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SMUD Comments on Draft 2019 Building Energy Efficiency Standards

Additional submitted attachment is included below.

STATE OF CALIFORNIA
BEFORE THE CALIFORNIA ENERGY COMMISSION

In the matter of:	)	Docket No. 17-BSTD-01
	)	
Title 24: Draft 2019 Building Energy Efficiency Standards	)	SMUD Comments On Draft 2019 Building Energy Efficiency Standards
	)	
	)	October 20, 2017

Comments of the Sacramento Municipal Utility District on Draft 2019 Building Energy Efficiency Standards

Thank you for the opportunity to provide comments on the Draft 2019 Building Energy Efficiency Standards under the California Energy Commission's ("CEC") Title 24 Building Energy Efficiency Program. SMUD supports the continuing process of updating the State's Building Efficiency Standards on a periodic basis as technologies and technology costs change over time.

SMUD has followed with interest the State's development of zero net energy goals and understands that one of the aims of the 2019 Building Standards is to focus on the goal of Zero Net Energy new residential buildings by 2020. Solar photovoltaic (PV) costs have come down sharply, leading to the background analysis by E3 that indicates a PV system is a cost-effective inclusion in the 2019 Building Standards. SMUD appreciates the thoughtful analysis being done to examine this requirement – particularly the question of the potential impact on distribution grids on which the new PV may become interconnected in significant local groups as post-2020 housing developments are built. SMUD has concerns about these potential impacts, leading to some of the comments contained herein.

SMUD supports inclusion, and strengthening, of the various aspects of the Draft 2019 Building Standards that act to moderate the impacts of significant clustered PV systems on the distribution grid, including:

- The credit for on-site storage that will tend to limit export of on-site PV to the grid; and
- The option for including Community Solar in place of the prescribed on-site PV systems.

On-Site Storage

SMUD supports the concept of Exception 5 to the prescribed photovoltaic requirements in Section 150.1 item 14. We agree that use of electricity storage can be used to moderate the grid-export aspects of the required PV, limiting impacts on the

surrounding distribution system. The proposed language reads: "… if installed in conjunction with at least an 8 kWh battery storage system." SMUD recommends expanding this concept to allow other forms of storage to be considered/included beyond just "batteries." For example, a heat-pump water heater can also provide some PV storage (storing the electricity as thermal rather than chemical energy) during the afternoon hours to avoid export. Cost per kWh of storage of heat-pump water heaters are a tiny fraction of the costs of a battery, even with the cost decline that batteries have recently experienced. We believe that heat-pump water heater storage will continue to be less expensive than batteries for at least the next 10-15 years. Other non-battery forms of storage should also be considered.

SMUD also suggests clarifying the term "… in conjunction with …." Clearly, any on-site storage installed with the PV system will act to limit export to the grid, but some off-site storage could also be installed "in conjunction with" the PV system and have commensurate benefits at a defined distribution grid level. SMUD has experimented with on-site as well as neighborhood level storage and could provide insight about the costs, benefits, and impacts of each. In particular, the Community Solar compliance option may interact with neighborhood and/or community storage to enhance benefits.

Community Solar Option

SMUD strongly supports the Community Solar option found in Part 10.115. Community Solar systems are significantly less costly on a $/watt basis than on-site integrated systems and, if allowed to be a viable compliance option in implementation of the Draft 2019 Standards, would boost cost-effectiveness. Specific comments include:

- SMUD appreciates the inclusion of "…other community shared renewable system …" in the opening paragraph (a) of Part 10.115. SMUD believes that there is potential at some sites for other community owned renewable generation – wind, biomass, geothermal, etc. – to be considered as fulfilling this compliance option. The last sentence of the paragraph drops this phrase, and SMUD recommends that the phrase be added there to avoid confusion and to add clarity.
- SMUD appreciates the inclusion of "… community shared battery storage system ..." in the opening paragraph (a) of Part 10.115. SMUD agrees that a community shared storage system can be included in a low-cost compliance option that minimizes grid impacts and overall costs. Again, however, SMUD suggests that the community shared storage system not be limited to just "battery" systems. Allowing consideration of storing the electricity produced with thermal and/or mechanical energy systems in addition to just chemical energy systems makes sense. Since the Commission must approve the specific installation for this compliance option, additional flexibility can be afforded to propose for approval innovative storage systems in addition to batteries.

Heat Pump References

The current definition of heat pump is ambiguous and should be clarified as a piece of equipment, rather than as the technology. A heat pump, in addition to being an

appliance (a space conditioning heat pump), is also a technology that is found in equipment such as refrigerators and water heaters, among others. To clarify that the CEC is referring to the appliance, not the general technology in each instance, SMUD suggests a few clarifications:

1. **Section 100.1** the definition of "Heat Pump" is specific to space conditioning, and hence should be amended to state: "Space Conditioning Heat Pump." Consider adding definitions as well of "Heat Pump Water Heater" and/or "Multi-Use Heat Pumps." There are many definitions in the standards that reference "heat pump" that seem to be discussing space conditioning heat pumps which would benefit from clarification.
2. **Section 110.2(b)** should be amended to read: "(b) Controls for Space Conditioning Heat Pumps with Supplementary Electric Resistance Heaters."
3. **Section 150.1 (b)(4)(B)(iv)** should be amended to state: "HSPF Rating. When performance compliance requires installation of a heat pump space conditioning system with an HSPF rating that is greater than the minimum HSPF rating required by TABLE 150.1-A or B, the installed system shall be field verified in accordance with the procedures specified in Reference Residential Appendix RA3.4.4.1.
4. **Section 150.1(b)(4)(B)(v)** should be amended to read: "Heat Pump Space Conditioning Equipment Rated Heating Capacity."

