November 26, 2007

Docket Number 0-7-BSTD-1
California Energy Commission
Docket Office
1516 Ninth Street, MS-4
Sacramento, CA 95814-5512

Comments on Amendments of the Building Energy Efficiency Standards Initial Study Proposed Negative Declaration:

My comments relate to the Ventilation Indoor Air Quality section found on page 34.

There are two issues that need to be recognized and evaluated before the ASHRAE 62.2 indoor air quality guidelines for residential buildings is accepted as part of the 2008 Standards.

1. Energy is required to condition the air that comes into the living area whether it be "pushed in" with a supply type system or "pulled in" with an exhaust fan running in the bathroom. In many new California houses during the summer the attic temperature can easily exceed 130°F. Therefore, air that is drawn in from the attic by the exhaust fan can be, depending on the climate zone, 30°F to 50°F above the outside temperature. This creates an increased cooling load as the exhaust fan volume flow rate increases.

   In many new California houses the HVAC system in located in the attic and the duct that carries the ventilation air goes through the attic. Therefore, in this type of supply type ventilation system all the ventilation air comes into the living room 30°F to 50°F above the outside temperature. The energy required to cool the amount of air recommended by the ASHRAE 62.2 guideline can add more that 15% to the normal peak cooling load. A more detailed discussion of the energy required to condition ventilation air has been given by Davis (2007).

   In order to ensure that adopting the ASHRAE 62.2 guideline does not produce a nasty hit on the peak time energy draw during the summer months, the added energy required to condition ventilation air needs to be analyzed for each climate zone.

   In the case of an exhaust type system, it is more difficult to control the conditioning of the ventilation air since the sources of incoming air can be very distributed throughout the house. On the other hand, the supply type systems lend themselves to the use of heat recovery units and small cooling systems that required no additional energy.

2. The second comment relates to the use of exhaust fans to provide ventilation air that can be contaminated with chemical and particulate matter found in areas outside the living area. Although we know embarrassing little about the infiltration of air when negative pressure is created in the living area, we do know that air that comes from the attic can contain various contaminates including formaldehyde (Davis 2007). The level of contaminates in the attic will depend on many variables including attic temperature, attic ventilation, building materials, insulation, etc.

   Therefore, depending upon the percentage of air the comes in from the attic, increasing the air change rate by using a bathroom exhaust fan can actually degrade the indoor air quality and at the same time increase the energy usage by as much as 15%. Unless there is some information on the infiltration of air from the attics of new California houses, there is a large risk associated with recommending that higher ventilation rates be achieved by using exhaust fans. This kind of information should have come out of the ARB sponsored project RFP #04-310 entitled " Ventilation and Air Quality in New Homes". However, recent public presentation of the results from this project indicate this aspect of the project was not carried out.

In summary, before the ASHRAE 62.2 guideline is incorporated in the 2008 building code for residential building there needs to be an understanding of the negative energy impact this could have. Recommending the use of exhaust fans to achieve the required ventilation can have a double negative effect on indoor air quality and energy consumption.

Davis, C. 2007. Energy Required to Neutralize Formaldehyde Off Gassing in Residential Houses. Proceedings of the ASHRAE 2007 Indoor Air Quality Conference. Baltimore, October 14-17.

Sincerely,

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INITIAL STUDY/PROPOSED NEGATIVE DECLARATION

CALIFORNIA ENERGY COMMISSION

for the 2008 BUILDING ENERGY EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS

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Arnold Schwarzenegger
Governor

are already used in central water heating systems the added amounts are insignificant.[11]

No other environmental impacts are expected as a result of the changes to water heating recirculation loops.

Ventilation Indoor Air Quality: The adoption of ASHRAE 62.2 indoor air quality guidelines for residential buildings the 2008 Standards will require that all residences provide some means of providing outside air to conditioned space. While a number of methods can be used, the most likely manner of meeting this requirement will be the use of a small constant running exhaust fan in the bathroom.

The sound level requirement for these fans is set at 1 sone, which is considered a comfortable zone free of noise. In comparison, existing bathroom fans have sone ratings between 3 and 7. At 3 sones the sound level would be equal to what would occur during a normal conversation. The new requirement is for the fan to run continuously, but since the noise level is at a level considered free of noise, no negative consequences are expected.[12]

To attain the required sound level of one sone, exhaust fans use a variety of measures. These include better motors, added sound insulation, and better design. The material impact of all of these improvements is negligible compared to the materials already used.

No other environmental impacts are expected as a result of the addition of ventilation for indoor air quality.

Pool System Equipment and Installation: Pools use relatively large pumps and motors to circulate the volume of water required to keep a swimming pool clean and warm. In pumping this large volume of water, significant flow resistance can be created in the piping, especially at elbows where the lines turn, and in the filtration system. To eliminate piping resistancem the 2008 standards require proper sizing of piping and the installation of long elbows instead of the tight 90 degree turns. Proper sizing of the filtration system to reduce resistance is also required. In addition, the 2008 Standards will require that pumps are sized based on a performance calculation. Finally, control requirements have been added to provide the ability to turn off swimming pool circulation systems during peak demand periods.

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[11] Comments based on information from *Central Hot Water Distribution Systems in Multifamily Buildings and Modeling Rules for Boilers and Water Heaters Report.*

[12] Comments based on information from report on *Applicability of Residential Ventilation Standards in California* and other comments made in the 2008 standards adoption proceedings.