

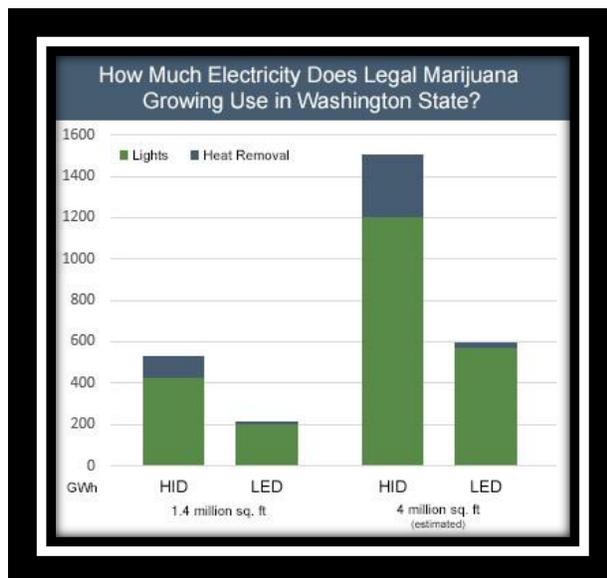
# CANNABIS AND HEMP association



## THE ENVIRONMENTAL IMPACT OF CANNABIS CULTIVATION, INDOOR AND OUTDOOR

**SUMMARY:** Cultivation of cannabis requires the following resources; **land, water, light (sun/artificial), energy, soil, proper air constituents, and nutrients.**

Growers seek to find the right balance of these elements in order to produce their crop, however the impact of their work is rarely studied or reported on.



This graph projects the electricity needs of cannabis cultivation in Washington state, comparing the use of high-intensity discharge lights (HID) versus light-emitting diodes (LED). Green is the electricity used to power lights; blue is the electricity used by fans and air conditioners to remove heat. Further, it compares the current square footage of legal marijuana canopy (1.4 million square feet) versus a conservative estimate of how much canopy it will grow in the future (4 million square feet). Data courtesy of Lighting Science Group.

Chart from  
<http://www.eenews.net/stories/1060004230>

Most indoor growers rely on 1,000 watts or more high-pressure sodium, high-intensity discharge or metal halide bulbs. They give off enough heat that significant fans and air conditioners, which require yet more energy to be used. Fluorescent bulbs are cooler and can be used during the early growth phase or light-emitting diodes (LEDs) can be used which are more expensive and the growing capabilities are still being evaluated by the industry.

- When states issue cultivation licensing they measure the total square footage allocated to legal grows. This cumulative number is known as the “canopy” and is consistently measured. For example, two years ago Washington state issued 1.2million square feet of canopy since voters passed recreational law.
- Numbers from Colorado's largest utility indicate that about one in every 200 watts it sells is being fed to marijuana grow operations.
- Gabriel Romero, spokesman for Xcel Energy Inc., the major electricity provider in Colorado, wrote in an email, "We are in the process of beginning to track state licensed facilities in the marijuana industry and

have roughly estimated that the industry's total energy use is 150-200 [gigawatt-hours] per year, or about ½ of 1 percent of our total annual electric sales."

- Cannabis plants using HID lighting are currently using an average of 200watts per square foot, an astronomical amount of energy.
- Issues between Washington and Colorado are occurring because the federal government has deeply entwined relationships with power companies, offering federal grants or electricity deliveries from federal hydroelectric dams. The federal government could penalize or remove federal assistance from many power stations that are serving this energy-intensive field. In fact the new tax on electric in Colorado is most likely in response to avoiding issues in this area. As a result states are reluctant to offer rebates on energy efficient practices.
- In Washington state, two utilities, have already offered substantial rebates to pot growers. Avista, which supplies power to much of eastern Washington, recently gave a marijuana grower a rebate of almost \$163,000, or \$291 per light, for switching from high-intensity lights to LEDs.
- Paying power bills are also an issue for the industry as growers have a hard time finding banks willing to take their money so they are showing up paying bills in cash in the tens of thousands every month.
- The water that is needed in abundance in Washington and Colorado are received from federal dams and in May, the Bureau of Reclamation said it would tell the Dept of Justice of any water agency serving marijuana growers, but according to a lawyer for several public utilities the federal government's position has been "please don't tell us, we don't want to have to deal with this."
- The rise of greenhouse grows with LED supplementation is bound to happen as LED technology is more understood. This is the ultimate energy efficiency, supplementing the natural sunlight with artificial energy-efficient light vs. indoor warehouse HPS style. This is mostly needed due to climate control needs.
- Producing the amount needed to fill a single joint has the same carbon footprint as running a 100-watt light bulb for 25 hours, according to a report by Evan Mills.

