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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

METRO VANCOUVER REGIONAL DISTRICT
CLIMATE ACTION COMMITTEE

REGULAR MEETING

Friday, June 11, 2021
1:00 p.m.
28th Floor Boardroom, 4730 Kingsway, Burnaby, British Columbia

A G E N D A[1]

1. ADOPTION OF THE AGENDA

1.1 June 11, 2021 Regular Meeting Agenda

That the Climate Action Committee adopt the agenda for its regular meeting scheduled for June 11, 2021 as circulated.

2. ADOPTION OF THE MINUTES

2.1 April 16, 2021 Regular Meeting Minutes

That the Climate Action Committee adopt the minutes of its regular meeting held April 16, 2021 as circulated.

3. DELEGATIONS

4. INVITED PRESENTATIONS

5. REPORTS FROM COMMITTEE OR STAFF

5.1 Cancellation of Provincial Climate Action Revenue Incentive Program (CARIP)

That the MVRD Board authorize the Board Chair to write a letter to the Provincial Minister of Municipal Affairs, Minister of Environment and Climate Change Strategy, and Minister of Finance, regarding the cancellation of the Climate Action Revenue Incentive Program, providing details on key elements to be retained in a replacement program and suggested improvements, based on the analysis in the report dated May 27, 2021, titled "Cancellation of Provincial Climate Action Revenue Incentive Program (CARIP)".

5.2 Next Phase of Engagement on an Open-Air Burning Emission Regulation

That the MVRD Board:

[1] *Note: Recommendation is shown under each item, where applicable.*

a) receive for information a summary of the initial engagement on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver, as described in the report titled "Next Phase of Engagement on an Open-Air Burning Emission Regulation", dated May 18, 2021; and
b) authorize staff to proceed with additional engagement on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver, based on the draft discussion paper and updated engagement plan presented in the report titled "Next Phase of Engagement on an Open-Air Burning Emission Regulation", dated May 18, 2021.

5.3 Alternatives to Agricultural Open-Air Burning in Metro Vancouver
That the Climate Action Committee receive for information the report titled "Alternatives to Agricultural Open-Air Burning in Metro Vancouver", dated May 17, 2021.

5.4 2021 Update on Liquid Waste Sustainability Innovation Fund Projects
That the Climate Action Committee receive for information the report dated May 19, 2021, titled "2021 Update on Liquid Waste Sustainability Innovation Fund Projects."

5.5 Air Quality and Climate Action Initiatives in *Caring for the Air* 2021
That the MVRD Board receive for information the report dated May 10, 2021, titled "Air Quality and Climate Action Initiatives in *Caring for the Air* 2021".

5.6 Sectoral GHG Reduction Targets Update and Comparison
That the Climate Action Committee receive for information the report dated May 25, 2021, titled "Sectoral GHG Reduction Targets Update and Comparison".

5.7 Manager's Report
That the Climate Action Committee receive for information the report dated May 25, 2021, titled "Manager's Report"

6. INFORMATION ITEMS

6.1 Correspondence dated June 1, 2021, from the Mayor's Office, Corporation of the District of Saanich, to BC Elected Officials and BC Chief Administrative Officers regarding British Columbia Climate Action Revenue Incentive Program Ending

6.2 Report from Gregory Freeman, Senior Economist and Megan Gerryts, Senior Advisor, Regional Economic Prosperity Service re Clean Transportation Sector Profile dated May 7, 2021.

7. OTHER BUSINESS

8. BUSINESS ARISING FROM DELEGATIONS

9. RESOLUTION TO CLOSE MEETING

Note: The Committee must state by resolution the basis under section 90 of the Community Charter on which the meeting is being closed. If a member wishes to add an item, the basis must be included below.

That the Climate Action Committee close its regular meeting scheduled for June 11, 2021 pursuant to the *Community Charter* provisions, Section 90 (1) (k) as follows:

"90 (1) A part of the meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:

(k) negotiations and related discussions respecting the proposed provision of a regional district service that are at their preliminary stages and that, in the view of the board or committee, could reasonably be expected to harm the interests of the regional district if they were held in public."

10. ADJOURNMENT/CONCLUSION

That the Climate Action Committee adjourn/conclude its regular meeting of June 11, 2021.

Membership:

Carr, Adriane (C) - Vancouver
Dhaliwal, Sav (VC) - Burnaby
Arnason, Petrina - Langley Township
Baird, Ken - Tsawwassen First Nation
Dupont, Laura - Port Coquitlam
Hocking, David - Bowen Island
Kruger, Dylan - Delta
McCutcheon, Jen - Electoral Area A
McIlroy, Jessica - North Vancouver City
McLaughlin, Ron - Lions Bay
Patton, Allison - Surrey
Royer, Zoe - Port Moody
Steves, Harold - Richmond
Yousef, Ahmed - Maple Ridge

METRO VANCOUVER REGIONAL DISTRICT
CLIMATE ACTION COMMITTEE

Minutes of the Regular Meeting of the Metro Vancouver Regional District (MVRD) Climate Action Committee held at 1:00 p.m. on Friday, April 16, 2021 in the 28th Floor Boardroom, 4730 Kingsway, Burnaby, British Columbia.

MEMBERS PRESENT:
Chair, Councillor Adriane Carr, Vancouver
Vice Chair, Councillor Sav Dhaliwal*, Burnaby (departed at 1:15 p.m.)
Councillor Petrina Arnason*, Langley Township
Chief Ken Baird*, Tsawwassen
Councillor Laura Dupont*, Port Coquitlam
Councillor David Hocking*, Bowen Island
Councillor Dylan Kruger*, Delta
Director Jen McCutcheon*, Electoral Area A
Councillor Jessica McIlroy*, North Vancouver City
Mayor Ron McLaughlin*, Lions Bay
Councillor Allison Patton*, Surrey (arrived at 1:01 p.m.)
Councillor Zoe Royer*, Port Moody
Councillor Harold Steves*, Richmond
Councillor Ahmed Yousef*, Maple Ridge

MEMBERS ABSENT:
None.

STAFF PRESENT:
Roger Quan, Director, Air Quality and Climate Change, Parks and Environment
Amelia White, Legislative Services Coordinator, Board and Information Services

1. ADOPTION OF THE AGENDA

1.1 April 16, 2021 Regular Meeting Agenda

It was MOVED and SECONDED
That the Climate Action Committee adopt the agenda for its regular meeting scheduled for April 16, 2021 as circulated.

CARRIED

1:01 p.m. Councillor Patton arrived at the meeting.

*denotes electronic meeting participation as authorized by Section 3.6.2 of the *Procedure Bylaw*

2. ADOPTION OF THE MINUTES

2.1 March 3, 2021 Regular Meeting Minutes

It was MOVED and SECONDED
That the Climate Action Committee adopt the minutes of its regular meeting held March 3, 2021 as circulated.

CARRIED

3. DELEGATIONS

No items presented.

4. INVITED PRESENTATIONS

No items presented.

5. REPORTS FROM COMMITTEE OR STAFF

5.1 Draft *Climate 2050 Transportation Roadmap*

Report dated March 24, 2021, from Morgan Braglewicz, Senior Policy and Planning Analyst, and Jason Emmert, Senior Planner, Parks and Environment, seeking MVRD Board authorization to proceed with engagement on the draft *Climate 2050 Transportation Roadmap*.

Members were provided with a presentation on the draft *Climate 2050 Transportation Roadmap*, highlighting the vision, goals and targets, strategies, estimated emissions impact and engagement plans.

1:15 p.m. Vice Chair Dhaliwal departed the meeting.

Discussion ensued regarding congestion pricing, the effects of COVID on transportation, the regional emission targets, multi-modal options for transportation, electric vehicle readiness in residential buildings, the cycle of biofuel, and the affordability of electric vehicles.

Members were informed about the principles that should guide the design of mobility pricing, which are outlined in the "Exploring Mobility Pricing in Metro Vancouver: What We Learned So Far".

Request of Staff:
Staff were requested to provide an electronic copy of the Mobility Pricing Independent Commission's report, "Exploring Mobility Pricing in Metro Vancouver: What We Learned So Far", published in May 2018, to the Climate Action Committee members.

Presentation material titled "Draft *Climate 2050 Transportation Roadmap*: A Pathway to Resilient, Carbon Neutral Transportation" is retained with the April 16, 2021 Climate Action Committee agenda.

It was MOVED and SECONDED
That the MVRD Board authorize staff to proceed with engagement on the draft *Climate 2050 Transportation Roadmap*, as presented in the report dated March 24, 2021, titled "Draft *Climate 2050 Transportation Roadmap*".

CARRIED

5.2 Metro Vancouver Electric Vehicle Program Review and Recommendations

Report dated March 26, 2021, from Brendon James, Special and Community Events Coordinator, and Erik Blair, Air Quality Planner, Parks and Environment, providing an update on Metro Vancouver's Electric Vehicle Programs and presenting program enhancements for 2021 and 2022.

Discussion ensued regarding the BC SCRAP-IT vehicle program, and the possibility of making electric vehicles more affordable.

It was MOVED and SECONDED
That the Climate Action Committee receive for information the report dated March 26, 2021, titled "Metro Vancouver Electric Vehicle Program Review and Recommendations".

CARRIED

5.3 Feasibility of Targeted Invasive Plant Grazing in Metro Vancouver

Report dated March 22, 2021, from Laurie Bates-Frymel, Senior Planner, Regional Planning and Housing Services, and Janice Jarvis, Natural Resource Management Specialist, Regional Parks, Parks and Environment, providing the results from Phase 1 of the Targeted Invasive Plant Grazing project.

Members were provided with a presentation on grazing methodology, livestock suitability, grazing methods and the possibility of a pilot project at Aldergrove Regional Park.

Presentation material titled "Feasibility of Targeted Invasive Plant Grazing in Metro Vancouver" is retained with the April 16, 2021 Climate Action Committee agenda.

It was MOVED and SECONDED
That the Climate Action Committee receive for information the report dated March 22, 2021, titled "Feasibility of Targeted Invasive Plant Grazing in Metro Vancouver".

CARRIED

5.4 Best Management Practices for Invasive Species: Hedge Bindweed and American Bullfrog

Report dated March 22, 2021, from Laurie Bates-Frymel, Senior Planner, Regional Planning and Housing Services Department, providing the Climate Action Committee and the MVRD Board with two new invasive species best management practices documents and a suite of seventeen new fact sheets for information.

Members were provided a presentation on best management practices for the American Bullfrog and Hedge Bindweed/Morning Glory.

Presentation material titled "Best Management Practices for Invasive Species: American Bullfrog and Hedge Bindweed" is retained with the April 16, 2021 Climate Action Committee agenda.

It was MOVED and SECONDED

That the MVRD Board:

a) receive for information the report dated March 22, 2021, titled "Best Management Practices for Invasive Species: Hedge Bindweed and American Bullfrog"; and
b) direct staff to forward the Best Management Practices and suite of seventeen invasive species fact sheets to member jurisdictions for information.

CARRIED

5.5 Manager's Report

Report dated March 30, 2021, from Roger Quan, Director, Air Quality and Climate Change, Parks and Environment Department, updating the Committee on various on-going, and upcoming initiatives and programs.

Members were provided a video presentation on the Clean Air Plan, which is not retained with the agenda.

It was MOVED and SECONDED

That the Climate Action Committee receive for information the report dated March 30, 2021, titled "Manager's Report".

CARRIED

6. INFORMATION ITEMS

6.1 Correspondence re Help Cities Lead Campaign dated March 4, 2021 from Mayor Mike Little, District of North Vancouver.

6.2 Correspondence re Help Cities Lead Campaign dated March 10, 2021 from Mayor Lisa Helps, City of Victoria.

6.3 Correspondence re Help Cities Lead Campaign dated March 29, 2021 from Mayor Rob Vagramov, City of Port Moody.

Discussion ensued regarding Metro Vancouver's role in the Help Cities Lead Campaign.

It was MOVED and SECONDED
That the MVRD Board write letters expressing its support for the Help Cities Lead campaign, to the following Provincial Ministers:

i. Minister of Environment and Climate Change Strategy;
ii. Minister of Municipal Affairs;
iii. Minister of Energy, Mines and Low Carbon Innovation;
iv. Minister of Finance; and
v. Attorney General and Minister responsible for Housing.

CARRIED

6.4 Staff report re Liquid Waste Heat Recovery Policy Amendments and Related Cost Apportionment Bylaw Amendments to Expand Opportunities for Sewer Heat Recovery.

6.5 Trinity Western University Media Release Article dated Mach 21, 2021 re TWU's Dr. David Clements and Team Track Climate Change-Driven Spread of Invasive Plants in Metro Vancouver, Inform Municipal Strategies.

6.6 Vancouver Province Article dated April 8, 2021 re B.C. Tops North America for 2020 Electric Vehicle Uptake.

7. OTHER BUSINESS
No items presented.

8. BUSINESS ARISING FROM DELEGATIONS
No items presented.

9. RESOLUTION TO CLOSE MEETING
No items presented.

10. ADJOURNMENT/CONCLUSION

It was MOVED and SECONDED
That the Climate Action Committee conclude its regular meeting of April 16, 2021.

CARRIED
(Time: 3:31 p.m.)

_____ _____

Amelia White, Legislative Services Coordinator

Adriane Carr, Chair

45003075 FINAL

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Conor Reynolds, Division Manager, Air Quality and Climate Change Policy
Jason Emmert, Program Manager, Climate Policy
Parks and Environment Department

Date: May 27, 2021 Meeting Date: June 11, 2021

Subject: **Cancellation of Provincial Climate Action Revenue Incentive Program (CARIP)**

RECOMMENDATION

That the MVRD Board authorize the Board Chair to write a letter to the Provincial Minister of Municipal Affairs, Minister of Environment and Climate Change Strategy, and Minister of Finance, regarding the cancellation of the Climate Action Revenue Incentive Program, providing details on key elements to be retained in a replacement program and suggested improvements, based on the analysis in the report dated May 27, 2021, titled "Cancellation of Provincial Climate Action Revenue Incentive Program (CARIP)".

EXECUTIVE SUMMARY

Metro Vancouver and its member jurisdictions are advancing innovative climate actions that are critical to enabling the Province to meet its *CleanBC* GHG reduction targets. The cancellation of the Provincial Climate Action Revenue Incentive Program (CARIP) was announced on May 11 without prior consultation with local governments. The impact for local governments is the loss of an established framework for tracking and reporting climate action, both corporately and in the community, which supports coordination and sharing of best practices, as well as the loss of a source of funding for local government climate action staffing and programs.

The cancellation of the program presents an opportunity for local governments to call for the launch of a replacement program that improves on its predecessor and provides flexible and consistent funding, streamlines the public reporting process, strengthens accountability for community emissions reductions, and provides more resources to smaller communities.

The Mayors Committee and MVRD Board have previously considered this matter and is preparing correspondence to the Province, calling for a replacement program that builds on and improves the existing CARIP program. The MVRD Board has referred the matter to the Climate Action Committee and directed staff to prepare a followup response that provides details on suggested improvements.

PURPOSE

To provide information on the cancellation of the Provincial Climate Action Revenue Incentive Program and summarize impacts for Metro Vancouver and its member jurisdictions. Per direction from the MVRD Board, this reports seeks Climate Action Committee feedback and direction on the specifics of a replacement program that provides funding for local government climate action programs, and brings consistency and transparency to the calculation and reporting of greenhouse

gas (GHG) emissions by local governments, which will be conveyed to the appropriate provincial ministries.

BACKGROUND

On May 11, 2021 the Province announced the end of the Climate Action Revenue Incentive Program. A subsequent letter from the Minister of Municipal Affairs to B.C.'s Mayors and Chairs confirmed that 2021 will mark the end of the CARIP program (reporting for 2020 actions), with final payments of the carbon tax refund before end of year (Attachment).

At its meeting on May 26, 2021, the Mayors Committee considered a staff report on the cancellation of the CARIP program, leading to the subsequent adoption of the following resolution by the MVRD Board at its meeting of May 28, 2021:

That the MVRD Board:

a) authorize the Board Chair to write a letter to the Provincial Minister of Municipal Affairs, Minister of Finance, and Minister of Environment and Climate Change Strategy regarding the cancellation of the provincial Climate Action Revenue Incentive Program ("CARIP"), including its financial implications, impacts of the cancellation of the program, and requesting an environmentally-sustainable replacement of the CARIP with an improved program with payments to start in 2022 without conditions; and

b) refer the matter of the cancellation of the CARIP program to the Climate Action Committee and direct staff to prepare an additional response that provides details on suggested improvements to the program.

This report responds to part (b) of the Board resolution, and provides staff's analysis of suggested elements for an improved replacement for the CARIP program.

CLIMATE ACTION REVENUE INCENTIVE PROGRAM

Local Government signatories to the BC Climate Action Charter committed to measure and report GHG emissions, aim for carbon neutrality in their own operations, and plan compact, energy efficient communities. CARIP was created by the Province as a reporting and funding framework for signatories to the Charter. Participants were required to annually report their climate actions, quantify the GHG emissions associated with corporate operations, and demonstrate progress towards carbon neutrality. Local governments that fulfilled these requirements were eligible to receive a refund of their carbon taxes paid on direct fuel purchases.

Acceleration and Coordination of Local Government Climate Action

Since the inception of the Climate Action Charter, 187 of 190 municipalities, regional districts and the Islands Trust have signed on and have been publically reporting their climate actions, including Metro Vancouver and all of its member municipalities. As of 2018, 147 local governments were measuring and reporting their emissions and 50 had achieved carbon neutrality in their operations. This represents a comprehensive and current database of local governments' actions in their communities, which has enabled sharing of best practices among climate program staff. In addition, the process of annual CARIP reporting to the province has highlighted the scope and impact of climate actions at the local government level to Municipal Councils and Regional District Boards across BC.

In its communication with local government staff following the cancellation of CARIP, the Province has reiterated that local governments will continue to be a key partner in the collective efforts to address the challenges of a changing climate, and will play a specific and important role in reaching British Columbia's climate goals. The end of CARIP risks undermining the level of action and coordination among local governments on climate actions that directly support *CleanBC*.

Metro Vancouver's CARIP Reporting and Linkages to *Climate 2050*

Metro Vancouver has been preparing its annual climate action report using the CARIP framework program since the 2012 reporting year. While CARIP reporting was made optional in 2019 due to capacity constraints faced by local governments as a result of COVID-19, Metro Vancouver submitted its report in accordance with provincial timelines, and achieved carbon neutrality in its operations (References 1 and 2). The achievement of carbon neutrality by Metro Vancouver and a number of local governments serves as a call to action to extend carbon neutrality to the region as a whole, supporting targets adopted by the MVRD Board.

CARIP funding has supported the development of *Climate 2050*, Metro Vancouver's 30-year climate action strategy, and the implementation of ambitious strategies and actions to accelerate greenhouse gas reductions in the region. *Climate 2050* includes actions to ensure Metro Vancouver continues to reduce its corporate GHG emissions, adapt its corporate assets and services to the impacts of climate change, and share best practices with its member jurisdictions.

Implications of Loss of CARIP Funding

The Province has indicated that the cancellation of CARIP means that the final carbon tax refund to local governments will be paid in 2021. To date, no replacement program with non-application based funding for climate action has been announced, and it appears that future programs would be grant-based for eligible local governments. The Province has signaled its aim to work with local governments through UBCM and the Green Communities Committee on further supporting the *CleanBC* goals, but there are no details at this time, and local governments have not been engaged.

Metro Vancouver received over $200,000 in CARIP funding each year in recent years. Since the inception of the program, Metro Vancouver received more than $1.2 million and has been able to leverage more than $250,000 in additional funding from other partners. Select examples of impactful projects and programs supported by CARIP include the following:

- Electric vehicle outreach programs (e.g., *Emotive*)
- Modelling a Carbon Neutral Region
- Quantifying GHG reductions from Burns Bog restoration and new park land acquisition
- Development of a Building Energy and Emissions Benchmarking and Performance Standard
- Partial funding for a staff positon to develop the *Climate 2050 Energy Roadmap*

A STRONGER CLIMATE ACTION PROGRAM FOR LOCAL GOVERNMENTS

The Provincial *CleanBC* plan puts a priority on reducing greenhouse gas emissions, supporting energy-efficient solutions and building a low-carbon economy. A replacement to CARIP must ensure local governments are well resourced to be strong partners in meeting the Provincial climate targets. It should build on the strengths and the lessons learned from the decade of implementing CARIP, and also represents an opportunity to address some of its challenges and weaknesses of CARIP.

CARIP was a reliable source of funding for local governments that allowed them to plan multi-year climate action projects that were not reliant on application-based grant funding. Since the CARIP funding was not tied to a specific project it could be used for the climate priorities that fit local governments' individual contexts, opportunities, and needs. At the same time, because the funding was tied to local government reporting of climate actions and emissions, it helped ensure a level of accountability to the Province and the public.

Local Governments have identified two main weaknesses of CARIP. First, smaller local governments typically paid low carbon taxes which resulted in small carbon tax rebates that were insufficient to fund meaningful climate action. In many cases the rebates were disproportionate to the staff time needed to meet the reporting requirements, such that many small communities were not able to report their corporate emissions or climate actions. Secondly, since funding was tied to corporate purchase and use of fossil fuels, local governments that were successful in reducing their corporate emissions would receive reduced funding. Local government successes in making progress towards corporate carbon neutrality could impact on the funding received to implement actions to reduce community emissions. These challenges could be addressed in a replacement program by creating a minimum funding amount for smaller communities and tying the funding to a metric other than corporate emissions such as population. Finally, the Province could streamline the reporting process by aligning it with other reporting protocols.

Since the announcement of the cancellation of the CARIP program, Metro Vancouver staff have engaged with other local government staff across the province, as well as member jurisdictions, UBCM staff and the Community Energy Association. Staff have also had discussions with provincial staff from the Ministry of Environment and Climate Change Strategy, and the Ministry of Municipal Affairs. From these discussions, while there appears to be receptiveness to a replacement program for CARIP, and for constructive suggestions from affected local governments, the mechanism and extent of engagement is unclear. Another issue is the timing to develop a replacement program, as for most local governments it is critical that there not be a lapse in funding, i.e., rebates received in 2021 must be followed up with funding in 2022 and beyond.

ALTERNATIVES

1. That the MVRD Board authorize the Board Chair to write a letter to the Provincial Minister of Municipal Affairs, Minister of Environment and Climate Change Strategy, and Minister of Finance, regarding the cancellation of the Climate Action Revenue Incentive Program, providing details on key elements to be retained in a replacement program and suggested improvements, based on the analysis in the report dated May 27, 2021, titled "Cancellation of Provincial Climate Action Revenue Incentive Program (CARIP)".

2. That the Climate Action Committee receive for information the report dated May 27, 2021, titled "Cancellation of Provincial Climate Action Revenue Incentive Program (CARIP)", and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

Metro Vancouver received just under $217,000 in 2020, which was used to directly support both corporate and regional climate action projects and programs. In 2020, it is estimated that CARIP accounted for $3 to $4 million in climate action funding for Metro Vancouver's member jurisdictions which was used to fund staff, consultants, and capital projects that support climate action. CARIP funding was projected to increase annually with increases to the provincial carbon tax rate (despite projected improvements in corporate energy efficiency). The loss of consistent funding for Metro Vancouver's climate action projects and program could impact the ability to pursue actions in the *Climate 2050* strategy. While the Province has announced additional funding to local governments in its 2021-2022 budget, these application-based funding programs are not a direct replacement to the CARIP funding. The timing to develop a replacement program for CARIP is also critical, as local governments cannot experience a lapse in funding after 2021.

CONCLUSION

The unexpected Provincial announcement of the end of the Climate Action Revenue Incentive Program and associated funding will compromise local governments' ability to deliver climate action programs, and in turn will make it more difficult to reach *CleanBC* and local government GHG targets.

Alternative 1 is recommended and is based on direction from the MVRD Board, for staff to prepare a followup letter to correspondence from the Board to the province, to convey staff's suggestions for a replacement program for CARIP. Staff have had initial discussions with provincial government staff, and are also coordinating with member jurisdictions, other local governments in BC, UBCM and others.

Attachment

Letter from Minister of Municipal Affairs to BC Mayors and Chairs confirming cancellation of Provincial Climate Action Revenue Incentive Program, dated May 11, 2021 *(45563350)*

References

1. Metro Vancouver Climate Actions 2019: Climate Action Revenue Incentive Program (CARIP) Public Report (dated May 31, 2020)
2. Carbon Neutral Achievement Sets Stage for Bold Climate Action (Metro Vancouver media release dated June 29, 2020)

45693543

May 11, 2021

Ref: 266895

Dear Mayors and Chairs:

I am writing in follow up to a recent update from Okenge Yuma Morisho, Deputy Minister of Municipal Affairs, to Chief Administrative Officers regarding the Climate Action Revenue Incentive Program (CARIP). As you may be aware, 2021 will mark the wind down and final year of grant payments under this program. Budget 2021 also commits new funding to help local governments reduce greenhouse gas emissions through planning for compact, energy-efficient communities. The purpose of this letter is to thank British Columbia's local governments for your continued leadership and to describe how our government continues to work with local governments to achieve our collective climate goals.

Since the 2008 inception of the Climate Action Charter (CAC), almost every local government in B.C. has signed the CAC, committing to take action and develop strategies to achieve the following three goals:

- Work toward becoming carbon neutral in their local government corporate operations
- Measure and report on their community greenhouse gas (GHG) emissions profile
- Create complete, compact, energy-efficient rural and urban communities

As of 2018, the last year of full reporting prior to the pandemic, 187 local governments had signed on to the CAC and were publicly reporting on their progress toward meeting their climate action goals, 147 were measuring and reporting GHG emissions, and 50 local governments had achieved carbon neutrality in their operations. Communities across B.C. both large and small have consistently demonstrated leadership in taking action on climate change, in areas as broad as local food production, renewable energy generation and planning for public transit and active transportation. Thank you for your continued ambition and efforts to reduce greenhouse gas emissions in your corporate operations, and more broadly to inspire and work within your communities to tackle climate change.

Under CleanBC, the Province of British Columbia has put a priority on reducing pollution, boosting energy-efficient solutions and building a low-carbon economy. Local governments will continue to be a key partner in our collective efforts to address the challenges of a changing climate, playing a specific and important role in B.C.'s climate goals.

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Ministry of Municipal Affairs Office of the Minister

Mailing Address:
PO Box 9056 Stn Prov Govt
Victoria BC V8W 9E2
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Location:
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Victoria BC V8V 1X4

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Just as local governments' actions on climate solutions have evolved in the past decade, our government is responding to support you with tools and funding programs such as:

- Updating the BC Action Climate Toolkit and the Green Communities Committee Carbon Neutral Framework.
- Investing $110 million in combined provincial and federal funding to help local governments and Indigenous communities develop energy efficiency and clean energy projects through the Investing in Canada Infrastructure Program CleanBC Communities Fund.
- Working with the federal government to assess the climate impacts of all major infrastructure being funded under the Investing in Canada Infrastructure Program to reduce GHG emissions and increase resilience to climate change, which benefits communities and creates jobs.
- Boosting active transportation infrastructure with $18 million through the Ministry of Transportation and Infrastructure.
- Making sure commuters can get out of their cars with historic investments in public transit, such as the Broadway Subway Line, and free transit for kids 12 and under starting this September.

Building on record investments in CleanBC, the province will continue to strengthen our work with local governments and support the CAC.

As noted, Budget 2021 commits $11 million in new funding to help local governments plan for compact, energy-efficient communities, directly supporting the CAC's commitment to create complete, compact, energy-efficient rural and urban communities. I look forward to working with all local governments through Union of BC Municipalities and the Green Communities Committee on how to support greener and more livable communities.

Our government remains committed to working with local governments to reach our climate goals and make life better for people across British Columbia.

Sincerely,

Josie Osborne
Minister

pc: Chief Administrative Officers

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Amy Thai, Senior Policy Analyst
Julie Saxton, Air Quality Planner
Parks and Environment Department

Date: May 18, 2021 Meeting Date: June 11, 2021

Subject: **Next Phase of Engagement on an Open-Air Burning Emission Regulation**

RECOMMENDATION

That the MVRD Board:

a) receive for information a summary of the initial engagement on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver, as described in the report titled "Next Phase of Engagement on an Open-Air Burning Emission Regulation", dated May 18, 2021; and

b) authorize staff to proceed with additional engagement on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver, based on the draft discussion paper and updated engagement plan presented in the report titled "Next Phase of Engagement on an Open-Air Burning Emission Regulation", dated May 18, 2021.

EXECUTIVE SUMMARY

Reducing emissions of smoke from open-air burning of vegetative debris can protect public health, air quality, and our climate. Metro Vancouver completed the initial phase of engagement on a potential open-air burning emission regulation in August 2020. Feedback was generally supportive of the development of an emission regulation as a simpler process for authorizing emissions from open-air burning compared to the current site-specific approval process. Staff considered feedback and adjusted proposals presented during the initial engagement, such as simplifying record keeping and notification to neighbours and authorities, clarifying registration requirements and associated fees, and options to increase protection of the public near open-air burning activities. Details about the adjusted proposals and additional information requested during initial engagement are provided in a discussion paper, which will be used to support the next phase of engagement.

PURPOSE

This report summarizes engagement to date on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver. This report also outlines how regulatory proposals were adjusted based on feedback and seeks Board approval to carry out the next phase of engagement.

BACKGROUND

The MVRD Board endorsed the *Integrated Air Quality and Greenhouse Gas Management Plan* and the *Climate 2050 Strategic Framework*, which both identify the need to reduce emissions from open-air burning. On November 1, 2019, the MVRD Board directed staff to proceed with initial engagement on an open-air burning emission regulation and endorsed a two-phase engagement plan. Phase 1 was conducted between November 2019 and August 2020 on regulatory measures to

reduce emissions from open-air burning of vegetative debris, as described in a discussion paper presented to the MVRD Board (Reference 1). The Climate Action Committee 2021 Work Plan includes a second phase of engagement on a potential open-air burning emission regulation.

This report presents a summary of the feedback received during initial engagement (Attachment 1) and describes how initial proposals were revised in response to feedback (Attachment 2). This report seeks Board approval to engage on revised proposals described in a discussion paper (Attachment 3).

PURPOSE OF INTRODUCING AN OPEN-AIR BURNING EMISSION REGULATION

Open-air burning refers to the outdoor combustion of vegetative debris, such as agricultural crop residues, land-clearing waste, and yard trimmings, that is not vented through a chimney or stack. Open-air burning of vegetative debris is usually inefficient and produces more smoke than controlled combustion. Thousands of planned outdoor fires of various sizes occur across the region each year, and the smoke emissions can impact public health, air quality, and our climate.

Metro Vancouver exercises its air quality regulatory authority through permits and short-term approvals that apply to individual facilities, and emission regulations that apply to types of operations and activities with similar characteristics. Metro Vancouver has been managing emissions from open-air burning through site-specific approvals that can be issued for a cumulative period of 15 months per site. A regional regulation would provide a simpler, more efficient way of managing emissions from open-air burning activities that meet specified requirements. The current system of site-specific approvals would be retained for managing emissions from exceptional short-term activities.

The *BC Open Burning Smoke Control Regulation* places restrictions on open-air burning while making allowances for certain exemptions. Metro Vancouver can be more restrictive in implementing a regional emission regulation than what is required by provincial law, but cannot be less restrictive.

INITIAL REGULATORY PROPOSALS

Initial engagement was based on a discussion paper outlining proposals for an emission regulation for open-air burning of vegetative debris, which would reduce regulatory burden while protecting public health (Reference 1). The proposals included requirements mirroring those in the provincial *Open Burning Smoke Control Regulation* (OBSCR), such as requirements for minimizing and preparing material to be burned and adhering to minimum distances between open-air burning and residences, businesses, institutions, and care facilities. Due to the population density in Metro Vancouver and greater risk of exposure to smoke, staff proposed some requirements that were more stringent than OBSCR, such as registration of properties where vegetative debris is burned, additional notification of neighbours and Metro Vancouver before burning, additional record keeping, and consideration of designating sub-regional areas in which more stringent protective measures would apply.

SUMMARY OF INITIAL ENGAGEMENT ACTIVITIES

The objectives of initial engagement were to inform interested parties and the public of the proposals for regulating emissions from open-air burning and to receive feedback for consideration in the development of a potential regulation. Engagement followed Metro Vancouver's public engagement policy and took into account the wide range of audiences to be engaged, the potential impact of the proposals that were being explored, and the intention to adjust proposals in response to feedback.

Engagement activities targeted a wide range of audiences including the public, other governments including First Nations, member jurisdictions, staff at federal and provincial government agencies, and health authorities. Additional issue-specific audiences included municipal fire departments, the agriculture sector including individual farms and agricultural associations and committees. Input and feedback were sought through meetings, phone calls, webinars, and presentations. Open houses were planned for spring 2020, but events were modified due to COVID-19 public health measures. Input was also received through online feedback forms, email and letters. A complete list of engagement activities and participating audiences is provided in Attachment 1.

INITIAL ENGAGEMENT FEEDBACK

Feedback received in the first phase of consultation indicated general support for a simpler and more streamlined process. Comments and questions generally fell into four categories:

- **Proposed Requirements**, including concerns about restrictions related to the timing, frequency, and duration of burns as well as the materials allowed to be burned, and questions about the proposed process to register a site, requirements to notify neighbours and Metro Vancouver prior to burning, where a regulation would apply, and what the criteria would be for areas with more stringent requirements.
- **Existing Regulatory Processes**, including concerns about the cost and timeliness of the current process and their effect on missed chances to conduct burns, the conditions included in approvals, and a desire for more streamlined municipal and regional permitting processes.
- **Alternatives to Open Burning**, including questions and support for different alternatives to open burning, and concerns about availability of equipment, lack of awareness of alternatives, potential cost, and material transportation barriers.
- **Consultation and Outreach**, including a desire for increased awareness and communication on open-air burning requirements, and the need for more ways to access information.

A summary of the feedback received in each of these categories is presented in Attachment 1 and a detailed account of the feedback received and staff responses is in Attachment 2.

ADJUSTED REGULATORY PROPOSALS FOR NEXT PHASE OF ENGAGEMENT

Based on initial feedback, proposals were adjusted as described in Attachment 4, including:

- simplifying required notifications of neighbours and Metro Vancouver prior to burning to align more closely with the provincial OBSCR;
- describing the records that need to be kept and committing to creating a form or template to simplify record keeping;
- clarifying site registration requirements and the associated fees, which would be $100-$250 for initial registration and $50-$100 for annual renewals, with the lower range of fees intended for agricultural operations;
- focusing on greater protection of the areas around residences, businesses, schools, hospitals, daycares, and long term care facilities already set apart in OBSCR instead of designating additional areas with more stringent requirements; and
- providing options of adhering to more stringent limits on the duration and size of open-air burning activities or using cleaner-burning technology as means of reducing emissions within the more protected areas around residences, businesses, institutions, and care facilities.

Information has been included in the discussion paper (Attachment 3) to provide more detail or clarification on proposed requirements in response to feedback, including:

- information about clean and seasoned vegetative debris;
- the frequency and duration of burns;
- the minimum distances that must be kept between various types of open-air burning and nearby residences, businesses, institutions, and care facilities;
- cleaner-burning technology operating and performance conditions;
- conditions for disposal of diseased vegetative debris by open-air burning;
- conditions for open-air burning activities that reduce community wildfire risk; and
- the ability for Metro Vancouver to make substitutions for any requirements and to temporarily prohibit open-air burning.

ACTIVITIES FOR NEXT PHASE OF ENGAGEMENT

For the second phase of engagement, staff will engage with audiences that may be impacted by a potential Metro Vancouver open-air burning regulation. Since the two-phase engagement process was approved in 2019, changes made to engagement generally relate to the timing of engagement phases and shifting to online activities due to the COVID-19 public health measures.

Metro Vancouver intends to seek feedback on the adjusted proposals between July and October 2021, through online meetings, phone calls, webinars, presentations to community associations and committees, newsletter and social media ads, and direct mail to agricultural operations. The updated engagement plan (Attachment 5) provides details about the process for the next phase of engagement. The engagement timeline may be extended or additional engagement activities may be identified to better reach interested parties depending on future feedback.

ALTERNATIVES

1. That the MVRD Board:
   a) receive for information a summary of the initial engagement on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver, as described in the report titled "Next Phase of Engagement on an Open-Air Burning Emission Regulation", dated May 18, 2021; and
   b) authorize staff to proceed with additional engagement on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver, based on the draft discussion paper and updated engagement plan presented in the report titled "Next Phase of Engagement on an Open-Air Burning Emission Regulation", dated May 18, 2021.

2. That the MVRD Board receive for information the report titled "Next Phase of Engagement on an Open-Air Burning Emission Regulation", dated May 18, 2021, and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

Under Alternative 1, the additional engagement activities described in this report can be completed under the approved budget for 2021, including staff time and consulting expenditures.

CONCLUSION

The *Climate 2050 Strategic Framework* identifies the need to reduce agricultural emissions, such as those from open-air burning, to reduce the impacts of climate change. The current *Integrated Air Quality and Greenhouse Gas Management Plan* and the next *Clean Air Plan* that is currently under development include actions for Metro Vancouver to reduce emissions from open-air burning. Based on feedback received during initial engagement on a potential open-air burning emission regulation that took place between November 2019 and August 2020, staff adjusted proposals and developed a discussion paper to support the next phase of engagement. The discussion paper includes additional information in response to feedback requesting more detail or clarification on initially proposed requirements.

