



THE
CANNABIS
CONSERVANCY

Stewardship • Education • Certification

TCC works to empower and assure that the regulated Cannabis industry achieves environmental, economic, and social sustainability.

Sustainability

At the forefront of Canadian Cannabis Policy and Regulation

Prepared by Brittny Anderson for the Standing Committee on Health, August 2017

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Executive Summary:

The Cannabis Conservancy does not advocate for over regulation but seeks a baseline of sustainability requirements for cultivators to implement as part of the licensing process. This is critical as Canada endeavors to meet our commitments to the Paris climate-change accord, ensure our water consumption is sustainable and slow the filling of our landfills. Licensing preference should be given to cultivators who demonstrate commitment to sustainable Cannabis production as this is beneficial to all Canadians.

Introduction

The Cannabis Conservancy's (TCC) mission is to empower and assure that the regulated Cannabis industry achieves environmental, economic, and social sustainability. After three years of research we launched a Sustainability Certification in Canada and the USA. TCC Certification offers a holistic, life-cycle approach to sustainability for the regulated Cannabis industry. TCC also conducts scientific and policy research for the Cannabis industry.

Scientific and Policy Research in the Cannabis Industry

TCC was contracted to complete a report for the Colorado Energy Office which looked at consumption patterns of energy and water use during Cannabis cultivation in the State of Colorado. Participants were required to allow the installation of meters and submeters in their operation and supported qualitative and quantitative data collection. The case studies provide us with a clear picture of how models of production, cultivation methodology and resource consumption vary greatly between Cannabis production facilities within Colorado. Boulder County provided a set of 16 measured data sets of electricity consumption from Cannabis production facilities. The findings of this report will be released by the State in September. What was clear was that local policies had major impacts on resource use and by enabling producers to utilize the energy from the sun to grow Cannabis, rather than from artificial lights alone, energy consumption is reduced dramatically. The Cannabis Conservancy was one of the collaborators who drafted the Cannabis Environmental Best Management Practices Guide.¹

Sustainability in the Cannabis Industry

With the plethora of considerations that had to be made after voters passed Amendment 64 in Colorado, including how to keep the public safe and Cannabis out of the hands of youth, it is of little surprise that environmental provisions were not at the forefront of policy and licensing requirements on a state level. Since legalization, consideration for resource conservation and sustainable cultivation has emerged as an issue of concern for many stakeholders.²

Canada has the opportunity to ensure environmental provisions are included at the inception of the regulated adult use Cannabis industry in Canada. Cannabis cultivation can either be a resource intensive operation, or can demand very little of the grid and fossil fuels, use water sources responsibly and limit waste generation. The quantity of energy and water consumed to cultivate Cannabis and its subsequent strain on the grid is dependent on dispersion, cultivation methodology (indoor, greenhouse, outdoor), climate, infrastructure, technology utilized, operational strategies and the knowledge and commitment of the owner and grow master to conservation efforts.

¹ Denver Environmental Health Cannabis Sustainability Work Group. Cannabis Environmental Best Management Practices Guide. Available:

<http://www.denvergov.org/content/dam/denvergov/Portals/771/documents/EQ/MJ%20Sustainability/Draft%20Cannabis%20Environmental%20BMP%20Guide.pdf>

² Colorado Public Radio. The Quest For Lower Electric Bills Is A Sign Of Colorado's Maturing Pot Biz. August 17, 2017. Available: <http://www.cpr.org/news/story/the-quest-for-lower-electric-bills-is-a-sign-of-colorado-s-maturing-pot-biz#.WZWWnFZytgw.twitter>

With legalization of Cannabis for adult use in Canada there is great opportunity to develop an industry that is committed to environmental sustainability. There must be environmental provisions included as part of the licensing process and priority should be given to organizations who prove their commitment to sustainable cultivation through their methodology, technology and operational procedures.

