Efficient Cooling in the West

Supporting strategies that can significantly and cost-effectively reduce the impact of cooling systems on California's electricity grid.

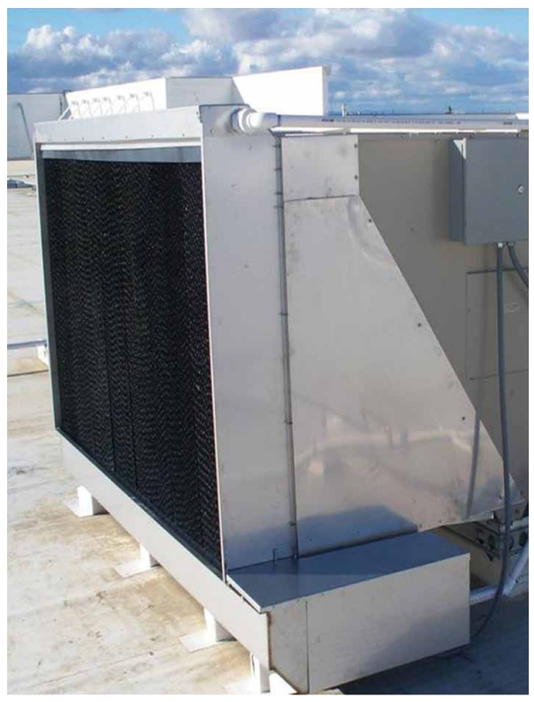
THE WESTERN COOLING EFFICIENCY CENTER partners with industry stakeholders to stimulate the development of impactful cooling technologies. We engage in primary research, innovation, laboratory testing, field demonstrations, education, outreach, and advocacy related to climate appropriate technologies.

Most California buildings experience large afternoon "load spikes" as their cooling systems turn on. Conventional cooling systems are sub-optimal for California—they usually dehumidify unnecessarily, increasing loads and operating costs by as much as 15%. Conventional practice also suffers from a general failure to take advantage of natural cooling alternatives such as flushing buildings with cool night air.

The Center supports a range of cooling strategies that can significantly and cost-effectively reduce the impact of cooling systems on California's electricity grid. The Center is implementing an organized process for bringing a wide range of emerging cooling technologies to market, with a combination of technical support and educational efforts.

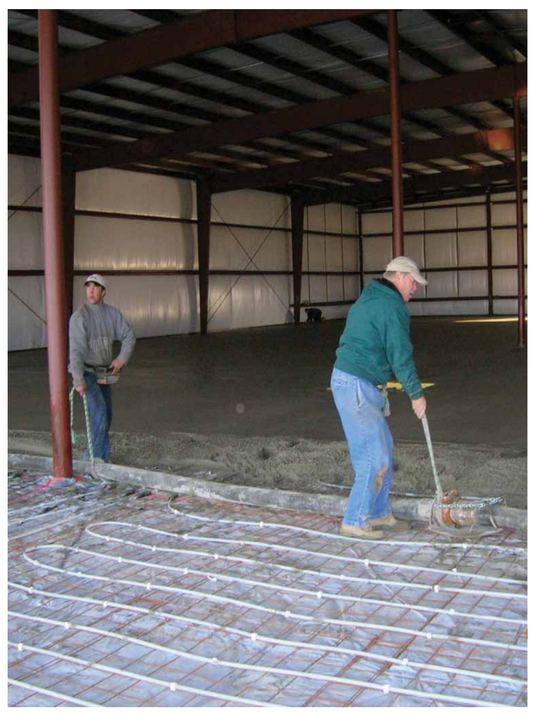
Cooling technologies being evaluated at the Center include:

- Using dry outdoor air to evaporatively cool condenser air, reducing peak afternoon demand and energy use up to 30%;
- Cooling concrete slabs at night, without compressors, to reduce daytime cooling loads;
- Raising evaporator temperatures to minimize unnecessary moisture removal from indoor air, and reusing collected water to reduce condensing temperatures;
- Using improved controls that diagnose HVAC problems and improve demand response;
- Purging and pre-cooling buildings with cool night air;
- Applying multi-stage evaporative and hybrid cooling systems that combine advanced evaporative and compressor-based cooling;
- Implementing strategies that reduce blower use and motor heat output.

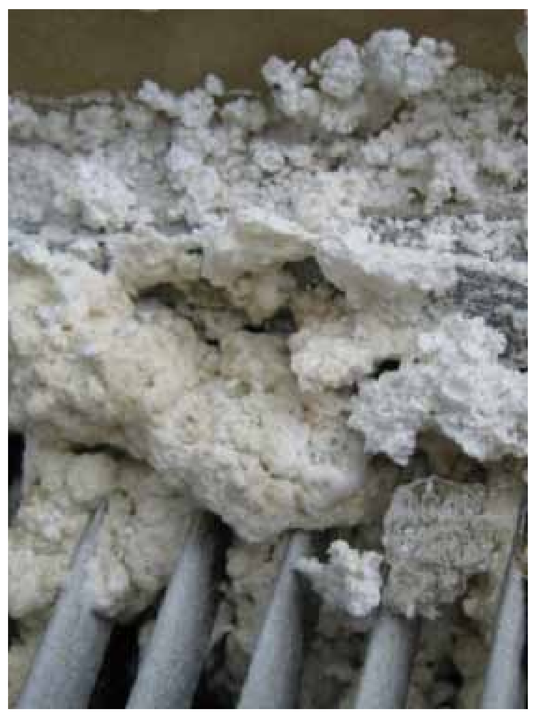


Evaporative pre-cooling of the air entering a rooftop A/C unit can lead to significant energy savings. In partnership with the retailer Target we are monitoring several different technologies in a local store. This pilot project could lead to wider adoption of these technologies.

Rather than simultaneously cooling a house and heating its swimming pool, we are studying the effectiveness of using the pool as a heat sink for the house's cooling system. This not only improves the efficiency of the cooling system, it also reduces heating costs for the pool.



Radiant cooling systems work by cooling the inside surfaces of buildings rather than the air in them. Large masses such as concrete floor slabs can store large amounts of cooling power. Using chilled water to cool slabs at night can significantly reduce the energy use of large commercial buildings.



Evaporative cooling systems suffer from mineral build-up—deposits left behind when the cooling water evaporates. This scaling can have significant impacts on the effectiveness of the system. We are studying a number of water treatment methods to reduce or eliminate this problem.

ENERGY

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