Staff recommend Alternative 1, for the Board to receive for information the summary of the initial engagement on a potential emission regulation for open-air burning of vegetative debris, and to authorize the next phase of engagement on adjusted proposals described in the attached discussion paper.

Attachments *(46023514)*

1. Consultation Summary Report – Metro Vancouver, Open-Air Burning Engagement, February 25, 2021 *(42784276)*
2. Consultation Issues-Response Table – Open-Air Burning, March 3, 2021 *(42780153)*
3. Proposals for a Regulation to Manage Emissions from Open-air Burning of Vegetative Debris – Discussion Paper *(41104103)*
4. Summary of Adjustments Made in Response to Feedback from Initial Engagement on a Potential Emission Regulation on Open-Air Burning of Vegetative Debris *(45569904)*
5. Updated Engagement Plan for an Alternative Approach for Regulating Emissions from Open-Air Burning of Vegetative Debris in Metro Vancouver *(42979455)*

Reference

1. Open-Air Burning: Consultation on an Alternative Approach for Regulating Emissions form Open-Air Burning of Vegetative Debris in Metro Vancouver, October 2019

45713778

MODUS

from insight to impact

CONSULTATION SUMMARY REPORT

METRO VANCOUVER, OPEN-AIR BURNING ENGAGEMENT

Prepared by: MODUS Planning, Design & Engagement Inc.
Version: 3.0
Date: 25 February 2021

TABLE OF CONTENTS

1 CONSULTATION OVERVIEW

1.1 INTRODUCTION

The Metro Vancouver Regional District (MVRD, operating as Metro Vancouver) is responsible for managing air quality in the region and regulating the discharge of air contaminants under authority delegated from the provincial government in the British Columbia *Environmental Management Act* (EMA). Metro Vancouver protects public health and the environment through a tiered approach of site-specific permits, sectoral emission regulations, and provisions in the *Greater Vancouver Regional District (GVRD) Air Quality Management Bylaw No. 1082, 2008* (Bylaw 1082) to manage the discharge of air contaminants. The system of permits and short-term approvals apply to individual facilities, and emission regulations apply to types of operations and activities with similar characteristics. Approvals are similar to permits, but are used in instances where discharges from a site are expected to be of short duration. Approvals for emissions from a particular site can only be issued for a cumulative period of up to 15 months (including any renewals).

Metro Vancouver is exploring options for alternative approaches to regulating emissions from open-air burning. The release of air contaminants from open-air burning in the Metro Vancouver region requires authorization by Metro Vancouver. The development of an emission regulation would offer an alternative mechanism for authorizing emissions that is aligned with the *BC Open Burning Smoke Control Regulation* (OBSCR), easier for the regulated community than the current approvals process, and less resource-intensive for Metro Vancouver. Introducing an emission regulation would reduce regulatory burden by providing ongoing authorization of open-air burning of vegetative debris in cases where specified requirements are met, more simply and efficiently than through site-specific approvals.

In December 2019, Metro Vancouver began conducting public and stakeholder engagement to gather feedback on potential components of a proposal for an emissions regulation. This report summarizes the engagement efforts and key engagement findings from this phase of engagement.

1.2 CONSULTATION OBJECTIVES

The objectives of Phase 1 Engagement were to inform interested parties and the public of the proposals for regulating emissions from open-air burning activities and to receive feedback. The proposals were described in a discussion paper, which had the following purposes:

- Provide information about the environmental and health impacts of smoke emissions from open-air burning in Metro Vancouver;
- Describe options to reduce emissions from open-air burning of vegetative debris through a potential emission regulation; and
- Support consultation and encourage feedback from affected and interested parties on options for regulating air emissions from open-air burning.

1.3 LIST OF STAKEHOLDERS

Staff identified the following stakeholders as being impacted or could have an interest in a potential emission regulation:

- General public
- Member jurisdictions
- Local Indigenous communities
    - Katzie First Nation
    - Kwantlen First Nation
    - Kwkwetlem First Nation
    - Matsqui First Nation
    - Semiahmoo First Nation
    - Musqueam Indian Band
    - Squamish Nation
    - Tsawwassen First Nation
    - Tsleil-Waututh Nation
- Agricultural producers
- Agricultural advisory committees
- Health agencies
- Industry and industry associations
- Municipal fire departments
- Professional organizations
- Provincial, federal and other government agencies
- Neighbouring jurisdictions

1.4 CONSULTATION ACTIVITIES

1.4.1 MEETINGS & PRESENTATIONS

Meetings and presentations were held to gather feedback on the proposed regulation from regional committees, and municipal advisory committees. Discussions were held with the groups shown in the table below. Staff made broad adjustments to engagement during this consultation in light of physical distancing requirements due to the emerging COVID-19 situation. These adaptations, which mainly moved efforts online, aimed to respond to public and stakeholder feedback and still provide the same level of engagement as outlined in the Metro Vancouver Board policy.

AUDIENCE	DATE	PARTICIPANTS
Lower Fraser Valley Air Quality Coordinating Committee (LFVAQCC)	December 3, 2019	21
Pitt Meadows Agricultural Advisory Committee	January 23, 2020	14
Maple Ridge Agricultural Advisory Committee	January 30, 2020	13
Surrey Agriculture & Food Policy Advisory Committee	February 4, 2020	17

AUDIENCE	DATE	PARTICIPANTS
Government Staff Interagency Meeting	February 12, 2020	20-30
Richmond Food Security and Agricultural Advisory Committee	February 20, 2020	19
Township of Langley Agricultural Advisory and Economic Enhancement Committee	February 26, 2020	11
Delta Agricultural Advisory Committee	March 4, 2020	12
Metro Vancouver Agricultural Advisory Committee	March 20, 2020	18

1.4.2 OPEN HOUSES

The following open houses were planned but were cancelled due to the COVID-19 situation.

LOCATION	DATE
Township of Langley: Murrayville Fire Hall	March 17, 2020
Coquitlam: Burke Mountain Fire Hall	March 19, 2020
Richmond: Hamilton Community Centre	March 26, 2020
Maple Ridge: CEED Centre	March 31, 2020

1.4.3 WEBINARS

AUDIENCE	DATE	PARTICIPANTS
Municipal partners, comprising staff from fire/planning/bylaw departments	June 22, 2020	3
Public	July 8, 2020	7
Public	July 16, 2020	6

1.4.4 PHONE CALLS & ZOOM MEETINGS

AUDIENCE	DATE	PARTICIPANTS
Bowen Island Municipality municipal and fire department staff meeting (Zoom Meeting)	July 24, 2020	5
City of Surrey Fire Chief (Zoom meeting)	August 4, 2020	3
Township of Langley municipal and fire department staff (Teleconference call)	August 5, 2020	4

Metro Vancouver staff also made 89 phone calls to farmers in the region between March 2 and March 5, 2020 to advise them about the consultation.

1.5 SUPPORT MATERIAL

To support consultation activities, Metro Vancouver created communication material to inform stakeholders and members of the public about the proposed regulation and to promote consultation activities.

1.5.1 GENERAL INFORMATION MATERIAL

To promote awareness of the proposed emission regulation and share opportunities to provide input, Metro Vancouver created:

- Website content: Website content posted to a project webpage on metrovancouver.org provided information on the proposed emission regulation, invited readers to participate in consultation activities and had links to the discussion paper and contextual background information.
- Discussion Paper: The discussion paper provided detailed information on potential regulatory approaches to control emissions from open-air burning, rationale, and alternatives to burning. Links to the discussion paper were provided on the project webpage.
- Email list: Stakeholders and interested members of the public were given an opportunity to sign up for email notifications regarding open-air burning regulatory engagement activities and other air quality and climate protection initiatives
- Feedback Form: An opportunity to provide feedback was provided in an online feedback form that sought information on current burning practices and opinions on the proposed regulation and burning alternatives. The link to this was on the project webpage.

1.5.2 PROMOTIONAL MATERIAL

To promote engagement activities, Metro Vancouver created the following material:

- E-vite: Email invitations to promote open house and webinar events were sent to stakeholders and interested members of the public. Open house events were eventually cancelled due to the COVID-19 situation, and shifted to webinars where possible.
- Social media: Posts on Facebook & Twitter advertised webinars and provided links to the online questionnaire.
- Newspaper advertisements: Advertisements were prepared and published in local newspapers to promote the open house events described in section 1.4.2.
- Postcards: Postcards were developed to promote awareness of the regulation and participation in consultation activities. These were not used because public spaces were closed due to the COVID-19 situation.

1.5.3 PRESENTATIONS & WORKSHOP MATERIAL

Metro Vancouver created material to support consultation activities:

- Presentations: Presentation decks were created to provide information about the emission regulation proposals and to encourage feedback from webinar and meeting participants. The presentation slides were also provided on the project webpage for information.
- Poster Boards: Poster boards were created to engage participants and encourage feedback at in-person open houses.
- One-pager: Summary document developed to highlight key aspects of the proposed emission regulation and similarities/differences with new provincial regulation.

2 CONSULTATION FEEDBACK

2.1 SUMMARY OF FEEDBACK

Feedback gathered through consultation activities included open-ended comments and concerns raised by participants during engagement events, correspondence received, and on questionnaires, as well as semi-quantitative data about levels of support for different aspects of the proposals from the responses to questionnaires.

Comments and questions fell into five broad categories:

Proposed Requirements
There were questions and concerns about the proposed requirements related to burn time restrictions, permitted materials and seasonal restrictions that limit burn windows. Participants questioned the processes of site registration, record keeping and notification, and requirements for sites in proximity to schools, businesses, public services and residential areas. There were also questions about the geographic scope of the proposed regulation and criteria for high sensitivity zones outlined in OBSCR.

Existing Regulations/Requirements
Comments addressed the timeliness of the current approval process and requirements of authorization. They also expressed a need for a more streamlined permitting process between local municipalities and Metro Vancouver. Participants wanted greater clarity on the role of local fire departments in regulating and enforcing a potential open burning bylaw. There was also concern about non-compliance with existing regulatory requirements and the cost of permits.

Alternatives to Open Burning
Participants provided questions and support for different alternatives to open burning, including chipping, grinding, forced air technology and green waste recycling. Participants also highlighted potential cost and transportation barriers and recommended the use of incentives to encourage interest in alternatives.

Consultation and Outreach
There was a general desire for increased awareness and communication on open-air burning requirements. Participants requested more ways of distributing and accessing information. There were also comments related to the consultation process and how public and stakeholder feedback will be collected and incorporated into the proposed regulation.

Other Feedback
Participants provided other comments related to the availability of information from air quality monitoring stations and the ventilation index. There were also questions on the timeline and implementation of a potential draft bylaw and how it would regulate different types of open-air

burning as well as other sources of emissions. Some comments expressed concern for the overregulation of farming and that new policy creates unfair restrictions for agricultural burns. Comments also indicated a desire to balance the needs of public health and safety with the needs of the agriculture community.

2.2 DETAILED FEEDBACK

PROPOSED REQUIREMENTS

Burn Time Restrictions

Participants in consultation activities expressed concern that it would be difficult to fully restrict or control the length of a burn and that multiple burns conducted on the same day may result in prolonged smoke or haze in an area, regardless of the burn time. It was recommended by a member jurisdiction that Metro Vancouver adopt the same burn time duration guidelines as the Open Burning Smoke Control Regulation (OBSCR).

Geographic Scope

There were a few questions related to the geographic areas where the proposed regulation would apply and where open-air burning approvals are required by Metro Vancouver. There was also concern about the potential for discrepancies between municipal open-air burning processes and new regional restrictions.

High Sensitivity Zones

Participants in consultation activities requested more information on the selection criteria for defining areas of high sensitivity and wanted confirmation that the additional limits in those zones would be the same as outlined in OBSCR. Some participants commented that the limits on the number of burn days in high sensitivity zones would unlikely be reached given the limited number of days that would have favourable burning conditions.

Material Restrictions

Feedback was received about potential challenges to regulating the volume and size of materials to burn, and stated that size restrictions may not be feasible for larger operations. Many participants in consultation activities also commented on the need to burn noxious weeds and diseased materials in a swift and safe way as an important means of pest and pathogen control for agricultural operators. Some participants questioned how Metro Vancouver will verify if materials have been properly cleaned and seasoned and raised concern about a potential lack of public awareness of particulate matter in smoke produced from burning debris. There were also suggestions to include an exemption to the proposed diseased plant material seasoning if authorized by an enforcement officer.

Notification

Comments were received about the cost and difficulty of properly notifying neighbours of their intention to burn, particularly in denser residential areas. Some respondents suggested that notifying Metro Vancouver and the local fire department should be sufficient and expressed a

need for a more streamlined and less labour-intensive method of communication. However, one respondent recommended requiring notification to high-risk populations nearby (e.g., hospitals, care facilities, schools).

Proximity to Schools and Businesses
There was a concern about sensitivity about smoke from farms in nearby residential areas. However, other respondents noted potential impacts to residents and First Nation communities. Some wanted clarification that Metro Vancouver would use the same conditions currently stated in the OBSCR that require burns remain at least 100m from residences and businesses and at least 500m from schools, hospitals and care facilities.

Record Keeping
Some participants questioned the process for record keeping and if Metro Vancouver is proposing the same guidelines as outlined in OBSCR. There was also interest in increasing awareness of record keeping requirements

Seasonal/Weather Restrictions
There was concern about the limited burn window for farmers to conduct the needed number of burns each season. Participants commented on the challenge of obtaining authorization that may not last long enough to conduct a burn within unpredictable windows. A need for greater outreach from Metro Vancouver on the anticipated timing of favourable burning conditions and information on seasonal restrictions was expressed. Some also expressed concern that a limited burn window will result in concentrated burning from farmers at the same time, which may negatively impact the regional air quality.

Site Registration
Participants in consultation activities questioned the process for site registration and whether it was an annual/seasonal requirement or required for each burn. There was also concern for potential lack of compliance for site registration and the ability to appropriately time burns if the site approval is valid for only a limited time.

EXISTING REGULATIONS AND REQUIREMENTS

Approval Process
Many participants expressed challenges with the timeliness and complexity of permit approvals and a lack of understanding for the current process. Some stated other barriers to the process including required information that may be difficult to provide and the limited amount of time for which approvals are valid. There is a need for a more streamlined process and understanding of the government entities from which applicants need approval.

Enforcement
Concern was expressed that regulations will be enforced disproportionately on smaller operations rather than large operations. There were also concerns about a lack of staff capacity from Metro Vancouver and municipal bylaw enforcement to actively patrol and monitor

burning processes and site inspection. There was concern about how the authorization process would differ from the permitting process and if fire departments would assume responsibility of site investigations and bylaw enforcement. Many participants in consultation activities also commented on the general public's inability and disinterest in reporting suspicious burns or recognizing prohibited material.

Non-Compliance
Participants in consultation activities were concerned that a lack of understanding of current requirements makes it difficult for farmers to adequately comply. Some also stated the importance of local municipalities receiving notification when there is a case of non-compliance within their jurisdiction.

Approval Fee
Some participants in consultation activities felt that there was a discrepancy between the cost of municipal permits and the cost of authorization from Metro Vancouver. Several participants felt that it was unfair for farmers to pay a permit fee when they do not have the chance to burn due to prolonged unfavourable conditions.

Streamlined Permit Process
A need for a "one window" system for the permitting process was mentioned in feedback. Participants in consultation activities commented on the cost and time burden of applying for two separate permits and were unsure whether they needed prior authorization from Metro Vancouver before receiving a municipal permit.

ALTERNATIVES TO OPEN BURNING

Alternative Disposal Methods
Many participants in consultation activities expressed support for the use of alternatives to open-air burning and commented on the importance of phasing out burning for less carbon intensive disposal methods. Participants suggested alternatives including recycling and use of agricultural waste for other purposes, such as soil conditioning and chipping or grinding of waste materials. There were questions related to the availability and capability of forced air technology and electric chippers, potential options for green waste collection and how the policy will define "reasonable" alternatives. There was also concern for a lack of general education and awareness of alternatives.

Cost of Alternatives
Cost was noted as a barrier for farmers to adopt alternatives to open-air burning. This includes the fees associated with chipping and forced air assistance, recycling green waste and transportation of waste to transfer stations. Participants in consultation activities noted the importance of reducing carbon emissions but expressed a need for alternatives that are affordable.

Incentives
Incentives, such as tax credits or discounts for green waste transfer, were suggested to encourage the use of alternatives that are less carbon intensive. Some participants in consultation activities indicated that switching to alternatives would be difficult and unappealing to farmers without some kind of incentive.

CONSULTATION AND OUTREACH

Communications
Participants in consultation activities shared the need for providing additional forms of communication and sharing new information publicly on open-air burning requirements, either via the website or by phone. There was concern about the lack of awareness of the provincial, regional and municipal regulations.

Consultation Process
Participants in consultation activities indicated a need for broad outreach and suggested targeted consultation on proposals with specific groups such as the Environment and Climate Action Committee of Bowen Island and Delta Farmers Institute. There were also questions related to the feedback received so far in the process and future opportunities for involvement.

Lack of Awareness or Education
There was concern about a lack of education and awareness of existing provincial, regional and municipal regulations on residential burns and permit requirements. Some expressed desire for other ways that information can be distributed offline.

OTHER FEEEDBACK

Air Quality Monitoring
Participants in consultation activities were unsure how to receive updates and notifications from the air quality monitoring stations to determine if burning is allowed. There was also concern whether the data would be accurate or representative for farmers who do not live near the stations.

Different Types of Burning
There was concern that regulations will not be equally applied to all types of open burning and were unsure if ceremonial burns, backyard or campfire burns and other types of burns would be included. Some participants questioned whether smaller burns would require the same permitting process as larger burns.

Fire Department Permits
Comments were received on the need for a more streamlined permitting process between Metro Vancouver and local fire departments and questions about how the number of fire department permits compares to the number of Metro Vancouver approvals. There was also confusion about who is responsible for fire prevention.

Draft Bylaw
There were questions related to the timeline of the draft bylaw and how it will be implemented if it is adopted. Participants also desired the opportunity for stakeholders to review and comment prior to its consideration for approval.

Other Sources of Emissions
Some comments questioned how the bylaw will address other sources of carbon emissions, including construction, airport activity, vehicle traffic and cannabis production. There were also questions on how farmers may measure emissions from their own individual operations.

Overregulation of Farming
Participants in consultation activities expressed concern that additional regulation will put an extra and unfair burden on the agriculture industry and create procedural obstacles to navigate. Some comments also recognized that new regulation should be balanced between addressing needs of the agriculture community and the negative health and environmental effects from smoke caused by burning.

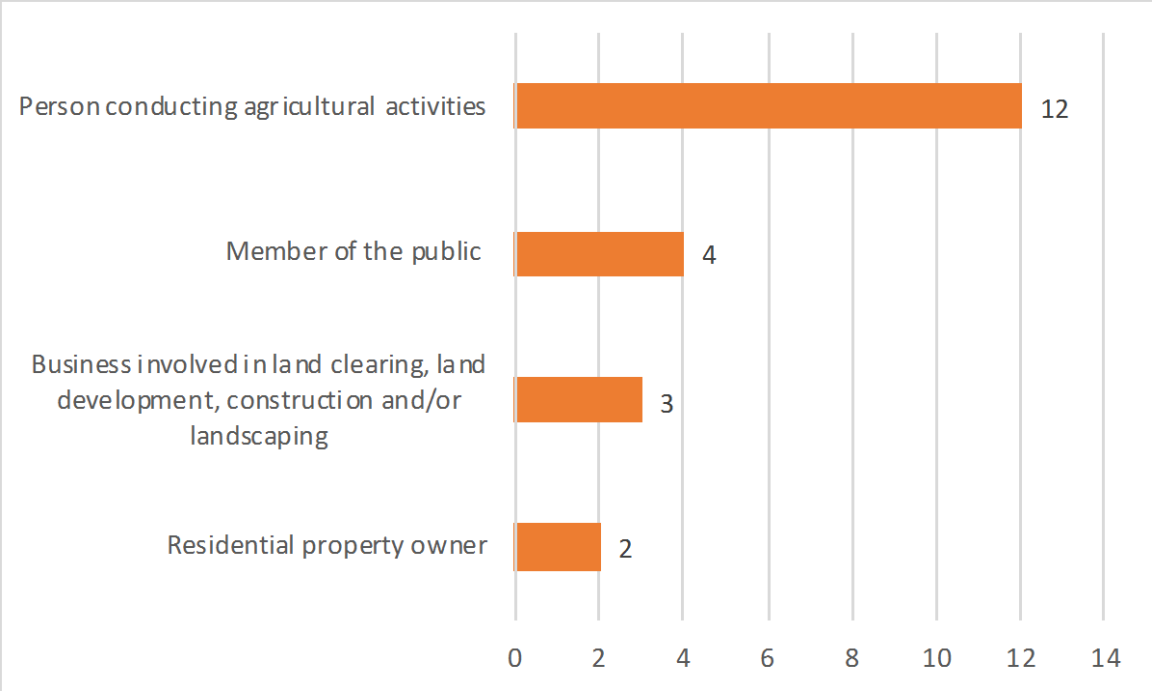
Ventilation Index
Some participants in consultation activities requested more notice when conditions are predicted to be favourable so compliant registrants may plan burns ahead of time. There was some concern that the ventilation index does not allow for many burns per year and expressed the need for additional education and awareness on the benefits of forced air assistance technologies.

2.3 FEEDBACK FROM QUESTIONNAIRE

The following section describes the results from the public questionnaire.

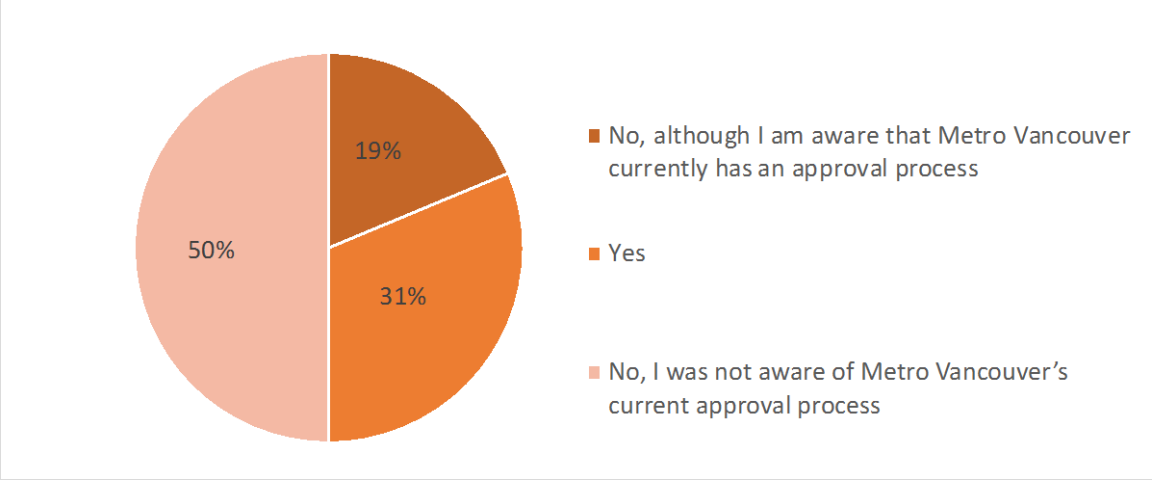
Q1. Which of the following best describes you? (select all that apply)

Responses: 16



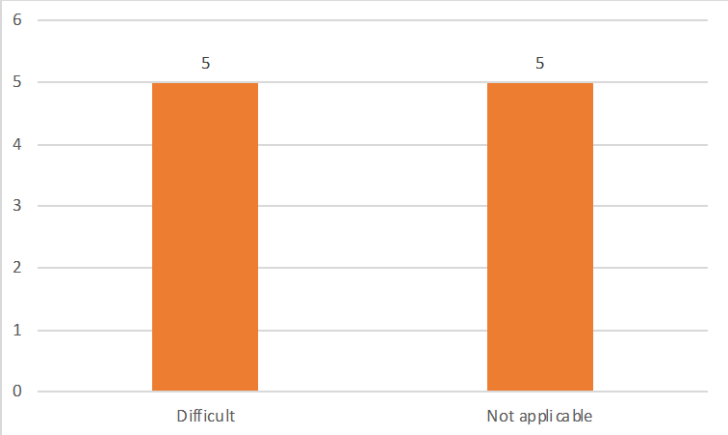
Q2. Have you ever applied for an open-air burning approval from Metro Vancouver?

Responses: 16



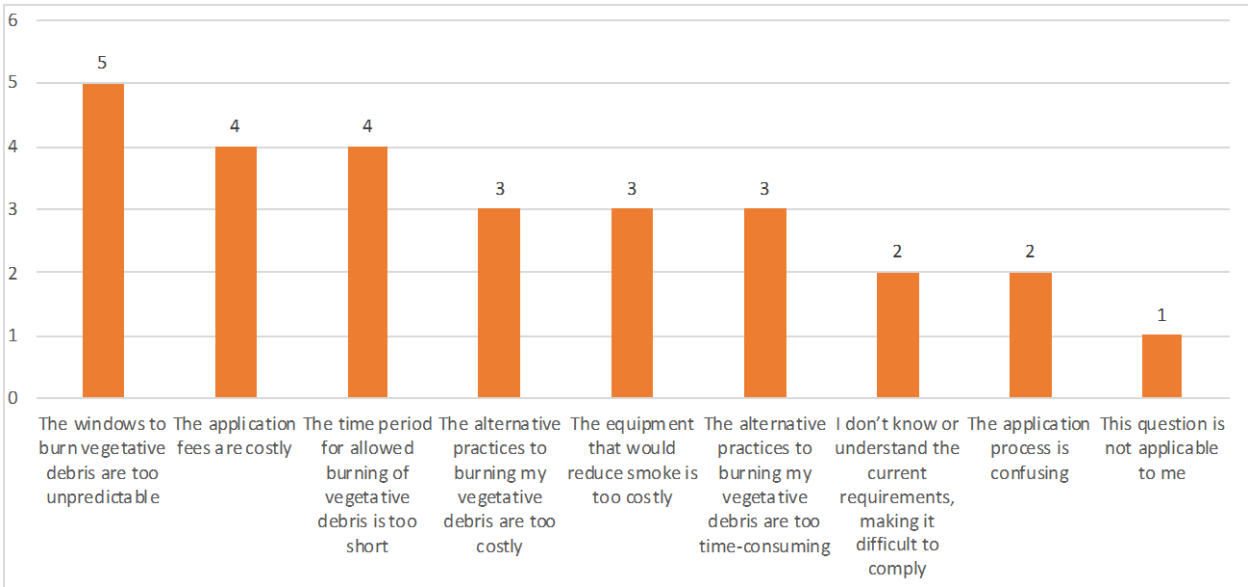
Q3. If you answered yes for question 2, how did you find the application process?

Responses: 10



Q4. What made it difficult for you to comply with the current open-air burning approval process? (Select all that apply)

Responses: 7



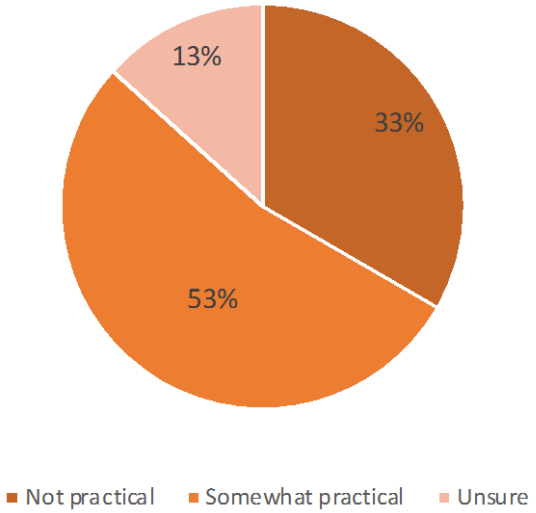
Other (2):

- Haven't applied for permit in last two years because too difficult, so don't know new restrictions
- Easier to work with local Delta Fire Department directly

In the following five questions, participants were asked to rate how practical it is for you to comply with the following potential Metro Vancouver regulatory options:

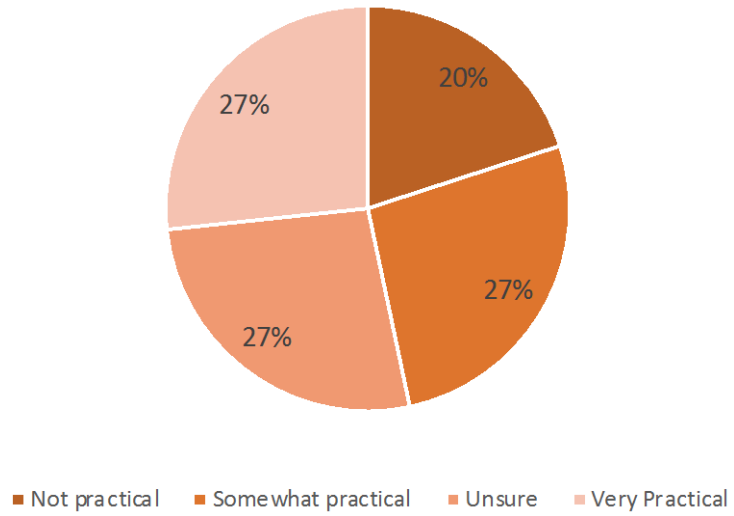
Q5. Register your site for open-air burning

Responses: 15



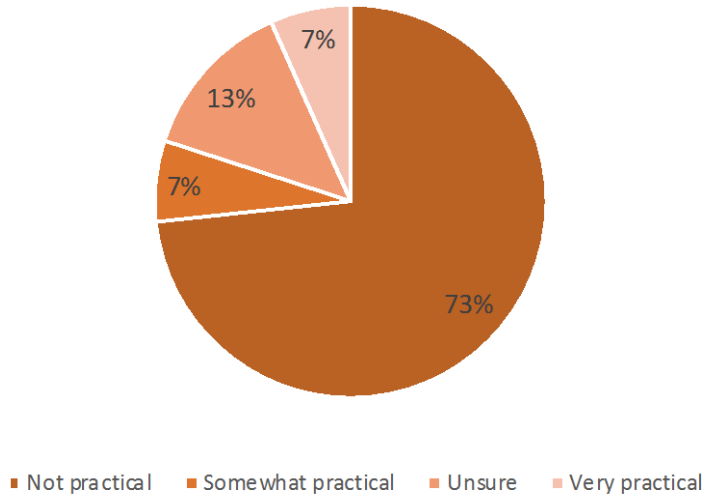
Q6. Ensure all material that is burned originates from the registered site

Responses: 15



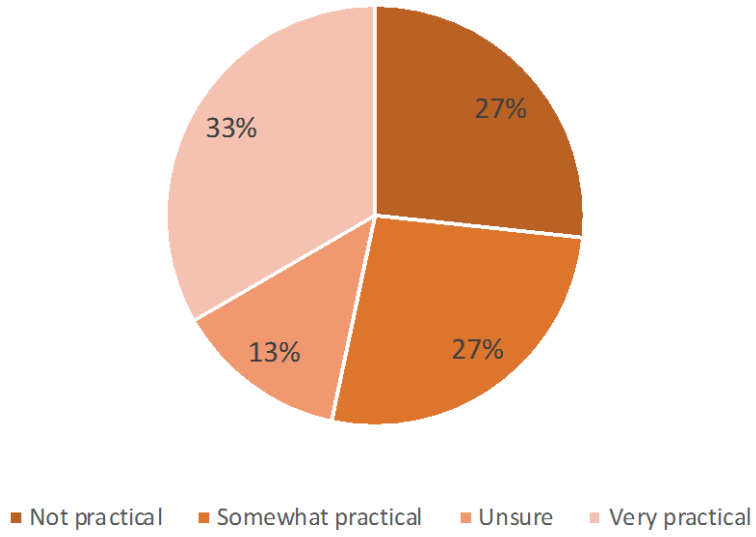
Q7. Notify neighbours and in certain cases, Metro Vancouver, prior to all burns

Responses: 15



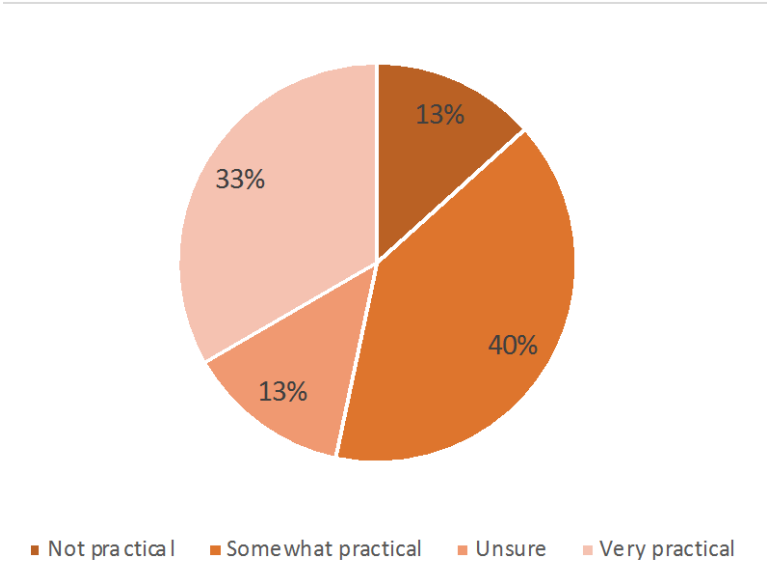
Q8. Not use accelerants, such as diesel, gasoline or kerosene

Responses: 15



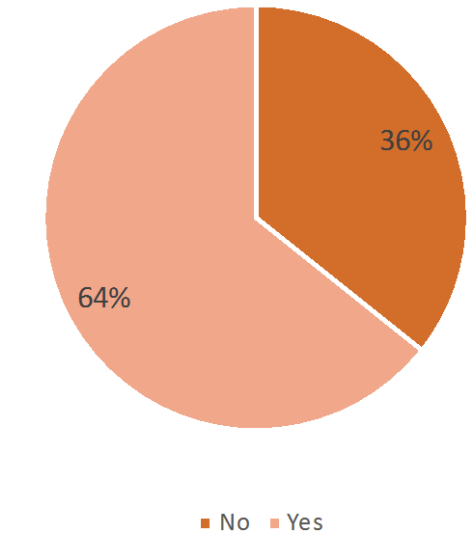
Q9. Not burn during fire bans or periods of degraded air quality

Responses: 14



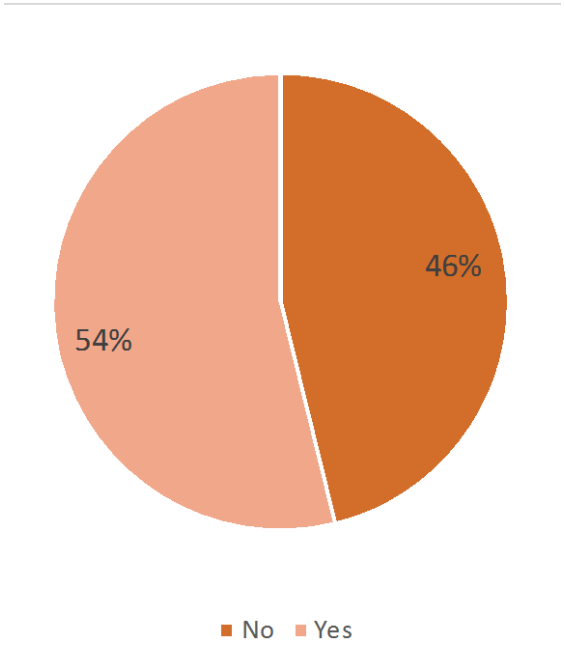
Q10. Do you currently pursue alternatives to open burning, such as reusing, recycling or composting materials?

Responses: 14



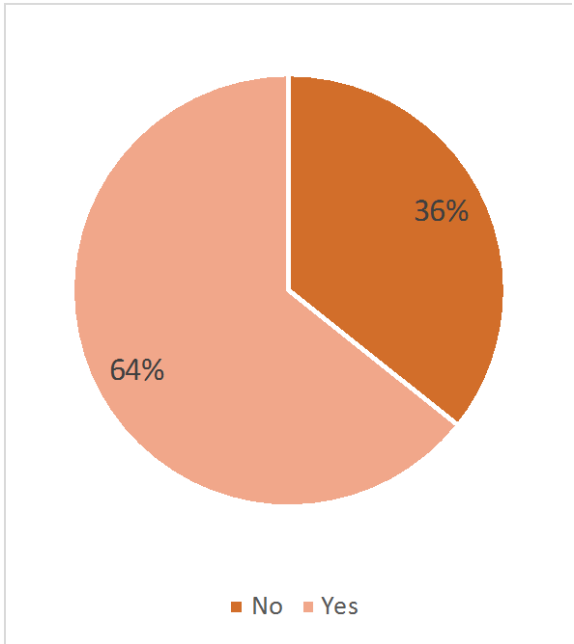
Q11. Do you currently check for reported favourable ventilation conditions?

