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Guttmann & Blaevoet Consulting Engineer Comments on ACM Draft

Additional submitted attachment is included below.

Guttmann & Blaevoet
CONSULTING ENGINEERS

March 1, 2019
Commissioner McAllister
California Energy Commission
1516 9th St, Sacramento, CA 95814

Re: Guttmann & Blaevoet Comments on the 2019 Building Energy Standards Draft Alternative Calculation Method Reference Manuals and Compliance Software Tools

Dear Commissioner McAllister:

First off, a gigantic thank you to you and your staff for being so proactive with the design community and stakeholders as we move to a decarbonized and grid harmonized world. The changes in the residential standards and Res-ACM have been incredibly important as we design and build decarbonized homes. We completely understand the heavy lifting and the focus on residential for 2019 Standards but there are some gigantic challenges for Non-Res we need to focus our efforts on. The majority of my comments will focus on Non-Residential ACM and we implore the commission to tackle these issues in the 2019 Non-Res ACM and do not delay to the 2022 Standards development. That will be a 5 year delay in the construction field we cannot afford in our path towards climate change mitigation.

We respectfully ask the commission to reconsider adopting the ASHRAE 90.1-2016 Baseline system mapping. All of the baseline comparisons are a natural gas baseline which prevents many of the electrified building options from reaching performance based compliance and requires prescriptive compliance as the only option. We request that you modify the ASHRAE 90.1 system mapping with a fuel neutral baseline similar to the ASHRAE 90.1-2010 HVAC System pathways. There should also a heat pump water heater baseline adopted in the Domestic Hot Water System Mapping. The current DHW system mapping in ASHRAE 90.1 favors again natural gas and really challenges the performance based compliance.

ASHRAE 90.1-2010

TABLE G3.1.1A Baseline HVAC System Types

Building Type	Fossil Fuel, Fossil/Electric Hybrid, and Purchased Heat	Electric and Other
Residential	System 1—PTAC	System 2—PTHP
Nonresidential and 3 Floors or Less and <25,000 ft^2	System 3—PSZ-AC	System 4—PSZ-HP
Nonresidential and 4 or 5 Floors and <25,000 ft^2 or 5 Floors or Less and 25,000 ft^2 to 150,000 ft^2	System 5—Packaged VAV with Reheat	System 6—Packaged VAV with PFP Boxes
Nonresidential and More than 5 Floors or >150,000 ft^2	System 7—VAV with Reheat	System 8—VAV with PFP Boxes
Heated Only Storage	System 9—Heating and Ventilation	System 10—Heating and Ventilation

Notes:

Residential building types include dormitory, hotel, motel, and multifamily. *Residential space* types include guest rooms, living quarters, private living *space*, and sleeping quarters. Other building and *space* types are considered *nonresidential*.

Where no heating *system* is to be provided or no heating *energy* source is specified, use the "Electric and Other" heating source classification.

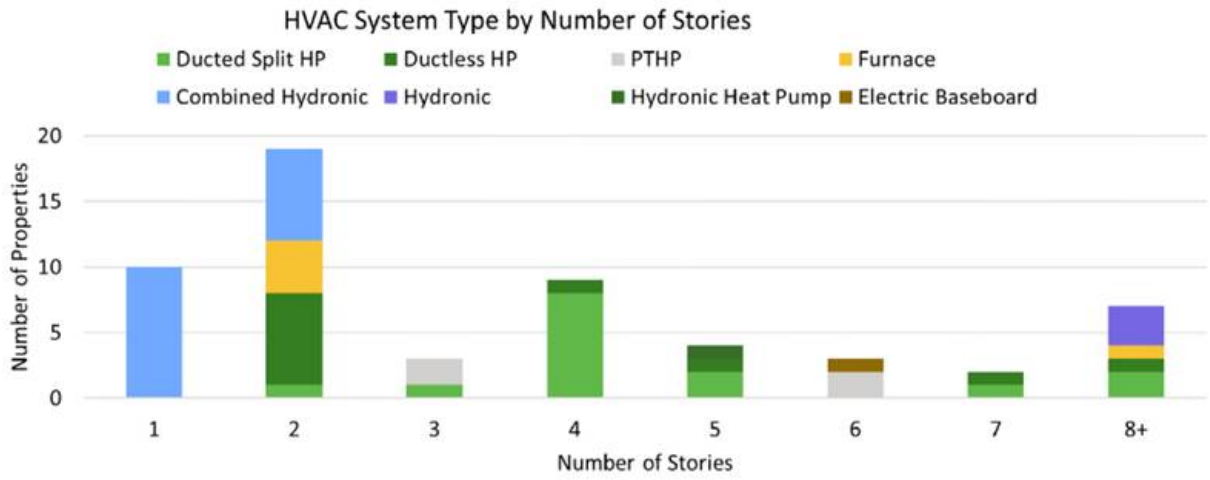
Where attributes make a building eligible for more than one *baseline system* type, use the predominant condition to determine the *system* type for the entire building except as noted in Exception a to Section G3.1.1.

For laboratory *spaces* in a building having a total laboratory exhaust rate greater than 5000 cfm, use a single *system* of type 5 or 7 serving only those *spaces*. For all-electric buildings, the heating shall be *electric resistance*.

The 2016 high rise model I've been working to get in compliance in the City of Berkeley (it's out by -12.7% under 2016) using electric baseboard heating with individual heat pump water heaters and small HRV's for ventilation (no cooling). When I get this in the 2019 version the heating penalty is 300 times the baseline currently and is overall -55% out of compliance. The 2019 TDV multipliers exacerbate the penalty for the gas furnace comparison. Even when I switch this over to a code compliant heat pump the TDV penalty is still enormous penalty and out of compliance by -25.4% overall. This occupancy more than others will be the hardest to meet compliance with the current system mapping. We ask the commission to publish both gas and electric buildings under the 2019 ACM rules and show that electrified buildings are not unfairly penalized. I have not seen anything that proves that electrified buildings are made easier and this ASHRAE 90.1 baseline system mapping is "not an issue". In fact the research I've provided here only exacerbates the issues in the 2016 ACM we all face now for electrified buildings. Before a major adoption these facts should have been publicly disclosed and prototype models with results developed by the commission staff.

The building facts provided in the ACM workshop provide below are a bit concerning. Look at the frequency of "furnaces" used in the examples and you'll note this is the baseline (SZAC has a furnace less than seven stories). This is nothing that the mainstream California builders construct with and is reflected in the CEC's own research. The dominant construction in this building construction is some version of a heat pump and that should be the appropriate baseline comparison.

HVAC System Type



We additionally request that the CBECC-Com modeling be updated as soon as possible with the central heat pump water heating with recirculation controls as soon as possible as this is a critical system that is becoming more common for buildings. With University of California, California State University, Cities, Counties, and Corporations adopting Carbon free building requirements these electrified options are becoming the dominant design strategies.

The Solar Thermal requirement of up to 35% solar savings fraction in high rise residential for central heat pumps should be reconsidered as well. Solar thermal does not work well with heat pump water heating technology, the requirement option for this technology should be allowed to be electric photovoltaic to offset heat pump energy, not solar thermal.

Sincerely,

Proud to be -
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