The Cannabis Conservancy has developed seven pillars of sustainable Cannabis production:

- Policy and Implementation
- Land and Infrastructure
- Cultivation Practices (think beyond organic)
- Energy
- Water
- Waste
- Harvest

Within each of those pillars there are several opportunities to ensure human and environmental protection is upheld. By adopting sustainability initiatives into the scoring of license applications the Canadian government can propel the Cannabis industry to being one of the most sustainable globally and in alignment with Canada's environmental initiatives and commitments.

Resource Use Reporting

There continues to be a paucity of data throughout the Cannabis industry which precludes much needed scientific research. Licensed Cannabis cultivators in Oregon are required to submit annual reports on their energy usage. It would be beneficial for the Canada require cultivators to provide basic resource use data on an annual basis that could be compared to production data.

Cultivation Methodology

Indoor cannabis cultivation is a resource-intensive process, with energy demands the highest contributor to the industry's large environmental footprint.³ Greenhouse and outdoor Cannabis operations require a fraction of the energy required to cultivate Cannabis in comparison to indoor facilities. By giving preference to sun grown Cannabis facilities, the demand on utilities will be reduced. This is particularly important in areas where fossil fuels are the predominant source of energy. In greenhouses lights are only used to supplement the energy from the sun. By wiring a quantum meter to the lights in the greenhouse, the lights are only activating when the meter dips below the minimum micromole target, allowing for the most efficient use of electricity. By giving preference to growers who are able to utilize the sun for cultivation will decrease the strain on our energy grids.

Energy Sources

Energy production is not created equal. There have been great developments in the renewable energy sector and Canada should seek to provide preference to Cannabis producers who use energy from renewable sources. Where renewable energy is not an option, licensing preference should be given to cultivators who are committed to paying for energy offsets. Boulder County requires all Cannabis cultivators to report on their energy usage and to either offset their electricity use with local renewable energy, or pay a 2.16 cent charge per kWh charge. The Boulder County Energy Impact Offset Fund used the money generated by this program to educate and encourage

³ Mills, E. The carbon footprint of indoor Cannabis production. (2012) Energy Policy 46 (2012) 58–67, O'Hare, M. Sanchez, D. and Allstone, P. (2013) Environmental Risks and Opportunities in Cannabis Cultivation. BOTEC Analysis, UC Berkley Available: http://lcb.wa.gov/publications/Marijuana/SEPA/BOTEC_Whitepaper_Final.pdf

Last accessed September 9, 2016 and Arnold, J.M. Energy consumption and environmental impacts associated with Cannabis cultivation. (2013) Environmental Systems: Energy Environment and Society, Humboldt State University. Master of Science Thesis.

best Cannabis cultivation and fund other carbon offset projects such as the development of more renewable energy.⁴

Lighting

Lighting is the most energy-intensive component of Cannabis cultivation and plays a significant role in the overall sustainability of the facility. The design of a facility's lighting system and the types of lights utilized impact both crop yield and quality. Facilities should be encouraged or be given preference for working with an engineer who is able to determine the target PPFD and to design the lighting system around the target. A poorly designed system can waste light which increases cooling requirements and puts further strain on the grid. There are many methods to increase efficiency:

- Type of lamps
- Adjustable lamps
- Racks
- Trellising
- Pruning
- Maintenance of lamps

Light Scheduling

In facilities where artificial lights are utilized, light scheduling can have significant impacts on peak demand. By staggering lighting schedules, cultivators can significantly reduce their peak demand which equates to less pressure on the grid without compromising the health of the plants. In areas where 'peaker plants' are utilized the environmental benefits are compounded as many 'peaker plants' are less efficient and have higher fossil fuel emission rates. By giving preference to facilities that have the capacity and have shown a commitment to light staggering Canada could help to reduce peak electricity demand.

Climate Control

Climate Control is the second most-energy intensive component of Cannabis cultivation. Climate control consists of multiple components of heating, ventilation, air conditioning (HVAC) and dehumidification. While purpose-built cannabis cultivation facilities allow for optimal climate design, repurposed facilities add a layer of complexity to the HVAC optimization equation. Preference should be given to operations that were designed by engineering firms with specific sustainability credentials such as a Certified Energy Manager® or LEED® accreditations.