Responses: 13



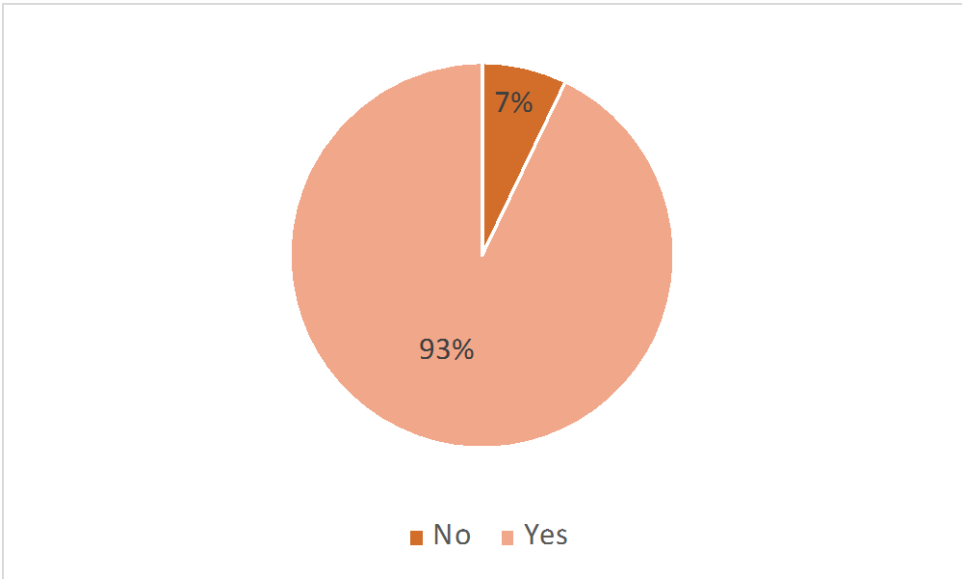
Q12. Do you currently ensure material is clean and seasoned (dry)?

Responses: 14



Q13. Do you currently respect minimum distances of the burn site from residences and businesses, and schools, hospitals and care facilities?

Responses: 14



Q14. What would make it easier for you to comply with these requirements?

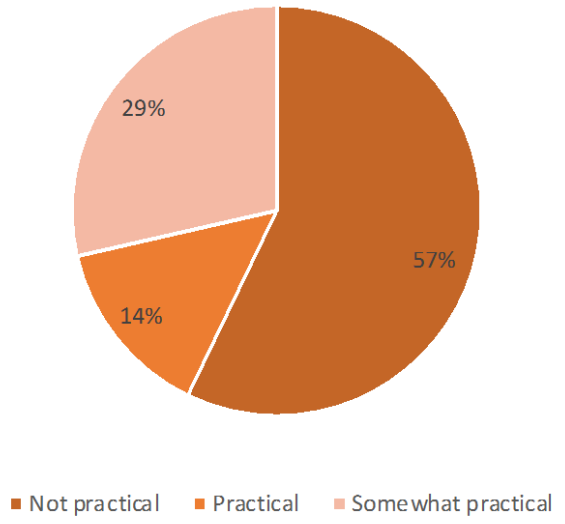
Responses: 5

Respondents shared that if certain areas were exempt from the permit requirement then it would be easier to comply. Reducing the price of green waste disposal was suggested. Compliance may also be supported through a streamlined permitting process as well as increasing the length of time a permit is valid so that it does not expire before permit holders are able to use it.

For the following three questions, respondents were asked to rate how practical it is to comply with the following potential requirements:

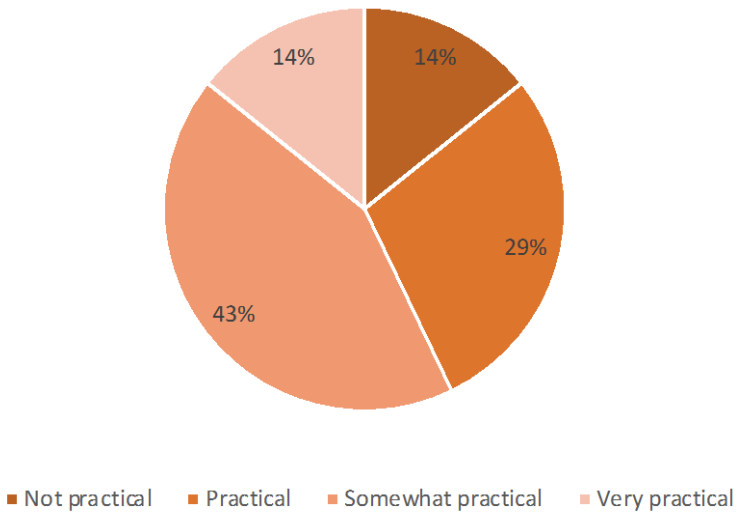
Q15. Apply stricter requirements (for example, requiring the use of equipment to reduce smoke emissions such as forced air assistance or air curtain technology), or more restrictive limits on the frequency and duration of open-air burning activities, for parts of Metro Vancouver, based on factors such as population density and topography

Responses: 14



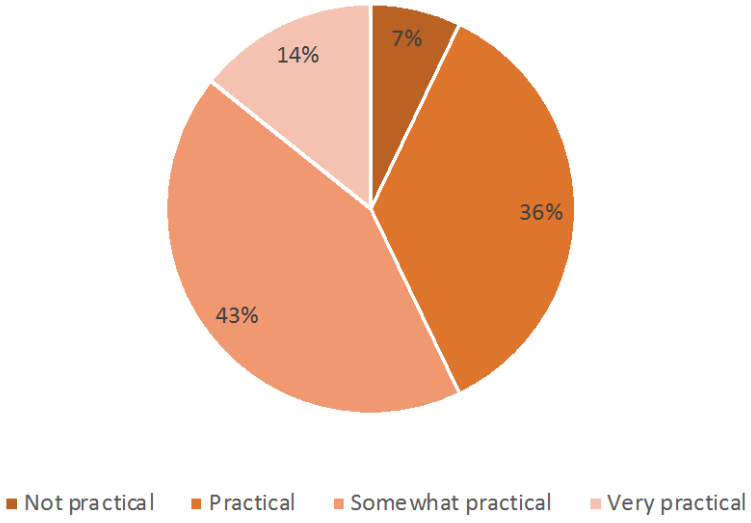
Q16. Ensure a person is attending the fire at all times

Responses: 14



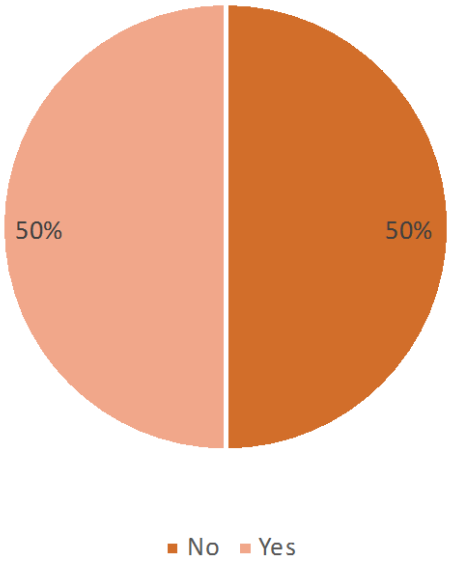
Q17. Not cause a navigation hazard due to smoke from the burn

Responses: 14



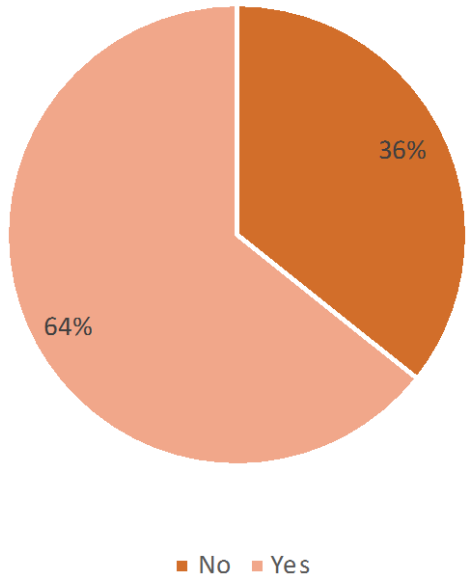
Q18. Do you currently burn during limited times within a day?

Responses: 14



Q19. Do you currently burn a maximum of 12 days per year, and no more than 6 days per month?

Responses: 14



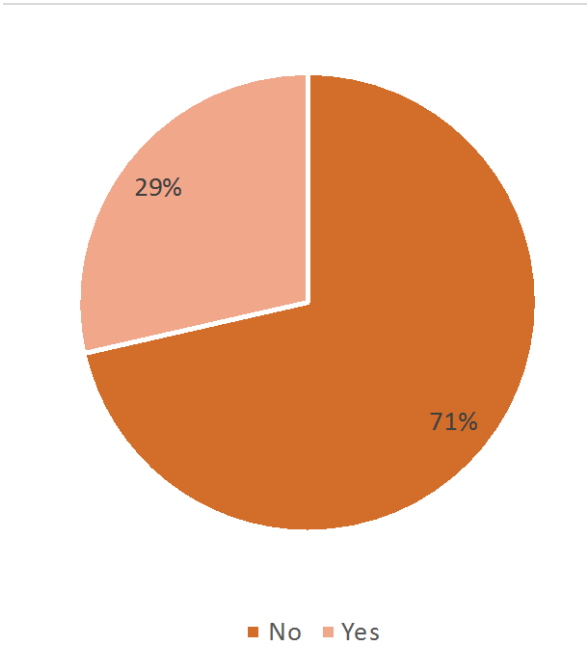
Q20. What would make it easier for you to comply with these requirements?

Responses: 5

Participants suggested ensuring Metro Vancouver regulation applies to all municipalities, so each municipality does not have a separate permitting process. Some expressed the desire for municipal authority over the permitting process. Participants also stated a need for flexibility, particularly in instances that may be out of individual control (e.g., wind changing directions during a burn).

Q21. Would you be able to maintain descriptive records of each open-air burning event to comply with this proposed requirement?

Responses: 14



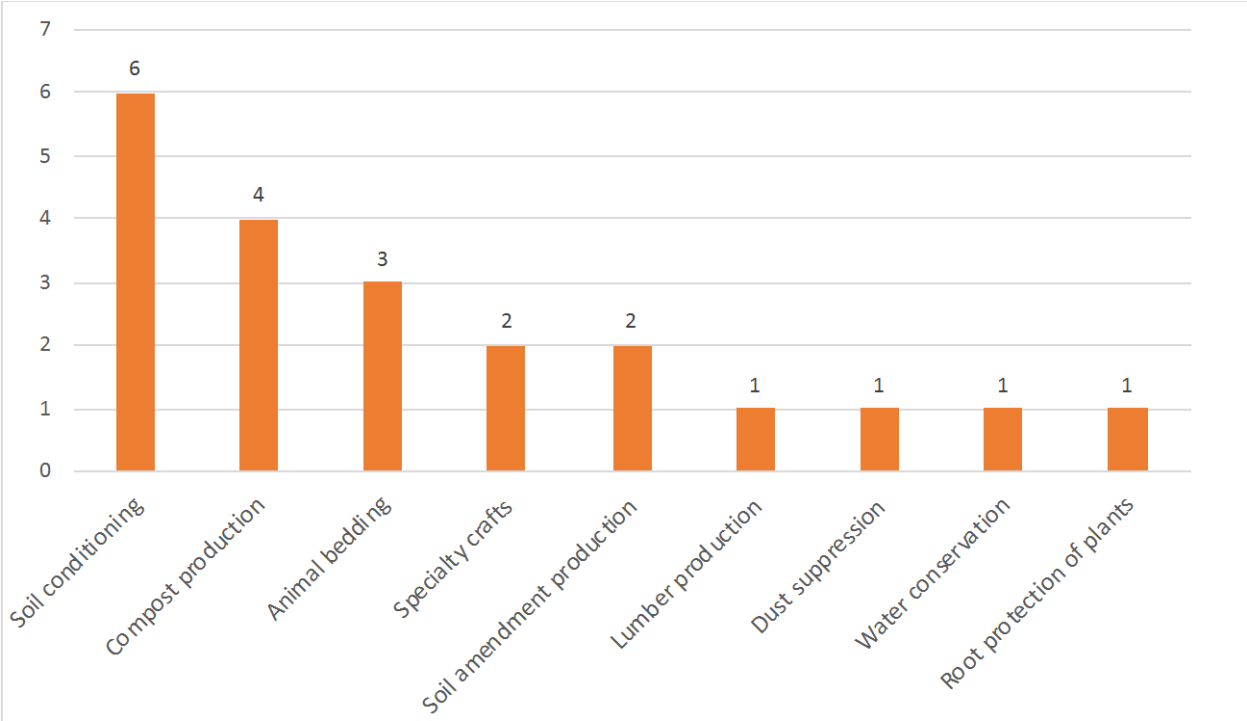
Q22. What would make it easier for you to comply with this proposed requirement?

Responses: 6

Reduced paperwork and processing times would make it easier to comply with the proposed requirement. Other comments included support for a simpler application, without requiring estimated volume of debris or venting conditions. There was also support for a digital template for permit applications to be submitted online.

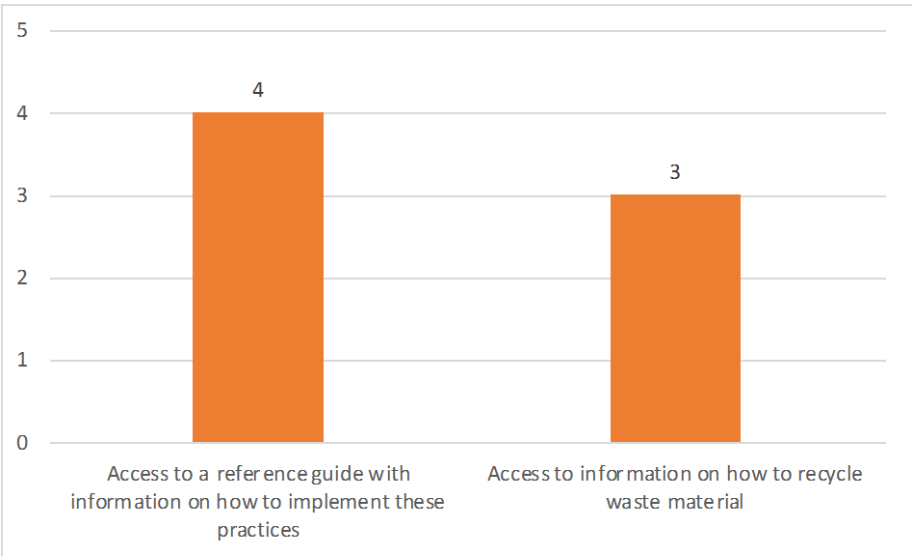
Q23. Depending on the size and type of vegetative debris, it can be used for various purposes. Which following are practical for you to use? (Check all that apply)

Responses: 10



Q24. What would make it easier for you to implement these alternative practices to open-air burning?

Responses: 8

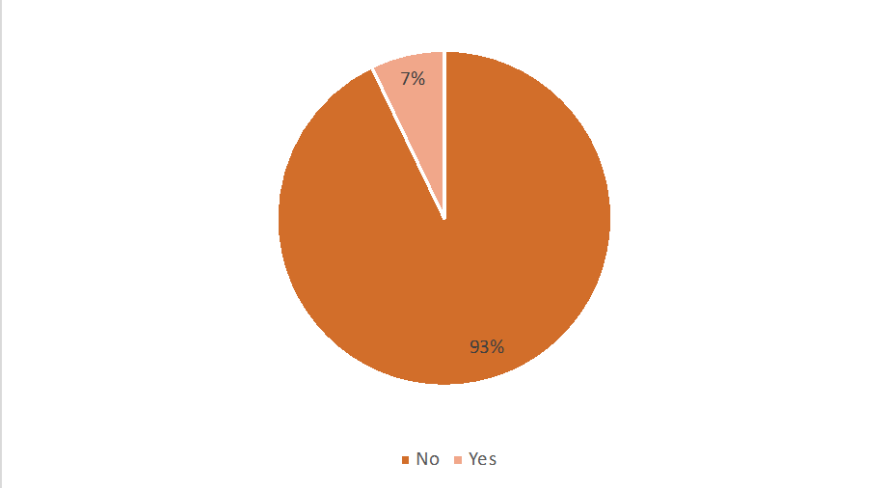


Other:

- More accessible and more convenient recycling for materials
- Make recycling service free
- More funding for alternatives

Q25. Would you implement air curtain technology?

Responses: 14



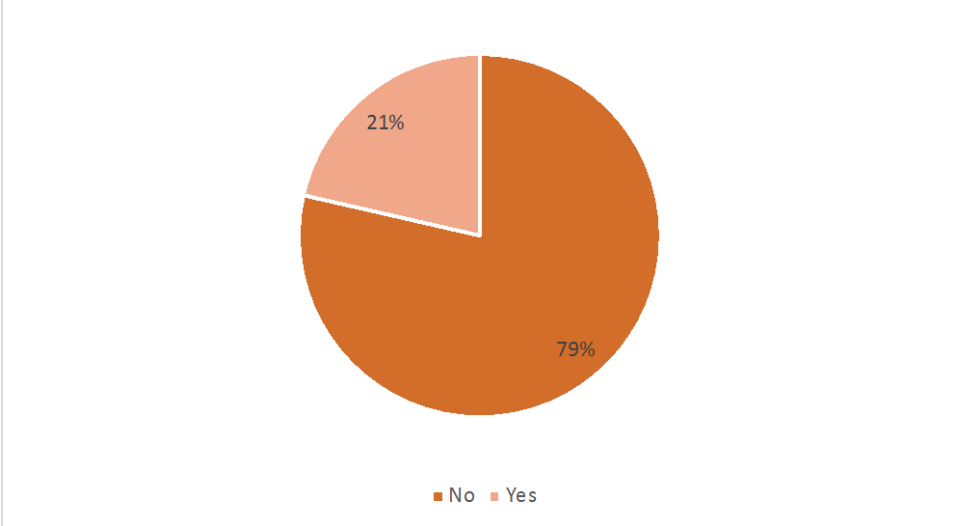
Q26. What would make it easier for you to implement air curtain technology?

Responses: 4

Financial assistance and less expensive technology options were included as ways to make implementation easier.

Q27. Would you implement forced air technology?

Responses: 14



Q28. What would make it easier for you to implement forced air technology?

Responses: 4

Participants expressed concern with potential hazards from electrical extension cords of fan technology near buildings and suggested financial assistance as a means of supporting the implementation of forced air technology.

Q29. Would you like to provide any additional comments?

Responses: 4

Participants commented that the approval process takes too much time and may not correspond with the opportunity to burn under favourable conditions. Some also noted that burning vegetation is not appropriate given today's climate and recycling of green waste and vegetative debris should be prioritized and incentivized. Other comments reflected a sentiment that the process is overregulated.

Consultation Issues-Response Table

Initial Consultation

An Alternative Approach for Regulating Emissions from Open-Air Burning of Vegetative Debris in Metro Vancouver

Consultation Issues-Response Tracker
Open Air Burning
March 3rd, 2021

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
1	**Proposed Requirements**	**Burn Time Restrictions**	Maple Ridge Agricultural Advisory Committee (1) Surrey Agriculture & Food Policy Advisory Committee (1) Matsqui First Nation (1) City of Delta (1)	Restrictions on time may be difficult operationally. An extinguished fire is difficult to restart.	Metro Vancouver has proposed the same burning duration time as in the provincial Open Burning Smoke Control Regulation (OBSCR), except for more stringent limits for burns that occur between 100-500 m from neighbouring residences and businesses and between 500-1000 m from sensitive receptors due to population density and increased risk of exposure to smoke. Metro Vancouver's requirements cannot be less stringent than OBSCR.
				Canada Food Inspection Agency's (CFIA) requirements to immediately burn diseased vegetative debris should be built into the proposed regulation.	Metro Vancouver is proposing to allow burning of diseased vegetative debris with similar requirements to the provincial Open Burning Smoke Control Regulation (OBSCR)
				Concern about poor air quality when many burns are concentrated over a short window of time during favourable burning conditions.	Comment noted. Measures such as requiring material to be clean and seasoned are intended to reduce emissions from open-air burning that would be happening during favourable burning conditions. Metro Vancouver is also proposing similar protective measures to OBSCR, which would allow the District Director to prohibit burning to protect the public or the environment if it becomes necessary. Metro Vancouver must align with OBSCR, which does not allow burning during unfavourable conditions.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				The proposed Metro Vancouver Regulation should retain the burning duration time as specified in the Open Burning Smoke Control Regulation. If air quality deteriorates because of open air burning, the regional district's authority to quickly impose burning bans is a sufficiently protective regulatory tool.	Comment noted. Metro Vancouver has proposed the same burning duration time as in the provincial Open Burning Smoke Control Regulation (OBSCR), except for more stringent limits for burns that occur between 100-500 m from neighbouring residences and businesses and between 500-1000 m from sensitive receptors. However, due to the higher population density and increased risk for exposure than other parts of the province, Metro Vancouver is proposing to apply burn duration time limits to properties of any size in the region. Metro Vancouver is also proposing similar protective measures to OBSCR, which would allow the District Director to prohibit burning to protect the public or the environment if it becomes necessary.
2		**Geographic Scope**	Richmond Food Security and Agricultural	Need more information about where the proposed regulation would apply.	The proposed regulation and any site-specific open air burning approval issued by Metro Vancouver apply only in the Metro Vancouver region.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
			Advisory Committee (1) Township of Langley Agricultural Advisory and Economic Enhancement Committee (1) Written Questionnaire Response (1) Feedback from Farmers (1) Bowen Island Municipality (1)	Concern about discrepancy between local open air burning processes/regulations and regional requirements.	Local open air burning regulations may fulfill a different purpose than Metro Vancouver's potential regulation, which is intended to protect air quality and, by extension, public health. Local and regional requirements will not contradict each other, and the most stringent requirements will prevail. A proposed Metro Vancouver regulation aims to be more efficient and less resource-intensive than the current approval process. Open-air burning activities that meet the requirements of the proposed regulation will not need to apply for a Metro Vancouver approval. Applicants would still need to obtain a municipal fire permit, if applicable.
3		**High Sensitivity Zones**	City of Delta (1) Ministry of Agriculture (3)	Need more information on whether certain municipalities or areas within a municipality qualify to be in a higher or lower smoke sensitivity zone, and how these zones would be determined.	Under the provincial Open Burning Smoke Control Regulation (OBSCR), all of the Metro Vancouver region is categorized as a High Smoke Sensitivity Zone. Under both OBSCR and Metro Vancouver's proposed regulation, the minimum distances for open-air burning are at least 100 m from neighbouring residences and businesses and at least 500 m from hospitals, schools, daycares and long-term care facilities (sensitive receptors). Metro Vancouver is proposing more stringent conditions than OBSCR for burns that occur between 100-500 m from neighbouring

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
					residences and businesses and between 500-1000 m from sensitive receptors due to population density.
				Need more information on whether Metro Vancouver intends to use the same start and end time guidelines for high sensitivity zones as stated in OBSCR.	The same start and end times on each day of burning have been proposed as are stated in the provincial Open Burning Smoke Control Regulation (OBSCR) for high smoke sensitivity zones. Metro Vancouver cannot be less stringent than the requirements in OBSCR.
4		**Material Restrictions**	Pitt Meadows Agriculture Advisory Committee (3) Maple Ridge Agricultural Advisory Committee (1) Lower Fraser Valley Air Quality Coordinating Committee (1) Matsqui First Nation (2) Written Questionnaire Response (1) City of Surrey (4) City of Delta	Concern that restrictions on volume and size of materials to burn do not work.	Comment noted. Metro Vancouver's proposed requirements cannot be less stringent than requirements in the provincial Open Burning Smoke Control Regulation (OBSCR). Metro Vancouver is proposing some more stringent conditions than OBSCR on volume and size of materials to qualify to do open-air burning between 100-500 m from neighbouring residences and businesses and between 500-1000 m from sensitive receptors, due to the higher population density and increased risk for exposure than other parts of the province. Open-air burning activities that don't meet the requirements of a proposed regulation may continue to seek authorization through an approval.
				Some municipalities hire local services with large grinders to plough ground material, including diseased material, back into land. This builds soil and is a benefit but may contravene regulations limiting tannin leachate into	Comment noted. Metro Vancouver is exploring ways to promote alternative methods of managing vegetative debris that align with relevant regulations. Metro Vancouver does not propose to require the burying of woody materials.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
			(5) Ministry of Agriculture (1) Feedback from Farmers (1)	groundwater and creeks. Other regulations may also be contravened by burying ground wood materials.	
				The proposed regulation is better suited to small properties as large operations need to burn large quantities of material (30x the size of the allowed amount).	Activities that do not meet the requirements of a regulation require site-specific approvals, which is the current process for all open-air burns in the Metro Vancouver region.
				Need more information on Metro Vancouver's definition of "clean and seasoned material".	Metro Vancouver defines "clean" material as minimizing any soil content that may be mixed in with the vegetative debris. Metro Vancouver is proposing the same definition of "seasoned material" as the provincial Open Burning Smoke Control Regulation: material has been dried to the extent that the dry basis moisture content is 30% or less, has been put in piles for a period of at least 4 months, or has originated from standing dead timber.
				There would be no way to determine if the vegetative material is seasoned before it is burned.	Metro Vancouver is proposing the same definition of "seasoned material" as the provincial Open Burning Smoke Control Regulation: material has been dried to the extent that the dry basis moisture content is 30% or less, has been put in piles for a period of at least 4 months, or has originated from standing dead timber.
				Many farmers burn wet debris, but it is important that piles are dried prior to burning.	Support noted. Metro Vancouver is proposing that vegetative debris is seasoned before burning, with exceptions for diseased vegetative debris.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				Lack of awareness of type of specific particulate matter contaminants found in emissions from burning debris.	Open-air burning of vegetative debris produces smoke, which is a source of fine particulate matter (PM2.5). Fine particles are associated with health issues that include bronchitis, asthma, emphysema, pneumonia and heart disease. Infants, children, pregnant women, the elderly, and people who already have respiratory illnesses, heart problems or other chronic diseases are most at risk, and healthy adults can also be affected. Research has shown there is no known threshold below which airborne fine particles have no health effects. This means it is important to minimize the amount of smoke produced and reduce exposure to it.
				According to ALR regulations, only agriculture material may be burned (e.g., blueberry bush debris).	Comment noted. Metro Vancouver is aligning with the provincial Open Burning Smoke Control Regulation on the types of material that can be burned.
				Concerns about the prompt disposal of diseased material and how this regulation will affect the burning of this material.	Metro Vancouver is proposing that seasoning is not required for diseased material, as per the provincial Open Burning Smoke Control Regulation. It is proposed that an accelerant must be used if the diseased material is not seasoned.
				Need more information on whether there will be a verification requirement for noxious weed burning similar to diseased material and whether noxious weeds need to be seasoned before burning.	A discussion paper containing more detailed proposed requirements will be published for a second phase of consultation. Best Management Practices and factsheets with information about how to dispose of invasive species, including noxious weeds, can

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				Suggestion that noxious weeds can be burned while still rooted in the soil to reduce propagule spread.	be found at metrovancouver.org, search for “invasive species”.
				Concern about past compliance with respect to material restrictions.	Concern noted. Metro Vancouver officers are responsible for promoting compliance with and enforcing Metro Vancouver Bylaws. Further information about the compliance promotion and enforcement program can be found on metrovancouver.org by searching for "compliance promotion".
				No land clearing debris can be burned under some municipal bylaws, even if on ALR land.	Comment noted. Metro Vancouver's proposed regulation is intended to manage emissions from open-air burning of vegetative debris, which can include land clearing debris, wherever this activity is allowed in the region. There may be additional municipal and ALR burning requirements and restrictions.
5		**Notification**	Maple Ridge Agricultural Advisory Committee (1) City of Delta (6) Written Questionnaire Response (1) Ministry of Agriculture (3) City of Surrey	Notifying neighbours is too onerous.	The provincial Open Burning Smoke Control Regulation requires all reasonable efforts are made to notify neighbours. A Metro Vancouver regulation cannot be less stringent than the provincial regulation.
				Need clarification about the purpose and extent of notifications.	Notifications assist Metro Vancouver in responding to complaints and assessing if there were authorized open-air burns in the area. The provincial Open Burning Smoke Control Regulation (OBSCR) requires all reasonable efforts are made to notify nearby residences, businesses, schools, hospitals, and care facilities no later than 24 hours before the start of an open burn. A Metro Vancouver

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
			(1) Public (1)		regulation cannot be less stringent than the provincial regulation.
				Concern about cost of notifications.	Comment noted. The provincial Open Burning Smoke Control Regulation (OBSCR) requires all reasonable efforts are made to notify nearby residences, businesses, schools, hospitals, and care facilities no later than 24 hours before the start of an open burn. A Metro Vancouver regulation cannot be less stringent than the provincial regulation in relation to the extent of required notifications and associated costs.
				Concern that notification has never been a priority in the past as farmers have not had a need to inform neighbours of their intention to burn.	The provincial Open Burning Smoke Control Regulation, amended in September 2019, includes requirements for anyone conducting agricultural burning to notify neighbours when the vegetative debris to be burned is 10 cm or larger in diameter. Due to the higher population density and increased risk for exposure than other parts of the province, Metro Vancouver is proposing that notification been done for burning of any size of vegetative debris.
				Need more information about why there is an additional need for written notification to Metro Vancouver and others if a permit has already been applied for through Metro Vancouver.	Open-air burning activities that meet the requirements of a proposed regulation will not need to apply for a Metro Vancouver approval. A proposed regulation aims to be more efficient and less resource-intensive than the current approvals process. The provincial Open Burning Smoke Control Regulation (OBSCR) requires all reasonable efforts are made to notify nearby residences, businesses, schools, hospitals, and care facilities no later than 24 hours before the

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
					start of open burning. Metro Vancouver's proposed requirements cannot be less stringent than OBSCR.
				Desire to know why in some cases (i.e., when using an air curtain incinerator), the regional district should be notified at least two weeks in advance.	Air curtain burners are generally used to reduce the higher potential for impacts of burns that are large or close to neighbours, so proper use of the air curtain burner is important. Advance notification was proposed to enable Metro Vancouver to schedule staff to conduct an inspection. The timing has been adjusted in proposals being put forward for a second phase of consultation.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				The air curtain incinerator notification requirement and possible subsequent inspection by Metro Vancouver is especially useful for registrants who have no experience in using this technology. However, Metro Vancouver should use discretion when deciding whether to conduct inspections related to air curtain incinerator use, particularly for registrants who have previously demonstrated proper use of the technology, so as not to dissuade air curtain use due to a real or perceived increase of regulatory scrutiny.	Comment noted. Metro Vancouver Officers have the authority to use their discretion to ensure that available resources achieve the best outcomes overall. Metro Vancouver Officers may use discretion when deciding whether to conduct inspections as a result of air curtain burner notification, particularly of registrants who have previously demonstrated proper use of the technology.
				Concern about challenge of maintaining communication between local governments and Metro Vancouver on complaints from residents.	Comment noted. Municipalities that wish to receive notification of unauthorized open burns should submit that request by email to regulationenforcement@metrovancouver.org. Municipalities can share information about complaints and inquire about the status of open burn authorization through this email address as well.
				Metro Vancouver staff should consult with its provincial counterparts to enquire about what methods of neighbourhood notification are cost and time-efficient, while also considered legally	The consultation process for the development of a potential Metro Vancouver open-air burning regulation has included discussion with staff from the provincial government. The provincial regulation states "all reasonable efforts", but provincial staff did not provide any specific guidance since it

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				acceptable by the Ministry of Environment and Climate Change Strategy.	depends on the circumstances of a given situation.
				Metro Vancouver should require registrants to directly contact facilities with high risk populations (e.g. hospitals, care facilities, and schools) within the notification radius, despite potential challenges to mass notification.	Metro Vancouver is proposing to align with the provincial Open Burning Smoke Control Regulation (OBSCR) which requires all reasonable efforts are made to notify nearby residences, businesses, schools, hospitals, and care facilities no later than 24 hours before the start of open burning.
6		**Proximity to schools, businesses, etc.**	Pitt Meadows Agriculture Advisory Committee (1) Matsqui First Nation (1) Ministry of Agriculture (1)	Concern that there is a higher sensitivity to smoke around farms when residential areas are nearby which adds a barrier to farming.	Concern about barriers to farming noted. Under the provincial Open Burning Smoke Control Regulation (OBSCR), the entire Metro Vancouver region is categorized as a High Smoke Sensitivity Zone, which means there are particular restrictions near residential areas and other sensitive land uses. Metro Vancouver's proposed requirements cannot be less stringent than OBSCR. Municipalities are responsible for zoning of residential developments.
				IR#2 and IR#4 are in agricultural areas where there is constant burning of debris that smokes up the entire Matsqui Village and impacts residents in the IR#4 location periodically.	Air quality complaints can be registered with Metro Vancouver at 604-436-6777. Metro Vancouver staff recommend contacting the local health authorities if there are any health concerns attributed to the described burning activities.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				Need more information on whether Metro Vancouver is planning to use the same guidelines as described in the OBSCR. OBSCR describes the additional conditions required to burn 100m from residences and businesses; and 500m from schools, hospitals and care facilities.	Under both the provincial Open Burning Smoke Control Regulation (OBSCR) and Metro Vancouver's proposed regulation, the minimum distances for open-air burning are at least 100 m from neighbouring residences and businesses and at least 500 m from hospitals, schools, daycares and long-term care facilities (sensitive receptors). Metro Vancouver is proposing requirements that are more stringent than OBSCR for burns that occur between 100-500 m from neighbouring residences and businesses and between 500-1000 m from sensitive receptors due to population density.
7		**Record Keeping**	Lower Fraser Valley Air Quality Coordinating Committee (1) Ministry of Agriculture (2)	Desire to know whether there a process or form for record keeping.	Metro Vancouver's proposed regulation will list the items that must be recorded. A form or template would be developed should the Metro Vancouver Board adopt the bylaw.
				Desire to know whether Metro Vancouver is planning to increase awareness around general record keeping needs.	Metro Vancouver would conduct education and outreach to build awareness of new regulatory requirements.
8		**Seasonal/Weather Restrictions**	Maple Ridge Agricultural Advisory Committee (1) Surrey Agriculture & Food Policy Advisory Committee (2)	Concern for limited amount of days allowed for burning and difficulty to finish the needed amount of burns for each season (i.e., good smoke dispersion conditions are rare, and in practice, there is sometimes only a 3 day open window per year to burn, which is not practical for a large farm).	Metro Vancouver has proposed that open-air burning is allowed up to 12 days per year and up to 6 days per month, providing other requirements such as smoke dispersion conditions are met. It is proposed that using an air curtain burner may make it possible to burn under a wider range of smoke dispersion conditions. Activities that do not meet the requirements of a regulation would require site-specific approvals, which is the current

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
			Interagency Meeting (2) Delta Agriculture Advisory Committee (3) July 16th Webinar (1) Written Questionnaire Response (4) Township of Langley Fire Department (1) City of Surrey (1)		process for all burns in the Metro Vancouver region.
				Concern about doubling up of pollutants during the summer wildfire season and interest in expanding seasonal burn windows to October-March.	Comment noted. Metro Vancouver's proposed requirements on when open-air burning can occur depend on smoke dispersion conditions, which are based on the ventilation index. Metro Vancouver may restrict open-air burning during the summer during episodes of degraded air quality (from wildfire smoke and other sources) or during provincial burn bans. Municipalities may have additional seasonal restrictions.
				Desire to know whether there a seasonal pattern for burns.	Metro Vancouver's proposed requirements are based on smoke dispersion conditions. This typically limits the number of days in the winter when burning can occur and in the last few years, December has had the fewest days that burning can occur. Metro Vancouver is also proposing that burning could be restricted by the District Director. As a result, during episodes of degraded air quality, such as due to wildfire smoke in the summer, open-air burning could be restricted. Provincial burn bans may also occur in drier months, and some municipalities have additional restrictions on open-air burning at certain times of year.
				Confusing messaging regarding when farmers can burn (i.e., all year or seasonal).	Residents who are planning to carry out open-air burning can check Metro Vancouver's open-air burning advisory message to determine if open-air burning is allowed on that day. Municipal requirements should also be consulted as they may differ from Metro

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
					Vancouver's requirements. Metro Vancouver would conduct education and outreach to build awareness of new regulatory requirements.
				Concern that farmers will not get the chance to burn material, because the approval process will take too long or there will not be any favourable conditions for burning. Farmers would lose money on the approval application fee if this happened.	The proposed regulation aims to be more efficient, less resource-intensive, and less costly than the current approvals process: open-air burning activities that meet the requirements of a regulation would not need to apply for a Metro Vancouver approval. Metro Vancouver is proposing an initial site registration which will be valid for one year, and subsequent annual registration if burns are occurring during those years.
				The windows to burn vegetative debris are too unpredictable	Comment noted. Metro Vancouver's proposed requirements on when open-air burning can occur depend on smoke dispersion conditions, and are based on the ventilation index.
9		**Site Registration**	Delta Agriculture Advisory Committee (2) Feedback from Farmers (2) City of Delta (1) June 16th Webinar (1)	Questions and confusion about frequency of registration and whether registration is required for every burn or for an entire burn period.	Metro Vancouver is proposing an initial site registration, and subsequent annual registration if burns are occurring during those years. Municipalities may have additional requirements.
				Desire to know whether it is possible to have site specific inspections and simultaneous permitting and posting. Paperwork could be submitted in advance and checked off for compliance at the site visit.	Implementation processes will be developed once a proposed bylaw has been adopted. This allows them to reflect the requirements of the bylaw.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				Concern for lack of compliance with site registration.	Metro Vancouver officers are responsible for promoting compliance with and enforcing Metro Vancouver bylaws. Further information about compliance promotion and enforcement program can be found on metrovancouver.org by searching for "compliance promotion".
				Desire to know whether residents who register for open-air burning would need to complete a questionnaire similar to the questions asked in the current approval form.	The registration process will be developed after a bylaw has been adopted. The information that is proposed to be required will be available in a discussion paper for the second phase of consultation.
				Desire to know if further questioning would be conducted after registration, or only when an investigation or inspection is required.	It is possible that registrants may be asked additional questions so that Officers can assess compliance with the proposed Bylaw.
10	**Existing Regulations and Requirements**	**Approval Process**	Maple Ridge Agricultural Advisory Committee (1) Delta Agriculture Advisory Committee (2) Metro Vancouver Agriculture Advisory	Desire to know proportion of approvals that are agricultural.	In the last 2 years, just over half of open-air burning approvals issued were agricultural.
				Need more information on the current approval process for open-air burning.	Authorization of emissions from open-air burning from Metro Vancouver is typically done through approvals. An approval can only be given for a combined total of 15 months. Information about the approval process can be found on metrovancouver.org by searching for "open burning". There may also be municipal permit requirements.
				Need clarification on whether the information needed to obtain a permit from Metro Vancouver is distributed with	The process to share information about obtaining authorization from Metro Vancouver depends on the municipality.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
			Committee (1) City of Delta (2) July 16th Webinar (1) Bowen Island Municipality (1) City of Surrey (3) Written Questionnaire Response (2)	each municipality's burn permits.	
				Need more information on how the proposed registration process differs from the current process.	The proposed regulation aims to be more efficient and less resource-intensive than the current approvals process: open-air burning activities that meet the requirements of the proposed regulation will not need to apply for a Metro Vancouver approval. Metro Vancouver is proposing an initial site registration, and subsequent annual registration if burns are occurring during those years.
				There should be zones in more rural areas where permits are not required.	The Greater Vancouver Regional District Air Quality Management Bylaw No. 1082 prohibits the discharge of air contaminants unless authorized under a regulation, permit, approval or order or other conditions stated in the bylaw. It is anticipated that an emission regulation would reduce regulatory burden by simplifying the process for obtaining authorization of emissions for appropriate types of open-air burning.
				The estimated volume of debris and burn registration number should not be needed for approval process.	The estimated volume of debris is required by the BC Open Burning Smoke Control Regulation for some types of activities. Metro Vancouver's requirements cannot be less stringent than the provincial regulation.

