

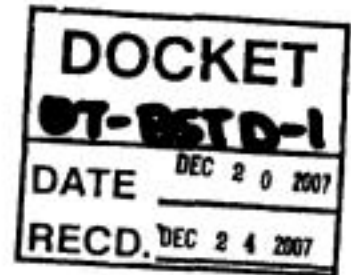
December 20, 2007

CALIFORNIA ENERGY COMMISSION

Docket Office

1516 Ninth Street, MS-4

Sacramento, CA 95814-5512



Re: Docket Number 07-BSTD-1

Dear Energy Commission Representatives:

This public comment is being submitted to address the 45 day language in Section 150 (O), which introduces requirements for mechanical ventilation. Based on compelling research, the 45 day language has inserted proposed text which would require mechanical ventilation in residences in accordance with ASHRAE 62.2. However, this language in its current state fails to address the energy consumption of these systems. Included in this comment is rationale for regulating the energy consumption of these systems as well as proposed language for accomplishing this end.

Why Regulate the Energy Consumption of Mechanical Ventilation Systems

Findings from a recent LBNL study commissioned by the U.S. Department of Energy and the California Energy Commission identified that energy consumption of mechanical ventilation systems is significant.¹ Furthermore, the study revealed that large disparities exist in the energy consumption and costs of ASHRAE 62.2 compliant ventilation systems in California's cold; mild; and hot, dry climates. Within the study, exhaust only systems, balanced heat recovery systems, supply only systems, and central fan integrated systems were all modeled to assess resultant energy use and associated costs. When ventilation, distribution, and conditioning energy were taken into account, it was revealed that ventilation energy consumption for 62.2 compliant systems was between 630 kWh and 4500 kWh beyond that of a non-mechanically vented base case. Based on the graphs provided by the study, energy and cost premiums above the base case are summarized below:

Temperate climate: 1000 kWh – 2100 kWh; \$70 - \$190

Hot dry climate: 630 kWh – 3500 kWh; \$60 - \$425

Cold climate: 2100 kWh – 4500 kWh; \$140 - \$410

Other studies have provided evidence supporting a mechanical ventilation mandate for residences², and it is likely that this provision will be included in the 2008 version. In light of the research that has been conducted by LBNL, it would be a gross oversight to include ventilation requirements within the energy provisions of Title 24 but not address the energy consumed by these systems.

¹ Sherman, M. and Walker, I. 2007. "Energy Impact of Residential Ventilation Standards in California", LBNL 61282. Lawrence Berkeley National Laboratory, Berkeley, CA.

² Price, P.N. and M.H. Sherman "Ventilation Behavior and Household Characteristics in New California Houses," April 2006. LBNL-59620.

How Should Energy Consumption of Mechanical Ventilation Systems be Regulated?

The most logical way to regulate the amount of energy consumed by residential mechanical ventilation systems is to address the power consumption of the fans that are powering the system. Wilcox and others have supported a maximum power draw of 1.2 W/cfm to ensure that exhaust based, balanced, and energy recovery ventilation systems can be used to satisfy the requirements of ASHRAE 62.2.³ This proposal has been controversial, however, in that it would result in de facto exclusion of central fan integrated systems from being used to provide whole-house mechanical ventilation. To ensure that practicable energy performance regulations for various systems are better received, these regulations should not be structured to exclude various systems. Included in this comment is language that has been structured to achieve this end and ensure that a requirement for mechanical ventilation systems goes hand in hand with energy performance requirements for these systems.

The proposed language included with this comment identifies mechanical ventilation systems according to three distinct groupings and proposes efficiency requirements that are relevant and effective for those groupings.

The first grouping is composed of systems that incorporate the central air handler, also known as "CFI" systems. To avoid de facto exclusion of the CFI systems, the proposed language does not seek to impose the 1.2 W/cfm ceiling on CFI systems. However, to ensure that CFI systems are required to achieve a certain degree of energy efficiency, the proposed language would require them to be powered by an electronically commutated motor (ECM) if specified for ASHRAE 62.2 compliant, whole house ventilation. ECM motors for residential blowers are now offered by many manufacturers and operate at about a 20% higher efficiency than permanent split capacitor motors.

The second grouping is composed of balanced systems that provide heat recovery. This group would include HRVs and ERVs. Based on the testimony of Wilcox and others, the 1.2 W/cfm ceiling can be applied to these energy recovery ventilating devices without excluding them from being specified.

The third grouping is composed of all other ventilation systems (e.g. exhaust or supply stand-alone ventilation). For this grouping, a maximum watt draw of 0.71 W/cfm is proposed – the same maximum watt draw permitted for Energy Star rated bath and utility room fans. The EPA has noted that these fans can save up to 65% over baseline or "builder grade" fans. Baseline fans are also generally not rated for continuous operation – a common operational method used to achieve ASHRAE 62.2 compliance. Furthermore, Energy Star compliant fans operate at lower sound levels than builder grade fans and are therefore more likely to be used, ensuring that ventilation targets based on indoor air quality goals are realized.

³ Sherman, M. and Wilcox, B. "New Mandatory Requirements for Indoor Air Quality Ventilation in Low Rise Residential Buildings", July 2006. Presented in the July 12, 2006 pre-rulemaking staff workshop.

Proposed Language to Address Energy Consumption of Mechanical Ventilation Systems

Part 6 Section 150 (o)

Current 45 day language:

Ventilation for Indoor Air Quality. All dwelling units shall meet the requirements of ANSI/ASHRAE Standard 62.2. Ventilation and Acceptable Indoor Air Quality in Low-Rise Residential Buildings. Window operation is not a permissible method of providing the Whole Building Ventilation required in Section 4 of that Standard.

Proposed language to be added to 45 day language:

If whole-building ventilation is provided by a system incorporating the central air handler, that system shall be powered by an electronically commutated motor. If whole-building ventilation is provided by a balanced system that also provides heat recovery, the system shall have a maximum watt draw of 1.2 W/cfm of ventilation air based on manufacturer ratings at design conditions. All other whole-building ventilation systems shall have a maximum watt draw of 0.71 W/cfm of ventilation air based on manufacturer ratings at design conditions.

Thank you for your consideration of these points. Regardless of whether this language is adopted, provisions should be made to ensure that the energy efficiency of residential mechanical ventilation systems is regulated within the 2008 standards.

Sincerely,

Mike Moore, P.E.