



micronwaste
TECHNOLOGIES

RCA RECYCLING COUNCIL
OF ALBERTA

CANNABIS WASTE IMPLICATIONS

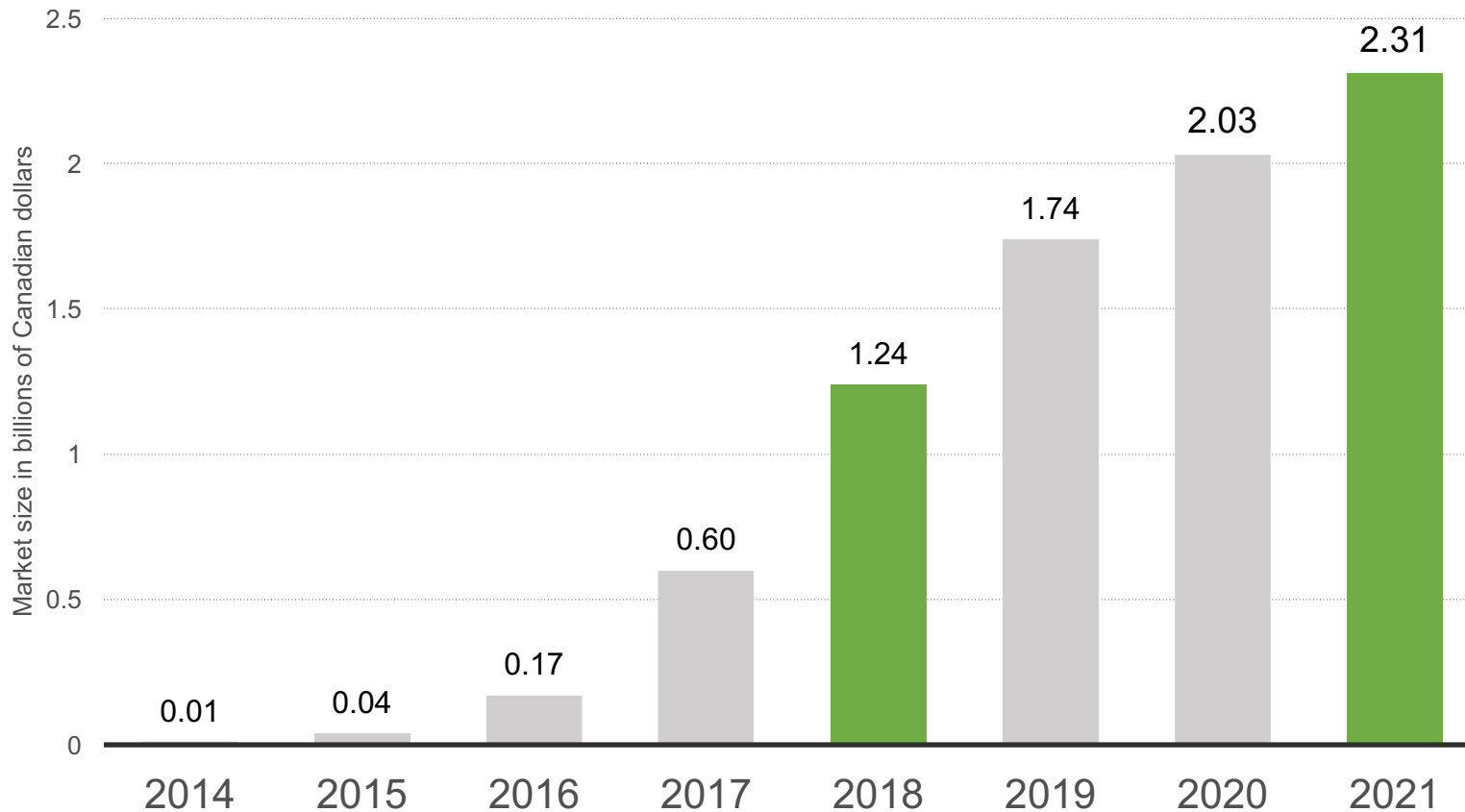
Regulating for Clean Air and Water

ALFRED WONG
PRESIDENT

Cannabis is a Rapidly Growing Industry

Estimated total market size of medical marijuana in Canada

2014-2021 in billions of Canadian dollars



Source: The Canada Cannabis Report: 2018 Industry Outlook

- Canada is leading the globe in marijuana legalisation, with recreational use coming into effect on **October 17, 2018**
- Need more standards and regulation to prevent cannabis smoke and residues (APIs) from affecting children, youth, and environment

Compliance with ACMPR

ACMPR – Access to Cannabis for Medical Purposes Regulation

The ACMPR is Canada's response to the Federal Court of Canada's February 2016 decision in *Allard v. Canada* which is a precedent setting Charter challenge of Canada's prior medical cannabis laws

Destruction

A licensed producer may destroy cannabis only if they do so in accordance with a method that conforms with all federal, provincial and municipal environmental legislation applicable to the location at which it is to be destroyed, and does not result in any person being exposed to cannabis smoke; and in the presence of at least two persons who are qualified to witness the destruction, one of whom must be a person referred to in paragraph;

Witness to destruction

The following persons are qualified to witness the destruction of cannabis:

- The senior person in charge, the responsible person in charge and, if applicable, the alternate responsible person in charge; and
- A person who works for or provides services to the licensed producer and acts in a senior position.

