Introduction:

With the CDPH lifting of guidelines, the District has begun moving forward in the most appropriate and efficient manner related to clean and efficient indoor air quality at all school sites.

The District has installed Indoor Air Quality Monitors (IAQ's) which are now being integrated into the HVAC energy management system (EMS) controls in all classrooms within the District.

PGUSD will be establishing a baseline for IAQ levels PM 2.5, PM 10, VOC and CO_2 during the Fall of 2023. The established baseline will help the District regulate these levels by mitigating techniques (opening windows, placing fans, opening HVAC unit economizers...etc) to allow for more volume of outdoor air.

HVAC Systems are set on a programmed schedule, and the schedule has been established to provide the most adequate indoor effective air exchange per hour (eACH) allowable by the corresponding unit.

Studies also show that set points of 68-72 degrees is the ideal temperature for the learning environment. All HVAC unit controls are set to 68-72, and the air management will be coupled with the IAQ monitors proposed for installation later this spring at all PGUSD sites.

<u>Current</u> HVAC Systems:

1. Turning the thermostat up or down does not make a room heat up or cool down faster. It simply changes the point at which a heater will turn off or on.

2. Very few classrooms have air conditioning

3. Turning an air conditioner too high will create ice on the condensing coil and potentially damage the unit.

4. Turning a heater up too high will simply cause the heater to run longer and with the windows and doors open it may never shut off.

5. EMS systems are set to perform a "warm up" cycle in the morning for about 30 minutes to 70 degrees. Thereafter the low is set to 68 degrees throughout the day.

Future Systems:

In 2022, PGUSD partnered with ABM Group to complete a master development agreement for efficiency projects within the District.

The goal of the ABM Group assessment is to identify areas in which the district's infrastructure would benefit from equipment improvements or replacement.

Areas of focus are mechanical systems (HVAC), interior and exterior lighting, building envelope heat loss/gain, water usage, as well as the potential for electrical storage systems.

New systems will include economizers which regulate outdoor air mixing with indoor conditioned air.

Ex. If it's smokey outside the District will keep windows closed, shut down economizers to 10% and have primary indoor circulated and filtered air.

New HVAC systems also give the District the ability to install Merv13 high particulate filters.

District Goal:

Create an indoor environment in our classrooms that is like an outdoor eating environment with a goal of six effective air changes per hour (6eACH), adequate air mixing with HEPA filters, and IAQ monitoring devices to establish baseline levels of CO_2, VOC, PM 2.5 and PM 10.

Introducing a simple concept:

More direct outside air + Indoor HEPA Units (designed to mix the stagnant air) + IAQ Monitoring = <u>Higher cognitive learning environment and less loss of learning and instructional time</u>

Approach:

1. Increase outside air flow with the use of economizers, open to 50% (on RTU's), and use operable windows and box fans (1000CFM on low) to create adequate circulation prior to installation of new systems through the ABM Group efficiency Projects.

2. Install MERV-13 filters, where allowable, on systems that meet the 2019 CBC requirements. Units that do not meet current 2019 CBC requirements will have issues with the MERV-13's as there will be a much higher static pressure than designed. Mitigation can be accomplished with more routine (2-3 month) filter changes.

3. Use HEPA filters in classrooms strategically placed for proper mixing of stagnant air

4. Installing IAQ monitoring in all District classrooms to monitor air quality real time, and establish an IAQ baseline

Research and Methodology:

The Monterey County Office of Education (MCOE) had the opportunity to establish a private/public working partnership with Bill Hayward of The Hayward Score/Hayward Lumber, and Dr. Mark Hernandez from the University of Boulder on implementation of indoor air quality study and guidance tools.

The study and guidance tools were developed for implementation at Denver City Schools and Post Ranch, Big Sur. Guidance identifies how to calculate ventilation rates, including the right amount of HEPA based on rated clean air delivery rate (CADR).

The Hayward Score has extensive experience with these tools and guidance from years of leadership in the building industry. The private/public partnership working group had the honor of bringing these tools to the schools in Denver City, Monterey County, to many state agencies and K12 groups (CASH, CSBA, CSCF, CABSO) in the anticipation of mitigating exposure risk.

The goal was to leave K12 schools with the legacy benefit of increased average daily attendance, lower energy cost, higher learning outcomes, and resilience to environmental factors like agriculture and forest fires.

The private/public partnership hosted by MCOE held a variety of webinar sessions with Monterey, San Benito, Santa Cruz County Schools, and state agencies/K12 associations (CDPH, CASBO, CASH, CSBA, CSFC) on the use of these tools and mitigation strategies.

PGUSD Implementation:

PGUSD's goal is to move to full implementation by the end of 2024 school year.

PGUSD's goal is to establish a baseline classroom IAQ with monitoring levels at periods of the day where the classroom is in peak use.

PGUSD's goal is to monitor and make every effort to maintain levels of C02 at or below 900ppm, VOC below 500ppb, Pm 2.5 at or below 10ug/m3, and Pm 10 at or below 10ug/m3.

Measurable Results:

Students, staff, and the community who use District facilities will be the immediate beneficiary of the project.

A 60-80% increase in cognition, 12% improvement in productivity, 20% sleep quality improvement and an overall improvement to loss of instructional time by teachers and students due to lower levels of all the monitored setpoints.