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## **Use of natural ventilation considering energy use, indoor and outdoor air quality and thermal comfort**

The most efficient buildings use available natural resources to the highest level. Natural ventilation is such a resource that impacts energy consumption, thermal comfort of building occupants, and indoor air quality in all types of buildings. Besides just reducing the quantity of energy used for air conditioning, natural ventilation also enables reduction of the HVAC equipment size. In some parts of California, this can result in having Zero HVAC buildings (centralized heating, ventilation, and air conditioning equipment is not necessary).

A number of parameters restrict the use of natural ventilation and variation of outdoor air pollution is the most important one. Some of the pollution sources are localized (eg. the proximity of residential estate to the major highway) and have a significant local impact that does not affect adjacent communities. In these scenarios, use of natural ventilation leads to the indoor environment pollution buildup. Repeated exposure to high levels of outdoor pollution, especially exhaust fumes, can lead to the significant adverse health effects. With the development of air quality sensing technology and the deployment of outdoor sensing stations, better understanding of use of fans for comfort and air quality, development of simulation platforms that serve as tools in the design we have reached a point where these type of problems can be effectively resolved and as an outcome, we can have the highest utilization of all natural potential

We propose that the CEC support the use of natural ventilation, through the development of strategies, sensing technologies, and tools that can provide key information in the decision-making process affecting new construction and retrofit in the residential and commercial sector. We also propose that the evaluation matrix takes into account energy, air quality, and thermal comfort.