Transportation of cannabis

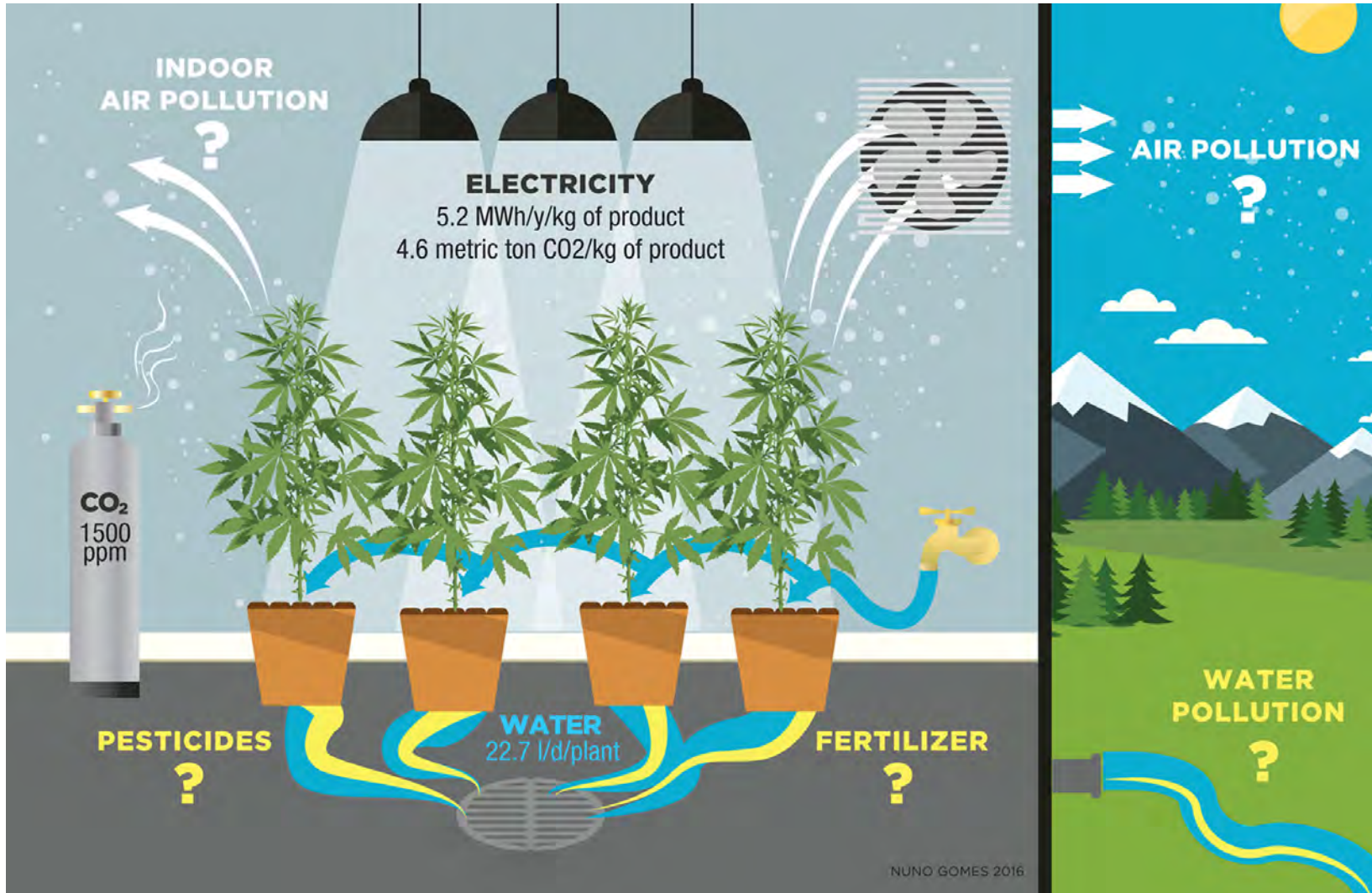
If the cannabis is to be destroyed at a location other than the licensed producer's site, the senior person in charge, the responsible person in charge or, if applicable, the alternate responsible person in charge must accompany the cannabis to the location at which it is to be destroyed.