Water Use

Clean, pure water is essential to cultivate Cannabis and many local and provincial governments have goals to reduce water consumption. To meet these water consumption targets it is critical that the Cannabis industry be required to ensure responsible and sustainable water consumption and prevent downstream impacts. The Cannabis industry has the potential to have impacts on water resources⁵ if we do not have the necessary provisions in place to ensure sustainable water use from a plentiful source.

⁴ Boulder County. (2014) Boulder County Energy Impact Offset Fund. Available: <http://www.bouldercounty.org/env/sustainability/pages/mjimpactoffset.aspx>

⁵ Growing Marijuana? State Will Now Regulate Water Use for Pot Cultivation. KQED Science. July 11, 2016. Available: <https://ww2.kqed.org/science/2016/07/11/growing-marijuana-state-will-now-regulate-water-use-for-pot-cultivation/>

Water Treatment

There are several water treatment methods that are utilized by Cannabis producers. Reverse osmosis is a popular water treatment method but they produce a significant amount of waste water; some efficient models advertise a 1:1 ratio (producing one liter of usable water for every liter of wastewater), however many systems flush three to twenty liters of water to waste for every liter of treated, usable water. By giving preference to producers who choose alternative water treatment methods, Canada can decrease the quantity of water consumed by Cannabis cultivation facilities which means more water is available to our communities and other industries.

Irrigation

Hand watering can use more water than necessary and result in nutrient rich run-off. By utilizing irrigation systems that provide water to the plants automatically and directly based on soil moisture content it can help to ensure responsible water use. Tensiometers measure soil water tension and indicate soil water conditions experienced by plants' roots. They can be incorporated into automated irrigation systems. Automated soil water sensor-based irrigation maintains a desired soil water range in the root zone that is optimal for plant growth. For outdoor and greenhouse cultivators, watering during cooler temperatures (early morning or in the later evening) is preferable as evaporation rates are slower. By giving preference to facilities that are committed to using technology and scheduling that optimizes water use, Canada can help to reduce the demand on our watersheds.

Waste

The Cannabis industry has the capacity to generate a significant amount of waste. Many locations in Canada are already experiencing landfill air space shortages.⁶ Waste in the Cannabis Industry includes but is not limited to:

- Excess Cannabis plant material (from pruning and post harvest)
- Soil or substrate
- Packaging of Cannabis
- Packaging of inputs

The three areas where Canada can have an immediate and direct impact on waste is by focusing on the first three types of waste generated by the industry as mentioned above. By requiring excess plant material and soil to be composted and giving preference to onsite composting, Canada prevents plant material and soil from ending up in landfills and reduces the costs for local governments to dispose of these materials. Cannabis packaging should be required to be derived from sustainable sources, be recyclable and possibly require a deposit, like beverage containers in many provinces. This will further reduce waste while setting an example for other industries to follow.

Sustainability Certification

People want to purchase and consume products they can trust and that adhere to their personal values. ENERGY STAR is a voluntary energy efficiency certification program that identifies products which are energy efficient so consumers can make educated choices. The Cannabis Conservancy provides a Sustainability Certification to Cannabis cultivators that adhere to the Seven Pillars of Sustainable Cannabis Production to assure that products are not only free of harmful chemical inputs, but are energy efficient, conserve water and reduce waste. By providing consumers with third party assurance regarding resource use, consumers are able to choose products that adhere to their personal values and growers are rewarded for their commitment to sustainable cultivation practices. By giving preference to license applications that are committed to going above and beyond the governmental sustainability requirements Canada is helping to drive the Cannabis industry to be one of the most sustainable in Canada.

⁶ Ontario Landfills are filling up fast. The Record. October 19, 2011. Available: <https://www.therecord.com/news-story/2589653-ontario-landfills-are-filling-up-fast/>