Section 100.1

SMUD suggests amending the current definition of Natural Gas Availability, which states: "For newly constructed buildings, natural gas is available if a gas service line can be connected to the site without a gas main extension. For addition and alteration, natural gas is available if a gas service line is connected to the existing building."

SMUD suggests amending the definition to: 1) reflect more clearly the costs of connecting to gas service and foster more consideration of all-electric developments and 2) remove the ambiguity surrounding the use of the term "gas main extension." It can cost up to $50,000 to connect a site to the gas distribution system, even without a "gas main extension." Structuring the definitions to allow a significant increase in development sites where the code baseline does not assume inexpensive natural gas connection will point developers toward consideration of all-electric developments and enhance the necessary movement toward electrification of end uses.

With respect to the term "gas main extension," a search in gas company documents refers to terms such as: Transmission Line, Distribution Rib, Distribution Line, Main Extensions, Service Extensions, Main, Single Service/Meter Set Assembly, Main Extension Laterals.

SMUD suggests the Natural Gas Availability definition be amended to read, "Natural Gas Availability: For newly constructed buildings, additions and alterations, natural gas is available if a gas service line is connected to the site ~~natural gas is available if a gas service line can be connected to the site without a gas main extension. For addition~~

~~and alteration, natural gas is available if a gas service line is connected to the existing building~~."

Electrification Ready Buildings

Similar to how the CEC has used the Code to assist in making buildings solar ready in Section 110.10, SMUD believes the CEC should now include a new Section 110.13 to assist in making buildings electric ready, to facilitate future installation of heat pump water heaters, heat pump dryers, cooking, and heat pump space heating.

Converting an existing mixed-fuel home to an all-electric home costs between $10,000 and $30,000. Implementation of measures that would reduce the cost and complexity of performing fuel substitution during the lifetime of new homes is an important strategy to help California achieve its long-term climate goals, which require transitioning the vast majority of its building stock to electric appliances. Therefore, SMUD suggests that the CEC require an electrical connection appropriately suited to run an appliance on electricity everywhere that gas is expected to be stubbed out for that appliance.

Section 150.1(c)(8)(A)(iii)

SMUD suggests reorganizing this section to align with the increasing efficiency and availability of electric heat-pump water heater technology, by reversing the prescriptive and Exception options. SMUD proposes the amended language read:

iii. A single electric heat pump water heater that meets the requirements of NEEA Advanced Water Heater Specifications Tier 3 or higher, and

a. For climate zones 1 and 16, a photovoltaic system capacity of 0.3 kW larger than the requirement specified in Section 150.1(c)4.

EXCEPTION 1 to Section 150.1(c)8Aiii: A single electric <u>resistance</u> water heater with rated volume of more than 55 gallons and in addition one of the following:

a. For Climate Zones 2 through 15, a photovoltaic system capacity of 0.3 kW larger than the requirement specified in Section 150.1(c)4.

b. For Climate Zones 1 and 16, a photovoltaic system capacity of 1.1 kW larger than the requirement specified in Section 150.1(c)4.

Section 150.1(c)(8)(B)(i)

SMUD suggests striking this section as it seems redundant. The phrase "Gas or propane water heaters, boilers or other water heating equipment" includes every type of water heating equipment, and all of these are what this section is referencing already.

Section 150.1-A and Table 150.1-B Component Package

The current text states that refrigerant charge is prescriptively required for space cooling in some climate zones. Since proper refrigerant charge is a determining factor to achieve the rated equipment efficiency in all refrigerant based heating and cooling systems, SMUD suggests the CEC require refrigerant charge verification in all climate zones when a heat pump space heating system is installed.

Section 150.2(a)(1)(D)(iii)

SMUD sees no reason to exclude an electric water heating alternative when a building alteration includes a second water heater. SMUD suggests adding an electric option "iv" using the same language as proposed in Section 150.1(c)(8)(A)(iii) above:

iv. A single electric heat pump water heater that meets the requirements of NEEA Advanced Water Heater Specifications Tier 3 or higher, and

b. For climate zones 1 and 16, a photovoltaic system capacity of 0.3 kW larger than the requirement specified in Section 150.1(c)4.

EXCEPTION 1 to Section 150.2(a)(1)(D)(iv): A single electric resistance water heater with rated volume of more than 55 gallons and in addition one of the following:

a. For Climate Zones 2 through 15, a photovoltaic system capacity of 0.3 kW larger than the requirement specified in Section 150.1(c)4.

b. For Climate Zones 1 and 16, a photovoltaic system capacity of 1.1 kW larger than the requirement specified in Section 150.1(c)4.

Section 150.2(b)(1)Hiii

SMUD again suggests reflecting the increasing efficiency and availability of electric heat-pump water heater technology even for simple alterations, by reversing prescriptive and Exception options similarly to our suggestion in Section 150.1(c)(8)(A)(iii):

iii.(…)

b. A single electric heat pump water heater that meets the requirements of NEEA Advanced Water Heater Specifications Tier 3 or higher.

EXCEPTION TO 150.2(b)1Hiii: A single electric water heater with rated volume of more than 55 gallons and an additional photovoltaic system capacity of 1kW.

(…)

SMUD contends that the phrase "… additional photovoltaic capacity of 1 kW …" may not be easily defined or met in a simple alteration setting, since: 1) there is not a clear requirement for any photovoltaic addition in this instance, making "additional" vague; and 2) adding a 1 kW photovoltaic system when replacing a water heater during an alteration may not make sense.

Thank you again for the opportunity to comment on the Draft 2019 Standards.

/s/

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cc: Corporate Files (LEG 2017-0535)