saving could be analyzed during 15 years (as mentioned on slide 36), it could also take into consideration the expected useful life of the appliances installed to based their calculations on.

For affordable housing, simple calculations to determine if the new technologies installed result in bill savings should be envisioned. For example, Energy Commission staff can calculate the efficiency needed for a natural gas water heater to offset the 15% delta between the electric and the gas discount offered by the CARE rates.

Example:

Parameter or Assumption		**Rationale**
Daily hot water consumption	50 gal	
ρ : Volumetric mass of water	3.785 kg/gal	By definition
C: Specific heat of water	4.1855 kJ/kg-°C	By definition
Temperature exiting the water heater	60 °C or 140 °F	https://www.waterheaterhub.com/what-is-the-best-water-heater-temperature-setting/
Temperature of cold water	16.6 °C or 62 °F	Average groundwater temperature in California: https://www.hotspotenergy.com/heat-recovery-performance/groundwater-temperature-map.php
EF: Electric water heater efficiency	95%	https://smarterhouse.org/water-heating/replacing-your-water-heater
COP (heat pump): Coefficient of Performance	3.5	https://www.sciencedirect.com/topics/engineering/coefficient-of-performance
Average gas rate in California	$1.33/therm	https://www.eia.gov/
Average electricity rate in California	15.34¢/kWh	https://www.electricitylocal.com/states/california/
CARE discount on electric bill	35%	https://www.cpuc.ca.gov/iqap/
CARE discount on gas bill	20%	https://www.cpuc.ca.gov/iqap/

- **Energy needed for hot water:**

$$E_{needed} = mC\Delta T$$

$$E_{used} = \rho \times Total\ Volume\ of\ Hot\ Water \times C \times \Delta T$$

$$E_{needed} = 3.785\left(\frac{kg}{gal}\right) \times 50\left(\frac{gal}{day}\right) \times 365\left(\frac{days}{yr}\right) \times 4.1855\left(\frac{\text{kJ}}{\text{kg °C}}\right) \times (60(°C) - 16.6(°C)) \times \frac{1(kWh)}{3600(kJ)}$$

$$\boldsymbol{E_{needed} = 3485\ kWh/yr}$$

- **Annual electric bill for hot water with CARE discount:**

$$Bill_{electric} = E_{needed} \times \frac{1}{EF_{electric}} \times Rate_{electric} \times (1 - discount_{electric})$$

$$\boldsymbol{Bill_{electric} = \$366/yr}$$

- **Minimum efficiency needed for the gas water heater to equal utility bill:**

$$EF_{gas} = E_{needed} \times Rate_{gas} \times (1 - discount_{gas}) \times \frac{1}{Bill_{electric}}$$

$$EF_{gas} = 3485\left(\frac{kWh}{yr}\right) \times 0.0341296\left(\frac{therm}{kWh}\right) \times 1.33\left(\frac{\$}{therm}\right) \times (1 - 0.20) \times \frac{1}{366\left(\frac{\$}{yr}\right)}$$

$$\boldsymbol{EF_{gas} = 35\%}$$

Yet, the average efficiency for a natural gas water heater is 65%. The gas water heater would be result in lower utility bill than the electric water heater. We replicate these calculations to compare an electric heat pump with a gas water heater.

- **Annual electric bill for heat pump with CARE discount:**

$$Bill_{heat\ pump} = E_{needed} \times \frac{1}{COP} \times Rate_{electric} \times (1 - discount_{electric})$$

$$\boldsymbol{Bill_{heat\ pump} = \$99/yr}$$

- **Minimum efficiency needed for the gas water heater to equal utility bill:**

$$EF_{gas} = E_{needed} \times Rate_{gas} \times (1 - discount_{gas}) \times \frac{1}{Bill_{electric}}$$

$$EF_{gas} = 3485\left(\frac{kWh}{yr}\right) \times 0.0341296\left(\frac{therm}{kWh}\right) \times 1.33\left(\frac{\$}{therm}\right) \times (1 - 0.20) \times \frac{1}{99\left(\frac{\$}{yr}\right)}$$

$$\boldsymbol{EF_{gas} = 128\%}$$

This efficiency is impossible to reach for a gas heater. Therefore, because of how the CARE rates are structured, the heat pump is the best solution. The upfront cost of a heat pump will be the major barrier. The differences between models will simply be noise drowned out by the subsidy differences between electric and gas.

In conclusion, EDF thanks you for the workshop on June 15, 2020 and is available to answer further questions if they arise.

123 Mission Street
San Francisco, CA 94105
T 415 293 6050
F 415 293 6051
edf.org
New York, NY / Austin, TX / Bentonville, AR / Boston, MA / Boulder, CO / Raleigh, NC
Sacramento, CA / San Francisco, CA / Washington, DC / Beijing, China / La Paz, Mexico

Sincerely,

Michael Colvin
Director, Regulatory and Legislative Affairs
California Energy Program
Environmental Defense Fund