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Prove Safety, Health, and Comfort over Energy Efficiency

Additional submitted attachment is included below.

BESC

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After three decades working on both the consulting and construction side of energy projects and dee, broad experience in schools, commercial buildings, and institutions, we strongly feel much more emphasis must be placed on the HVAC system commissioning, measurement and validation in the implementation of **AB841.** We applaud the legislature and California Energy Commission for maintaining integrity of this program by requiring certified and experienced technicians to perform air balancing, mechanical acceptance testing, and commissioning of HVAC systems. This is a high standard above and beyond the internal skillset of most mechanical contractors and consultants.

There are numerous field studies since 2000 by California Energy Commission, U.C. Davis, Lawrence Berkeley, ACEEE, ASHRAE, National Comfort Institute, and other responsible organizations showing a **40 to 85% failure rate of outside air economizers** intended for ventilation and "free" cooling.

Although Fault Diagnostic requirements on small unitary commercial HVAC units is a good start, the system must be defined with the end in mind: **the comfort and safety of the teachers and children in the classroom and assembly areas.** Many of these studies show the cause of economizer failures is forced damper lock-out which are most likely initiated to relieve comfort issues related to poor system performance.

With the immediate safety of teachers and children as the goal, we recommend emphasizing dedicated outside air heat recovery systems with easy to change MERV-13 filter locations and logistics and low system pressure drop. Heat and cooling will include energy required to properly ventilate to below 800 ppm in Carbon Dioxide EPA recommended levels, maintain ASHRAE recommended 40 to 60% relative humidity, "Green Light" EPA2.5 Air Quality Index, and most importantly, teacher comfort. Teacher comfort will highly depend on their control of the classroom environment (mainly on/off scheduling, consistent temperature and noise level). Variation of temperatures, relative humidity must be minimized and can be quantified within temperature and air flow ranges studied in prior comfort studies (e.g. U.C. Berkeley Center for Built Environment).

Indoor and outdoor temperature, humidity, CO2, and particle data collected continuously must be used constructively to educate the end users in achieving safety, health, comfort, and energy efficiency. Proof of energy efficiency will depend on changing baselines to achieve the higher priority safety, health, and comfort.

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