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
				Support for the transition from the current Air Quality Management Bylaw approval process to the proposed registration process, to help reduce the regulatory burden for both the regulator and registrants while still achieving acceptable air quality for the region.	Comment noted
11		**Enforcement**	Surrey Agriculture & Food Policy Advisory Committee (3) Metro Vancouver Agriculture Advisory Committee (1) City of Delta (1) Feedback from Farmers (6) Public (1) City of Delta (1) City of Surrey (2)	Complexities with current regulations make it difficult to know how they will be enforced.	It is anticipated that an emission regulation would reduce regulatory burden by simplifying the process for obtaining authorization of emissions for appropriate types of open-air burning. Information about Metro Vancouver's compliance promotion and enforcement program can be found on metrovancouver.org by searching for "compliance promotion".
				Concern about lack of equitable enforcement for all who burn.	Metro Vancouver aims to promote compliance with its laws in an effective, efficient, timely and fair manner. However, resources are limited and therefore regulatory efforts are focussed to achieve the greatest environmental threat reduction.
				It is difficult for the public to identify and report non-compliant burns, and there is a lack of interest in reporting non-compliant burns.	Comment noted. The public can check whether a burn is currently authorized on the "Permitting" page of Metro Vancouver's website by searching by municipality. Non-compliant burns can be reported to Metro Vancouver by calling the air quality complaint line at 604-436-6777. Metro Vancouver will

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
					call complainants if they require additional information.
				Need clarification on whether enforcement will remain a complaints-driven or user-initiated process.	Metro Vancouver Officers proactively inspect open burns observed while in the field. In addition, Metro Vancouver follows up on complaints by residents about open burns occurring in the region.
				Concern for time that would be required from local Fire Departments for enforcement and to visit sites prior to burning.	Metro Vancouver officers are responsible for promoting compliance with and enforcing Metro Vancouver Bylaws. Metro Vancouver staff communicate reports of open burns to municipal staff so they can assess compliance with their own bylaws.
				Limited period of time each year when permits are issued.	Municipalities may have additional requirements for when permits are issued.
				An equitable cost recovery agreement should be discussed if Metro Vancouver staff request a local Fire Department to conduct investigations on their behalf.	Metro Vancouver officers are responsible for promoting compliance with and enforcing Metro Vancouver Bylaws. Metro Vancouver staff communicate reports of open burns to municipal staff so they can assess compliance with their own bylaws.
12		**Non-Compliance**	Written Questionnaire Response (3) Township of Langley Fire Department (1) City of Surrey (1) Public (1)	Larger burns have been left unattended in the past after they had been burning for 8 hours or have been conducted during a municipal burning ban.	Comment noted. The focus of a Metro Vancouver regulation would be to reduce emissions from open-air burning. Metro Vancouver staff communicate reports of open burns to municipal staff so they can assess compliance with their own bylaws. Open-air burns that are non-compliant with Metro Vancouver bylaws can be reported to Metro Vancouver by calling the air quality complaint line at 604-436-6777.

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				It is important for municipalities to receive notification of non-compliance.	Comment noted. Municipalities that wish to receive notification of unauthorized open burns should submit that request by email to regulationenforcement@metrovancouver.org.
				Desire to know how compliance will be ensured.	Metro Vancouver officers are responsible for promoting compliance with and enforcing Metro Vancouver Bylaws. Further information about Metro Vancouver's compliance promotion and enforcement program is available on metrovancouver.org (search for "compliance promotion").
				Lack of knowledge or understanding of the current requirements make it difficult for famers to comply.	Comment noted. The development of a regulation would include education and outreach, including information on Metro Vancouver's website.
13		**Approval Fee**	Written Questionnaire Response (1) Feedback from Farmers (2) City of Surrey (2)	The current system is not equitable as farmers have to pay a costly application fee when they are not contributing significantly to air pollution and may not get the chance to burn because there are no favourable conditions.	It is anticipated that an emission regulation would reduce regulatory burden by simplifying the process for obtaining authorization of emissions for appropriate types of open-air burning. In the next phase of consultation, Metro Vancouver will be seeking feedback on proposed fees for initial registration and annual renewal under a potential regulation.
				Discrepancy between cost of municipal permit and cost of Metro Vancouver authorization.	Metro Vancouver's aim is to recover regulatory costs in a way that is effective, fair and efficient.

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14		**Streamlined Permit Process**	Richmond Food Security and Agricultural Advisory Committee (1) Delta Agriculture Advisory Committee (1) July 16th Webinar (1) Bowen Island Municipality (2) City of Surrey (2) City of Delta (1) Written Questionnaire Response (2)	There is a need for a more streamlined approach between municipal permitting processes and authorization from Metro Vancouver. Many farmers have been burning only with municipal permits and never obtain a Metro Vancouver approval.	Comment noted. The Greater Vancouver Regional District Air Quality Management Bylaw No. 1082 prohibits the discharge of air contaminants unless authorized under a regulation, permit, approval or order or other conditions stated in the bylaw. Currently, emissions from open-air burning in Metro Vancouver are typically authorized through a short-term approval. It is anticipated that an emission regulation would reduce regulatory burden by simplifying the process for obtaining authorization of emissions for appropriate types of open-air burning. People wishing to conduct open-air burning may still need to obtain a municipal fire permit.
				Need more information on the following: “An emission regulation would aim to reduce regulatory burden by authorizing open-air burning activities that meet all specified requirements, so these activities would not need to obtain a site-specific approval”	Emissions from open-air burning in Metro Vancouver are currently typically authorized through an approval. It is anticipated that an emission regulation would reduce regulatory burden by simplifying the process for obtaining authorization of emissions for appropriate types of open-air burning. Open-air burning that meets all of the requirements of a Metro Vancouver regulation would not need to apply for a Metro Vancouver approval. People wishing to conduct open-air burning may still need to obtain a municipal fire permit.
				Need clarification on whether municipal permits should be dependent on receiving Metro Vancouver authorization.	It is up to individual municipalities to determine if their permits require additional authorizations.

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				Local municipalities should be responsible for burn permits. It was much easier when people who burn could work with the local Fire Department directly, as they know the area first-hand. This new process is buried in bureaucracy.	Metro Vancouver has delegated authority under the BC Environmental Management Act to regulate emissions and manage air quality within the region. Currently, under Metro Vancouver's Bylaw 1082, emissions from open-air burning are typically authorized through a short-term approval. It is anticipated that an emission regulation would reduce regulatory burden by simplifying the process for obtaining authorization of emissions for appropriate types of open-air burning. Burn permits may also be required from local municipalities
15	**Alternatives to Open Burning**	**Alternative Disposal Methods**	Pitt Meadows Agriculture Advisory Committee (2) Ministry of Agriculture (1) Surrey Agriculture and Food Policy Advisory Committee (1) Interagency Meeting (1) Delta Agriculture Advisory	There are value-added applications for agricultural waste. We can learn from farmers that are managing waste without burning and there may be places or people that would want to use agriculture waste for other purposes (e.g., tree waste).	Comment noted. Metro Vancouver has sought input from the agriculture sector in a separate study of alternative methods of managing vegetative debris. One of the eventual outcomes of that work will be the development of a best management practices guide, which it is hoped will involve input from farmers, farming associations, and others, and could include information about the uses of agricultural waste for other purposes.
				Need rationale for why biowaste can't clippings be collected from farms.	Collection can typically be arranged with private waste hauling companies for most materials.
				Lack of education and awareness of alternatives to open burning.	The development of a regulation would include education and outreach to promote and encourage the use of alternatives to open burning. Metro Vancouver is also working on the development of a best management practices guide, to reduce barriers to

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			Committee (1) Metro Vancouver Agriculture Advisory Committee (2) Maple Ridge Agricultural Advisory Committee (1) July 16th Webinar (4) Feedback from Farmers (4) Written Questionnaire Response (3) City of Delta (1)		alternatives to open burning. It is hoped that initiative will involve getting input from farmers, farming associations, and others.
				We need to phase out open burning and consider banning open burning long-term, not just in our current circumstances. Many farmers started using alternatives like chipping and grinding 20 years ago and stopped burning.	Comment noted. The proposed regulation would promote alternatives to the use of open-air burning as a method for the disposal of vegetative debris and define conditions for conducting open-air burning to reduce emissions of harmful air contaminants.
				Some farmers chip their waste, but that may not be viable method for all farming operations (e.g. it is very difficult to chip blackberry vines).	Comment noted. A proposed regulation would define conditions for conducting open-air burning that would seek to reduce emissions of harmful air contaminants as well as promote alternatives to open-air burning where possible while recognizing that such alternatives may not be viable for all circumstances.
				Many farmers burn because it is a free way to get rid of green waste and green roadside pickup is not an option. Desire to know of alternatives that make it easier for farmers to get rid of waste and if there is an option to reduce the cost of green material waste per tonne for agricultural landowners	Metro Vancouver's solid waste system operates on a cost recovery basis. Tipping fees are based on the cost to run the system. Metro Vancouver is also working on the development of a best management practices guide, to reduce barriers to use an alternative method to open-air burning for the disposal of vegetative debris. It is hoped that that initiative will involve getting input from farmers, farming associations, and others.

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				Need more information on whether there are electric chippers powerful enough to handle agricultural waste	The electric chippers currently available for handling agricultural waste typically require the use of electricity rather than battery power. Metro Vancouver is currently exploring alternatives for the disposal of agricultural vegetative debris in a separate study.
				One of recommendations for agriculture debris is to use chipping machines, but the amount of noise pollution as well as air pollution is still considerable from a gasoline powered chipping machine.	Smoke contains a complex mixture of harmful air contaminants and open-air burning of vegetative debris is generally inefficient and produces smoke at a rate significantly higher than controlled combustion. Metro Vancouver is currently exploring alternatives for the disposal of vegetative debris in a separate study, which includes an assessment of emissions from the different disposal methods.
				Desire to know the number of approvals that have been issued where forced air technology was proposed. There are not many available companies that can provide this in the lower mainland.	In 2020, nine open burn approvals were issued; seven of them required a fan or blower.
				Need clarification on whether Metro Vancouver intending to use the same definition of "reasonable" as OBSCR (in relation to "reasonable alternatives" in proposed policy).	For a second phase of consultation a more detailed discussion paper will be published. Metro Vancouver' proposals would require that practical alternatives for disposal instead of open-air burning be pursued. Definitions will be created as part of bylaw development process.
16		**Cost of Alternatives**	Pitt Meadows AAC (1)	Tipping fees associated with disposing of yard waste are	Metro Vancouver's solid waste system operates on a cost recovery basis. Tipping fees

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
			Bowen Island Municipality (1) Written Questionnaire Response (3) Metro Vancouver Agriculture Advisory Committee (1) Maple Ridge Agricultural Advisory Committee (1) July 16th Webinar (1)	high, eliminating tipping fees would reduce burning.	are based on the cost to run the system. Metro Vancouver is currently exploring ways to reduce barriers to alternative methods of disposing of agricultural vegetative debris
				Alternatives to open burning are costly and affect the viability of farming. People don't want to pollute but they need affordable alternatives.	Metro Vancouver is currently exploring how to reduce barriers to using alternatives to open-air burning to manage agricultural debris in a separate study. It is hoped that initiative will involve getting input from farmers, farming associations, and others.
				Transporting green waste to disposal sites is costly and time-consuming, and not environmentally sound if traveling longer distances.	Metro Vancouver encourages on-site disposal alternatives to open-air burning such as chipping, mulching/mowing, and composting. Metro Vancouver is exploring how to reduce barriers to using alternatives to manage agricultural debris in a separate study, which includes an assessment of emissions from the different disposal methods. That initiative also includes the development of a best management practices guide to reduce barriers to alternatives to open burning.
				Desire to know whether Metro Vancouver worked with the Environmental Farm Plan. They have cost sharing for wood residue management (i.e., chipper and forced air assistance).	Comment noted. Metro Vancouver is exploring how to reduce barriers to using alternatives to open-air burning to manage agricultural debris in a separate study. That initiative looked at the Environmental Farm Plan.
17		**Incentives**	Maple Ridge Agricultural Advisory Committee (1)	Without incentives, alternatives are not as appealing to farmers.	Metro Vancouver is currently exploring alternatives for the disposal of agricultural vegetative debris in a separate study. That work includes the development of a best management practices guide, to reduce

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			Written Questionnaire Response (2)		barriers to alternatives to open burning. It is hoped that initiative will involve getting input from farmers, farming associations, and others.
				Need more information on whether there are credits available for those who use tools or practices that reduce air emissions.	BC Hydro offers rebates to individuals and businesses for energy efficiency: visit bchydro.com to view current rebates. Metro Vancouver does not offer a credit program for practices that reduce emissions from open-air burning. However, Metro Vancouver is currently exploring alternatives for the disposal of agricultural vegetative debris in a separate study. That work includes looking at ways to reduce barriers to alternatives to open burning.
18	**Consultation and Outreach**	**Communications**	Metro Vancouver Agriculture Advisory Committee (2) Bowen Island Municipality (1) Township of Langley Fire Department (1) Written Questionnaire Response (2) Feedback from Farmers	Concern about lack of awareness of the provincial, regional and municipal regulations. Also, questions about whether Metro Vancouver will increase outreach and awareness of current open-air burning requirements including open-air burning authorization, compliance with Ventilation Index and timing of acceptable burn conditions, and issues outlined in the new regulation.	The implementation of a new regulation would involve education and outreach. Information on Metro Vancouver's website will be updated.
				Desire to know whether Metro Vancouver has a representative on call for people to speak with.	For questions about policy proposals, contact AQBylaw@metrovancouver.org or 604-432-6200. For air quality complaints, call 604-436-6777.

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			(1) City of Surrey (1)	Need for access to a reference guide with information on implementing required practices.	Comment noted. Metro Vancouver is exploring how to reduce barriers to using alternatives to open-air burning, including the development of a best management practices guide. Metro Vancouver would also conduct education and outreach to build awareness of new regulatory requirements.
19		**Consultation Process**	Maple Ridge Agricultural Advisory Committee (2) Interagency Meeting (2) Richmond Food Security and Agricultural Advisory Committee (1) Delta Agriculture Advisory Committee (3) Metro Vancouver Agriculture Advisory Committee (2) Bowen Island	Need more information on how Metro Vancouver is consulting with farmers and producer groups to explore barriers to alternatives. It would be useful to send letters to farmers.	Comment noted. Metro Vancouver identified outreach methods and a wide range of stakeholders, including agricultural producers and agricultural advisory committees, in an engagement plan. Due to the COVID-19 situation that arose during consultation, activities were adapted to meet public health protection requirements. Engagement methods will be adjusted to include a mail drop for the second phase of consultation.
				Need more information on how feedback is being collected.	Metro Vancouver identified outreach activities in an engagement plan and an update that was required due to the COVID-19 situation. A summary of the feedback is compiled and published on Metro Vancouver's website as part of the reporting process.
				Desire to know whether recommendations went out to the Delta Farmers Institute.	Metro Vancouver reached out to a wide range of stakeholders, such as agricultural producers, associations (including the Delta Farmers Institute) and advisory committees.
				Desire to know when the next phase of consultation and development is and if the next phase will be more detailed	The feedback received during the first phase of consultation guide the development of a new discussion paper, which will include more detailed proposals for further consultation. When the updates have been made,

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			Municipality (3) Feedback from Farmers (2)	than the first round of consultation.	information about updated consultation materials and upcoming opportunities for input in 2021 will be posted on Metro Vancouver's website.
				It will be difficult to obtain fair and adequate input in the current situation (i.e., COVID-19).	Due to the COVID-19 situation that arose during consultation, the engagement plan was reviewed, and activities were adapted to meet public health protection requirements.
				Desire to know if the Fall Fair display been used to provide information about proposed regulation to farmers.	This event was cancelled in 2020 due to the COVID-19 pandemic.
20		**Lack of Awareness or Education**	Public (2) Ministry of Agriculture (1)	Need more information on the other ways (rather than information posted on websites) that can be employed to inform and educate.	Metro Vancouver will explore methods of informing and educating residents about correct burning practices and would conduct education and outreach to build awareness of new regulatory requirements. In addition to a website, potential tools include mail outs, notices in agricultural associations' newsletters and mailing lists, and rack cards at libraries and agricultural events
21	**Other**	**Air Quality Monitoring**	Delta Agriculture Advisory Committee (2)	Need more information on how people determine if it is permitted to burn from the air quality monitoring station.	Metro Vancouver's open burning advisory phone line at 604-436-6777 provides callers with a message indicating whether or not smoke dispersion conditions are favourable for conducting open-air burning activities.
				Monitors may not give representative data for farmers who do not live near them. Concern that the air quality monitoring station does not accurately represent the area	The network of air quality monitoring stations is designed to be representative of air quality conditions experienced by most people most of the time.

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				(e.g. more concentrated pollutants at airport).	
22		**Different Types of Burning**	Written Questionnaire Response (2) Public (2) Feedback from Farmers (2) City of Surrey (1) Township of Langley Fire Department (3)	Concern that rules and regulations will not be equally applied across a region and to a wide mix of stakeholders. There are agriculture land and suburban backyards with burn pits and charcoal grills. There are forests and campers with campfire. Desire to know if all groups are being regulated equally.	The focus of the proposed regulation is open-air burning of vegetative debris. During consultation, Metro Vancouver is seeking feedback from the public, stakeholders and others orders of government to create a fair, efficient and cost-effective open-air burning regulation for vegetative debris management. Campfires are proposed to be exempt from most requirements.
				Need more information on how small burns (e.g., backyard burns, campfires, ceremonial burns) will be regulated. Need more information on whether the same application fee ($300.00) imposed on farm owners will apply.	The focus of the proposed regulation is open-air burning of vegetative debris. As ceremonial burns are recognized as a cultural practice, Metro Vancouver is proposing to exempt these burns from the regulation. Campfires are proposed to be exempt from most requirements. The current Metro Vancouver open burning approval application fee is $200. In the next phase of consultation Metro Vancouver will be seeking feedback on proposed fees for initial registration and annual renewal under a potential regulation. The aim is to recover regulatory costs in a way that makes sense financially and is fair to the regulated community.
				Desire to know if small burns need a municipal burn permit.	Residents need to consult with their municipality on which activities require a municipal permit.

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		Fire Department Permits	Maple Ridge Agricultural Advisory Committee (2) Richmond Food Security and Agricultural Advisory Committee (3) Township of Langley Agricultural Advisory and Economic Enhancement Committee (1) City of Surrey (2) Written Questionnaire Response (1) City of Delta (1)	Need more information on the difference between Metro Vancouver approvals and municipal fire department permits.	Emissions from open-air burning in Metro Vancouver are currently typically authorized through a short-term approval. Open-air burning that meets all of the requirements of a potential Metro Vancouver regulation would not need to apply for a Metro Vancouver approval. People wishing to conduct open-air burning may still need to obtain a municipal fire permit.
				Desire to know the number of approvals issued by the municipal fire departments compared to Metro Vancouver.	In 2019, Metro Vancouver issued 26 open burn approvals. In 2020, open burning was banned for several months due to the COVID-19 pandemic, as a result only 9 open burn approvals were issued. Metro Vancouver does not have recent statistics for the municipal fire departments, but based on previous information it is anticipated that member jurisdictions issue more burn permits than Metro Vancouver issues approvals.
				Confusion around fire prevention responsibilities.	Comment noted. The focus of a Metro Vancouver regulation would be to reduce emissions from open-air burning.
23		**Draft Bylaw**	Delta Agriculture Advisory (4) Committee City of Surrey	Need clarification on how this relates to the Right to Farm Act.	Under the BC Environmental Management Act, Metro Vancouver has delegated authority from the province to manage air quality and regulate the discharge of air contaminants in the region. A proposed regulation will help

ID #	Theme	Issue Topic	Source	Questions/Issues/Concerns	Response
			(1) Township of Langley Fire Department (1) Interagency Meeting (1) Richmond Food Security and Agricultural Advisory Committee (1)		reduce smoke emissions from open-air burning of vegetative debris.
				Need information on when a draft bylaw be available for review and consultation.	A second phase of consultation with more detailed proposals is planned which would outline proposed bylaw requirements. The second phase of consultation would be scheduled for a period of approximately three to four months. A proposed regulation will be drafted once the feedback and input from the second phase of consultation has been completed. The proposed regulation would be first available for review when it is published in the agenda of the relevant standing committee of the Metro Vancouver Board, currently the Climate Action Committee.
				Need more information on how the regulation will be implemented.	The implementation process will be developed after a bylaw has been adopted. Education and outreach would be conducted to support the bylaw.
24		**Other Sources of Emissions**	Interagency Meeting (2) Delta Agriculture Advisory Committee (1) Maple Ridge Agricultural Advisory Committee	Need more information on how the regulation will address emissions from vehicle traffic.	This potential regulation is intended to address emissions from open-air burning of vegetative debris. Other Metro Vancouver initiatives address other sources of emissions.
				Question about how other sources of $PM_{2.5}$ will be addressed.	Metro Vancouver has developed regulations for other significant sources of $PM_{2.5}$, such as non-road diesel engines and residential wood burning. Metro Vancouver is also developing the Clean Air Plan to manage air quality over the next 10 years, which will include actions to further reduce $PM_{2.5}$ in the region.

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			(1) Farmer (1) Bowen Island Municipality (1)	Need more information on how Metro Vancouver accounts for cannabis emissions.	Metro Vancouver is exploring options to manage emissions from cannabis production operations in a separate initiative. Information on engagement opportunities can be found at metrovancouver.org, search "cannabis".
				Need more information on how farmers can measure individual emissions generated by using a gasoline powered engine as well as dust generated from mowing.	Metro Vancouver is currently exploring alternatives for the disposal of agricultural vegetative debris in a separate ongoing study. As part of that study, the emissions associated with alternative disposal methods have been assessed.
				Concern about disposal of construction waste.	Comment noted. A proposed regulation is intended to manage emissions from open-air burning of vegetative debris and would not apply to construction waste.
25		**Overregulation of Farming**	Pitt Meadows Agriculture Advisory Committee (2) Maple Ridge Agricultural Advisory Committee (2) Interagency Meeting (1) Surrey Agriculture & Food Policy Advisory	Concern that a new regulation will add more obstacles for farmers and the agriculture industry.	Metro Vancouver is proposing to develop a regional emission regulation that would reduce the administrative and financial burden of the current site-specific approvals process. Under an emission regulation, activities that meet all specific requirements would be authorized without having to obtain site-specific approvals. Metro Vancouver is also exploring how to reduce barriers to using alternatives to open-air burning to manage agricultural debris.
				Needs of people with health issues must be balanced with the needs of agriculture community.	Comment noted. The guiding principles of the development of a regulatory strategy identify both the need to reduce regulatory burden and the need to minimize the risk to public health, the local environment, and the global climate from emissions of smoke. Metro

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			Committee (1)		Vancouver's approach to managing emissions from open-air burning will continue to ensure that the health effects of smoke are minimized.
26		**Ventilation Index**	Pitt Meadows Agriculture Advisory Committee (1) City of Delta (5) City of Surrey (1) Surrey Agriculture & Food Policy Advisory Committee (1) Bowen Island Municipality (1) Written Questionnaire Response (2)	Ventilation index creates many constraints for farmers.	Comment noted. The consultation process helps Metro Vancouver identify and understand the barriers faced by residents who engage in open-air burning activities. However, Metro Vancouver's requirements cannot be less stringent than those of the BC Open Burning Smoke Control Regulation, including smoke dispersion conditions, characterized using the ventilation index.
				Desire to know the number of days the ventilation index allowed for burning last year.	In 2019, Metro Vancouver's smoke dispersion conditions advisory message, which is based on the ventilation index and other considerations, allowed new burns to start on 35 days. There were additional days when material was allowed to be added to an existing multi-day burn. Some municipalities have additional restrictions on when burning is allowed, which reduces the number of days available.
				Need more information on where the information for the ventilation index comes from.	The ventilation index is calculated by Environment and Climate Change Canada and represents a measure of the ability of smoke to disperse in current atmospheric conditions.
				Concerns with further limiting number of days where open-air burning without forced air technology will be permitted.	In order to minimize health effects in our densely populated region while allowing for the management of vegetative debris by open-air burning, Metro Vancouver has proposed to relax certain requirements, such as the required smoke dispersion conditions,

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					in cases where an air curtain burner that meets certain operating and performance conditions is used to control emissions. This could potentially increase the number of days on which open-air burning could occur. Metro Vancouver is also exploring how to reduce barriers to using alternatives to open-air burning, including the development of a best management practices guide
				The discussion paper mentions emission control technologies, with the examples shown as the air curtain incinerator or forced air assistance. The provincial regulation specifies that relaxation of the ventilation index requirement is only for when air curtain incinerators are in use. Need clarification on whether this means that Metro Vancouver cannot allow the use of blower fans on open burning piles during fair ventilation index days, unless the vegetative material is placed in a trench and the blower fans are positioned at the top of the trench to simulate an air curtain.	Metro Vancouver can be more restrictive in requirements in a regional emission regulation than the requirements of the BC Open Burning Smoke Control Regulation (OBSCR) but cannot be less restrictive. The discussion paper provides information on the utilization of forced air assistance devices, such a blower fans, as an example of a technology that can improve combustion efficiency. The use of a forced air device during an above ground open-air burning activity would not qualify for a variance from smoke dispersion condition requirements but use of an adequately sized forced air blower could create more efficient burning conditions and reduce emissions.
				Need for more available information on how ventilation	Comment noted. Education and outreach in support of a new bylaw will include guidance on finding smoke dispersion conditions and

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				index applies to specific municipalities.	promote understanding of when conditions are favourable for open-air burning.
				Desire for Metro Vancouver to give a notice when ventilation index conditions are most likely going to be favorable (i.e., indicating common times where ventilation index is typically favourable).	The ventilation index is calculated by Environment and Climate Change Canada. This is used by Metro Vancouver to provide smoke dispersion conditions information to residents about whether or not open-air burning can occur in the region through the open burning advisory phone line. The forecast from Environment Canada currently only extends to the day following the day the forecast is issued.
				Concern that changes in wind direction can affect where the smoke goes.	Comment noted. Minimum distance requirements are intended to ensure that the impacts of smoke at ground-level will be minimized. In addition, as per the provincial Open Burning Smoke Control Regulation (OBSCR), anyone carrying out open-air burning must ensure that no more vegetative debris is ignited or added to ignited piles, or put in an air curtain burner, if the local air flow or atmospheric mixing is causing a negative impact at a nearby population centre or work camp, or is a navigation hazard at nearby airports or highways.
				Confusion about the ventilation index.	Metro Vancouver will provide more background information about the ventilation index as part of an outreach initiative to support measures to manage emissions from open-air burning of vegetative debris.

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				It is recommended that Metro Vancouver uses the ventilation index requirements required for high smoke sensitivity zones in the Provincial Open Burning Smoke Control Regulation, which would allow a registrant to quickly take advantage of good ventilation index days.	Comment noted. Under the provincial Open Burning Smoke Control Regulation, the entire Metro Vancouver region is categorized as a High Smoke Sensitivity Zone. Periods when burning can be conducted are indicated on the Metro Vancouver open burning advisory phone line, at 604-436-6777, which is based on the ventilation index.
				Need for additional education and awareness to the agricultural community on the benefits of employing forced air assistance technologies even if ventilation index exemptions cannot be utilized.	Comment noted. Metro Vancouver would conduct education and outreach to build awareness of new regulatory requirements as well as share information about best practices.

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Proposals for a Regulation to Manage Emissions from Open-Air Burning of Vegetative Debris

Discussion Paper

June 2021

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Proposals for a Regulation to Manage Emissions from Open-Air Burning of Vegetative Debris

INTRODUCTION

The Metro Vancouver Regional District (MVRD, operating as Metro Vancouver) consists of 21 municipalities, one Electoral Area and one Treaty First Nation. Metro Vancouver is responsible for managing air quality in the region and regulating the discharge of air contaminants under authority delegated by the provincial government in the British Columbia *Environmental Management Act* (EMA). Currently, Metro Vancouver manages air emissions from open-air burning of vegetative debris by issuing a site-specific approval under the *Greater Vancouver Regional District (GVRD) Air Quality Management Bylaw No. 1082, 2008* (Bylaw 1082). Approvals for emissions from a particular site can only be issued for a cumulative period of up to 15 months (including any renewals) as stipulated in the EMA and Bylaw 1082.

Metro Vancouver conducted initial engagement on a potential regulation to manage emissions from open-air burning between November 2019 and August 2020. Metro Vancouver is undertaking a second phase of consultation on a potential emission regulation as an alternative approach to managing air contaminant emissions from open-air burning. This discussion paper presents proposals that are being considered for inclusion in a potential emission regulation. Under the proposal for a regulation, a person wanting to conduct an open-air burn that would not meet the requirements of the emission regulation would still be able to apply for a site-specific approval.

The *Climate 2050 Strategic Framework* identifies the need to reduce agricultural emissions, such as those from open-air burning, to reduce the impacts of climate change. The current *Integrated Air Quality and Greenhouse Gas Management Plan* and the next *Clean Air Plan* that is currently under development include actions for Metro Vancouver to reduce emissions from open-air burning. Reducing harmful air contaminant emissions will help improve air quality for the region, to protect human health and the environment. The development of emission regulations for agriculture, industry, and business will help to accelerate emission reductions in these sectors and are part of the overarching approaches to achieve regional air quality and climate targets.

PURPOSE

The purpose of this discussion paper is to:

- Provide information about the environmental and health impacts of smoke emissions from open-air burning in Metro Vancouver;
- Describe proposals for a potential regulation to reduce emissions from open-air burning of vegetative debris; and
- Support consultation and encourage feedback from affected and interested parties on proposals for a potential regulation to manage air emissions from open-air burning.

For the purpose of this regulatory initiative, open-air burning is defined as the combustion of vegetative debris (such as branches, stalks, and other pieces of vegetative matter with or without leaves) that is conducted outside a structure and does not vent to a chimney or stack.

An emission regulation would offer a simpler alternative to the approval or permit process, which is the current method for authorizing emissions from open-air burning of vegetative debris. If an emission regulation is adopted by the MVRD Board, a person will have the option to conduct an open-air burn in compliance with the requirements of the regulation, rather than their only option for burning being to seek a site-specific approval for the open-air burn. A person must also separately ensure their own compliance with municipal regulations and any other legal restrictions. Under the proposal, if a person cannot meet the requirements in Metro Vancouver's emission regulation and still wishes to conduct an open-air burn, they would be required to seek authorization through an approval or permit issued under Bylaw 1082.

This discussion paper may be of interest to:

- members of the public affected by emissions from open-air burning;
- persons who conduct agricultural or open-air burning activities;
- businesses involved in land clearing, land development, construction and landscaping;
- businesses providing services of collection, recycling, and processing of vegetative debris;
- forestry operations;
- consultants, manufacturers and distributors of equipment that provide services for open-air burning activities, such as air emission control;
- manufacturers and distributors of equipment used to reduce the size of vegetative debris;
- local Indigenous communities;
- provincial ministries;
- Metro Vancouver's member jurisdictions;
- agricultural advisory committees;
- municipal fire departments;
- public health experts; and
- other interested parties affected by potential regulatory proposals related to open-air burning activities or by air quality in the Metro Vancouver region.

This discussion paper was drafted in the first half of 2021, and is being introduced for public, stakeholder, and government comment during the COVID-19 pandemic response. Metro Vancouver assesses work plans on a case by case basis to determine if the COVID-19 pandemic response requires an adjustment to any work plans, including engagement components. For air quality and climate change programs and initiatives, this means continuing with work plans that protect human health and the environment, but adjusting how we approach engagement to focus on online and mail consultation opportunities.

A consultation program will allow Metro Vancouver to inform interested parties and the public of the proposals for regulating emissions from open-air burning activities described in this discussion paper and to receive feedback. Representatives of interested parties and the public will be invited to provide feedback between July and October 2021.

DEFINING THE PROBLEM

Smoke Emissions and their Effects

Smoke is emitted when wood or other organic matter burns inefficiently. Open-air burning of vegetative debris is usually inefficient and produces smoke at a rate significantly higher than controlled combustion.

Smoke is a complex mixture of harmful air contaminants including fine particles ($PM_{2.5}$) and many gases such as carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOCs). Smoke contains smaller quantities of other harmful compounds such as benzene, acrolein, formaldehyde, and polycyclic aromatic hydrocarbons (PAHs). Fine particles are associated with health issues that include bronchitis, asthma, emphysema, pneumonia and heart disease. Infants, children, pregnant women, the elderly, and people who already have respiratory illnesses, heart problems or other chronic diseases are most at risk, and healthy adults can also be affected. Research has shown there is no known threshold below which the fine particles in smoke have no health effects. This means it is important to minimize the amount of smoke produced and reduce exposure to it.

BC Centre for Disease Control (BCCDC) notes that there is strong evidence that exposure to air pollution increases susceptibility to and severity of respiratory viral infections, including COVID-19, by decreasing immune function. Evidence also suggests that air pollution from combustion sources is most strongly associated with the increased risk of viral infection, particularly vehicle emissions and biomass burning. While the focus to prevent the spread of infection and reduce the number of COVID-19 cases remains on safety measures and physical distancing, keeping our air as clean as possible will also help to protect the population during the pandemic. The BCCDC has previously recommended implementing measures that help to reduce excess air pollution in populated airsheds across the province.

In addition to its effects on health, smoke emissions also impact the environment. At the local level, emissions of $PM_{2.5}$, NO_x and VOCs in smoke can contribute to visual air quality degradation, which can range from the formation of a regional haze that obscures distant views to dense smoke that can cause immediate safety concerns. At the global level, emissions from open-air burning may contribute to climate change due to the release of short-lived climate forcers such as black carbon (soot) particles and ground-level ozone, which is formed from VOCs and NO_x.

Regional Sources of Smoke

Sources of smoke in the region include open-air burning of vegetative debris, indoor residential wood burning, industrial combustion sources, wood-fired ovens, biomass boilers, campfires, special event

fires and wildfires. Thousands of open-air burning events occur in various sizes across the region each year.

Open-Air Burning of Vegetative Debris

Open-air burning is used to dispose of vegetative debris generated by land clearing activities, agricultural land management, residential property maintenance and forestry practices. Due to Metro Vancouver's population density, smoke emissions from open-air burning tend to impact a greater number of people than in more rural areas of the province. Furthermore, open-air burns that are authorized under approvals are generally only authorized to occur during limited windows of time, which can create the potential for high, short-term exposure to smoke. In addition to health impacts, smoke has a distinctive odour and can irritate the eyes and respiratory pathways, which can negatively affect residents' use and enjoyment of their environment. Metro Vancouver has received complaints and requests for help from the public related to smoke emissions from open-air burning.

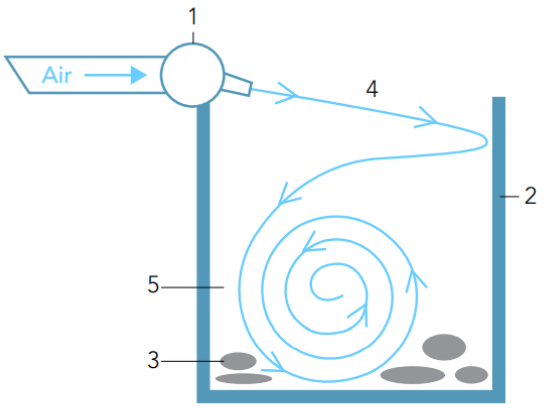
Individual, longer approvals or multiple, shorter approvals for open-air burning emissions at a particular site can be issued for a cumulative period of up to 15 months, after which Bylaw 1082 requires authorization under a permit or an emission regulation. At this time, Metro Vancouver is proposing to authorize emissions from open-air burning through a potential emission regulation, as an alternative to the approvals process that is already used.