According to the US Forest Service one illegal cannabis clean-up operation from Nov 5-14, 2014 turned up the following:

1. 3.5 tons of garbage removed from the Sierra and Sequoia national forests.
2. 100 government personnel and volunteers were deployed to clean up the garbage.
3. 13 cultivation sites were targeted, 14.8 miles of drip line, 116 bags of fertilizer, 84 trashbags of garbage filled with various things including pesticides.

<http://www.fresnobee.com/2014/11/27/4257126/tons-of-trash-collected-from-marijuana.html?sp=/99/406/>

According to the Evan Mills Report:

1. The legal cannabis market accounts for 1% of all US energy consumption or \$6billion in energy costs.
2. 2 pounds of cannabis is approximately associated to 10,000lbs of carbon dioxide emissions, the equivalent to 3 million "average" cars.
3. The practice of indoor cultivation is privacy/security from authorities, pest and disease control, and more environmental controls.
4. Energy analysts and policymakers have yet to address this issue as it relates to legalization.
5. Were product prices to fall as a result of legalization, indoor production would not be viable in the HID/HVAC model.

<http://evanmills.lbl.gov/pubs/pdf/cannabis-carbon-footprint.pdf>

According to Mother Jones magazine the only thing green about the industry are the leaves of the plant itself:

1. Of the 22 million pounds of cannabis produced annually 80% come from California, Tennessee, Kentucky, Hawaii, and Washington.
2. 2013 California 329 illegal outdoor grow sites were raided 1.2 million plants, 119,000lbs of trash, 17,000 pounds of fertilizer, 40 gallons of pesticides, 244 propane tanks, 61 car batteries, 89 illegal dams, 81 miles of irrigation piping.
3. 72% of all illegal grows were trespass grows in CA, nearly half of all cannabis eradicated was on public or tribal land.
4. During outdoor growing season 60 million gallons of water are used a day. That's 50% MORE than all of the water used by citizens in San Francisco.
5. 1/3 of America's pot crop is grown indoors.
6. An average indoor grow of 4 plants sucks the energy of 29 refrigerators.
7. In CA, indoor cannabis grows account for 9% of total energy consumption.
8. Nationwide the power consumed is enough for 1.7 million homes, the equivalent output of 7 large power plants.

NOTE: Mother Jones also cited the Evan Mills article above.

<http://www.motherjones.com/environment/2014/03/marijuana-pot-weed-statistics-climate-change>

## POSSIBLE SOLUTIONS

- **Legalize, tax, and regulate:** It's pretty clear that the current legal climate is not working, things are just getting worse.
  - Legalization will increase supply, which at a certain point will drive down price. Lower prices mean lower margins, which will make HID indoor growing no longer financially feasible.
  - With tax money being generated the Federal Government and states can siphon off a piece of the taxes to create grants aimed at the damage caused to the environment due to prohibition.
  - Regulating the industry will allow for environmental standards to be employed at a legislative level and create cannabis cultivation standards.
- **Create an awareness campaign:** Many people have no idea of the issues, thus there may not be enough organizations developing solutions to these issues.
- **Engage with environmental and animal right groups to form a coalition for energy-efficient cannabis businesses.**
- **Hold fundraisers that bring prohibitionists and freedom fighters together to fight this common cause.**
- **Start companies to handle illegal outdoor grow cleanup.**
- **Create an operating standard for environmentally responsible cannabis businesses and create a CHA certification for environmentally responsible cannabis businesses.**
- **Start a charity based upon the restoration of national forests impacted by illegal cannabis activities.**