



Exploring Options for Managing Emissions

CANNABIS PRODUCTION AND PROCESSING

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AIR QUALITY PLANNER, AIR QUALITY AND CLIMATE CHANGE

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Metro Vancouver

Population:
2.5 million

Comprises 53% of
the population of BC

Land Area:
287,736 ha



Managing Air Contaminants

Substances emitted into the air capable of

- Injuring health or safety
- Injuring property or any life form
- Interfering with visibility
- Interfering with the normal conduct of business
- Causing material physical discomfort
- Damaging the environment



Potential Health and Environmental Issues

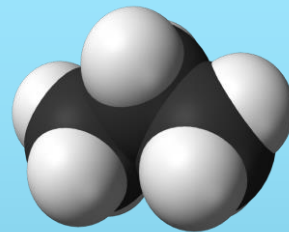
Volatile organic compounds:

- Ground-level ozone formation
- Particulate matter formation
- Odorous air contaminants

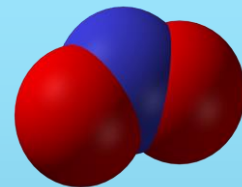
Example:

- Terpenes and terpenoids

Volatile Organic
Compounds

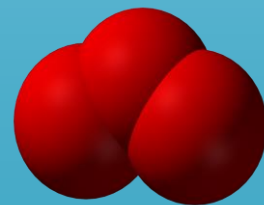


Nitrogen
Dioxide



sunlight,
heat

Ground Level
Ozone



Policy Drivers

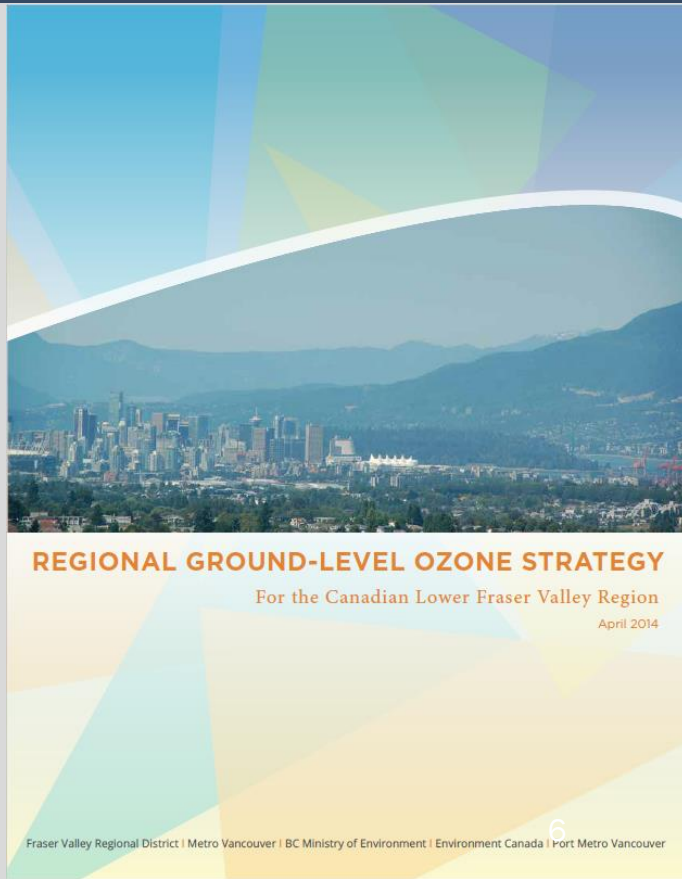


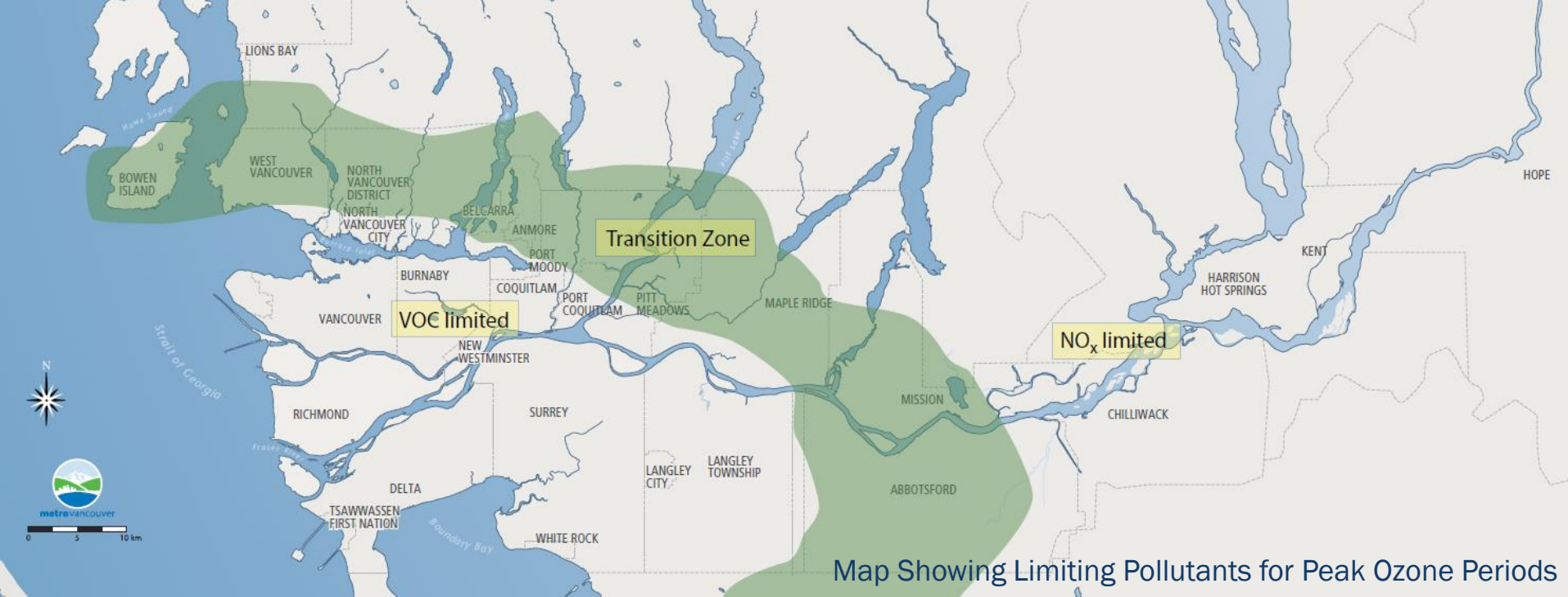
- Odour Management Policy Development Plan
- Regional Ground-Level Ozone Strategy

Regional Ground Level Ozone Strategy

Strategy produced jointly by:

- Fraser Valley Regional District
- Metro Vancouver
- BC Ministry of Environment and Climate Change Strategy
- Environment and Climate Change Canada
- Port Metro Vancouver





Map Showing Limiting Pollutants for Peak Ozone Periods

Strategic Policy Directions for Peak and Non-Peak Periods

- Reduce VOCs west of transition zone to reduce ground-level ozone