Best Management Practices

Best management practices can be employed to either avoid burning vegetative debris, or to reduce the amount of smoke generated by open-air burning. The proposed regulation would promote the use of best practices. For example, vegetative debris can be recycled or reused instead of burned. Depending on the size and type of vegetative debris, the material can be used for various purposes such as soil amendment or ground cover.

If debris is burned, smoke can be reduced with proper preparation of vegetative debris prior to burning, such as drying the material and removing excess soil. Burning only when atmospheric dispersion conditions are good can also lower concentrations of smoke at ground level compared to when dispersion is poor. Emission control technologies, such as air curtain technology and forced air assistance, can also reduce smoke by improving the efficiency of burning.

Air curtain technology burns vegetative debris in a partially-enclosed space with an open top over which a high-speed flow (or 'curtain') of air is directed (Figure 1). The partially-enclosed space can be an above-ground, self-contained unit or an excavated trench. The curtain of air has the effect of providing additional oxygen to the fire, raising the burning temperature and also trapping the smoke. The result is almost a smokeless burning activity, with a nearly complete combustion of all emissions. Similarly, forced air assistance uses blower fans to improve air circulation, increase burning temperatures, and reduce emissions.



1. Air curtain burner manifold and nozzles directing high velocity air flow
2. Refractory lined wall for self-contained or earthen wall for trench burning system
3. Waste material to be burned
4. Air flow forms a high velocity 'curtain' over fire
5. Continued air flow over-oxygenates fire keeping temperatures high and higher temperatures provide cleaner and more complete burn

Figure 1 - AIR CURTAIN TECHNOLOGY

GUIDING PRINCIPLES

The regulatory strategy to address regional smoke emissions from open-air burning aims to:

- minimize the risk to public health, the local environment, and the global climate from emissions of smoke;
- reduce regulatory burden by simplifying the process for obtaining authorization of emissions arising from appropriate types of open-air burning;
- promote alternatives to open-air burning for the disposal of vegetative debris;
- require the use of best burning practices so that smoke emissions are reduced in circumstances where open-air burning activities are authorized; and
- recover regulatory program costs in an effective, fair, and efficient manner.

WORKING WITHIN THE LEGISLATION

Provincial Regulation

The BC *Open Burning Smoke Control Regulation* (OBSCR), a regulation under the *Environmental Management Act*, restricts open-air burning and defines conditions under which open-air burning may be allowed to be conducted in the province. Updates to this regulation came into effect on September 15, 2019. The requirements of OBSCR stipulate what, where, how, and when material can be burned. OBSCR also designates smoke sensitivity zones that each have specific requirements. The entire Metro Vancouver region has been designated a high smoke sensitivity zone in OBSCR. High smoke sensitivity zones have the most stringent requirements.

Metro Vancouver's Regulatory Jurisdiction and Approval Process for Open-Air Burning

Under Section 31 of the *Environmental Management Act* (EMA), Metro Vancouver has the delegated authority for air pollution control and air quality management within the Metro Vancouver region, including on industrial and agricultural land. EMA states that the Metro Vancouver Board "may, by bylaw, prohibit, regulate and otherwise control and prevent the discharge of air contaminants."

Under Bylaw 1082, Metro Vancouver exercises its air quality regulatory authority with a system of permits and approvals that apply to individual facilities and emission regulations that apply to types of operations and activities with similar characteristics. Metro Vancouver's current regulatory requirements with respect to open-air burning of vegetative debris, set out under Bylaw 1082, are in addition to provincial OBSCR requirements.

Bylaw 1082 prohibits the disposal of waste by burning or incineration unless the discharge is conducted strictly in accordance with a permit, approval, order, or an emission regulation issued or adopted by Metro Vancouver, or unless the burning activity is exempted from the prohibition. In relation to the open-air burning of vegetative debris, Bylaw 1082 currently provides a number of exemptions for fires or burns conducted in compliance with the *Weed Control Act*, the *Wildfire Act* and *Fire Services Act* to control the spread of noxious weeds, to carry out fire hazard abatement activities, or for fire services training purposes, respectively. Discharges of smoke from non-exempt open-air burning activities are required to be authorized before open-air burning activities take place.

Currently, Metro Vancouver does not have an open-air burning emission regulation so authorizes such activities using site-specific approvals. Ensuring comprehensive compliance with Bylaw 1082 requirements with respect to open-air burning activities is a significant demand on Metro Vancouver resources. It is labour-intensive to issue, administer and enforce site-specific approvals and support programs that provide education and outreach on open-air burning requirements. Additionally, feedback received from some approval applicants indicates they find the process of obtaining an approval to be complicated, time-consuming and costly. An emission regulation would aim to reduce the burden by authorizing open-air burning activities that meet all specified requirements. Metro Vancouver can be more restrictive in implementing a regional emission regulation than what is required by provincial law, but cannot be less restrictive. In cases where the requirements of a regulation cannot be met, or if relaxation of certain requirements is sought (such as the relaxation of the requirement to burn only when the ventilation index allows open-air burning activities), emissions from open-air burning would need to be authorized under an approval or permit.

Municipal Bylaws

All Metro Vancouver municipalities have bylaws that include restrictions and conditions on open-air burning activities. These are primarily focused on establishing fire control and safety within their jurisdictions, rather than on health or air quality effects. Variations among the municipal bylaws throughout the region have resulted in a lack of consistency in open-air burning practices and reporting. Anybody who wishes to conduct open-air burning must also comply with local, municipal, and fire department requirements.

Path Forward

All the above listed regulatory tools from various levels of government support Metro Vancouver's regional management of smoke emissions from open-air burning. However, gaps exist, because these measures include variations in restrictions and exemptions. This discussion paper proposes a region-

wide regulatory mechanism to reduce smoke emissions from open-air burning in Metro Vancouver in order to minimize impacts on air quality, health, and the environment and provide a simpler alternative to the current approvals approach. Open-air burning activities would continue to need to comply with local or provincial requirements, prohibitions or fire bans.

PROPOSED REGULATORY REQUIREMENTS

Metro Vancouver is seeking feedback from stakeholders representing different perspectives on proposals for a potential regulation to manage smoke emissions from open-air burning of vegetative debris. The regulation must be as restrictive as OBSCR, but feedback on additional requirements proposed below will be taken into consideration during bylaw development.

Metro Vancouver's proposals align with OBSCR in many respects. However, due to the region's population density and air quality management priorities, additional protections are proposed. Table 1 outlines the areas of the proposed regulation that will mirror requirements in OBSCR and the areas for which Metro Vancouver is proposing more stringent requirements. Details of Metro Vancouver's proposed regulatory requirements are provided below Table 1.

Table 1: Comparison of BC Open Burning Smoke Control Regulation (OBSCR) to Metro Vancouver's proposed open-air burning emission regulation

Topic	***BC Open Burning Smoke Control Regulation* (OBSCR) Requirements**	**Proposed Metro Vancouver Requirements**
Registration and associated costs	None	Initial fee: $100-$250 Renewal fee: $50-$100 Lower range of fees would be for agricultural operations
Notifying relevant parties about open-air burning activities	No later than 24 hours before the start of open-air burning, all reasonable efforts must be made to notify neighbours (residences, businesses, schools, hospitals, and care facilities) when: • minimum distances between open-air burning and receptors are reduced • diseased vegetative debris is being open-burned • open-air burning to reduce community wildfire risk is being conducted	Neighbours must be notified of pending open-air burning activities as per OBSCR requirements. Metro Vancouver must be notified by email or phone of pending open-air burning activities when OBSCR requires notification of neighbours, plus when using one or more air curtain incinerators.

Topic	*BC Open Burning Smoke Control Regulation* (OBSCR) Requirements	Proposed Metro Vancouver Requirements
Smoke dispersion	Ventilation forecast for the area in which open-air burning is located must be obtained on the day, but before, the open burning starts	Instead of the ventilation index, Metro Vancouver's open-air burning advisory message must be checked on the day, but before, open burning starts.
Preparing material to be burned	Strategies and techniques to minimize smoke are listed and "seasoned debris" is defined.	Same as OBSCR
Transportation of materials	Material to be burned can be moved only within 5 km of its origin.	Only material generated on the registered property and within 5 km of its origin can be burned.
Use of accelerants	An accelerant must be used if diseased material is not seasoned.	Same as OBSCR
Frequency of burns	Maximum of 12 days or portions of days per year, and 6 days or portions of day per month for land parcels smaller than 64 hectares	Maximum frequency of burning stated in OBSCR applies to all of Metro Vancouver.
Duration of burns	• Starts not earlier than one hour after sunrise • Various end times as defined in OBSCR	Same as OBSCR
Minimum distances of open-air burns from receptors	• 500 m from residences and businesses • 1,000 m from schools, hospitals, and community care facilities • Reduced setbacks of 100 m from residences and businesses and 500 m from schools, hospitals, and community care facilities allowed if defined conditions are met.	More stringent conditions must be met for open-air burns conducted at minimum distances from the same receptors defined in OBSCR. Minimum distances apply if burning single pile of limited size in one day (debris < 10 cm diameter), or air curtain technology is used.
Smoke sensitivity zone locations	All of Metro Vancouver is considered a high smoke sensitivity zone. High smoke sensitivity zones set additional defined conditions for burning within certain distances from residences, businesses, schools, hospitals, and community care facilities.	Same zone as in OBSCR, with more stringent defined conditions for burning within certain distances from residences, businesses, schools, hospitals, and community care facilities.
Air curtain technology	May be used under defined operating and performance conditions.	Same as OBSCR

Topic	*BC Open Burning Smoke Control Regulation* (OBSCR) Requirements	Proposed Metro Vancouver Requirements
Disposal of diseased vegetative debris	Must be verified and burned based on defined requirements.	Same as OBSCR
Wildfire risk reduction	Defined allowances of activities to reduce wildfire risk, such as controlled burns.	Same as OBSCR, plus open-air burning must be attended at all times.
When records are required	Records required when open-air burning conducts one or more category 3 open fires or uses one or more air curtain incinerators.	Records required for any open-air burning activity covered by the regulation except for short duration burns of pieces less than 3 cm in diameter.
Items recorded	• Burn registration number, if one has been issued under the *Wildfire Regulation*. • If no burn registration number has been issued, name, address and contact information and geographic location of the area in which the open burning is taking place. • Any decisions respecting substituted requirements made under section 29 that apply to the open burning. • Any ventilation forecasts or custom ventilation forecasts obtained in respect of the open burning. • Date on which the open burning starts. • Number of piles or air curtain incinerators ignited. • Approximate size of each pile of the approximate volume of material burned. • Whether the open burning relates to a domestic or industrial purpose and, if it relates to an	Same items as OBSCR, plus: • general type of material burned; • a description of actions taken to minimize burning amounts by reducing, reusing, or recycling; • rationale for requiring open-air burning of material that was not reduced, reused, or recycled; and • moisture content reading if moisture content was used as the method to confirm debris was seasoned.

Topic	*BC Open Burning Smoke Control Regulation* (OBSCR) Requirements	Proposed Metro Vancouver Requirements
	industrial purpose, the name of the industry.	
Record retention and submission	Records must be retained for one year beginning on the start date of the open burning and submitted to an officer on request.	Same as OBSCR
Exemptions	Campfires are exempt from OBSCR.	Same as OBSCR Burning of salt-laden driftwood waste in campfires or other open-air burns would be prohibited.
Substituted requirements	A director may substitute a requirement in the regulation to further protect the public or the environment.	Same as OBSCR
Prohibitions and air protection measures	A director can temporarily prohibit open-air burning in an area.	Same as OBSCR
Dry land sorts	Defined requirements for open-air burning at a dry land sort area.	Open-air burning at a dry land sort would need to be authorized under a Metro Vancouver approval or permit.
Additional requirements	n/a	Open burning activities that cannot meet the requirements of the regulation would need to seek authorization under a Metro Vancouver approval or permit.

Before Burning

Under a potential regulation, proposed requirements would have to be met before starting any burn. The following subsections outline proposed requirements related to registering a property where open-air burning activities could occur, notifying relevant parties, and protecting the environment.

Registration

Registration is proposed as a simpler and less costly approach to providing information to Metro Vancouver about open-air burning activities than applying for multiple approvals. Any person planning open-air burning of vegetative debris would need to register with Metro Vancouver. The registration information required is their name and the address of the property where the open-air burning will take place.

In cases where open-air burns do not meet regulation requirements or when relaxation of certain requirements is sought, the emissions would continue to need to be authorized under an approval or permit.

Notifying relevant parties
Notifying neighbours allows people to take precautions to minimize any effects from smoke produced during the open-air burning. OBSCR requires neighbours to be notified at least 24 hours in advance when:

- open-air burning of vegetative debris is conducted near residences, businesses, schools, hospitals, and care facilities (see "Minimum distances of open-air burns from receptors" subsection for conditions);
- diseased vegetative debris is open-air burned; and
- open-air burning to reduce community wildfire risk, such as controlled burns, is conducted.

Metro Vancouver is proposing that anyone carrying out these open-air burning activities would also be required to notify Metro Vancouver by email or phone at least 24 hours before conducting a burn. In addition, Metro Vancouver would also need to be notified when air curtain technology is used in the burning.

Environmental protection considerations
Burning when atmospheric conditions allow smoke to disperse can reduce smoke concentrations at ground level. To ensure that open-air burning occurs only when smoke can disperse efficiently, it is proposed that any person planning open-air burning of vegetative debris would have to check Metro Vancouver's open-air burning advisory message at 604-436-6777 after 8:30 am on the day of the planned open-air burning, before burning starts or continues. For open-air burning to be allowed, the open-air burning advisory message would have to identify that a new burn can be started or vegetative debris can be added to an existing multiple-day burn in progress.

Open-air burning activities are proposed to be prohibited when an air quality advisory or bulletin is in effect to prevent smoke from open-air burning from further worsening air quality.

Conducting Burns
The proposed requirements for conducting an open-air burn under the potential regulation are described in the following subsections. The proposals relate to material preparation, timing, and location of burning. Since Metro Vancouver is more densely populated than other parts of British Columbia, some more stringent restrictions are proposed than those in the OBSCR, to reduce the negative health effects of exposure to smoke.

Preparing material to be burned
The strategies and techniques outlined in OBSCR to minimize the amount of material to be open-air burned and smoke emitted would need to be followed, including the requirements for material to be

clean and seasoned and practical alternatives to burning to have been pursued. However, OBSCR allows vegetative debris to be moved within 5 km from its origin to be open-air burned whereas, under the proposed regulation, Metro Vancouver is proposing that vegetative debris may only be open-air burned on the registered property on which it was generated and within 5 km of the location in which it was generated on that property.

Requirements are proposed to apply to all sizes of vegetative debris, except within areas of increased protection around residences, businesses, schools, hospitals, and care facilities where a maximum size limit will apply to pieces of vegetative debris. In addition, open-air burning of salt-laden wood is proposed to be prohibited under the regulation.

Frequency and duration of burns

As stated in OBSCR, open-air burning can be carried out on properties smaller than 64 hectares for a maximum of 12 days or portions of days per year and 6 days or portions of days per month. This maximum frequency is proposed to apply to all sizes of properties in Metro Vancouver. The times of day when open-air burning is proposed to be allowed aligns with the requirements in OBSCR and is based on when the best smoke dispersion tends to occur in a day.

Minimum distances of open-air burns from the public

Minimum distances between open-air burning activity and nearby residences, businesses, or other occupied facilities are intended to reduce the potential for negative effects from smoke. OBSCR defines setbacks from neighbouring properties for open-air burning activities. Open-air burning cannot be conducted within the minimum distances established in these setbacks, which are:

- at least 100 m from neighbouring residences and businesses; and
- at least 500 m from hospitals, schools, daycares and long-term care facilities (sensitive receptors).

Exceptions to minimum distance requirements, such as when dealing with wildfire risk or diseased vegetative debris, are described in later sections, and are proposed to be the same as in OBSCR.

Under a potential Metro Vancouver regulation, more stringent conditions are proposed for these distances than are in OBSCR, to provide additional protection for people who are more likely to be sensitive to the negative health effects of air contaminants in smoke. Proposed conditions for open-air burning to occur in the more protected areas (between 100 m and 500 m from neighbouring residences and businesses and between 500 m and 1000 m from sensitive receptors) are:

- vegetative debris is in a single pile before it is burned, unless air curtain technology is used;
- the largest horizontal dimension of the pile is not greater than 3 metres and the height is not more than 2 metres, unless air curtain technology is used;
- a written record of the dates the debris was put into a pile is available on request;
- no stumps are present and individual pieces all have a diameter of less than 10 cm, unless air curtain technology is used;
- the vegetative debris is seasoned;

- the occupants of all residences, businesses, schools, hospitals and community care facilities within 500 m of the open-air burning are notified of the location of the open-air burning no later than 24 hours in advance;
- Metro Vancouver's open-air burning advisory message is checked on the day, before open-air burning starts or continues;
- the open-air burning advisory message identifies that a new burn can be started;
- open-air burning does not last longer than one day, unless air curtain technology is used;
- open-air burning starts not earlier than one hour after sunrise;
- open-air burning ends by 4:00 p.m. or two hours before sunset, whichever is later; and
- if air curtain technology is used, the amount of vegetative debris allowed to be burned would not be limited (see "Air Curtain Technology" section for conditions on air curtain technology use).

Open-air burning that occurs at distances greater than 500 m from neighbouring residences and businesses and 1,000 m from sensitive receptors are not subject to these more stringent conditions.

The proposal in the initial discussion paper for defining areas in which more stringent requirements would apply was not pursued because the areas protected by the minimum distance requirements described above encompass the areas of concern in the region.

Air Curtain Technology

Air curtain technology increases the efficiency of a burn and reduces smoke significantly by burning vegetative debris in a partially-enclosed space with an open top over which a high-speed flow or 'curtain' of air is directed. If air curtain technology is used to burn vegetative debris and meets the operating and performance conditions described in OBSCR as well as all other requirements of the proposed regulation, some requirements with respect to smoke dispersion conditions are proposed to be relaxed, which would make more days suitable for burning. When burning occurs at the minimum distances from residences, buildings, and sensitive receptors and the duration of the burn is limited to two consecutive days or less, use of air curtain technology could allow for burning of an unlimited amount of vegetative debris.

Disposal of Diseased Vegetative Debris

Recognizing that diseased vegetative debris must be disposed of quickly to reduce the spread of pathogens or insects, diseased vegetative debris is proposed to be allowed to be open-air burned under the conditions required by OBSCR. OBSCR has provisions for reduced minimum distances of at least 50 m to residences and businesses and 100m to sensitive receptors, provided the defined requirements are met. The District Director would have the discretion to authorize an alternative method of destroying diseased vegetative debris.

Written verification from a qualified professional that a pathogen or insect listed in Schedule 1 of OBSCR has infested the vegetative debris, or that a pathogen or insect not listed in Schedule 1 of

OBSCR has infested the vegetative debris, would have to be provided to the District Director. A registered agrologist, professional biologist, professional forester, or registered forest technologist, all as defined by the *Professional Governance Act*, would be acceptable as professionals qualified to provide the verification. In both cases, the District Director would confirm in writing that open-air burning of the vegetative debris is necessary to stop the spread of the pathogen or insect. In addition, for situations in which a pathogen or insect not listed in Schedule 1 has infested the vegetative debris, the District Director would confirm that in writing.

Plans for Community Wildfire Risk Reduction

Open-air burning activities such as controlled burns could be carried out for up to one day, provided they are done to reduce community wildfire risk and adhere to the conditions outlined in OBSCR as well as any other provincial requirements, prohibitions or fire bans. OBSCR includes provisions for reduced minimum distances of at least 50 m to residences and businesses and 100m to sensitive receptors, provided other defined requirements are met. Metro Vancouver also proposes that open-air burning carried out under these conditions must be attended at all times.

Record Keeping

Record keeping would be required for anyone conducting open-air burning, excluding short duration burns of pieces less than 3 cm in diameter. To facilitate record keeping, Metro Vancouver would develop a form or template listing the required information. The information required to be recorded would be the same as in OBSCR, with the following additional information:

- general type of material burned, such as branches or tree stumps;
- a description of actions taken to minimize burning amounts by reducing, reusing, or recycling;
- rationale for requiring open-air burning of material that was not reduced, reused, or recycled; and
- moisture content readings if moisture content was used as the method to confirm debris was seasoned.

Any person conducting open-air burning activity would have to follow the record retention and submission requirements stated in OBSCR.

Exemptions

The scope of the potential bylaw is the management of vegetative debris. Therefore, campfires, defined as an open fire that burns wood in one pile not exceeding 60 cm high and 75 cm wide for a maximum period of 5 hours, would be exempt from the requirements of the potential regulation, with the exception of the prohibition on burning salt-laden wood such as marine driftwood. Ceremonial burns are recognized as a cultural practice, and these burns would also be exempt from the potential regulation.

Additional Requirements

A person conducting open-air burning of vegetative debris that does not meet the requirements of a potential new Metro Vancouver regulation would have to continue to seek authorization through an approval or permit under Bylaw 1082. For example, anyone conducting open-air burning at a dry land sort (an area of land in which commercially harvested wood is collected and sorted before the wood is transferred elsewhere) in the Metro Vancouver region would require authorization under an approval or permit under Bylaw 1082.

Substitutions and Prohibitions

The proposed regulation would allow the District Director to temporarily substitute requirements in the regulation, such as to prohibit burning in conditions that are normally allowed under the regulation, to further protect the public or the environment. The provisions for implementing a substitution or prohibition would be the same as those in OBSCR.

PROPOSED ADMINISTRATION OF REGULATION AND FEES

An emission regulation could offer an alternative method to the current approval process for managing emissions from open-air burning of vegetative debris. The potential regulation is intended to be simpler for the regulated community and less resource-intensive for Metro Vancouver. In administering regulations, Metro Vancouver is expected to recover costs in a manner that is both fiscally responsible and fair to the regulated community. The proposed fees for registering under the potential regulation are summarized in the table below.

Type of vegetative debris	Current open burn approval fee	Proposed initial registration fee	Proposed annual renewal fee
Agricultural	$200*	$100	$50
Non-agricultural	$200*	$250	$100

*Under review

Metro Vancouver is currently also reviewing the approval application fee of $200 for open-air burning as described in the November 2020 discussion paper on "Proposed Amendments to Air Quality Permit and Regulatory Fees in Metro Vancouver". In that discussion paper, fees for agricultural open-air burn approvals and non-agricultural open-air burn approvals are proposed to be changed to $100 and $1,000 respectively.

PROVIDING FEEDBACK AND COMMENTS

Metro Vancouver is seeking feedback on proposals to manage air emissions from open-air burning of vegetative debris through a potential regulation as described in this discussion paper. Metro Vancouver will consider all comments in the development of a proposal for an emission regulation. The MVRD Board will receive a summary of the feedback received.

Metro Vancouver staff and contractors will treat comments received with confidentiality; however, please note that comments you provide and information that identifies you as the source of those comments may be publicly available if a freedom of information (FOI) request is made under the *Freedom of Information and Protection of Privacy Act*. If you have any questions or comments regarding the consultation process, please call 604-432-6200.

Metro Vancouver invites you to provide feedback by **October 31, 2021** by email to AQBylaw@metrovancouver.org or through consultation opportunities featured on Metro Vancouver's website (search for "open-air burning consultation"). Metro Vancouver will consider options to address concerns and suggestions raised. A summary of feedback received will be provided to the MVRD Board to inform decisions on an emission regulation bylaw for managing emissions from open-air burning of vegetative debris.

Thank you for taking the time to provide feedback on potential regulatory proposals for managing emissions from open-air burning of vegetative debris.

GLOSSARY

The following definitions are for clarification and discussion paper purposes only and are not intended to be used as legal definitions. The draft regulation will include legal definitions.

Air curtain technology: burns vegetative debris in a partially enclosed space with an open top over which a high-speed flow (or 'curtain') of air is directed. The partially enclosed space can be an above-ground, self-contained unit or an excavated trench. The curtain of air provides additional oxygen to the fire, raising the burning temperature and trapping the smoke. The result is an almost smokeless burning activity, with nearly complete combustion of all debris (see Figure 1 on page 7).

Campfire: an open fire that burns wood in one pile not exceeding 60 cm high and 75 cm wide for a maximum period of 5 hours.

Day: a calendar day.

Diseased vegetative debris: vegetative debris that has been infested by a pathogen or insect listed in Schedule 1 of the BC *Open Burning Smoke Control Regulation* (OBSCR).

District Director: a staff person appointed by the Metro Vancouver Board who makes decisions on authorizations of discharges of air contaminants.

End (as in when a burn ends): when each pile of vegetative debris has ceased flaming and is emitting smoke from no more than 10% of its burnt surface area.

Forced air assistance: devices, such as blower fans, that improve airflow and increase oxygen. This increases burning temperatures, resulting in more complete combustion and thereby reducing smoke emissions.

Opacity: a measure of the amount of light obscured by smoke. 100% opacity means all the light is obscured, and 0% means none of the light is obscured.

Open-air burning: combustion of vegetative debris, such as branches and other pieces of vegetative matter with or without leaves and plant stalks, that is conducted outside a structure and does not vent to a chimney or stack.

Seasoned vegetative debris: vegetative debris that has a dry basis moisture content of 30% or less, has been piled for at least four months, or has originated from standing dead timber.

Vegetative debris: branches and other pieces of vegetative matter with or without leaves and plant stalks. This does not include salt-laden wood.

Ventilation index: an index produced by Environment and Climate Change Canada which identifies how quickly and effectively smoke will clear out of an area.

Summary of Adjustments Made in Response to Feedback from Initial Engagement on a Potential Emission Regulation on Open-Air Burning of Vegetative Debris

Initial Proposal	Feedback	Adjusted Proposal
Notification of neighbours and authorities: Neighbours would be notified of any open-air burning activity, and Metro Vancouver would be notified when open-air burning involves a certain amount of vegetative debris.	Notification requirements are onerous.	Neighbours and Metro Vancouver would need to be notified in circumstances described in the *BC Open Burning Smoke Control Regulation*, to streamline notification requirements.
Record-keeping of specific information pertaining to open-air burning activity would be required, such as number and size of piles burned, estimated volume of debris, approximate drying time, venting conditions at ignition, date and time that burns were conducted, and burn registration number, if the person has a burn registration number issued under the Wildfire Regulation.	Questions about if a form or template would be provided.	A form or template will be developed. To minimize burning and help promote compliance, Metro Vancouver will require some additional items to be recorded compared to the BC Open Burning Smoke Control Regulation requirements.
Registration and associated fees would be required.	The current approval process is time-consuming and current approval fees ($200) are high.	Clarified that registration will be a simpler process than the current approval process and provided proposed registration fees of $100 ($50 renewal fee) for agricultural burns and $250 ($100 renewal fee) for non-agricultural burns.
Areas with more stringent requirements could be established based on factors such as population density and topography.	Concerns that residential areas' higher smoke sensitivity creates another barrier to farming.	More stringent conditions than in the *BC Open Burning Smoke Control Regulation* were proposed to further reduce emissions within protected areas around residences, businesses, institutions, and care facilities. This results in protecting all areas of concern in the region, so it is not necessary to define additional areas with more stringent requirements.
Use of emission control equipment, such as forced air assistance or air curtain technology would be required within designated areas with more stringent requirements.	Concerns about the cost and accessibility of air curtain incinerators.	More stringent limits on the duration and the size of the burn pile are proposed, as an alternative to the use of costly emission control equipment for reducing emissions within the more protected areas around residences, businesses, institutions, and care facilities.

Updated Engagement Plan for an Alternative Approach for Regulating Emissions from Open-Air Burning of Vegetative Debris in Metro Vancouver

In November 2019, a two-phase consultation and engagement process on a potential emission regulation to manage emissions from open-air burning of vegetative debris was approved by the MVRD Board. For the first phase of engagement, Metro Vancouver invited the public, Indigenous communities, agricultural producers, businesses, member jurisdictions, municipal fire departments, provincial government agencies, and other interested parties to provide feedback on a discussion paper outlining the potential emission regulation between November 2019 and August 2020. Initial engagement activities for early 2020 were impacted by COVID-19. As outlined in the report to the Climate Action Committee titled "Adapting Air Quality and Climate Change Engagement During COVID-19", dated April 30, 2020, staff moved all outreach online, reached out specifically to key stakeholders, and received insightful feedback on the proposals.

All feedback received to date has been considered to refine proposals where feasible for a second phase of engagement, and adjustments have been made to the engagement strategy. For example, participants shared the need for Metro Vancouver to use additional forms of communication about proposed open-air burning requirements. Additional engagement aims to mail postcards to agricultural communities, and include more committees and associations for targeted consultation, as well as to increase social media notifications.

OBJECTIVES

- Inform stakeholders about the amended provincial *Open Burning Smoke Control Regulation* (OBSCR) provisions and on the overlap and differences between the amended OBSCR and proposed Metro Vancouver emission regulation;
- Understand challenges of complying with the current Metro Vancouver approvals process;
- Gather feedback on Metro Vancouver's proposed requirements for an emission regulation; and
- Understand the barriers and supports needed to transition away from open-air burning.

STAKEHOLDERS, AUTHORITIES, AND THE PUBLIC

Staff expect to engage with the public and the following stakeholders and authorities on a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver:

- The public;
- Member jurisdictions;
- Local Indigenous communities;
- Agricultural producers;
- Agricultural advisory committees and associations;
- Municipal fire departments and associations;
- Businesses involved in land development, construction, and landscaping;
- Industry and industry associations;
- Professional organizations;
- Provincial, federal and other government agencies;
- BC Hydro, Fortis BC;
- Neighbouring jurisdictions; and
- Health agencies.

ENGAGEMENT PLAN

As with all Metro Vancouver outreach, engagement on a potential emission regulation for open-air burning of vegetative debris will be responsive. Based on feedback received, the engagement timeline may be extended or additional engagement activities may be identified to better reach target audiences. Staff will be holding meetings with interested parties where requested. The preliminary timeline for the engagement process is described below.

Initial Engagement on Discussion Paper: Proposals for Regulating Emissions from Open-Air Burning of Vegetative Debris in Metro Vancouver

COMPLETE (November 2019 – August 2020)

Additional Engagement on Discussion Paper: Adjusted Proposals for a Potential Emission Regulation for Open-Air Burning of Vegetative Debris in Metro Vancouver

July – October 2021

A subsequent phase of engagement activities has been shaped by what was heard during initial engagement. Please note most activities from initial engagement will be repeated to ensure that all interested parties receive the adjusted proposals for a potential emission regulation for open-air burning of vegetative debris in Metro Vancouver and a summary of how initial feedback was considered.

- Webinars structured as an informational presentation and feedback session with:
    - agricultural producers in the region, industry associations, interested service associations, and the public (up to three)
- Virtual staff-to-staff meetings with:
    - staff from member jurisdictions, neighbouring jurisdictions, and municipal fire departments
    - staff from Indigenous communities
    - other orders of government
    - health agencies in the region
- Presentations and feedback sessions at municipal agricultural advisory meetings in the region and agricultural association events (approximately 8)
- Online feedback form
- Ads placed in relevant agricultural newsletters
- Mailed postcard to agricultural operations in the region
- Metro Vancouver's website and social media channels
- Direct communication (email and phone)

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Julie Saxton, Air Quality Planner
Amy Thai, Senior Policy Analyst
Parks and Environment Department

Date: May 17, 2021 Meeting Date: June 11, 2021

Subject: **Alternatives to Agricultural Open-Air Burning in Metro Vancouver**

RECOMMENDATION

That the Climate Action Committee receive for information the report titled "Alternatives to Agricultural Open-Air Burning in Metro Vancouver", dated May 17, 2021.

EXECUTIVE SUMMARY

Open-air burning of vegetative debris is a significant source of fine particulate matter and other air contaminants, including greenhouse gases, which are harmful to health and the environment. A study to investigate the benefits and barriers to using alternatives to open-air burning for managing agricultural vegetative debris in the Metro Vancouver region has been completed as part of a Sustainability Innovation Fund project. The work complements public engagement on a potential open-air burning emission regulation. Benefits of alternative waste management methods include reduced emissions of both particulate matter and greenhouse gases compared to open-air burning. Barriers for farmers in the region to using these alternative methods include cost, complexity, practical feasibility, biosecurity considerations, and equipment availability.

PURPOSE

This report provides information about the results of a Sustainability Innovation Fund (SIF) study of alternative practices for managing agricultural vegetative debris, in order to identify opportunities to avoid open-air burning in the Metro Vancouver region. Information about alternative vegetative debris management methods and programs in other jurisdictions, a summary of current practices in the Metro Vancouver region, an evaluation of the feasibility of various alternatives to open-air burning and their effects on air emissions, and recommendations about possible ways to promote alternative practices are presented in the study report (Attachment 1).

BACKGROUND

On February 28, 2020, the MVRD Board approved an allocation from the Regional District SIF for a project to reduce barriers for farmers to using emissions-reducing equipment and alternative methods for the management of vegetative debris. The development of a potential open-air burning regulation is the subject of Report 5.2 in the Climate Action Committee's June 11, 2021 agenda, and the SIF project will support the proposed requirement that records be kept of alternative practices considered prior to open-air burning of vegetative debris (Reference 1).

This report presents results from the first part of the SIF project: an assessment of possible alternative practices for management of agricultural vegetative debris in the Metro Vancouver region, with

examples of ways to promote use of low-emission practices. The second part of the project will develop a multi-language best practices guide to support the use of alternative practices.

AGRICULTURAL VEGETATIVE DEBRIS IN METRO VANCOUVER

Agricultural production of a wide range of commodities in Metro Vancouver can result in the production of vegetative debris. The study involved discussions with farmers and representatives of agricultural agencies and producer groups to identify the types of agricultural vegetative debris produced in the Metro Vancouver region and current practices for managing this debris.

Agricultural vegetative debris on farms in the region includes woody prunings from berry crops, hazelnut growing and other orchard crops, herbaceous residues from cultivation of vegetables and berries, diseased material from a variety of crops, as well as waste from land clearing and field renovation activities. The method used for managing this debris typically depends on the nature of the vegetative debris. The study identified that mulching, chipping, on-site composting, and incorporation into the soil, as well as hiring of waste removal and composting services, are commonly used for managing vegetative debris. Open-air burning is widely used for the management of debris from land clearing and property clean up, as well as for diseased material and by some berry farmers.

MANAGING EMISSIONS FROM OPEN-AIR BURNING

Open-air burning is widely used to dispose of vegetative debris in the region. Smoke from open-air burning is a significant source of fine particulate matter and also contains other air contaminants, including greenhouse gases, which are harmful to health and the environment. Metro Vancouver currently authorizes emissions from open-air burning under the *GVRD Air Quality Management Bylaw No. 1082, 2008* through site-specific approvals. However, farmers provided feedback that the current process can seem complicated, time-consuming and costly. As described in Report 5.2 in this agenda package, Metro Vancouver is exploring an alternative regulatory mechanism to reduce smoke emissions but simplify the authorization process.

ALTERNATIVE DEBRIS MANAGEMENT OPTIONS

Alternative debris management programs in eight jurisdictions in British Columbia, Washington, Oregon and California were reviewed, and the study included an assessment of the feasibility and regional applicability of the alternative approaches supported by each program. The programs supported one or more alternatives to open-air burning for managing vegetative debris as well as, in some cases, best practices when open-air burning is necessary. Five categories of alternative methods of disposing of agricultural vegetative debris were identified in these programs:

- chipping with on-farm use;
- chipping with off-farm use;
- mowing and mulching (where mowed material remains in place as ground cover or “mulch”),
- off-farm disposal; and
- air curtain technology (equipment that increases combustion efficiency to reduce smoke).

These alternative practices as well as on-farm composting, which was identified through discussion with stakeholders, were evaluated against 18 criteria relevant to the development of a potential program, including cost and emissions. Open-air burning was included in the assessment for

comparison. Mowing and mulching, chipping with on-farm use, and on-farm composting offered the most promise for the potential development of programs to support alternatives to open-air burning.

Emissions Benefits

The potential for reductions in emissions of particulate matter and three greenhouse gases (carbon dioxide, nitrous oxide and methane) was calculated for each of the categories of alternative practices. The calculation included the direct emissions from the activity as well as the emissions from operations associated with the activity, such as aggregation of material. The study report presents the estimates relative to the emissions from open-air burning. A key finding was that particulate matter emissions from open-air burning significantly exceed any of the alternative practices. In addition, emissions of greenhouse gases (combined and expressed as carbon dioxide equivalents), was highest for open-air burning and lowest for mowing and mulching.

BARRIERS TO ALTERNATIVE DEBRIS MANAGEMENT METHODS

Using structured telephone interviews, farmers were asked about their current vegetative debris management practices and the potential benefits of and barriers to alternative practices. Farmers representing a range of farm sizes, crop types, and locations participated in interviews. Common themes with respect to barriers to using alternatives were costs, bureaucracy, government control or oversight, practical feasibility, biosecurity considerations, and the availability of alternatives. In addition, difficulties conducting open-air burning were noted due to regulatory requirements.

Almost all farmers interviewed identified cost as a concern. Open-air burning is perceived as the lowest cost option for disposal of vegetative debris, with farmers who already use alternatives indicating concerns about the higher cost relative to burning. To be an attractive option for farmers, the alternative debris management method must be low cost. Dealing with additional paperwork and having to share operational information to access programs that support alternative practices were also viewed negatively.

