Scientists test solutions for energy-efficient grow houses

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UC Davis assistant engineer Derrick Ross examines the test setup of the MSP dehumidifier at the Western Cooling Efficiency Center. Credit: Paul Fortunato/UC Davis

If Colorado's experience is any indication, energy use is expected to spike with the recent legalization of recreational marijuana in California, much as it did when data centers sprang up throughout the state.

For example, just two years after Colorado legalized recreational marijuana in 2012, grow houses consumed about 2 percent of the power supply in Denver alone.

In anticipation of this new demand, a team of researchers from the Western Cooling Efficiency Center at UC Davis lab-tested equipment designed to reduce the energy demand of this rising new industry. Their results are published in an online case study.

Pot-Growing a Power-Hungry Process

Indoor grow houses for cannabis cultivation have unique design considerations, yet state standards and best practices for facility design are lacking. Grow houses often feature multiple, portable dehumidifiers. While these systems remove water from the room, they also create additional heat. Separate, additional air conditioning is then needed to remove the excess heat, making for a power-hungry, inefficient growing process.

The researchers developed a model of a typical grow house and tested a new dehumidifier built by the New York-based company MSP Technology. The scientists found the system could save 30 to 65 percent of the energy a grow house uses for dehumidification and cooling. It also reuses 100 percent of the water it removes from the air to water plants.

'A Legitimate Engineering Problem'

"The technology we tested is one potential solution but not the only solution," said Theresa Pistochini, senior engineer at the Western Cooling Efficiency Center at UC Davis. "We need to acknowledge this as a legitimate engineering problem that needs to be solved."

MSP's dehumidifier uses a plate heat exchanger combined with an air conditioning process that efficiently dehumidifies while transferring the heat outdoors.

"We want to start creating best practices for this industry as it develops," Pistochini said. "It's hard to retrofit after the fact. It's better to build it right the first time. There are solutions out there if one goes looking."

More information: Case study: wcec.ucdavis.edu/wp-content/up … _XCEL-Case-Study.pdf

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