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CEC Research concept suggestion

Additional submitted attachment is included below.

CEC Research Concept Proposal, Sept. 5,2018 Submitted by Alice Sung, AIA, LEED AP, BD+C, ISSP-SA, Principal, Greenbank Associates asung1@gmail.com

"Survey and Quantification of Potential Building Decarbonization and Methane Leakage Impacts at California Public K-12 School Sites"

Decarbonization of public school infrastructure has the potential to simultaneously improve air quality-thermal comfort as well as reduce greenhouse gas (GHG) emissions, positively affecting health, reducing risk, and more. This research concept proposes to quantify both methane leakage and GHG emissions from natural gas combustion at California public school sites, including measurements at exterior playground, surrounding streets, and indoors. In addition, to measuring any methane/non-combusted natural gas, school buildings with natural gas-based HVAC/space and water heating systems, and cooking appliances, will be analyzed to quantify potential GHG emissions reductions from the CA public school sector through "conceptual decarbonization" to electrify the space and water heating, as well as on-site cooking. Study will prioritize school sites using CALEnviroScreen v 3.0 DACs, and further screen using leakage "hot spots" identified by available data base(s). The research objective is to quantify any air quality, energy use, and GHG impacts from natural gas use in and around existing school buildings, for inclusion in estimated total GHG reduction from building decarbonization (Co2 + leaks.) It's also directly relevant to CARB's current research priorities: Environmental Justice (source identification, IAQ/toxics/odors), and Climate (mitigation options, evaluation of GHG emissions reductions.) A literature review should be performed to identify relevant studies in schools. Methane emissions from both pipe leaks and incomplete combustion in equipment/ appliances will be quantified with portable commercial sensors using mass-balance and gas enhancement ratio methods, respectively. Energy use data and conventional CEC-approved energy modeling software could be used to compare proposed all-electric (heat pump) technology substitutes for extant gas-based systems. The final deliverable will be a key report summarizing results of data collected as well as energy benefits/GHG analysis in the context of meeting state GHG reduction goals through the entire public K-12 school sector, focused on the potential for mitigation solutions resulting in meeting environmental justice (youth are vulnerable communities), air quality/health, ***and*** energy and climate goals. As the State moves towards a 100% renewable electric grid, increasing carbon-free offerings from CCA's, and coupling of on-site renewable energy to deep energy retrofits towards ZNE of all existing public school facilities, addressing future stranded assets of natural gas systems in our school facilities NOW, can save potential millions of dollars for our K-12 school districts throughout the state. Let's help them do the math, and systematically transform these inefficient and ready-to-replace gas or fuel-based systems with efficient, clean renewable energy systems. The benefits are better health, better safety, less risk, more efficient energy use, resilience, more money for educational purposes, and better opportunities for green jobs and environmental eco-literacy. I'd like to propose the CEC work together in collaboration with leading K-12 school facilities ZNE practitioners (consultants/architects/engineers), other agencies such as DSA, CDE, CARB, CPUC, and organizations such as the School Energy Coalition and other school facilities stakeholders.