Practicalities that present barriers for farmers in the region include the availability and accessibility of equipment, as well as the ability to use the products of alternative management methods, such as chipped or mowed debris. In addition, open-air burning alternatives were regarded as unsuitable methods for the disposal of diseased vegetative debris.

Farmers also noted that opportunities for open-air burning are becoming increasingly limited. Reasons for this included new requirements and restrictions from recent updates to the BC *Open Burning Smoke Control Regulation* and the limited number of days when smoke dispersion conditions allow burning to occur. Metro Vancouver's current process for authorizing emissions through short-term, site-specific approvals was also noted as making it difficult to conduct open-air burning.

POTENTIAL PROGRAMS TO PROMOTE ALTERNATIVE PRACTICES

The study identified three organizations (Agricultural Research & Development Corporation, BC Investment Agriculture Foundation, Farmland Advantage) that have delivered programs assisting farmers in British Columbia and may be interested in future discussions with Metro Vancouver about potential programs supporting the use of alternatives to open-air burning. The involvement of farmers, producer groups and agricultural advisory committees in designing a program to support

alternative debris management options would be critical for success. An effective program may have to minimize administrative burdens and complexity, as well as provide cost reductions to mitigate the incremental cost of alternatives over open-air burning. In addition, the likelihood of the long-term existence of a program would be an important factor to encourage uptake. The study found that a program might also need to target specific types of debris, since the debris management needs of producers differ between the various sectors.

Discussions with farmers indicated that outreach about alternatives to open-air burning and the availability of existing programs, such as Environmental Farm Plan incentives, may be helpful in promoting the use of alternatives. This feedback will inform the second part of this Sustainability Innovation Fund project, which will involve developing and distributing a multi-language best practices guide to support the use of alternative practices in collaboration with the agricultural sector.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
Funding was received from the Regional District Sustainability Innovation Fund to complete the work described in this report, including the next phase of the project to be completed in 2021.

CONCLUSION
Open-air burning is a significant source of fine particulate matter and other air contaminants, including greenhouse gases, which are harmful to health and the environment. This report presents the findings of a study to assess the feasibility and potential benefits of alternative methods for managing agricultural vegetative debris. The analysis found that harmful particulate matter emissions from open-air burning significantly exceeded any of the alternatives, when taking into account emissions from all of the activities associated with various vegetative debris management methods. In addition, open-air burning also had the highest greenhouse gas emissions. The study also evaluated potential programs to reduce barriers for farmers to using emissions-reducing equipment and alternative methods for the disposal of vegetative debris.

This work is part of a Sustainability Innovation Fund project to investigate the benefits and barriers to using alternatives to open-air burning for the agricultural crops typically produced in the Metro Vancouver region. The next part of the project is expected to be completed in 2021 and will focus on developing and distributing a multi-language best practices guide to achieve emissions reductions. These activities will complement Metro Vancouver's work to develop an emission regulation to manage emissions from open-air burning in a simpler, more efficient way than the current process.

Attachment
1. Alternative Waste Management Practices for Agricultural Debris, April 15, 2021 *(45709156)*

Reference
1. "Consultation on an Alternative Approach for Regulating Emissions from Open-Air Burning of Vegetative Debris in Metro Vancouver", dated October 1, 2019

45704705

PREPARED FOR METRO VANCOUVER REGIONAL DISTRICT

ALTERNATIVE WASTE MANAGEMENT PRACTICES FOR AGRICULTURAL VEGETATIVE DEBRIS

APRIL 15, 2021 FINAL

wsp

ALTERNATIVE WASTE MANAGEMENT PRACTICES FOR AGRICULTURAL VEGETATIVE DEBRIS

PREPARED FOR METRO VANCOUVER REGIONAL DISTRICT

REPORT
FINAL

WSP PROJECT NO.: 201-08930-00
DATE: APRIL 15, 2021

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APPENDICES

1 EXECUTIVE SUMMARY

Metro Vancouver Regional District (MVRD) manages air quality within its regional boundaries under authority delegated from the BC provincial government by the BC Environmental Management Act. Under this authority, MVRD prohibits the disposal of waste by burning unless the discharge is conducted in accordance with a permit, approval, order, or an emission regulation, or is exempted from the prohibition. MVRD currently authorizes open-air burning of agricultural vegetative debris using an approval process in instances where discharges of air contaminants from burning are expected to be of short duration. However, it is understood that not all agricultural burning activities occurring in the region are formally approved.

Open-air burning contributes to degraded air quality and can impact human health. Smoke from open-air burning is a regionally significant source of fine particulate matter ($PM_{2.5}$) in Metro Vancouver, contains nitrogen oxides and volatile organic compounds (VOCs), which are precursors to ground-level ozone and smog, potent greenhouse gases (GHG) such as methane, and a range of other toxic compounds depending on the material burned.

MVRD is investigating alternative management practices for the disposal of agricultural vegetative debris in order to identify opportunities to avoid open-air burning. In support of this investigation, WSP Canada was contracted to identify current agricultural vegetative debris management practices in the Metro Vancouver region and perform a jurisdictional review and feasibility assessment to identify debris management approaches, and resulting emission reductions, best matched to regional needs. Wide-ranging communication was conducted with groups including the provincial government, agriculture producer groups, funding organizations, alternative management practice service providers, MVRD Environmental Regulation and Enforcement staff, and perhaps most importantly, farmers themselves.

Generation of agricultural vegetative debris in Metro Vancouver was found to fall into three main categories: land clearing to open land for agricultural production and remove invasive species, annual pruning and maintenance of trees and bushes, and periodic renovation and replacement of entire fields of fruit trees and bushes. Blueberries and cranberries were identified as key crop types due to their large regional acreage and regular generation of vegetative debris that is sometimes burned. Chipping and on-farm use of chipped material and mowing / mulching of smaller debris were identified as alternative practices commonly used on some farms in the region.

The jurisdictional review focused on British Columbia and the US Pacific states revealed a number of alternative debris management programs, with the most common approach being the funding of on-farm chipping of vegetative debris. A number of jurisdictions with reduced or free tipping fees for agricultural vegetative debris were identified. There were limited examples of equipment lending library type programs, and only one instance of a program focused on air curtain burning of agricultural debris was identified. The debris management approaches carried forward to a feasibility assessment included: open-air burning; air curtain burning; chipping with on-farm use; chipping with off-farm use; mulching and mowing; on-farm composting with no chipping; and off-farm disposal.

The feasibility assessment considered a wide range of scoring criteria, including compatibility with regional needs, emissions reduction potential, stakeholder acceptance and costs. The three highest scoring debris management approaches were chipping with on-farm use, mulching and mowing, and on-farm composting with no chipping. A quantitative assessment of air pollutant and GHG emissions associated with management practices was also performed, and clearly indicated that all alternative management options offer significant reductions relative to open-air burning, even when fossil fuel use associated with equipment operation and transportation was considered.

Identification of business / funding models and potential partner organizations pointed to the existing agricultural funding bodies in BC, including the BC Agricultural Research & Development Corporation (ARDCorp) and Investment Agricultural Foundation (IAF), as key organizations for further dialogue. The Environmental Farm Plan program operated by ARDCorp already includes a Beneficial Management Practices (BMP) program that provides monetary incentives for purchase of chipping, forced air burning and mulching / moving equipment.

Finally, discussions with farmers and agricultural producer groups indicated that there appears to be interest in programs that can assist with implementation of alternative practices, but such a program must overcome the key barriers of cost, administrative burden / complexity, and long-term availability. The opportunity for farmers and producer groups to be involved in program development was viewed positively.

2 BACKGROUND

Metro Vancouver is a federation of 21 municipalities, one Treaty First Nation, and one Electoral Area operating as a regional district under British Columbia provincial legislature. Metro Vancouver Regional District (MVRD) manages air quality within its regional boundaries under authority delegated from the BC provincial government by the BC Environmental Management Act. Under this authority, MVRD prohibits the disposal of waste by incineration or burning unless the discharge is conducted in accordance with a permit, approval, order, or an emission regulation, or is exempt from the prohibition.

Open-air burning contributes to degraded air quality and can impact human health. Smoke from open-air burning is a regionally significant source of fine particulate matter ($PM_{2.5}$) in Metro Vancouver, contains nitrogen oxides and volatile organic compounds (VOCs), which are precursors to ground-level ozone and smog, as well as a range of other toxic compounds depending on the material burned. MVRD currently authorizes open-air burning of vegetative debris using an approval process in instances where discharges of air contaminants from burning are expected to be of short duration. However, it is understood that not all agricultural burning activities occurring in the region are formally approved.

MVRD is investigating alternative waste management practices for vegetative debris in order to identify opportunities to avoid open-air burning. In support of this investigation, the following tasks were conducted in this study:

- Identification of current agricultural vegetative debris management practices in Metro Vancouver;
- Jurisdictional review focused on North America to identify waste management and emission reduction approaches with focus on agricultural vegetative debris;
- Conducting a feasibility study aimed at evaluating the potential of relevant alternative management practices applicable to local agricultural sectors;
- Identification of potential partner organizations, business models, and sources of funding supporting the implementation of alternative practices in Metro Vancouver;
- Quantification of potential emission reductions for alternative waste management practices, and;
- Identification of barriers faced by farmers and industry stakeholders in Metro Vancouver to using alternative waste management practices.

In order to perform this study, WSP has conducted discussions with a wide range of groups with interest in the management of vegetative debris including the provincial government, agriculture producer groups, funding organizations, alternative management practice service providers, MVRD Environmental Regulation and Enforcement staff, and farmers themselves. Details on all non-farmer stakeholders are included in Appendix A, and details of outreach to farmers are included in Section 5.

2.1 OPEN-AIR BURNING IN METRO VANCOUVER

2.1.1 REGULATORY FRAMEWORK

At the provincial level, open-air burning is regulated through the *Open Burning Smoke Control Regulation* (OBSCR) under the BC Environmental Management Act (EMA), which came into effect in its amended form on September 15, 2019. This regulation provides a framework for open-air burning of vegetative debris including land clearing and some agricultural activities while aiming to minimize the

risk to air quality. The new regulation addressed concerns and shortcomings of the previous regulation by improving protection of community air quality, providing flexibility for necessary burning activities and promoting less polluting burning technologies. Specifically, the new OBSCR introduces three smoke sensitivity zones, increases mandatory setback distances for burning, facilitates burning required for community wildfire risk reduction and burning of diseased vegetative material, encourages cleaner-burning technologies, provides partial OBCSR exemptions for agricultural and backyard burning of small vegetative debris (<10cm diameter), and prescribes the use of ventilation forecasts.

Also at the provincial level, the *British Columbia Code of Practice for Agricultural Environmental Management* (2019) regulates the management of waste materials on farms. While not directly addressing air contaminant emissions associated with open-air burning, it imposes requirements on the storage of wood residue and agricultural by-products (including vegetative debris) prior to disposal, including setbacks, duration and record keeping. Further, it also regulates the conduct of alternative management practices such as agricultural composting and soil application of agricultural by-products such as vegetative debris.

The MVRD manages air quality within its regional boundaries under authority delegated from the BC Provincial government by Section 31 of the BC EMA. Under this authority, MVRD prohibits the disposal of waste by incineration or burning under *Air Quality Management Bylaw No. 1082, 2008* unless the discharge is conducted in accordance with a permit, approval, order, or an emission regulation, or is exempt from the prohibition. MVRD open-air burning approvals must adhere to the Code of Practice for Agricultural Environmental Management and meet or exceed the requirements of OBSCR. Burners with an MVRD approval must adhere to municipal bylaws and restrictions, which vary by municipality as detailed in Table 2-2 below.

Bylaws and regulations addressing open-air burning in the MVRD region, including specific requirements for each member jurisdiction are summarized in Table 2-1 and Table 2-2 below.

Table 2-1 Summary of provincial and regional open-air burning related regulations applicable in Metro Vancouver Region

Jurisdiction	Regulation / Bylaw	Details
British Columbia	Open Burning Smoke Control Regulation (OBSCR)	• Open-air burning of vegetative agricultural and land clearing material permitted if OBSCR regulation and bylaw requirements set by local governments are followed; • Open-air burning must comply with prohibitions and bans issued by the Ministry of Environment and Climate Change Strategy, local governments, fire departments or an improvement district; • Specific conditions pertaining to atmospheric conditions (Ventilation Index) and smoke sensitivity zones must be met; • Burning must meet minimum setback distances from specified properties and sensitive receptors; • Burning times and frequencies are regulated; • Special allowances are made for disposal of diseased vegetative debris; • Burning of agricultural vegetative debris between 3 and 10 centimetres in diameter is subject to a limited set of requirements (i.e. material must originate within 5 km of burning site; no prohibited materials; burning must adhere to prohibitions by a Director), while the OBSCR requirements apply in full to the burning of material greater than 10 centimetres in diameter.

Jurisdiction	Regulation / Bylaw	Details
British Columbia	Code of Practice for Agricultural Environmental Management	• Contaminated runoff, leachate, solids or air contaminants originating from wood residue and agricultural by-products including vegetative debris are prohibited from crossing property boundaries or entering watercourses and groundwater; • Storage of wood residue and agricultural by-products including vegetative debris are subject to maximum storage durations and minimum setback distances from drinking water sources, watercourses and property boundaries; • Composting of wood residue and agricultural by-products including vegetative debris is regulated with limitations on leachate collection, runoff prevention setbacks, storage and compost use. • Requires records to be kept showing how the requirements of the Code are being met.
Metro Vancouver Regional District	Air Quality Management Bylaw No. 1082, 2008	• Burning of vegetative waste and land clearing debris may be authorized if an approval is obtained from MVRD. Burning under an approval must adhere to the Code of Practice for Agricultural Environmental Management, meet or exceed the requirements of OBSCR, and adhere to local municipal restrictions; • Must be conducted when atmospheric conditions are favourable, as indicated on the MVRD phone line; • Burning of leaves, foliage, weeds, crops or stubble permitted in compliance with Weed Control Act RSBC 1996, chapter 487. • Burning of vegetative debris is also permitted if it is conducted for training purposes under the BC Fire Services Act, or fire control or resource management purposes under the BC Wildfire Act.

Table 2-2 Summary of municipal bylaws regulating open air burning in Metro Vancouver Region

Jurisdiction	Regulation / Bylaw	Details
Village of Anmore	Anmore Fire Protection Bylaw No. 578-2018	• Open-air burning of garden refuse, in the nature of grass and other clippings, leaves, tree and shrub prunings, cuttings and light material and any land clearing materials is prohibited
Village of Belcarra	Village of Belcarra Fire Prevention Bylaw No. 310, 2000	• Open air burning permits may be issued for land clearing and large clean-up larger than 1 cubic metre
Bowen Island Municipality	Bowen Island Fire Protection District Bylaw No.41, 2013	• Fire to be located at least 3m (10 feet) from any grass, shrubbery or wooden fence; and 6 m (20 feet) from any Building • Except for the occasional "open air" burning of waste materials resulting from agriculture or gardening, no Person shall burn any waste material other than in an Authorized Incinerator. • Category 3 – Land clearing and other major burning Requires BIM and MVRD Burn Permit • Open-air burning allowed from October 15 to April 15, when permitted by MVRD Open Burn Advisory

Jurisdiction	Regulation / Bylaw	Details
City of Burnaby	Burnaby Fire Services Bylaw, 2004	• Open air burning prohibited
City of Coquitlam	Fire Prevention and Life Safety Bylaw No. 3712, 2005	• A permit may be issued for open air burning of garden refuse, including grass clippings, leaves, tree and plant pruning, cuttings and light material and any land clearing materials if the burning will be conducted within the Agricultural Land Reserve • Permits may be issued annually between March 1 through May 31, and September 1 through November 30
City of Delta	Delta Fire Regulation Bylaw No. 5855, 2001	• A permit may be issued for open air burning of cut and piled brush, slash, grass and other organic agricultural materials resulting from the clearing of land and for the destruction of agricultural waste materials originating on that property • Burning must not be carried out within 50 m from any buildings, structures, standing timber or any other flammable or combustible material, and not within 500 m from residentially, commercially or industrially occupied buildings • Burning has to take place between Monday and Friday • Pile size shall not exceed 5 m in diameter and 3 m in height
Electoral Area A	-	• Regional Requirements as per Table 2-1
City of Langley	Fire Protection and Safety Bylaw, 2009, No. 2784	• Open air burning prohibited.
Township of Langley	Fire Prevention Bylaw 2013 No.4956	• A permit may be issued for open air burning (outdoor burning permit, land clearing burning permit) • Burning permits must comply with Environmental Management Act and MVRD regulations and bylaws • Property on which burning will occur must be a minimum of 0.2 ha (0.5 acres) in size (land clearing burn permits on property not less than 1.7 ha (4.2 acres) in size or consolidated properties of greater than 1.7 ha) • Material must be indigenous to the property, including piled brush, slash, grass or other organic or agricultural material originating from that property • Minimum clearance of 15 m (50 ft) between the fire and all structures on the property • Burn piles shall not exceed 5 cubic metres (2m x 2m x 1.2m), and only one pile is permitted at a time • Land clearing burning may include the requirement for forced combustion air supply and shall not be carried out within 100 m from any neighbouring residences, businesses or highways; 500 m from schools in session, hospitals and facilities used for continuing care and 30 m from any on-site structures
Village of Lions Bay	Fire Bylaw, Bylaw No.428	• Open air burning prohibited.

Jurisdiction	Regulation / Bylaw	Details
City of Maple Ridge	Maple Ridge Outdoor Burning Regulation By-law No. 5535-1997	• Permit may be issued for an agricultural fire within an area marked as "Area Open for Burning" • Burning shall not be carried out within 100 m of residential buildings or businesses, within 500 m of schools or hospitals • Burning shall take place during daylight hours
City of New Westminster	Fire Protection Bylaw No. 6940, 2004	• Open air burning of vegetative and land clearing waste prohibited.
City of North Vancouver	Fire Bylaw, 2005, No. 7709	• Open air burning prohibited.
District of North Vancouver	Fire Bylaw, Bylaw No. 7481	• Open air burning prohibited, except in designated areas that are not accessible by road, including land situated immediately north of Cascades on Indian Arm, and land owned by the Metro Vancouver Regional District and Province of BC. • For the limited areas where burning is allowed, permit may be required.
City of Pitt Meadows	City of Pitt Meadows Burning Regulation Bylaw No. 2688, 2015	• Agricultural Land Open Burning permits may be available for land zoned as agricultural • Permits may be issued between March 1 through May 31, and September 1 through November 30 • No material other than waste from agricultural related activities on parcels zoned agricultural may be burned and all materials must come from land on which the burn is taking place • Burning may not exceed 120 consecutive hours and may not take place within 30 m of any building, structure, fence, hedge or overhead wire/cable, within 500 m of an industrial, commercial or institutional facility, within 30 m of any public roadway; within 10 metres of any water course • Burn piles may not exceed 4 cubic metres (1.8 m x 1.8 m x 1.8 m) • Burn may not take place between dusk/sundown to the time MVRD issues the daily burning index report
City of Port Coquitlam	Fire and Emergency Services Bylaw, 2014, No. 3880	• Permit may be issued for open air burning on A1 Agricultural zoned properties to allow orchard, berry, and vineyard pruning generated on site to be burned • Burning Permit period may not exceed 15 days and the permit may regulate location of burn, dates and time of burning, maximum area occupied by fire, materials to be burned, and precautions to be taken • Burning period shall comply with Fire and Emergency Services Bylaw No. 3880 and other applicable bylaws
City of Port Moody	City of Port Moody Fire Protection and Emergency Response Bylaw, 2010, No. 2835	• Open air burning of vegetative and land clearing waste prohibited.

Jurisdiction	Regulation / Bylaw	Details
City of Richmond	Fire Protection and Life Safety Bylaw No. 8306	• Open air burning permit may be issued • Burning restricted to one burning site pile no larger than five cubic metres • Burning site pile may not be located within 30.5 metres (100 feet) from any combustible structure or material, standing timber, surrounding brush, watercourse, or adjacent property line (except when considered safe by the Fire Chief and with written consent of adjacent occupants) • Burning not to commence prior to 7:00 am; no stumps, trees or other fuel may be added to fire after sunset • Standing crops shall not be burned
City of Surrey	Fire Service By-law, By-law, No. 10771	• Burning permit may be issued for burning of material originating on that property for agricultural purposes • Burning for agricultural purposes only when ventilation index is forecast as "Good"
Tsawwassen First Nation	Tsawwassen First Nation Fire Regulation, 2009	• Burning permit may be issued for burning of cut and piled brush, slash, grass and other organic agricultural materials resulting from land clearing and for the destruction of agricultural waste materials originating on that property • Burning pile shall not exceed five metres in diameter or three metres in height • Burning site may not be located within 50 metres of any buildings, structures, standing timber, or any other flammable or combustible material and not within 100 metres of any property containing residential, commercial or industrial occupancy • Burning shall only occur from Monday to Friday when safe to do so considering climatic conditions or other hazards
City of Vancouver	Fire By-law, By-law No. 12472	• Open air burning of vegetative agricultural and land clearing waste prohibited.
District of West Vancouver	Fire Protection and Emergency Response Bylaw No. 4366, 2004	• Open air burning of vegetative agricultural and land clearing waste prohibited.
City of White Rock	White Rock Fire Protection and Safety Bylaw, 2014, No. 2057	• Open air burning of vegetative agricultural and land clearing waste prohibited.

Open-air burning of land clearing and agricultural vegetative waste is subject to approval by MVRD, must be in compliance with provincial as well as local regulations, and must be conducted when atmospheric conditions are favourable for smoke dispersion. MVRD provides daily information on atmospheric conditions based on the Venting Index generated by Environment and Climate Change Canada.

To reduce emissions from open-air burning, OBSCR states that all reasonable alternative waste management practices must be explored to minimize burning, by reducing, reusing, or recycling of vegetative debris and to apply all reasonable efforts to reduce smoke from open-air burning by following

best practices such as maximizing air flow in burn piles and burning seasoned debris. Similarly, MVRD open-air burning approvals may be conditional requiring emission reducing practices such as burning of seasoned vegetative debris only, the application of forced air combustion, adherence to acceptable atmospheric dispersion conditions (good ventilation) and limiting the frequency and/or duration of open-air burning.

2.1.2 METRO VANCOUVER BURNING APPROVALS

Between February 2017 and April 2020, 28 approvals for open-air burning were issued by MVRD, a majority of which were associated with open-air burning of vegetative debris in the agricultural sector. As shown in Table 2-3, approximately 71% of burn requests were approved for materials stemming from land clearing activities including tree debris, roots, and invasive species such as the Himalayan blackberry, followed by the berry growing sector, specifically blueberry and cranberry with 18% and 7%, respectively. Blueberry vegetative debris approved for burning included branches and clippings as well as diseased bushes, while cranberry vegetative debris originated from field renovations. Additionally, open-air burning of leftover tree vegetative debris from plant nursing production was approved.

Table 2-3 Material distribution by number of open-air burning approvals issued in Metro Vancouver (2017-2020)

Type	Percentage
Land Clearing	71%
Blueberry Growing	18%
Cranberry Growing	7%
Nursery Growing	4%

2.1.3 CURRENT ESTIMATES OF BURNING EMISSIONS

Table 2-4 following presents a summary of estimated particulate and GHG emissions for Metro Vancouver open-air burning approvals issued between 2017 and September 2020. The estimate does not include all other open-air burning that occurred solely under authorization of municipal fire departments, as well as any unauthorized / unreported burning. The emissions estimation methodology is described in detail in Section 4, with average particulate, methane (CH_4) and nitrous oxide (N_2O) emissions factors as detailed in Table 4-1. Note that 2019 had by far the most approvals to date, as it was the year after Metro Vancouver had fully implemented their open burning approval program and conducted outreach around the region. During the COVID-19 pandemic, concerns related to the impact of elevated particulate levels on respiratory health, and susceptibility to and severity of COVID infection led to a prohibition on open-air burning by the Province and Metro Vancouver during the 2020 spring burning season, so open-air burning approvals and estimated emissions dropped sharply in 2020.

Table 2-4 Emissions quantification of Metro Vancouver open-air burning approvals (average PM and CH_4 emissions factors)

Year	Approvals	Estimated Amount Burned		Emissions (tonnes)							
		Volume (m^3)	Mass (Tonnes)	Total PM	PM_{10}	$PM_{2.5}$	Biogenic CO_2	Fossil CO_2	CH_4	N_2O	IPCC CO_2e
2017	1	381	57.1	0.3	0.3	0.3	92.6	0.0	0.1	0.07	24.7
2018	2	375	56.3	0.3	0.3	0.3	91.1	0.0	0.1	0.07	24.3
2019	23	117,129	17,569.3	105.4	105.4	105.4	28,462.2	0.0	31.6	22.84	7,597.0
2020 (to Sept.)	2	662	99.2	0.6	0.6	0.6	160.7	0.0	0.2	0.13	42.9
Total	28	117,884	17,781.9	106.7	106.7	106.7	28,806.7	0.0	32.0	23.12	7,688.9

The results in Table 2-4, particularly for 2019, suggest that particulate emissions from approved open-air burning is regionally significant. Metro Vancouver's 2015 emissions inventory forecast for 2020 (MVRD, 2018) predicted total annual emissions of $PM_{2.5}$ of 4222 tonnes, of which 154 tonnes were predicted to be emitted by on road vehicles. Predicted emissions from Metro Vancouver approved open-air burning in 2019 were of a similar magnitude as on-road vehicles, despite occurring for very limited time periods throughout the year. Further, they significantly exceed the emissions inventory open-air burning $PM_{2.5}$ emissions estimate for 2015 and forecast for 2020 (58 tonnes), which was based solely on authorizations reported by municipal fire departments and utilized emissions factors for particulate that were more than double the average factor used in this study.

2.2 AGRICULTURE IN METRO VANCOUVER

2.2.1 AGRICULTURAL LAND

Metro Vancouver, despite being a highly urbanized area and British Columbia's most populous regional district, is one of the most important agricultural regions in the province. Based on 2016 Census of Agriculture data, farm operations in Metro Vancouver, which represent only 1.5% of the agricultural land in BC, generated 26% ($945 million) of the province's gross annual farm receipts. Agricultural activities in the region benefit from the fertile soils in the Fraser River delta and temperate oceanic climate as well as economically from the proximity to a diverse urban market.

According to 2016 Agricultural Census information, the total (workable and unworkable) farm area in Metro Vancouver was 38,380 hectares (ha) (94,799 acres), most of which in the Agricultural Land Reserve (ALR). Table 2-5 summarizes the breakdown of 2016 Census total farm area and number of farms by municipality/region.

Table 2-5 Total agricultural area and number of farms in Metro Vancouver (2016 Census of Agriculture)

Municipality/Region	Total Farm Area (Ha)	Total Farms
Burnaby	277	47
Delta	9,090	185
Greater Vancouver Area[1]	692	73
Langley Township and City	10,807	1,103
Maple Ridge	2,446	203
Pitt Meadows	4,785	133
Richmond	3,122	189
Surrey	7,007	439
Vancouver	154	40
Metro Vancouver Total	38,380	2,412

[1] *includes Barnston Island, Port Coquitlam, other municipalities not separately listed in table that may have farms*

2.2.2 AGRICULTURAL CROPS

Analysis of recent Metro Vancouver agricultural data (*BC Ministry of Agriculture*, 2014; *Sigsworth*, 2020) shows that forage and pasture crops (grass, forage corn, legumes) are the prevalent cultivated field crop type in the region, followed by berries (predominantly blueberries and cranberries), vegetables, and nursery and tree plantations. Other less common crops include tree nuts (mainly hazelnut), tree fruit (apples, cherries, and plums), cereals (barley, oats and wheat), specialty crops such as herbs and rhubarb, turf, floriculture, and also bare cultivated land or land in between crop transitions ("other"). The distribution of cultivated field crop types by area in the Metro Vancouver region is illustrated in Table 2-6. These data do not include agricultural production areas in permanent enclosed structures, such as greenhouses and crop barns, which may be additional sources of agricultural vegetative debris.

Table 2-6 Prevalence of cultivated field crop types in Metro Vancouver by total area

Crop Type	Total Farm Area (Ha)	Percentage
Forage & Pasture	14,083	49%
Berries	8,437	29%
Vegetables	4,035	14%
Nursery & tree plantations	946	3%
Cereals	638	2%
Other	354	1%
Turf	108	0.38%
Vines	51	0.18%
Nut trees	45	0.16%
Tree fruits	35	0.12%
Specialty	14	0.05%
Floriculture	6	0.02%
Total	28,752	99%

2.2.3 AGRICULTURAL VEGETATIVE DEBRIS IN METRO VANCOUVER

Vegetative debris is a by-product of farming operations that, when managed correctly, can be an economically valuable resource. Depending on the type of agricultural operations, agricultural by-products can include organic matter from crop maintenance, harvesting and product processing including culls, or land clearing activities.

The *British Columbia Code of Practice for Agricultural Environmental Management* (2019), which regulates handling and disposal of on-farm processing waste, defines agricultural vegetative debris and wood residue as follows:

- Agricultural vegetative debris:
    - cuttings and prunings of 7 cm or less in diameter, and leaves, from trimming and pruning activities;
    - corn cobs, corn husks, straw, stalk, seed hulls and other crop residue from harvest activities; and
    - does not include wood residue or other by-products from wood processing.
- Wood residue:
    - is chipped or ground;
    - originates from wood processing, the clearing of land, if the majority of the greenery is removed and no soil is present, or trimming or pruning activities;
    - has not been treated or coated with chemicals, including preservatives, glues, paints, varnishes, oils or finishing materials;
    - does not contain a foreign substance harmful to humans, animals or plants when combusted;
    - has not been exposed to saltwater; and
    - has not been used for or recovered from construction or demolition activities.

The types of agricultural vegetative debris generated in Metro Vancouver are sector / crop dependent:

- Forage and pasture crops are grown as livestock feed in the form of direct grazing or as fodder. Typical waste by-products in this sector may include wasted feed, harvest residue, and diseased vegetation.
- Due to plant physiology and growing environment, vegetative debris in the berry growing sector differs significantly between the different berry crops:
    - Waste generated in the blueberry sector consists largely of woody pruning debris, but may also include culled material, diseased plants and torn out bushes from field renovations;
    - Cranberry growing operations generate mainly leafy vegetative debris and woody runners, post-harvest waste, culled and diseased material, as well as wood and roots from field renovations;
    - Waste from strawberry growing operations consist predominantly of non-woody, herbaceous post-harvest and post-processing residue, culled or diseased plants, and;

    - Blackberry and raspberry growing operations produce woody vegetative agricultural waste from pruning and replanting activities, as well as culled and diseased vegetation.
- The vegetable growing sector predominantly generates non-woody, herbaceous vegetative waste from weeding, post-harvest material on the fields, post-processing and culled waste.
- Waste generated from hazelnut growing and other orchard crop operations includes woody material from pruning, vegetative debris from harvest post-processing, but also orchard tear-outs of diseased vegetation.
- Vegetative debris from agricultural land clearing activities frequently consists of tree branches, stumps, roots, and dead or fallen trees as well as invasive species such as Himalayan blackberry bushes.

2.3 AGRICULTURAL VEGETATIVE DEBRIS MANAGEMENT PRACTICES IN METRO VANCOUVER

In order to develop an understanding of current waste management practices of agricultural vegetative debris in Metro Vancouver, a broad outreach campaign was conducted to individuals and organizations affiliated with the agricultural sector as well as local government and regulation enforcement. Appendix A provides details of all stakeholders contacted, but in gaining an understanding of current practices, WSP has relied primarily on discussions with the following groups:

- Ministry of Agriculture, Food and Fisheries (MoAg) staff;
- Agricultural sectoral / growers associations representatives;
- Farmers, and;
- MVRD Environmental Regulation & Enforcement Officers.

Based on communications with the above stakeholders and a literature review, in general the most common agricultural vegetative debris management practices in Metro Vancouver are:

- Re-use on-farm (mulch, ground cover);
- Reincorporation into soil;
- Composting;
- Open-air burning;
- Transport to landfill or green waste facility transfer station;
- Use in other sectors.

The following sections delve into individual sectoral / crop areas in more detail to provide a discussion of management practices.

2.3.1 LAND CLEARING

As discussed in Section 2.1.1, land clearing activities represent the majority of MVRD open-air burning approvals over the last three years. Twenty burn approvals were obtained for land clearing activities between February 2017 and April 2020, eight of which are associated with the agricultural sector and an additional four were deemed likely agricultural. Reasons for production of land clearing debris include

bringing idle and overgrown agricultural land back into production, removal of invasive species, and clearing of forest to open up land not previously used for agriculture.

Burning of agricultural land clearing debris appears to be the most common management approach, though use of chipping was also reported. Potential alternative management options include the chipping or grinding of land clearing debris and subsequent use of chips as a biomass fuel, landscaping material, agricultural bedding or composting material. Within Metro Vancouver, waste wood is typically managed by biomass aggregation / brokerage firms that collect wood waste from a wide range of sources, and process it, and sell it to end users. Large composting firms may also manage wood waste directly. Discussions with wood biomass brokerage firms and large-scale commercial composting operations revealed that land clearing debris is often contaminated with dirt, rocks, and green material (leaves, evergreen needles), making chips produced from land clearing debris less attractive as a composting material or biomass fuel than chips produced from "clean" wood streams such as sawmill waste or untreated construction debris. The contamination of agricultural land clearing debris, together with its scattered distribution throughout the region, inconsistent availability, and often small per site waste volumes limit the interest of wood biomass brokerage firms and large-scale commercial composting operations.

2.3.2 BLUEBERRY SECTOR

Blueberries are the largest berry crop in the Metro Vancouver area. Information obtained through communications with industry specialists at the BC MoAg, the BC Blueberry Council, and growers in the region indicates burning is not widely used. However, some burning does occur and MVRD open-air burning approval records between February 2017 and April 2020 show five approvals related to this sector, four of which for burning of pruning debris such as branches and clippings and one for burning of diseased blueberry bushes.

Standard procedures for pruning, particularly for younger blueberry bushes, are clipping, flail mowing, and mulching. The resulting material is frequently mulched in the field and left in place as ground cover in inter-row spaces. Higher volumes of vegetative debris generation are associated with field renovations, i.e. pulling out sections or entire fields, or diseased blueberry bushes. Blueberry fields with good yields can last 20 to 30 years, but with the development of new varieties with high yield and marketability, there is constant pressure to renovate / replant old fields. Growers indicated that use of chipping and soil incorporation is common practice for management of field renovation debris, though concerns about the cost of chipping were indicated.

Special consideration must be given to waste management of diseased vegetative material, which may require burning or burying. Blueberry scorch virus (Boscov) is the key pathogen of concern for blueberry growers in MVRD, and bushes with this disease must be removed to limit its spread. Under Section 24 of the BC OBSCR, open-air burning restrictions can be relaxed upon verification of diseased material by a registered agrologist, professional biologist or forester.

2.3.3 CRANBERRY SECTOR

Cranberries are the second largest berry crop in Metro Vancouver, located across the region in Richmond, Delta and along the Fraser River in Pitt Meadows and Langley. Information on current practices in the cranberry sector was gathered through communication with industry specialists at the BC MoAg, the BC Cranberry Growers Association, MVRD Environmental Regulation & Enforcement Officers and growers in the region.

The amount of vegetative debris from annual pruning and regular field maintenance of cranberry fields is relatively low in regard to tonnage and consists of leaves, vines, weeds, rotten fruit and debris generated during harvest. The material typically remains piled on-site to compost in place (inactive composting). Due to its nature, the cranberry vegetative debris can be wet and waterlogged and is difficult to burn.

Anecdotal information indicates that there are two preferred methods for disposal of vegetative debris generated from field renovations, (1) piling of material (which may contain soil) in the form of berms between cranberry fields and major roads or urban area, and (2) open-air burning. MVRD open-air burning approval records between February 2017 and April 2020 show two approvals related to this sector for burning of wood and roots from cranberry field renovation. As with the blueberry sector, the development of new varieties with high yield and marketability is the key driver of renovating / replanting old fields.

2.3.4 HAZELNUT AND TREE-FRUIT SECTOR

The hazelnut and tree-fruit sector in Metro Vancouver is relatively small and mainly located in Langley, with the majority of the hazelnut operations in the Lower Mainland in the Fraser Valley Regional District. Nevertheless, this sector has potential for generating vegetative debris from pruning and orchard removal. The hazelnut industry in the region is undergoing revitalization after the Eastern Filbert Blight, an airborne disease, devastated orchards in the Lower Mainland, requiring tree removal and burning, or composting off site to prevent further spread of the disease. As seen with the Eastern Filbert Blight and similar pathogens, vegetative debris management requires careful consideration of biosecurity issues.

Standard vegetative debris management methods of prunings from the predominantly young hazelnut trees as well as grass clippings and post-harvest processing waste are re-use on-farm through mulching (mowing and chipping), composting and occasionally open-air burning for land clearing of old (diseased) orchards. Waste from processing of hazelnuts (primarily shells) is generally not of concern as there is a receiving station in the Fraser Valley Regional District providing washing, drying and shipping services for growers.

2.3.5 VEGETABLE SECTOR

A number of field vegetable crops are grown in Metro Vancouver, including root and tuber vegetables, cole crops, salads and leafy greens, as well as beans and peas. In general, the vegetable sector generates non-woody, herbaceous post-harvest waste that is typically reincorporated into the soil, used for composting or as livestock feed. Cull piles are also spread out over the fields and incorporated into the soil. Anecdotal information indicates some burning may occur on vegetable farms, primarily for management of land clearing and invasive species debris.