- Reduce VOCs that are the most reactive in the presence of sunlight

VOC Emissions Estimate - Cannabis Production

Assumptions

- Potential area of cultivation
- Plant density and total number of plants
- Emissions per plant
- Number of growth cycles per year
- Emissions are uncontrolled

VOC Emissions Estimate - Cannabis Production

Potential area of cultivation

- 6,846,880 sq. ft., includes
 - Agrima (600,000 sq. ft.)
 - BC Tweed (3,000,000 sq. ft.)
 - Pure Sunfarms (1,030,000 sq. ft.)
 - Vintage Organics (125,000 sq. ft.)
 - Zenabis (2,091,880 sq. ft.)
- Does not include any other facilities (greenhouses, purpose-built, industrial or extraction)

VOC Emissions Estimate - Cannabis Production

Total number of plants

- Plant count for 400,000 sq. ft. greenhouse
 - 116,667

Equivalent to

- Plant count per 100 sq.ft.
 - 29

Source: <https://www.straight.com/cannabis/1052431/photos-inside-bc-tweed-largest-licensed-cannabis-greenhouse-world#>

VOC Emissions Estimate - Cannabis Production

Emissions per plant

- Emission capacity
 - 0.109 kg VOC/plant/lifetime
- Emission factor
 - 0.0013 kg VOC/plant/day

Sources:

Washoe County, Nevada Cultivation Emission Factors from "VOC Emissions from Marijuana Cultivation and Processing" presentation, May 2018

Personal Communications with Michael Wolf, Washoe County Air Quality Management Division

VOC Emissions Estimate - Cannabis Production

Emissions per year

- Growth cycle
 - 12 weeks
- Crops per year
 - 4 cycles per year

Source: https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/cannabis-production/cannabis_bacts_report.pdf