Source: Health Canada

Operational Concerns with ACMPR

- RPIC (Responsible Person in Charge) oversight requirement is costly
- Exposure to liability: indirect propagation of cannabis waste to the public
- Exposure to liability: cannabinoid residues (APIs – Active Pharmaceutical Ingredients) discharged into environment

Cannabis Waste from Cultivation Operations



In the News

Marijuana cultivation in California is sucking streams dry, says new report

The Guardian – 28 March 2015

Alberta facing water shortages, depleted reservoirs as dry summer drags on

Calgary Herald – 14 August 2017

Growing legal marijuana – whether indoors or outdoors – is bad for the environment

Financial Post – 8 January 2018

Industry Practices for Cannabis Waste Disposal

Disposal Method 1

- Shred cannabis waste
- Mix in inorganic materials
- Add bleach (or other chemicals)
- Leave outside facility for a few days
- Haul to landfill

Implications of Method 1

- Risk of theft causing propagation
- Risk of theft causing accidental injury
- Impact of chemicals in the environment
- Greenhouse gas emissions from hauling
- Environmental impact of landfilling
- Compliance issues with reporting

Disposal Method 2

- Shred cannabis waste
- Haul to compost site

Implications of Method 2

- Compliance cost of RPICs
- Liability of APIs (Active Pharmaceutical Ingredients) in waste discharge - APIs not denatured
- Greenhouse gas emissions from hauling
- Possible odours
- Composting takes months

Disposal Method 3

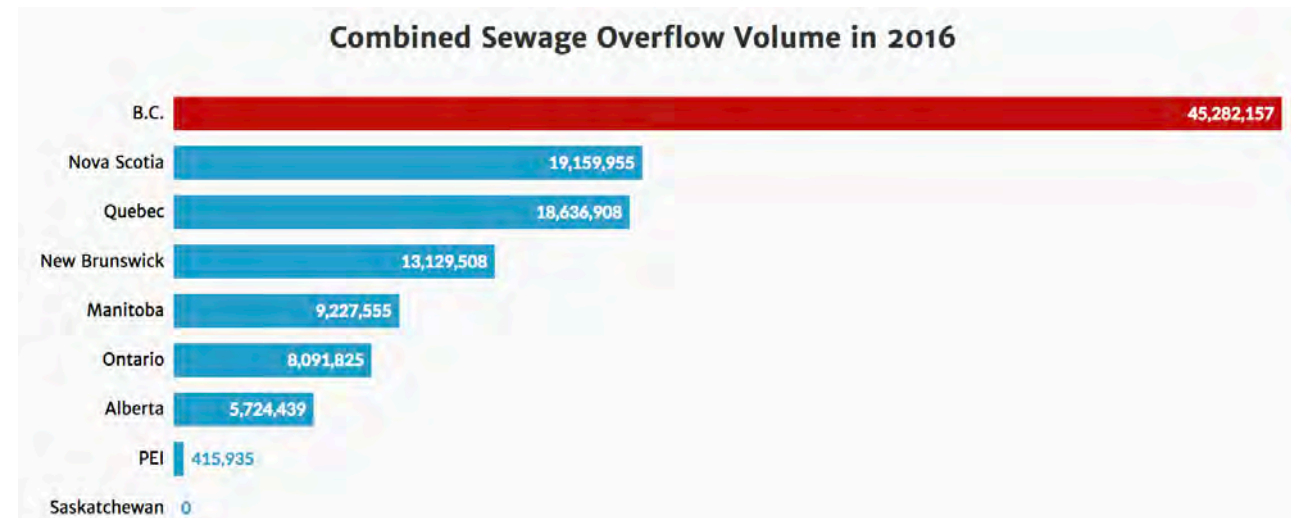
- Shred cannabis waste
- On-site compost

Implications of Method 3

- Liability of APIs (Active Pharmaceutical Ingredients) in waste discharge - APIs not denatured
- Odours affecting neighbours
- Composting takes months
- APIs not denatured

Impact of Cannabis Residue Discharge on Environment

- Inadvertent discharge has implications on public safety, as even dermal contact with contaminated air and water can result in exposure to delta 9-tetrahydrocannabinol (THC)¹
- While vapourized THC in the air has a half-life of 25 minutes by photodegradation, THC is expected to adsorb to suspended solids and sediment in aquatic environments where the potential for bioconcentration in aquatic organisms is very high, provided that the compound is not metabolized by the organism²
- THC and THC-COOH have been shown to cause oxidative stress to aquatic species³
- The removal efficiency of THC-COOH in wastewater treatment plants as low as 31%⁴ provided that it gets treated at all. Over 120 million cubic meters of untreated sewage and runoff entered Canadian waterways in 2016, with BC being responsible for almost 40% of the overflow⁵



Source: Environment Canada

^{1,2} TOXNET – US National Library of Medicine

³ Investigation of cannabis biomarkers and transformation products in waters by liquid chromatography coupled to time of flight and triple quadrupole mass spectrometry.

⁴ A critical review of the occurrence, detection, and treatment of Δ^9 -tetrahydrocannabinol in aquatic environments

⁵ Untreated sewage pollutes water across the country, StarMetro

The Micron Waste “Cannavore” System

- Fully automated system for processing cannabis waste and denaturing APIs within 24-48 hrs
- Integrated shredder, digester, effluent treatment system in a mobile shipping container – can be deployed anywhere on land or at sea
- 24/7 data reporting to comply with strict regulations
- Closed loop system for recycling water back to cultivation operations
- Proprietary aerobic bacteria and process to ensure break down of organic waste with no odour implications





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