Waste management approaches, particularly with respect to the use and integration of vegetative debris from other crop sectors, must consider biosecurity, as vegetable crops are sensitive to pathogen impact.

2.3.6 LANDSCAPE AND NURSERY SECTOR

The landscape and nursery sector is comparatively small, making up approximately 4% of the total agricultural production in the Metro Vancouver region. MVRD open-air burning approval records between February 2017 and April 2020 show one approval related to this sector for burning of tree leftovers from plant nursery production.

Information gathered from growers indicates composting is commonly used as preferred waste management method for vegetative material. Material may be piled and chipped / ground prior to

composting. Frequently, diseased vegetative debris can be composted as well; however, burning is required for disposal of some diseased material such as plants affected by the fungal disease commonly known as silver leaf (*Chondrostereum purpureum*). Anecdotal information indicates that Lower Mainland Landscape and Nursery growers make use of third-party waste removal and composting services.

2.3.7 SMALL SCALE AND HOBBY FARMS

Small scale and hobby farms are common in parts of the region, particularly Langley Township and rural parts of Surrey and Maple Ridge. Though agricultural production from these farms is typically small, they are numerous, and often do not have access to similar resources or equipment as larger farms. MVRD Environmental Regulation & Enforcement Officers report observing significant seasonal burning from these farms, and conversations with farmers bears this out. Farmers indicated that burning small amounts of vegetative debris is common practice, typically for management of blowdown material from trees, minor land clearing and property cleanup. The cost of alternative management approaches is viewed as a significant barrier, and farmers also report that on-farm reuse of material such as chipped debris can be difficult, owing to the relatively small size of typically small scale and hobby farm properties. Nevertheless, chipping and reuse is currently carried out in some cases.

3 ALTERNATIVE MANAGEMENT OPTIONS

3.1 JURISDICTIONAL REVIEW

An initial high-level jurisdictional scan identifying approaches taken in other jurisdictions to reduce emissions from open-air burning of agricultural vegetative debris with primary focus on North America was conducted. Based on this information, current and past regulations, programs, and practices were investigated in the following jurisdictions:

- British Columbia;
- the Regional District of Central Okanagan (RDCO), BC;
- the Regional District of Okanagan-Similkameen (RDOS), BC;
- the Cowichan Valley Regional District (CVRD), BC;
- Okanagan, Chelan, and Douglas Counties, Washington, USA;
- Washington State, USA;
- Hood River County, Oregon, USA, and;
- the San Joaquin Valley, California, USA.

Information was gathered through research of publicly available literature as well as regulator and stakeholder interviews. A tabular summary of the jurisdictional review, programs and regulations identified, as well as a discussion of relevance to local sectors and crops is provided in Table 3-1 below.

Table 3-1 Jurisdictional review of alternative agricultural vegetative debris management practices and programs

Jurisdiction	Practices/ Programs	Description	Status	Advantages	Disadvantages	Relevance to MVRD Agriculture
British Columbia, Canada	Canada-British Columbia Environmental Farm Plan (EFP) Program and Beneficial Management Practices (BMP) Program	• EFP program supports farms to complete agri-environmental risk assessments and enables farm operations with approved EFP to qualify for project funding through the BMP program • BMP eligible projects include, among others, waste management, air quality control, and emissions control	Active	• Promotes alternative practices to open-air burning • Promotes best practices to reduce emissions if burning is necessary • The 2020-2021 BMP program provides funding for agricultural waste management through (1) funding for purchase of on-farm portable chippers and forced air assistance burners (with 30% individual cost share, $10k funding cap); (2) composting technologies (up to $25k with 30% cost share); (3) orchard and vineyard mulching mowers ($1.5k, 30% cost share)	• Dependent on farmers' willingness to implement environmentally sound practices • BMP funding applies to changes to existing practices identified under the EFP only, not new operations • Under the 2020-2021 BMP funding, rental or contracted wood residue management services are ineligible	• EFP program applicable to all types and sizes of farms throughout BC • MV farms with valid "farm class" and EFP have access to BMP program
Regional District of Central Okanagan, British Columbia, Canada	Agricultural Wood Waste Chipping Program	• Chipping program for agricultural wood waste from orchard removal and land clearing (since 2004) • Coordinated through the RDCO Air Quality Program with support from the British Columbia Fruit Growers Association, the BC Fruit Packers Cooperative and the Pacific Agri-Food Research Centre • Funded through annual contributions from member municipalities.	Active	• Notable reduction in burn permit applications • Contractor moves and operates chipping equipment • End product (mulch) can be used in place or distributed to off-farm end-users	• Success dependent on consistent source of funding • At times overloaded, leading to wait list and a potential for farmers to burn instead • Aimed at larger scale operations only due to operational cost • Farmers responsible for preparing trees properly	• Highly relevant to cranberry and blueberry sectors, where full field renovation / tear-out are common. Could potentially be used for non-diseased tree crops.

Jurisdiction	Practices/ Programs	Description	Status	Advantages	Disadvantages	Relevance to MVRD Agriculture
		• Chipping conducted by a contractor				
Regional District of Central Okanagan, British Columbia, Canada	"Mow / Chip /Rent-It Rebate" Program	• Rebate program aimed at off-setting chipping costs for farmers through rebates on chipping and flail mowing services or equipment rental (since 2018). • Coordinated through the RDCO Air Quality Program. • Funded from the same source as the RDCO Agricultural Wood Waste Chipping Program: annual contributions from member municipalities	Active	• Available to smaller-scale farming operations not qualifying for the Agricultural Wood Waste Chipping Program • Easy to access online application process	• Success dependent on consistent source of funding	• Particularly relevant to blueberry and hazelnut/orchard sector • May benefit from partnership with lending library
Regional District of Okanagan-Similkameen, British Columbia, Canada	Agricultural Wood Waste Chipping Program	• Chipping program for orchard wood waste (since 2006) • Initial (2005 – 2010) funding through provincial grants and managed through air quality management plan • Program is currently coordinated through RDOS Solid Waste Management and funded through solid waste management fees and taxes • Growers required to pay 25% of the estimated chipping quote	Active	• Incentive to dispose of vine and tree debris from agricultural operations • Reduction of burning emissions in the region • Encourages salvaging of wood • Contractor moves and operates chipping equipment	• Program was over-subscribed when chipping was free • Program is under-subscribed since growers required to carry 25% of the cost • Dependent on growers' willingness to implement environmentally sound practices • Open-air burning presents a cheaper method to farmers of waste disposal	• Highly relevant to cranberry and blueberry sectors in particular, where full field renovation / tear-out are common. Could be used for non-diseased tree crops. • Further quantification of agricultural wood waste in Metro Vancouver needed to better understand the relevancy to Metro Vancouver solid waste services.

Jurisdiction	Practices/ Programs	Description	Status	Advantages	Disadvantages	Relevance to MVRD Agriculture
		• Pulling and gathering of trees is the responsibility of growers, chipping is conducted by a chipping contractor • Program distinguishes between large (>5 acres) and small (<5 acres) operations				
Regional District of Okanagan-Similkameen, British Columbia, Canada	Agricultural Organic Matter Disposal	• Free disposal of vegetative materials from agricultural operations at landfills in Campbell Mountain, Okanagan Falls, Oliver, and Keremeos. • Responsibility of growers to suitably prepare material, i.e. ensure material is not contaminated, sized appropriately, does not contain land clearing material or other prohibited wastes	Active	• Incentive to properly dispose of plant-derived agricultural wastes instead of burning	• Dependent on farmers' willingness to implement environmentally sound practices • Hauling cost falls on farmers	• Potentially relevant to local agricultural sectors. Farmers in Delta currently have access to low cost disposal of agricultural waste at Vancouver landfill, but farmers in other MVRD municipalities do not. • Metro Vancouver's solid waste management system operates on a cost recovery basis, limiting the feasibility of tipping fee reductions for select user groups, although other funding sources to subsidize fees could be explored.
Cowichan Valley Regional District, British Columbia, Canada	Bylaw No. 2020 – Landclearing Management Regulation Bylaw, 2009	• Cowichan Valley Regional District prohibits open-air burning of land clearing debris, exempting normal farm practices as defined by the BC Farm Practices Protection (Right to Farm)	Active	• Reduction of burning emissions through required use of air curtain or trench burners if alternatives to burning are not an option	• Requires accessibility to approved burning equipment	• Promoting use of air curtain or trench burner relevant to agricultural land clearing in MV

Jurisdiction	Practices/ Programs	Description	Status	Advantages	Disadvantages	Relevance to MVRD Agriculture
		Act. Provincial agricultural waste code of practice and open burning regulation requirements still apply. • Alternative practices such as composting, chipping and grinding are promoted. If burning is necessary, air curtain or trench burners are required, but normal farm practices are exempt from this requirement.				
Cowichan Valley Regional District, British Columbia, Canada	Municipality of North Cowichan	• Chipping program for North Cowichan residents to dispose of yard waste at no cost. • Funded by one-time $15,100 grant by the Community Resiliency Investment (CRI) and Fire Smart Community Funding & Supports programs which are intended to reduce the risk and impact of wildfire to communities in BC through funding of local governments and First Nations initiatives.	Active	• Provides a no cost disposal option that is targeted at small land holders	• Not explicitly focused on agricultural burning. • Funding comes from sources focused on wildfire risk reduction, so may not be Metro Vancouver relevant. • No details available on how the program has been implemented	• Potentially relevant for hobby farmers / small landholders.
Okanogan, Chelan, and Douglas Counties, Washington, USA	Orchard Chipping Grant (EPA Grant #BG-99086004	• U.S. Environmental Protection Agency grant coordinated by Washington Department of Ecology, which regulates agricultural burning in the state, to provide cost-	Discontinued	• Incentivised chipping of large amounts of vegetative debris from orchard tear-outs by making the cost of chipping comparable to the cost of burning	• Program not economically feasible without funding • Transportation cost for wood chips to power generating facilities may exceed the benefit of their use as power source, i.e.	• Highly relevant to cranberry and blueberry sectors in particular, where full field renovation / tear-out are common.

Jurisdiction	Practices/ Programs	Description	Status	Advantages	Disadvantages	Relevance to MVRD Agriculture
	Performance Partnership Grant)	sharing chipping and flailing programs as alternative to open-air burning (2002 – 2006) • The grant required chips not to be burned or directed toward landfills		• End-product used as ground cover (mulch, beauty bark, dust control, livestock bedding, mine reclamation) and in power production (as hog fuel) • Chipping promoted as alternative to open-air burning of vegetative debris • Chipping as pest management for codling moths, spider mites, aphids, and scale insects in abandoned orchards • Significant reduction of particulate matter and other pollutants released into air • Partnership between stakeholders, industry, and government enhanced	energetic use of chips must outweigh hauling costs	
Washington, USA	Agricultural Burning & Research Task Force	• Broad array of interest groups chaired by the Washington Department of Ecology, including Washington Department of Agriculture, as well as representatives from local air agencies, farmers, growers' associations, public health agencies, university and colleges, and the Washington Conservation Commission	Active	• Conducting research, with research projects tailored to alternative practices to burning	• Expert knowledge focused on region east of the Columbia Crest	• The Agricultural Burning & Research Task Force presents a useful model for a government / agriculture industry / stakeholder body that coordinates the management of agricultural burning. There is potential for application of such a model in Metro Vancouver.

Jurisdiction	Practices/ Programs	Description	Status	Advantages	Disadvantages	Relevance to MVRD Agriculture
		• Develops best practices for reducing air pollution from agricultural burning				
Hood River County, Oregon, USA	National Air Quality Initiative (NAQI)	• U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) provides financial assistance to farmers to implement practices such as chipping, grinding, and clean burning methods aimed at reducing open-air burning	Active	• Chipping, grinding and air curtain burners promoted as alternative to open-air burning of vegetative debris • Partnership between stakeholders, industry, and government enhanced	• Success dependent on consistent source of funding	• Highly relevant to cranberry and blueberry sectors in particular, where full field renovation / tear-out are common. Could be potentially used for non-diseased tree crops.
Hood River County, Oregon, USA	NRCS Conservation Innovation Grant	• U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) provided grants to farmers aimed at adopting innovative technologies, enabling a group of growers to purchase an air curtain burner	One-time	• Enabled implementation of costly alternative technology (air curtain burner) • Significant reduction of particulate matter and other pollutants released into air • Shared resource; able to utilize air curtain burners on a number of farms in the region	• Transportation and associated insurance of the air curtain burner is costly • Equipment has to be chosen and sized appropriately for the intended type of vegetative burning • Some operator training may be required	• Provides a useful example of a lending library type application of an air curtain burner. • Applicable to regional crop and debris types.
San Joaquin Valley, California, USA	San Joaquin Valley Air Pollution District Alternative to Agricultural Open Burning	• Pilot program providing chipping/shredding incentives for orchard and vineyard vegetative waste based on two categories, (1) chipping with soil incorporation ($600 per acre, up to 60k a year) and (2) chipping without soil	Active	• Program is well received by growers; applications received throughout the year • Program aimed at keeping chips on-site or other agricultural land specifically to be used for agricultural purposes. It's to be	• Success dependent on consistent source of funding • Soil incorporation does not work for all vegetative waste	• Relevant to regional vegetative debris types, provides an example of differential incentives with and without soil incorporation of chips.

Jurisdiction	Practices/ Programs	Description	Status	Advantages	Disadvantages	Relevance to MVRD Agriculture
	Incentive Pilot Program	incorporation ($300 per acre, up to 30k a year) • Established in 2018, actively funded from state and federal grant programs. • Chipped material is prohibited from burning; non-agricultural uses include being hauled off, sold or donated to biomass power generation or composting facilities		• incorporated in the soil or used as ground cover • Carbon sequestration due to incorporating chipped material in the soil		
San Joaquin Valley, California, USA	San Joaquin Valley Unified Air Pollution Control District Rules: Amended District Rule 4103 Open Burning; Smoke Management System	• San Joaquin Valley Unified Air Pollution Control District regulates and coordinates the use of open-air burning in the region • Open-air burning is managed by the District's Smoke Management System through permits and authorizations that among others take atmospheric and air quality conditions as well as number of burn allocations per zone across the Valley into account	Active	• Improvement of regional air quality and reduction of health risks due to open-air burning (e.g. burning of orchards) • Explicit limits on burning in smoke sensitive areas with greater population densities • Burn permits authorized for individual burns on a daily basis allowing for consideration of atmospheric conditions	• Requires extensive funding and resources	• Similar permitting / authorization approach to that currently taken by Metro Vancouver, but with greater spatial and temporal granularity.

3.2 SCREENING OF ALTERNATIVE PRACTICES APPLICABLE TO METRO VANCOUVER

Based on the jurisdictional review in Section 3.1 and conversations with Metro Vancouver farmers and other agricultural stakeholders, WSP has summarized the alternative vegetative debris management approaches potentially applicable to Metro Vancouver into the following broad categories:

Open-air burning: The current baseline practice of open-air burning piles of vegetative debris, governed by the municipal bylaws, Metro Vancouver Air Quality Bylaw, and provincial Open Burning Smoke Control Regulation (OBSCR). Currently allowed with regulatory limitations in approximately half of all Metro Vancouver municipalities.

Air curtain burning: The on-farm use of a trench burner or package air curtain burner to combust vegetative debris with forced aeration. The use of such devices is promoted within OBSCR through the relaxation of some requirements but still requires an authorization from Metro Vancouver. This practice is not currently established within Metro Vancouver, in part due to lack of available equipment. The Hood River County NRCS Conservation Innovation Grant program detailed in Section 3.1 provides an example air curtain use for agricultural vegetative debris management.

Chipping with on-farm use: The on-farm chipping of vegetative debris using woodchippers or tub grinders and the on-farm reuse of the chipped material. This practice is currently widespread within Metro Vancouver, and many farms already employ it for management of vegetative debris. The RDCO and RDOS Agricultural Wood Waste Chipping Programs detailed in Section 3.1 provide examples of programs designed to increase uptake of chipping with on-farm use.

Chipping with off-farm use: The on-farm chipping of vegetative debris using woodchippers or tub grinders, and the subsequent hauling of material for off-farm reuse, typically by wood fibre recycling / brokerage firms. This practice is currently established within Metro Vancouver, although wood fibre recycling / brokerage firms indicate that in practice, many types of agricultural vegetative debris are not suitable for off-farm use due to contamination by soil. This approach is best suited to clean land clearing debris consisting of large trees. The RDCO and RDOS Agricultural Wood Waste Chipping Programs detailed in Section 3.1 provide examples of programs designed to increase uptake of chipping with on-farm use. The Washington State Orchard Chipping Grant detailed in Section 3.1 investigated off-farm reuse of chipped material.

Mulching and mowing: The on-farm mulching or mowing of vegetative debris that has been spread on the ground, typically between rows of orchard crops or berries. This approach is only applicable to smaller size debris but represents the current baseline practice for management of prunings within the Metro Vancouver blueberry sector. The RDCO Mow-It/Chip-It Programs detailed in Section 3.1 provide an example of programs designed to increase uptake of mowing as a debris management method for small scale farms and other small rural properties.

On-farm composting with no chipping: The on-farm management of vegetative debris through piling of material without chipping, and composted, either with or without turning of piles. This practice is currently established within Metro Vancouver, particularly for annual pruning debris from cranberry growing, and debris that is not woody in nature.

Off-farm disposal: The on-farm aggregation of un-chipped vegetative debris and hauling for disposal at either regional facilities such as the Vancouver Landfill, or private landfill facilities. This practice is currently established in Metro Vancouver but is typically employed only for small

volumes of debris due to the cost of disposal. The RDCO and RDOS Agricultural Wood Waste Chipping Programs detailed in Section 3.1 provide examples of programs designed to increase uptake of chipping with on-farm use. The RDOS Agricultural Organic Material Tipping Fee and Vancouver Landfill Solid Waste from Delta Farms Tipping Fee are examples of reduced tipping fees specifically targeted at agricultural debris.

In order to further evaluate these vegetative debris management practices and screen them for development of potential programs within Metro Vancouver, a structured decision-making evaluation approach has been employed. Each of the practices has been evaluated against 18 criteria, with scoring assigned from 1 (poor) to 5 (excellent). Details of the criteria follow, including a description of the scoring approach for each. Note that for this screening assessment, all scoring is qualitative, based on WSP's understanding of the practices from literature research and stakeholder discussions.

Applicability: Applicability scores are based on the fit of a given management practice to the needs of a particular type of debris. A score of 1 means that a given management practice is poorly suited for managing that type of debris, while a score of 5 means a management practice is highly suited to managing that type of debris.

Air Quality/Emissions: Management practices that produce the least direct (i.e. from burning) or indirect (from fossil fuel combustion) emissions received a score of 5, while management practices that produce the most direct and/or indirect emissions received a score of 1.

Greenhouse Gas Generation: Carbon dioxide (CO_2) emissions from burning of biomass were considered carbon neutral for the purpose of this analysis, but significant methane (CH_4) and nitrous oxide (N_2O) emissions from biomass burning were considered, as were CO_2, CH_4 and N_2O emissions associated with fossil fuel use from on-farm and off-farm transportation and processing. Note that the climate forcing impact of woodburning particulate emissions was not considered in the analysis due to uncertainty around the particulate composition (black vs brown carbon) of wood smoke. Management practices that produce the least GHG emissions received a score of 5, while management practices that produce the most GHG emissions received a score of 1.

Waste Generation, Reuse and Recycling: Looks at whether a management practice reduces the generation of waste which must be managed on or off the farm. Additionally, considers the potential for on-farm or off-farm reuse or recycling of biomass as a soil amendment, ground cover or other. Management practices that minimize generation of waste and maximize reuse / recycling of material received a score of 5, while management practices that produce the most unreusable / unrecyclable waste received a score of 1.

Transportation Impact: Need to transport machinery to/from farms, as well as the need to transport biomass / waste materials from farms. Management practices that require the least transportation of machinery and material received a score of 5, while management practices that require the most transportation of machinery and material received a score of 1.

Ecosystem Impact: Impact of management practices on ecosystem health, with focus on-farm ecosystems such as wetlands, riparian areas, field buffers. Management practices that minimize ecosystem impacts received a score of 5, while management practices with the most potential for ecosystem impacts received a score of 1.

Soil Quality: Impact of management practices on soil quality. Management practices that maximize potential benefits to soil quality received a score of 5, while management practices with the most potential for negative soil quality impacts received a score of 1.

Biosecurity: Ability of management practices to mitigate biosecurity concerns associated with disposal of diseased plant material. Management practices that eliminate biosecurity concerns received a score of 5, while management practices that may not effectively manage biosecurity concerns received a score of 1.

Regulatory Acceptance: Compatibility of management practices with existing municipal, regional and provincial regulations. Management practices that are fully compatible with existing regulations received a score of 5, while management practices that raise the most concerns relative to existing regulations received a score of 1.

Agricultural Stakeholder Acceptance: Acceptance / familiarity of farmers and other agricultural stakeholders with the management practices. Management practices that are well accepted by agricultural stakeholders received the highest score, while management practices that are not well accepted or raise concerns from agricultural stakeholders received the lowest score.

Public Perception: Concern of the public with management practices. Management practices that generate the least public concern received a score of 5, while management practices that cause significant public concern received a score of 1.

Estimated Capital Cost: Relative overall capital cost of the management practices, considering both on and off-farm costs. Management practices with the lowest relative capital cost received the highest score, while management practices with the highest relative capital cost received the lowest score.

Operations & Maintenance Cost: Relative operations and maintenance cost of the management practices, considering both on and off-farm costs. Management practices with the lowest relative operations and maintenance cost received the highest score, while management practices with the highest relative operations and maintenance cost received the lowest score.

Local Supplier: Availability of equipment and knowledgeable suppliers of the management practices, as well the availability of off-farm facilities that will accept / manage biomass material. Management practices with equipment and/or services widely available from local suppliers received the highest score, while management practices with no currently available equipment and/or services from local suppliers received the lowest score.

Economic Advantages for Community: Potential for off-farm economic benefits associated with the disposal practice, such as equipment rental revenue and wages for provision of debris management services. Management practices with the greatest potential for off-farm economic benefit received the highest score, while management practices with the least potential for off-farm economic benefit received the lowest score.

Technological Uncertainty: Technical certainty in the success of the practice in delivering its management outcome. Management practices that are widely deployed and technologically certain received the highest score, while management practices that are not widely used and may exhibit technological uncertainty regarding their ability to manage vegetative debris received the lowest score.

In calculating the aggregate score for each practice, weighting factors from 1 (least important) to 5 (most important) are applied to each of the 19 criteria. These weighting factors have been developed based on WSP's understanding of Metro Vancouver's regional priorities and refined where applicable through discussions with Metro Vancouver staff.

Table 3-2 Agricultural vegetative debris management practice feasibility assessment matrix

	Management Practice	Weighting	Open-air burning	Air curtain burning	Chipping with on-farm use	Chipping with off-farm use	Mulching and mowing	On-farm composting with no chipping	Off-farm disposal
Applicability	Field Replanting / Renovation	2	5	5	5	5	1	2	4
	Annual Pruning	2	3	3	3	3	5	3	2
	Land Clearing / Clean-up	2	5	5	5	5	3	1	4
Environmental	Air Quality/Emissions	5	1	3	4	3	5	4	3
	Greenhouse Gas Generation	5	1	3	3	2	4	4	2
	Waste Generation, Reuse, Recycling	2	3	4	5	4	5	4	2
	Transportation Impact	3	5	4	4	2	5	5	2
	Ecosystem Impact	3	2	3	5	4	5	3	3
	Soil Quality	3	2	4	5	4	5	3	3
	Biosecurity	3	5	5	2	1	2	4	3
Social	Regulatory Acceptance	5	1	4	5	4	5	5	4
	Agricultural Stakeholder Acceptance	5	3	2	3	2	4	4	2
	Public Perception	3	1	3	4	4	5	4	4
Economic	Estimated Capital Cost	5	4	1	3	2	4	4	3
	Operations & Maintenance Cost	4	5	2	3	2	4	4	2
	Local Supplier	3	5	1	5	4	5	5	2
	Economic Advantages for Community	3	1	3	3	4	3	1	1
	Technological Uncertainty	2	5	3	5	4	5	4	5
	Total Score		**175**	**182**	**232**	**184**	**254**	**224**	**166**

The following paragraphs provide a brief discussion of the scoring for each vegetative debris management practice.

Open-air burning has wide applicability to the full range of vegetative debris types, low transportation requirements because no materials or equipment need to be moved to or from the farm site, is good for disposing of diseased plant material, and is a low-cost, simple and proven method. Conversely, open-air burning produces by far the largest amount of air contaminant emissions and associated public health implications, and due to its inefficient combustion producing methane emissions, is also the largest greenhouse gas emitter. It has poor public perception due to visible smoke produced and is not authorized in a number of municipalities due to restrictions in bylaws.

Air curtain burning has wide applicability to the full range of vegetative debris types, moderate transportation requirements due to the need for equipment to be moved to or from the farm site, is good for disposing of diseased plant material, and offers reductions of both air contaminant emissions and greenhouse gas emissions relative to open-air burning. However, air curtain burning equipment is not readily available in Metro Vancouver, has high capital and operating costs, and is not currently well known and accepted by the agricultural community.

Chipping with on-farm use has wide applicability to the full range of vegetative debris types, moderate transportation requirements due to the need for equipment to be moved to or from the farm site and offers significant reductions of both air contaminant emissions and greenhouse gas emissions relative to open-air burning and air curtain burning. Further, chipping with on-farm use returns nutrients to farms soils and is a well known, readily available and accepted management option within the agricultural community. Conversely, chipping with on-farm use has a relatively higher cost than open-air burning and may not be able to handle some diseased plant material due to concerns with spreading of airborne pathogens.

Chipping with off-farm use has relatively similar scoring to chipping with on-farm use but has higher air pollutant and greenhouse gas emissions due to the need to transport chips from the farm site to an offsite location. Due to the need for additional hauling, costs are also higher.

Mulching and mowing is not applicable to all vegetative debris types but still receives the highest score of all management options, because it offers low emissions, very limited transportation needs, recycling of nutrients on-farm, and low costs. For appropriate debris types (pruning debris), mulching / mowing is a widely used, simple and proven method with relatively low capital and operating costs.

On-farm composting with no chipping is similar to mulching / mowing in that it is not applicable to all debris types, particularly very bulky debris such as those derived from land clearing. However, it still scores very well because it offers low emissions, very limited transportation needs, recycling of nutrients on-farm, and low costs. For appropriate debris types and farms that have space and equipment for managing the composting process, on-farm composting with no chipping is a simple and proven method with relatively low capital and operating costs.

Off-farm disposal is applicable to a range of debris types, but due to the need for movement of debris off the farm to a disposal location, it may not be well suited to large amounts of bulky debris. It offers significant emissions reductions relative to open-air burning, but it has relatively high transportation impacts and associated emissions, and with the exception of farms located in Delta, there are significant costs associated with the disposal of debris.

Based on the scoring of management approaches in Table 3-2, the approaches that offer the most promise for further development of alternative vegetative debris management assistance programs in Metro Vancouver are chipping with on-farm and off-farm use, mulching / mowing, and on-farm composting of unchipped material. Air curtain burning did not score highly, but there may be potential for assistance programs to mitigate concerns, particularly because air curtain burning offers significant emissions

reduction benefits in instances where burning is required, such as the management of debris from some types of diseased plants.

3.3 IMPLEMENTATION OF ALTERNATIVE PRACTICES IN METRO VANCOUVER

Discussions with stakeholders, including Metro Vancouver farmers, have indicated that all of the alternative vegetative debris management practices detailed in Section 3.2 have been adopted to some degree within the region. Stakeholders have indicated that the key barrier to further uptake of alternative practices is their incremental cost relative to open-air burning. The jurisdictional review in Section 3.1 details a wide variety of different programs aimed at encouraging the uptake of alternative practices, but the key feature of all programs is reduction of the cost of alternative practices.

In order to deliver one or more programs that encourage adoption of alternative vegetative debris management practices in Metro Vancouver, a key consideration is the organizational delivery model. The programs summarized in Section 3.1 are delivered by a variety of governmental entities, including regional districts, state and national governments, and fire / air management districts, as well as non-profit agricultural advocacy organizations, and non-profit agricultural cooperatives. The following section summarizes the organizations contacted by WSP that represent the most promising potential as partner organizations in the implementation of programs that encourage adoption of alternative vegetative debris management practices in Metro Vancouver.

3.3.1 POTENTIAL PARTNER ORGANIZATIONS

Through discussions with stakeholder organizations including sectoral producer associations and agricultural advocacy and funding organizations, WSP identified three organizations that are both experienced in the delivery of programs providing assistance to farmers and have expressed interest in future discussions with Metro Vancouver regarding the development of potential programs to encourage adoption of alternative vegetative debris management practices. The organizations are detailed in the following table.

Table 3-3 Agricultural vegetative debris management program potential partner organizations

Organization	Mandate	Details
Agricultural Research & Development Corporation (ARDCorp), subsidiary of the BC Agriculture Council (https://ardcorp.ca/)	Delivers programs and services that advance both the individual producer and entire agriculture sector while benefiting local communities. ARDCorp provides funding and assistance for a variety of producer-focused programs for which eligible BC farmers and ranchers are free to apply. Administers the Environmental Farm Plan program and Climate Action Initiative on behalf of the governments of Canada and British Columbia.	ARDCorp is the primary funder of "on-farm" assistance programs for BC farmers. Funding sources include the federal / provincial Canadian Agricultural Partnership. The existing Environmental Farm Plan program administered by ARDCorp already has Beneficial Management Practices that provide one-time incentives for BC farmers for the purchase of chipping and mulching equipment.

Organization	Mandate	Details
BC Investment Agriculture Foundation (https://iafbc.ca/)	Industry led, not for profit society that creates funding opportunities to support BC agriculture and agri-food sector through the effective delivery of programs. Currently responsible for delivering close to 20 funding programs, including Buy BC Partnership Program, Bee BC Program, Canada-BC Agri-Innovation Program.	The Investment Agriculture Foundation is the primary funder of "off-farm" assistance programs for BC agriculture and agri-foods, particularly in the areas of marketing campaigns ("Buy BC") and market development. Funders include Agriculture and Agri-Food Canada, Environment and Climate Change Canada, Western Economic Diversification Canada and The British Columbia MoAg.
Farmland Advantage (https://www.farmlandadvantage.com/)	Farmland Advantage is a research and development project, working towards establishing a long-term program to assist BC farmers with enhancing the ecosystem services on their land through stable long-term funding for environmental protection and enhancement initiatives.	Farmland Advantage is currently transitioning from a pilot program into a long-term funding program. Partnered with both ARDCorp and Investment Agriculture Foundation, the focus of Farmland Advantage is the implementation of programs that provide ongoing funding to ensure that environmental protection initiatives remain in place over the long term.

As all of the organizations detailed above have a BC provincial mandate and are funded primarily by the federal and provincial government, they are necessarily oriented towards delivery of province-wide programs. Though this does not preclude their involvement in a program oriented to the Metro Vancouver region, it may limit the availability of funding through these organizations for a regionally focused program. No potential organizations with a geographic focus solely on the Metro Vancouver region were identified.

3.3.2 BUSINESS MODELS

In reviewing the alternative vegetative debris management programs detailed in Section 3.1, a key feature of the programs reviewed is the reliance of all programs on external funding, typically from governmental sources. None of the programs reviewed derived significant revenue from beneficial use of vegetative debris. Though the potential for use of processed vegetative debris as an off-farm fuel, composting feedstock or soil amendment exists in theory, none of the programs identified were able to leverage this potential into a revenue source that would significantly fund program operation. As such, the operation of alternative vegetative debris management programs in the Metro Vancouver region would almost certainly require an ongoing source of funding from Metro Vancouver, its municipal members or senior governments, potentially through organizations such as the potential partners identified in Section 3.3.1.

Table 3-4 below summarizes the primary business models utilized in the provision of the programs detailed in Section 3.1.

Table 3-4 Agricultural vegetative debris management program potential business models

Business Model	Reference Programs	Details
Provision of services to farmers through contracting of alternative vegetative debris management service provider	RDCO Agricultural Wood Waste Chipping Program, RDOS Agricultural Wood Waste Chipping Program	RDCO and RDOS directly contracts chipping contractors who perform the chipping for farmers. RDCO program is free to farmers, while RDOS program charges farmers 25% of the total chipping cost as a non-refundable deposit. The RDCO program has an annual budget of $60,000 and is funded by contributions from the City of Kelowna, Regional District of Central Okanagan, District of Peachland, City of West Kelowna, Westbank First Nation and the District of Lake Country. For 2019, the program reports chipping of 4891 m^3 of material from 128 acres, for a unit cost of $469/acre, or $12.26/$m^3$. Excluding a single very large burn in 2019 (108,000m^3), the annual MVRD approved burn total was 9,129m^3, the same order of magnitude as the amount chipped under the RDCO program. The RDOS budget varies from year to year depending on program demand and is funded primarily from tipping fee revenue received by three solid waste service areas (Campbell Mountain, Oliver, Electoral Area A), together with a small contribution from regional tax requisitions.
Rebates for rental of alternative vegetative debris management equipment or purchase of alternative vegetative debris management services	RDCO Mow-It / Chip-It Rebate, San Joaquin Valley Unified Air Pollution Control District (SJVAPCD) Alternative to Agricultural Open Burning Incentive Pilot Program	RDCO provides a rebate of up to 80% of the daily/multi-day/weekly/rental or chipping/flail mow service cost up to a maximum of $500 rebate per applicant. This program has an annual budget of $20,000 and is funded by contributions from the City of Kelowna, Regional District of Central Okanagan, District of Peachland, City of West Kelowna, Westbank First Nation and the District of Lake Country. For 2019, the program reports funding for chipping or mowing of material from 55 acres for a unit cost of $364/acre. SJVAPCD provides a maximum incentive of $600 per acre up to a $60,000 cap (with soil incorporation of chips) or $300 per acre, up to a $30,000 cap (without incorporation of chips). Funding for the program comes from federal, provincial / state and local government contributions to the SJVAPCD operating budget.
Grants to farmers to assist in adoption of emission reduction measures	BC Environmental Farm Plan (EFP) Beneficial Management Practices (BMP) Program	BC EFP BMPs provide farmers one-time grants for (1) funding for purchase of on-farm portable chippers and forced air assistance burners (with 30% individual cost share, $10k funding cap); (2) composting technologies (up to $25k with 30% cost share); (3) orchard and vineyard mulching mowers ($1.5k, 30% cost share). Farms can receive up to a total of $70,000 funding under the EFP. Funding for the EFP program comes from the federal / provincial Canadian Agricultural Partnership fund.
Lending library of alternative vegetative debris management equipment	USDA NRCS Conservation Innovation Grant, Hood River, Oregon	USDA NRCS Conservation Innovation Grant provided one-time funding of $39,000 USD to Hood River County and the Columbia Gorge Fruit Growers to purchase an air curtain burner, which was then loaned to individual growers for use. The burner is no longer in use, primarily due to insurance costs and insufficient capacity.

Business Model	Reference Programs	Details
Reduced disposal fee for vegetative debris	RDOS Agricultural Organic Material Tipping Fee, Vancouver Landfill Solid waste from Delta Farms Tipping Fee	Landfills operated in the RDOS have an Agricultural Organic Material Tipping Fee of $0. The annual amount of material disposed of under this no fee category is not readily available, so it is not possible to determine the effective "cost" of this free disposal program. The Vancouver Landfill has a special fee category for solid waste from Delta farms, allowing the disposal of agricultural waste at $19 per load for up to 3 tonnes, for up to 5 loads per year. This is in contrast to the generic solid waste tipping fee of $99/tonne (9 tonnes or more), and $80/tonne for yard waste and food waste. This reduced tipping fee is not applicable to farms in any other Metro Vancouver municipality. As with the RDOS program, the annual amount of material disposed of under this no fee category is not readily available, so it is not possible to determine the effective "cost" of this reduced fee disposal program.

3.3.3 FUNDING SOURCES

Table 3-5 below summarizes the funding sources accessed by the programs reviewed in Section 3.1 that would be most relevant / applicable to potential alternative vegetative debris management programs in Metro Vancouver.

Table 3-5 Agricultural vegetative debris management program potential funding sources / programs

Funding Source	Reference Programs	Discussion
Funding from municipalities / regional districts covered by program	RDCO Agricultural Wood Waste Chipping Program, RDOS Agricultural Wood Waste Chipping Program, RDCO Mow-It / Chip-It Rebate	This is the funding approach used by both the RDCO and RDOS programs, with the RCDO program employing municipal and regional district funding contributions, and the RDOS program employing solid waste management program funding.
Canadian Agricultural Partnership funding	BC Environmental Farm Plan (EFP) Beneficial Management Practices (BMP) Program	The Canadian Agricultural Partnership is a five-year (2018-2023), $3 billion investment by federal, provincial and territorial governments. The BC Environmental Farm Plan is cost-shared on a 60-40 basis between the federal and provincial governments and is already providing funding for alternative vegetative debris management programs in the form of the chipping / forced air burning, composting and mulching BMPs.
Reduction of fees charged by municipalities / regional districts covered by program	RDOS Agricultural Organic Material Tipping Fee, Vancouver Landfill Solid waste from Delta Farms Tipping Fee	This funding approach is already employed in Metro Vancouver in the form of the Vancouver Landfill Solid waste from Delta Farms Tipping Fee
BC Investment Agriculture Foundation funding	The IAF does not currently fund alternative vegetative debris management programs.	The IAF have indicated on openness to investigating funding opportunities for alternative vegetative debris management programs, with the qualification that their funding would likely require a program with a provincial rather than regional scope.

