



## Electricity Use in Marijuana Production

By Jocelyn Durkay and Duranya Freeman

Colorado, the first state to roll out legalized recreational marijuana, no longer is at the forefront of the marijuana debate. Visitors to Alaska, Colorado, Oregon and Washington, the four states that allow recreational use, may be greeted by the familiar green cross that flags a dispensary. In addition, 21 states, the District of Columbia, Guam and Puerto Rico have laws legalizing marijuana for medical purposes. That means that in nearly half the states, cultivators are working to provide users with variations of the plant. States that address marijuana use also are encountering a less-discussed issue: the immense amount of electricity required for indoor production, the style of growing highest in electricity requirements.

### Did You Know?

- Indoor growing systems, using fans and lights, sometimes operate 24 hours a day.
- Pacific Power in Portland experienced seven blackouts traced to marijuana production facilities the summer after Oregon legalized recreational marijuana.
- Forty-five percent of Denver's "load growth," or increase in energy demand, is for electricity to power marijuana facilities.

On a structural level, indoor cultivators must consider special lighting, ventilation and air conditioning systems when designing greenhouses. Each of these systems uses a substantial amount of energy. Many growers, in order to ensure the maximum harvest of their crop, use intensely bright lighting systems paired with powerful air conditioners to shorten a plant's growing cycle.

The electricity consumption of grow-houses is staggering when compared to business and residential use. In 2015, the [average electricity consumption](#) of a 5,000-square-foot indoor facility in Boulder County was 41,808 kilowatt-hours per month, while an average household in the county used about 630 kilowatt-hours. A 2012 [report](#) on the carbon footprint of indoor production found that cannabis production makes up 1 percent of national electricity use, and in California, the top-producing state, that number rises to 3 percent.

An indoor facility can have lighting intensities similar to hospital operating rooms, which are 500 times greater than recommended reading light levels. These facilities can also have 30 hourly temperature or fan speed air changes, which is 60 times the rate in a normal home. Put another way, a [four-plant lighting module](#) uses as much electricity as 29 refrigerators.

### Equipment Needed for an Indoor Growing Facility

- 1 Air Conditioning:** Chiller, ozone generator, powered carbon filter, controllers
- 2 Ventilation & Dehumidifying Process:** Dehumidifier, oscillating fan, room fan, in-line duct fan
- 3 Lighting:** High-intensity lamps, mechanically ventilated light fixture, ballast, motorized lamp rails
- 4 Water & Heating:** Water purifier, submersible water heater, pump, Co<sub>2</sub> generator, heater

Source: Evan Mills, Lawrence Berkeley National Laboratory

On a monetary level, the finished products come in at an [energy cost](#) of \$2,500 per kilogram. The [energy used](#) to produce one marijuana cigarette would also produce 18 pints of beer.

The link between cultivation and energy consumption, although not commonly on a legislature's agenda, is an issue becoming increasingly more relevant, especially with more states opening the door to both medical and recreational usage.

## State Action

In Colorado, the State Department of Revenue created the Retail Marijuana Code, which includes [guidelines on electrical codes](#). The code states that licensed growers cannot make any "material change" to a building, including installation or replacement of electric fixtures, ceiling adjustments, or "electrical modifications made for the purpose of increasing power usage to enhance cultivation activities." Any material change must be approved by the Marijuana Enforcement Division. Furthermore, any building that produces marijuana concentrates through the use of a solvent approved by the division must comply with all local and state electrical codes. The specific electrical equipment necessary (such as special outlets, lights and junction boxes) must be stored in accordance with the laws regulating flammable solvents.

A [Maine bill](#) was introduced in 2015 that would require cultivators who grow plants in residential buildings to acquire a permit from an electrical inspector. The permit must comply with the electrical codes of the type of building and be appropriate for the amount of marijuana the cultivator would grow to supply a certain number of patients.

Environmentally conscious areas such as Boulder County, Colorado, have taken it upon themselves to meet strict sustainability goals. The county requires commercial growers to either implement renewable energy in their facilities, or [pay a \\$2.16 charge per kilowatt-hour](#). The fee goes to the Boulder County Energy Impact Offset Fund, which educates cultivators on energy use practices and funds other efficient and renewable energy projects. The program is also in the process of developing more energy-efficient equipment for growers.

Voters in Arcata, California, passed a [45 percent tax](#) in 2012 on residential households that use more than 60 percent of a specific energy consumption baseline for a single household. Although not directly targeted at cultivation facilities, the only people affected would likely be home growers.

## Federal Action

Since marijuana is illegal under federal law, there have been no federal laws enacted to regulate electricity consumption in production facilities. However, if federal laws change, the impact of the subsequent jump in electricity use nationwide could be a major concern at the national level.

## NCSL Contacts and Resources

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## Additional Resources

Bade, Gavin. "Pot Power: How utilities and regulators are dealing with the budding marijuana industry." *UtilityDIVE* (Nov. 13, 2015).

Walton, Robert. "Marijuana grow houses trigger 7 summer outages for Pacific Power." *UtilityDIVE* (Nov. 6, 2015).