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**Comments on SRVEVR Program**

*Additional submitted attachment is included below.*

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### School Energy Efficiency Stimulus Program - School Reopening Ventilation and Energy Efficiency Verification and Repair Program Guidelines

Thank you for the opportunity to provide comments. I attended the CEC workshop on January 22, and would like to provide the following suggestions after reviewing AB841 Legislation Bill Text and the SRVEVR Program Draft Guidelines.

1. The goal of AB841 is to “provide grants to local educational agencies to reopen schools with functional ventilation systems...” (p.2, AB841 Bill Text) Therefore, the focus of the SRVEVR program needs to center on mechanical systems that provide ventilation. Even though additional filtration systems, such as portable air cleaners or commercial HEPA filtration units, may be an effective alternative to remove respiratory aerosols from the indoor air, they are not the focus of the AB841 legislation according to the Bill Text. On the other hand, I agree with the Program that it is within its scope to support upgrading to MERV 13 or better in the HVAC systems, because the HVAC systems also provide ventilation as its core function.
2. Draft guideline states that “If a system uses UVGI to disinfect the air, the UVGI lamp shall be checked for proper operation” (p.15, Program Draft Guidelines) While it is always a good idea to make sure that equipment already installed is being maintained, it is important to note that very few UVGI manufacturers report air disinfection performance, so it is unclear if ensuring proper operation alone is sufficient to provide protection against COVID-19 or other respiratory infections. For those manufacturers which report the tested efficacy, it is important to note that environmental factors (e.g., temperature, relative humidity, air velocity, duct reflectance) and the characteristics of the viral or bacterial aerosols, can impact greatly the effectiveness in practice. If Program grants will be spent on UVGI, it is very important to require some documentation of system specifications and air disinfection performance be submitted.
3. As described, the Program Draft Guidelines (p.17) is unclear if the requirement to set the carbon dioxide set point of 800 ppm or less for demand control ventilation is meant to be a temporary change in response to COVID, or if this change in set point is intended to be permanent even in the post-recovery period. Another point of confusion is how to determine if the demand control ventilation system is able to “maintain average daily maximum carbon dioxide levels below 1,100 ppm” (p.17, Program Draft Guidelines). The definition of “average daily maximum” needs to be better defined. Is the “average” referring to daily maximum CO<sub>2</sub> measured averaging from different days? Or is the

“average” referring to the time-averaged (e.g., 15 minutes?) measured CO<sub>2</sub> concentration? A clearer explanation for “average daily maximum” is needed.

4. Some of the additional requirements (p.18, Program Draft Guidelines) are referring to the ASHRAE Guidance for Reopening and Operation Schools and Buildings, which is being updated continuously. For example, the [latest version](#) (dated Feb 1, 2021) recommends a new method to calculate the daily flush schedule and provides a “Flush Time Calculator” based on “filter droplet nuclei efficiency”. Because ASHRAE guidance continues to evolve, for clarity it would be preferable to remove specific language such as “daily flush scheduled for two hours before and after scheduled occupancy”. It would be clearer to simply state that HVAC operation schedule should follow ASHARE daily flush recommendations without specifying two hours before and after occupancy.
5. The Program Draft Guidelines (p.19) state that “If a classroom carbon dioxide concentration exceeds 1,100 ppm more than once a week as observed by the teacher or the facility’s staff, the classroom ventilation rates shall be adjusted by qualified testing or adjustment personnel”. In order to do this, a very worthwhile feature is a software application that LEAs can use to identify classrooms with CO<sub>2</sub> exceedences. It would be very valuable to support LEAs to pay for data services so that LEAs can maintain a record of CO<sub>2</sub> data, which is necessary for tracking progress after adjustments to ventilation rates have been made. Another very valuable feature for California classrooms, especially because of the increasing impacts from wildfires, is IAQ monitors that not only measure CO<sub>2</sub>, but also fine particulate matter (PM). IAQ monitoring of both CO<sub>2</sub> and PM in every classroom will enable schools to determine indoor exposure inside their classrooms, and make a more informed decision whether to close or stay open.
6. As part of the HVAC Assessment Report, it is very important to also document information about the existing equipment specifications and performance, such as measured airflow, ventilation control setting, excess equipment noise, and other deficiencies. These as-found conditions are necessary for the Program to estimate energy impacts relative to the baseline, which is defined in the Program Draft Guidelines as what would have happened if HVAC were operated to meet reopening guidelines in their as-found conditions. Therefore, it is critical that the HVAC Assessment Report document the as-found conditions, and not just the verified performance after adjustment and repair has been made. The identification of the most critical data fields, development of efficient data compilation, and reporting tools are very important to this Program.
7. In order to estimate the energy impacts of this Program relative to the baseline, LEAs will need to submit information about how they may be operating their HVAC systems differently. For example, schools may have increased use of natural ventilation while HVAC is running, reduced occupancy for social distancing, and prolonging HVAC operation hours to enable “flushing” before and after occupancy. The assessment of energy impacts relative to a theoretical baseline means that comparison of pre- and post- energy use may not be the right approach. Rather, the assessment of energy

impacts may involve calculations or model simulations. If that's the case, then LEAs will need to submit additional information to support the evaluation of energy impacts, such as basic building characteristics (dimensions, year built, windows, lighting fixture types), occupancy schedule, and HVAC schedule.