VOC Emissions Estimate - Cannabis Production

Calculation

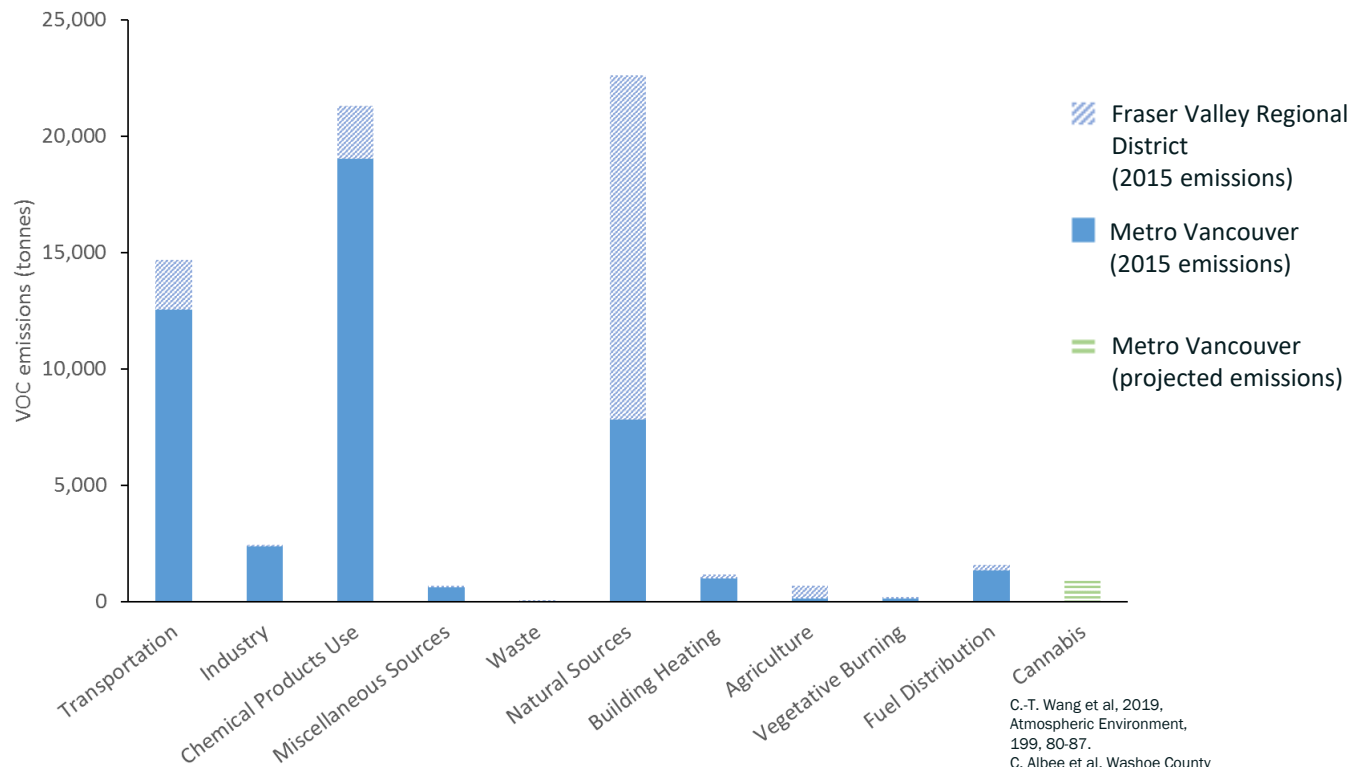
VOC emissions = Emission factor x Duration x Plant count

- Emission factor: (0.0013/1000) tonnes per plant per day
- Duration: 12 week growth cycle x 7 days per week x 4 cycles per year
- Plant count: 6,846,8880 sq.ft. x (116,667 plants/400,000sq.ft)

VOC emissions from 6 facilities = ~ 870 tonnes per year

VOC Emissions Comparison

Emissions of volatile organic compounds in the Canadian Lower Fraser Valley by sector compared to projected potential range of emissions from cannabis production in Metro Vancouver





Emission Management Approaches

- Emissions released at the facility
- Concentrations beyond the facility
- Technology and management practices
- Measurement, monitoring and reporting
- Economic instruments

Emission Management for Cannabis Production

- Emission Regulations
 - Agricultural Boilers
- Site-specific Permits
 - Cannabis cultivation
 - Reciprocating engines



Potential Regulation

Measures controlling what is discharged:

- Enclosing or containing key emissions sources
- Treating air with activated carbon
- Limiting additional VOC sources

Potential Regulation

Measures controlling how discharges can occur:

- Preventing the release of fugitive or uncontrolled emissions
- Minimizing risk during airshed air quality degradation
- Preventing impacts near sensitive receptors

Potential Regulation

Measures providing indication of effectiveness:

- Approved emissions management plan
- Monitoring for odorous air contaminants beyond property boundary
- Compliance with other applicable regulatory requirements
- Record keeping



Consultation Process

Phase 1: June – October 2019

- Meetings, site visits, webinars
- Community events
- Questionnaires
- Communications via 604-432-6200 or AQBylaw@metrovancover.org

Phase 2: Potentially in early 2020



Questions?



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