4 EMISSION REDUCTION QUANTIFICATION

4.1 QUANTIFICATION METHODS

In order to refine understanding of the vegetative debris management practices assessed in Section 3.2, a detailed estimate of emissions reduction potential for each practice has been carried out. In addition, an estimate of the emissions associated with all of the Metro Vancouver authorizations for open-air burning of vegetative debris up to September 2020 has been performed, utilizing the same estimation methods.

4.1.1 EMISSIONS FACTORS

Quantification of emissions from open-air burning of vegetative debris has been performed utilizing the same estimation approach utilized in Metro Vancouver's 2015 emissions inventory. Emissions factors for particulate matter (total particulate, PM_{10} and $PM_{2.5}$) are taken from US EPA AP-42 Chapter 2.5 "Open Burning", while emissions factors for greenhouse gases (CO_2, CH_4, N_2O) are taken from Canada's Greenhouse Gas Inventory National Inventory Report methodology appendices. There is considerable variability in the available factors based on type of debris, as detailed in Table 4-1 below.

Table 4-1 Particulate and GHG emissions factors for open-air burning

Data Source / Debris Category	Total Particulate (kg/tonne)	Methane (kg/tonne)	Nitrous Oxide (kg/tonne)	Carbon Dioxide (kg/tonne)
US EPA AP-42 Chapter 2.5 "Open Burning" [a]				
Field Crops: Unspecified	11	2.7	-	-
Orchard Crops: Unspecified	3	1.2	-	-
Forest Residues: Unspecified	8	2.8	-	-
Forest Residues: Hemlock, Douglas fir, cedar	2	0.6	-	-
US EPA AP-42 Chapter 13.1 "Wildfires and Prescribed Burning" [b]				
Logging slash debris: dozer piled conifer (no mineral soil)	6	1.8	-	-
Agricultural Residues	-	2.7	0.23	-
Canada's Greenhouse Gas Inventory National Inventory Report [c]				
Prescribed Burns	-	6.2	1.3	1620
Average	6	1.97	0.77	1620
Maximum	11	2.8	1.3	-
Minimum	2	0.6	0.23	-

Notes
A dash ("-") indicates that no value for a parameter was available for a given reference.
a US EPA AP-42 Chapter 2.5 "Open Burning", table 2.5-5
b US EPA AP-42 Chapter 13.1 "Wildfires and Prescribed Burning", tables 13.1-3, 13.1-5
c Canada's Greenhouse Gas Inventory National Inventory Report 1990-2003, table A13-17

Note that AP-42 indicates that "particulate matter from most agricultural refuse burning has been found to be in the sub-micrometre size range", meaning that emissions factors for PM_{10} and $PM_{2.5}$ are equivalent to that for total particulate. Due to the variability in open-air burning emissions factors for total PM and methane based on debris type and given the uncertainty in types of debris for any given burn, the average of the factors shown in Table 4-1 will be used for all estimates, with minimum and maximum values used to quantify the potential range for the estimates.

Emissions quantification for the comparison of disposal options assumes a fixed amount of material (36 tonnes) and compares the various emissions for each disposal method. This amount of debris represents the median amount of debris combusted under the Metro Vancouver authorizations for open-air burning of vegetative debris up to September 2020. Quantification of open-air burning emissions utilizes the factors detailed above, while quantification of emissions from internal combustion of diesel fuel associated with equipment use is based on emissions factors from US EPA MOVES 2014b on-road / non-road emissions model. Emissions factors for air curtain burning are drawing from a 2017 literature review conducted by the San Joaquin Valley Air Pollution Control District, while emission factors for particulate emissions from wood chipping are taken from a US EPA 2016 Potential to Emit calculator for sawmill facilities.

4.1.2 QUANTIFICATION SCOPE / SOURCES

In order to compare the relative emissions associated with vegetative debris management practices, emissions for a number of different operations that comprise each practice must be assessed. The following table lists the operations included in the analysis scope, and their applicability to each management practice.

Table 4-2 Agricultural vegetative debris management practice emissions quantification operational matrix

Operation	Description	Emissions Type	Open-air burning	Air curtain burning	Chipping with on-farm use	Chipping with off-farm use	Mulching and mowing	On-farm composting with no chipping	Off-farm disposal
On-farm aggregation	Aggregation of material from distributed locations in fields to aggregation points for processing.	Fossil fuel emissions from equipment used to aggregate debris.	X	X	X	X		X	X
Debris processing - direct biomass emissions	Burning, chipping or mulching of material.	Direct biomass emission from burning or chipping of debris.	X	X	X	X	*		
Debris processing - fossil fuel use		Fossil fuel emissions from equipment used burning / chip / mulch debris.		X	X	X	X		

Operation	Description	Emissions Type	Open-air burning	Air curtain burning	Chipping with on-farm use	Chipping with off-farm use	Mulching and mowing	On-farm composting with no chipping	Off-farm disposal
On-farm mechanical management – movement / loading of debris	Loading of material into burner, chipper or haulage trucks	Fossil fuel emissions from equipment.		X	X	X		X**	X
Off-farm transportation - trucking equipment to/from site	Trucking of debris management equipment to / from site.	Fossil fuel emissions from trucks.		X	X	X	X***		
Off-farm transportation - trucking processed debris from site	Trucking of processed or unprocessed debris from site.	Fossil fuel emissions from trucks.				X			X

Notes
* Mulching / mowing likely produces dust emissions, but no emissions factor source is available
** Assume the use of a tractor to turn / management pile during composting
*** Assume that mulcher / chipper must be transported to / from site

Note that all operations and emissions detailed in Table 4-2 represent direct emissions occurring over a short timespan. Both chipping with off-farm use and off-farm disposal have the potential for further downstream emissions associated with use of the chips or disposal of unchipped debris. However, there is considerable uncertainty about what operations may occur once the chips or debris leave the farm. As such, the current analysis focuses on the comparison of the on-farm and associated transportation emissions when comparing management approaches.

4.2 QUANTIFICATION RESULTS

4.2.1 MANAGEMENT PRACTICE RELATIVE EMISSIONS

Figure 4-1 on the following page presents a summary of estimated relative particulate and GHG emissions for the vegetative debris management practices detailed in Section 3.2. Rather than presenting emissions quantities, results are presented as a percentage of open-air burning emissions, which represent the "baseline" condition. The figure presents both average estimates and minimum and maximum estimates based on the range of particulate and methane emissions factors detailed in Table 4-1. Note that the y-axis scales for TPM, PM_{10}, $PM_{2.5}$ and CH_4 are all logarithmic, because the differences in emissions between open-air burning and some other alternative practices are three to four orders of magnitude.

The key feature of the results in Figure 4-1 is the significant margin by which fine particulate ($PM_{2.5}$) emissions from open-air burning exceed all other debris management practices, with air curtain burning emitting only 11% of the particulate of open-air burning, and chipping emitting 1.4%. Also notable is that open-air burning exhibits the highest IPCC CO_2e emissions, more than triple the nearest management practice. This is largely due to significant methane and nitrous oxide emissions that occur during incomplete combustion and occurs despite the fact that biogenic CO_2 emissions from open-air burning (and air curtain burning) are considered carbon neutral. It is also worth noting that the potential climate forcing impacts of biomass combustion particulates have not been included in this analysis, but may further increase the GHG impact of biomass burning.

The contribution of fossil fuel combustion emissions associated with management equipment operation and haulage to and from sites where debris is managed are minor contributors to particulate emissions and their contribution to IPCC CO_2e emissions, though relatively larger than particulate, is still well short of the influence of higher methane and nitrous oxide emissions from open-air burning. The management options with the smallest number of different operations (mulching / mowing, on-farm composting) have the smallest overall emissions contribution. In situations where debris must be combusted, air curtain burning offers emissions reductions of almost 90% for particulate and 50% for GHG relative to open-air burning.

Appendix B includes a tabular summary of the emissions estimates summarized in Figure 4-1 and discussed above.

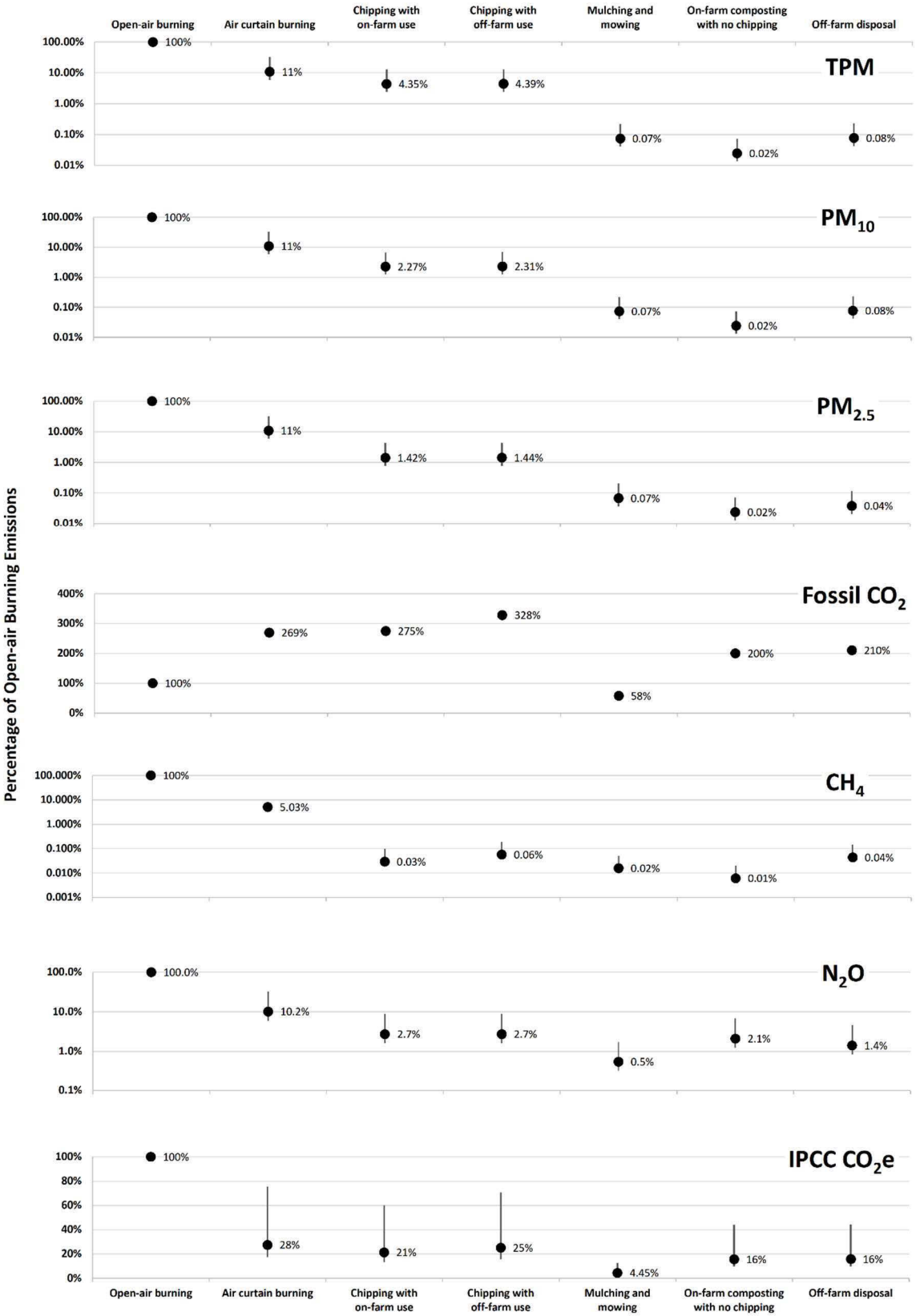

Figure 4-1 Agricultural vegetative debris management practice emissions comparison (% of open-air burning)

5 BARRIERS FACED BY FARMERS

5.1 OUTREACH SUMMARY

In order to identify barriers to the adoption of alternative vegetative debris management practices in Metro Vancouver, WSP contacted a number of farmers and farm industry stakeholders. Through a structured telephone interview format, farmers were asked about their current vegetative debris management practices and the potential benefits of and barriers to the alternative vegetative debris management programs described in Section 3.2. Farmers were identified through discussions with agricultural producer groups such as the BC Blueberry Council and BC Cranberry Growers Association, and a survey of farmer contacts available on marketing websites highlighting farmers around the Metro Vancouver region. In selecting farmers to be interviewed, the project team attempted to ensure diversity of agricultural sector / crop, farm size, and sub regional locations. WSP staff also attended the BC Blueberry Council Virtual Field Day on December 9, 2020.

In addition to speaking to farmers themselves, WSP also conducted extensive outreach with a wide range of organizations, including the BC MoAg, agricultural producer groups, and agricultural funding organizations. In many cases, these stakeholders had comments on the barriers to the implementation of alternative vegetative debris management practices. These comments are summarized together with farmer comments below. WSP also spoke with five staff from MVRD's Environmental Regulation & Enforcement Division who have experience with issuance of authorizations for agricultural open-air burning. Their experiences in working with farmers on the processing of applications and enforcement of authorizations process provide further valuable insight on barriers to the implementation of alternative vegetative debris management programs. The full list of non-farmer stakeholders is summarized in Appendix A.

5.2 OUTREACH RESULTS

5.2.1 WHO WE SPOKE TO

Table 5-1 below provides a summary of the farmers interviewed by WSP staff. To maintain the privacy of farmers, no names or contact information have been included in this report.

Table 5-1 Agricultural vegetative debris management farmer outreach groups

Category	Number	Comments
Cranberry Growers	2	1 medium size producer located in Langley, 1 large producer located in Richmond.
Blueberry Growers	2	Included 1 large producer with blueberry acreage in Richmond, Delta, Pitt Meadows and Langley, 1 medium size producer located in Ladner (Delta)
Landscape / Nursery Growers	2	Included 1 large grower with locations in the Okanagan and the Fraser Valley, and 1 smaller producer with a location the Fraser Valley. Unable to arrange interviews with growers in Metro Vancouver.

Category	Number	Comments
Other Crops	5	Included small mixed farms in Barnston Island, Surrey, Langley and Abbotsford.
Small / Hobby Farmers	2	Included 1 hobby farm in Langley and 1 in Abbotsford.
Total	**13**	

5.2.2 COMMON THEMES

In conversations with farmers and other stakeholders, a number of key themes regarding barriers to the adoption of alternative vegetative debris management practices emerged. Table 5-1 below provides a summary of the key feedback themes.

Table 5-2 Agricultural vegetative debris management farmer & stakeholder outreach feedback themes

Category	Discussion
Cost	The key theme that emerged in almost all farmer and stakeholder conversations was concern regarding the costs of alternative vegetative debris management practices. Open-air burning is widely perceived as the lowest cost disposal option. Even farmers who already opt to employ debris management practices such as chipping instead of open-air burning indicate concerns regarding the higher cost relative to burning. Experience from the RDOS chipping program indicates that even asking farmers to bear 25% of the total cost of chipping significantly reduced program uptake relative to its previous no-cost delivery model.
Bureaucracy	A number of farmers and stakeholders raised concerns related to the bureaucracy / red tape associated funding / assistance programs for agriculture and indicated that uptake of alternative vegetative debris management programs would be higher if program paperwork was minimized.
Government Control / Oversight	Hand in hand with concerns related to bureaucracy, a number of farmers and stakeholders raised concerns related to excessive data requirements for some existing funding / assistance programs for agriculture. Some farmers are concerned about sharing a significant amount of information related to their operation in order to qualify for funding / assistance.
Practical Feasibility	Farmers and stakeholders expressed concerns related to the practical feasibility of alternative vegetative debris management practices. In particular, farmers indicated that equipment access for practices such as chipping can be an issue, particularly due to wet soils. Further, particularly for small and hobby farms, there were concerns expressed regarding limited ability to make use of chipped or mowed debris on-farm due to space constraints.
Biosecurity	Farmers and stakeholders indicated that plant disease can be a common driver for the creation of vegetative debris, particularly in the case of sectors such as hazelnut and blueberry growing. Particularly for hazelnuts, which have been devastated by Eastern Filbert Blight (a fungal disease), burning of diseased material is the recommended management method, and other methods such as chipping should be avoided. Debris associated with most blueberry diseases such as scorch virus can be safely managed by composting of chipped material, but some farmers and stakeholders expressed a belief that burning is the most appropriate method for managing diseased material.

Category	Discussion
Availability	Particularly in the case of air curtain burning, stakeholders indicated that a significant barrier to uptake is the availability of alternative vegetative debris management equipment. At the current time, there are no air curtain burning service providers in Metro Vancouver, so it does not represent a readily available management approach.
Difficulty of Burning	Interestingly, despite open-air burning generally being considered the lowest cost and "easiest" vegetative debris management practice, a number of farmers and stakeholders indicated that burning is becoming increasingly difficult to do. The recent updates to the BC OBSCR increasing setback distances and limiting stump burning were cited, as was the relative scarcity of days with appropriate venting indices for burning. Metro Vancouver's own approval process for open-air burning was also noted. MVRD Environmental Regulation and Enforcement staff noted that during 2020, a significant number of burning authorization applications were not followed through because applicants reported opting for alternative practices such as chipping to avoid the difficulty in meeting all of the requirements for an open-air burn.

5.3 IMPLICATIONS FOR PROGRAM IMPLEMENTATION

The feedback from farmers and producer groups summarized in Table 5-2 above indicates that low cost to farmers, minimal administrative burden / complexity, and long-term availability of a program are key factors to overcoming barriers to program uptake. This seems to correlate well with the experience of existing programs that have long term track records such as the RDCO Agricultural Wood Waste Chipping Program.

Feedback from producers also served to highlight that a "one size fits all" program is unlikely to be effective. The debris management needs of cranberry and blueberry producers for field renovation differ from the same producers needs for annual pruning debris management, and the needs of producers dealing with land clearing debris are likely to be different again. Small scale and hobby farms represent a further challenge, as they may also have constraints related to their ability to effectively manage debris onsite. As such, program design may need to be targeted to a specific type of debris and agricultural sector. Involvement of farmers and producer groups in program design will be important to ensure program success, and a model similar to the Agricultural Burning Task Force in Washington State could provide an effective approach for involving farmers.

A number of farmers and producer groups raised the issue of disease management and biosecurity as justification of open-air burning, particularly for pathogens such as Eastern Filbert Blight. Despite the fact that air curtain burning did not score well in the feasibility assessment due to its high cost and lack of availability, it may offer an option for effectively dealing with such biosecurity concerns if a program could effectivity manage cost and availability issues. However, as noted by a number of farmers, many diseases can be effectively dealt with through proper composting of debris, so there may also be a need for dissemination of information on which plant diseases require the use of burning.

Another interesting outcome of discussions with farmers and producer groups was the recognition that many were not aware of the existing Environmental Farm Plan incentives for chipping, forced air burning and mulching / mowing equipment. Similar to control of diseases, improved dissemination of information about this program may improve farmer uptake. In general, the fact that alternative practices such as chipping and mulching / mowing are standard practice for some farmers and sectors and not others points to the potential importance of further dissemination of information about how alternative practices can be effectively employed.

6 CONCLUSIONS

WSP Canada was contracted to identify current agricultural vegetative debris management practices in the Metro Vancouver region and perform a jurisdictional review and feasibility assessment to identify debris management approaches, and resulting emission reductions, best matched to regional needs. Wide-ranging communication was conducted with groups including the provincial government, agriculture producer groups, funding organizations, alternative management practice service providers, MVRD Environmental Regulation and Enforcement staff and farmers.

Open-air burning of agricultural vegetative debris in Metro Vancouver is currently regulated by the *BC Open Burning Smoke Control Regulation*, the *BC Code of Practice for Agricultural Environmental Management*, and the *Metro Vancouver Air Quality Management Bylaw No. 1082, 2008*, as a well as municipal bylaws. An assessment of Metro Vancouver open-air burning approvals from 2017-2020 indicated that approved open-air burning is a regionally significant emissions source, producing annual $PM_{2.5}$ emissions of the same magnitude as on-road vehicles.

Generation of agricultural vegetative debris in Metro Vancouver was found to fall into three main categories: land clearing to open land for agricultural production and removal of invasive species, annual pruning and maintenance of trees and bushes, and periodic renovation and replacement of entire fields of fruit trees and bushes. Blueberries and cranberries were identified as key crop types due to their large regional acreage and regular generation of vegetative debris that is sometimes burned. Chipping and on-farm use of chipped material and mowing / mulching of smaller debris were identified as alternative practices commonly used on some farms in the region. Discussions with biomass aggregation / brokerage firms and commercial composting firms indicated limited interest in agricultural vegetative debris as biomass fuel or off-farm composting feedstock due to contamination with rocks and soil, scattered distribution throughout the region, inconsistent availability, and often small per site waste volumes.

The jurisdictional review focused on British Columbia and the US Pacific states revealed a number of alternative debris management programs, with the most common approach being the funding of on-farm chipping of vegetative debris. A number of jurisdictions with reduced or free tipping fees for agricultural vegetative debris were identified. There were limited examples of equipment lending library type programs, and only one instance of a program focused on air curtain burning of agricultural debris was identified. The debris management approaches carried forward to a feasibility assessment included: open-air burning; air curtain burning; chipping with on-farm use; chipping with off-farm use; mulching and mowing; on-farm composting with no chipping; and off-farm disposal.

The feasibility assessment considered a wide range of scoring criteria, including compatibility with regional needs, emissions reduction potential, stakeholder acceptance and costs. The three high scoring debris management approaches were chipping with on-farm use, mulching and mowing, and on-farm composting with no chipping. Air curtain burning did not score highly due to its limited availability and high cost, but if these issues can be overcome, it may offer an effective and lower emissions option for management of diseased agricultural vegetative debris. A quantitative assessment of air pollutant and GHG emissions associated with management practices was also performed, and clearly indicated that all alternative management options offer significant reductions relative to open-air burning, even when fossil fuel use associated with equipment operation and transportation was considered.

Identification of business / funding models and potential partner organizations pointed to the existing agricultural funding bodies in BC, including the BC Agricultural Research & Development Corporation (ARDCorp) and Investment Agricultural Foundation (IAF), as key organizations for further dialogue. The Environmental Farm Plan program operated by ARDCorp already includes Beneficial Management Practices providing monetary incentives for purchase of chipping, forced air burning and mulching / moving equipment.

Finally, discussions with farmers and agricultural producer groups indicated concern about the high administrative and cost burden of current regulations and a desire to avoid further regulation, while a strong interest in reducing environmental impacts and being good neighbors was also conveyed. Farmers expressed interest in non-regulatory programs that can assist with implementation of alternative practices but indicated that such a program must overcome the key barriers of cost, administrative burden / complexity, and long-term availability. The opportunity for farmers and producer groups to be involved in program development was viewed positively, raising the potential utility of a regional multi-stakeholder body similar to the Washington Agricultural Burning and Research Task Force.

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A APPENDIX: STAKEHOLDER CONTACTS

Table A-1 Stakeholder Contact Summary

Contact	Title/ Department	Organization	Date
Markus Kellerhals	Senior Air Quality Science Officer	BC Ministry of Environment and Climate Change Strategy	28-09-2020
Nadia Mori	Regional Agrologist	BC Ministry of Agriculture, Food and Fisheries	07-10-2020
Jacquay Foyle	Environmental Engineer	BC Ministry of Agriculture, Food and Fisheries (Resource Management)	
Karina Sakalauskas	Industry Specialist, Hazelnuts	BC Ministry of Agriculture, Food and Fisheries (Sector Development Branch)	15-10-2020
Nancy Mora Castro	Regional Air Quality Coordinator	Regional District of Central Okanagan	16-10-2020
Carolyn Teasdale	Industry Specialist, Berries	BC Ministry of Agriculture, Food and Fisheries (Sector Development Branch)	16-10-2020
Susan Smith	Industry Specialist, Vegetables	BC Ministry of Agriculture, Food and Fisheries (Sector Development Branch)	19-10-2020
Jake Turek	Waste Management	BC Ministry of Agriculture, Food and Fisheries (Resource Management)	19-10-2020
Dieter Geesing	Provincial Soil Specialist	BC Ministry of Agriculture, Food and Fisheries (Resource Management)	
Dave Knight	Agricultural Burning & Research Task Force Chair	Washington Department of Ecology	20-10-2020
Daniel Matsche	Unit Manager	Washington Department of Ecology	20-10-2020
Nadeane Nelson	President	Cowichan Green Community	02-11-2020
Paul Russow	Agricultural Burning & Research Task Force	Washington Department Of Ecology	04-11-2020
Sandy Muns	Supervisor, Garden Education Centre	Cowichan Green Community	09-11-2020
Darren Brown	Director of Environmental Programs	BC Agriculture Council / ARDCorp	19-11-2020
Dave Zehnder	Project Lead	Farmland Advantage	27-11-2020
Robbie Gill	Owner	Cloverdale Fuels	27-11-2020
Doreen Cheng	Environmental Regulation & Enforcement Officer	Metro Vancouver	27-11-2020
Craig Shishido	Environmental Regulation & Enforcement Officer	Metro Vancouver	27-11-2020
Jim Ross	Board Member and Former Chair	Kootenay Local Agricultural Society	27-11-2020
Eric Gerbrandt	Research Director	BC Blueberry Council	01-12-2020
Dennis Klick	Environmental Regulation & Enforcement Officer	Metro Vancouver	01-12-2020
Carly Heron	District Conservationist	USDA NRCS	01-12-2020

Contact	Title/ Department	Organization	Date
Karen Storry Terry Fulton	Senior Engineer, Solid Waste Project Engineer, Solid Waste	Metro Vancouver	01-12-2020
Mike Wallis	Executive Director	BC Cranberry Growers	02-12-2020
Riley Sziklai	Environmental Regulation & Enforcement Officer	Metro Vancouver	03-12-2020
Cameron Baughen	Solid Waste Management Coordinator	Regional District of Okanagan-Similkameen	08-12-2020
Matthew Bischoff	Strategies & Incentives	San Joaquin Valley Air Pollution Control District	09-12-2020
Ed Weissmiller	Owner	J&E Backhoe	10-12-2020
Darren Beairsto	Environmental Control Officer	Metro Vancouver	14-12-2020
Natalie Janssens	Manager of Programs and Strategic Initiatives	Investment Agriculture Foundation	18-12-2020
Brian King	Director, Compost Operations, North America	GFL Environmental Inc.	21-21-2020

** NOTE: To protect the privacy of farmers participating in this study, their names are not listed here. Table 5-1 above provides summary details of the number and type of farmers interviewed.

B APPENDIX: EMISSIONS QUANTIFICATION

Table B-2 Management Practice Emissions Comparison – 36 tonnes of debris burned / managed

Pollutant	Unit	Open-air burning (Minimum)	Open-air burning (Average)	Open-air burning (Maximum)	Air curtain burning	Chipping with on-farm use	Chipping with off-farm use	Mulching and mowing	On-farm composting with no chipping	Off-farm disposal
TPM	tonnes	0.07	0.22	0.40	0.024	0.0094	0.0095	0.00016	0.000053	0.00017
PM_{10}	tonnes	0.07	0.22	0.40	0.024	0.0049	0.0050	0.00016	0.000053	0.00017
$PM_{2.5}$	tonnes	0.07	0.22	0.40	0.023	0.0031	0.0031	0.00015	0.000051	0.000082
Biogenic CO_2	tonnes	58	58	58	58	0	0	0	0	0
Fossil CO_2	tonnes	0.76	0.76	0.76	2.0	2.1	2.5	0.44	1.5	1.6
Methane	tonnes	0.022	0.071	0.223	0.0033	0.000021	0.000040	0.000011	0.0000043	0.000031
N_2O	tonnes	0.009	0.028	0.047	0.0028	0.00076	0.00076	0.00015	0.00059	0.00039
IPCC CO_2e	tonnes	4	11	21	3.0	2.3	2.7	0.48	1.7	1.7

Table B-3 Emissions Quantification Assumptions by Operation

Operation	Equipment	Assumption Details
On-farm aggregation	Tractor / Excavator	200 hp diesel engine, operating hours: 12
Debris processing - direct biomass emissions	Air curtain burner	3-5 tonnes/hr burner throughput
	Chipper	10 tonnes / hour chipper throughput
Debris processing - fossil fuel use	Air curtain burner	50 hp diesel engine, operating hours: 12
	Chipper	765 hp diesel engine operating hours: 4
	Mulcher / Mower Tractor	100 hp diesel engine, operating hours: 12
On-farm mechanical management – movement / loading of debris	Tractor / Excavator	200 hp diesel engine, operating hours: 12
Off-Farm transportation - trucking equipment to/from site	Trucks	Diesel engine, MOVES 2014b "Short Haul Combination" Trucking distance: 50km round-trip
Off-farm transportation - trucking processed debris from site	Trucks	Diesel engine, MOVES 2014b "Short Haul Combination", 40 yard / 30.6 m^3 truck box Trucking distance: 50 km round-trip

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Paul Kadota, Program Manager, Utility Research and Innovation, Policy, Planning and Analysis, Liquid Waste Services

Date: May 19, 2021 Meeting Date: June 11, 2021

Subject: **2021 Update on Liquid Waste Sustainability Innovation Fund Projects**

RECOMMENDATION

That the Climate Action Committee receive for information the report dated May 19, 2021, titled "2021 Update on Liquid Waste Sustainability Innovation Fund Projects."

EXECUTIVE SUMMARY

This provides an update on ten projects that were approved for funding in 2017 through to 2020 under the Sustainability Innovation Fund. Three projects having the most material updates are covered in the following sections. Seven of the projects that are progressing, some with work pace slowed due to COVID-19 related challenges, are included in the Attachment.

One project has achieved its first significant milestone of in-situ deployment for evaluation:

- Multiphase Composite Coating (MCC) for Concrete Sewers

The following two projects will not proceed to their next phase of work due to the technology not achieving performance and/or economic expectations:

- Microwave-enhanced Advanced Oxidation Process Sludge Destruction Pilot
- Capture of wastewater contaminants of concern and beneficial use of residuals.

PURPOSE

This report provides an update on projects funded under the Liquid Waste Sustainability Innovation Fund.

BACKGROUND

The Liquid Waste Sustainability Innovation Fund (Fund) was created by the Board in 2004 to provide financial support to Liquid Waste Utility projects that contribute to the region's sustainability. The GVS&DD Board adopted the *Liquid Waste Sustainability Innovation Fund Policy* on June 27, 2014, with further amendments in 2016, to guide the use and management of the Fund. The policy requires that the Climate Action Committee be updated on an annual basis on the deliverables, outcomes and measurable benefits of the projects receiving funding.

This report presents an update on projects that have not yet been reported as complete to the Climate Action Committee. The projects, outlined below, were approved for funding from 2017 to 2020. There were no new project proposals submitted or approved in 2021, however, the previously approved Hydrothermal Processing – Biofuel Facility received additional funding in February 2021 and is identified in this report.

STATUS OF SUSTAINABILITY INNOVATION PROJECTS (APPROVAL YEARS: 2017 – 2021)

Project	Approval Year	Amount Approved	Status
High Efficiency Aeration Demonstration	2017	$750,000	In Progress
Genomics Approach to Anaerobic Digestion Optimization	2017	$460,000	In Progress
Microwave-enhanced Advanced Oxidation Process Sludge Destruction Pilot	2017	$850,000	Terminated
Capture of wastewater contaminants of concern and beneficial use of residuals	2018	$450,000	Terminated
Intelligent Water Systems - Making Use of Sensors and Big Data Analytics	2018	$200,000	In Progress
Hydrothermal Processing - Biofuel Demonstration Facility	2018 2021	$8,250,000 $6,130,000	In Progress
Multiphase Composite Coating (MCC) for Concrete Sewers	2019	$620,000	In Progress
Pump Station Optimization	2019	$330,000	In Progress
Advanced Resource Recovery from Sludge: Industrial Research Chair Program	2019	$2,985,000	In Progress
Handheld Wastewater Microbial DNA Monitor	2020	$330,000	In Progress

Multiphase Composite Coating (MCC) for Concrete Sewers: In Progress
The overall goal of this project is to field test and validate the performance of a new coating material developed by UBC, which has the potential to protect both new and existing concrete sewer pipes from biological corrosion, which can dramatically reduce the service life of sewer networks and result in significant repair and replacement costs. The project partners are UBC's Department of Civil Engineering, Ocean Pipe, and Metro Testing & Engineering.

Outcomes to Date:

- Collaborative research agreement developed and signed by project partners.
- Laboratory testing of coating material currently in progress at UBC.
- A spray-on version of the coating is currently under development at UBC with plans for piloting on a small scale rehabilitation project in the following year.

Milestone:

- Installed a trowel-on version of the coating material in a heavily corroded concrete sewer chamber in Delta as a pilot. The field application process and material properties are being evaluated. Performance of the coating will be monitored through to 2023.

Microwave-enhanced Advanced Oxidation Process Sludge Destruction Pilot: Terminated
This technology was developed by researchers at the Department of Civil Engineering, University of British Columbia (UBC) and is designed to enhance biogas yields and lower costs of operating anaerobic digesters at wastewater treatment facilities. Funding for this pilot project was approved in 2017 and the set-up and evaluation work proceeded in 2018. The work was structured in two phases as follows:

- Phase 1: involved process scale-up and testing at the Annacis Research Centre to validate technical and operational merits of the technology.
- Phase 2: install the system for continuous operation at a treatment facility. This phase would proceed only upon success of Phase 1.

Phase 1 work was completed in December 2020 and an independent assessment of the technology indicated the limited improvement potential for renewable natural gas production would not offset the higher operational costs compared to other commercially available alternatives. While additional research might produce better results, this new information from Phase 1 dramatically elevates the risk of further development of this technology. On this basis, Phase 2 work will not proceed and this project will be terminated.

Key Outcomes:
- Limited improvement potential for renewable natural gas yields.
- Higher operational costs than commercially available alternatives.
- Increased technology development risks.

Capture of Wastewater Contaminants of Concern and Beneficial Use of Residuals: Terminated
This technology proposed by researchers at UBC offers an alternative for biosolids to be dried and carbonized into an activated carbon product that can be used to capture compounds of environmental concern in wastewaters. Funding for this project was approved in 2018 and the work was structured in two phases as follows:
- Phase 1: involved assessing technical feasibility within the laboratory setting and estimating its economic feasibility at scale. This work was completed in February 2021.
- Phase 2: produce a sizable quantity of activated carbon product for use at a demonstration installation site.

Phase 1 results show evidence that this concept is technically feasible. However, the financial assessment indicates this would cost substantially more than current biosolids management practices. With elevated risks of further development of this concept, Phase 2 work will not proceed and this project will be terminated.

Key Outcomes:
- Technically feasible concept to produce activated carbon from biosolids.
- Higher costs than current biosolids management.
- Increased concept development risks.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
The projects summarized in this report had funding approved by the GVS&DD Board from 2017-2021. The disbursals of funds were made in accordance with the applicable *Sustainability Innovation Fund Policy* that governs the use and management of the Funds.

The table below outlines the funding approved and the amount spent to date for each project. Any unspent funds for completed projects remain in the Sustainability Innovation Fund reserve.

Project	Total Amount of Funding Approved	Est. Spent (as of Apr. 30, 2021)
2017 Approval Year		
High Efficiency Aeration Demonstration	$750,000	$96,013
Genomics Approach to Anaerobic Digestion Optimization	$460,000	$338,829
Microwave-enhanced Advanced Oxidation Process Sludge Destruction Pilot	$850,000	$585,000
2018 Approval Year		
Capture of wastewater contaminants of concern and beneficial use of residuals	$450,000	$150,000
Intelligent Water Systems - Making Use of Sensors and Big Data Analytics	$200,000	$184,562
Hydrothermal Processing - Biofuel Demonstration Facility	$8,250,000 $6,130,000	$875,304
2019 Approval Year		
Multiphase Composite Coating (MCC) for Concrete Sewers	$620,000	$130,874
Pump Station Optimization	$330,000	$195,043
Advanced Resource Recovery from Sludge: Industrial Research Chair Program	$2,985,000	$637,158
2020 Approval Year		
Handheld Wastewater Microbial DNA Monitor	$330,000	$0

The two projects being terminated conserves the following amounts in Fund reserves:

- $265,000 from the Microwave-enhanced Advanced Oxidation project
- $300,000 from the Capture of wastewater contaminants and use of residuals project.

The balance in the Liquid Waste Sustainability Innovation Fund at Dec. 31, 2020 was $18,528,389.

SUMMARY / CONCLUSION

This report has presented an update on ten projects funded under the Liquid Waste Sustainability Innovation Fund. The Sustainability Innovation Funds were created by the Board in 2004 to provide financial support to utility or Regional District projects that contribute to the region's sustainability.

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ATTACHMENT

UPDATE ON OTHER LIQUID WASTE SUSTAINABILITY INNOVATION FUND PROJECTS IN PROGRESS

High Efficiency Aeration Demonstration: In Progress
The goal of this project is to assess at pilot scale, a new device called the Perlemax Fluidic Oscillator which has shown its ability to improve energy efficiency by 25% in small tanks. For this, the project partners are the District of Columbia Water and Sewer Authority (DC Water), where the testing will be conducted, as well as the Water Research Foundation (WRF) who will provide independent technology evaluation.

Outcomes to Date:
- Perlemax has delivered a preliminary design of their system for testing at DC Water.
- WRF has assembled an expert independent evaluation panel.
- COVID-related priorities, facility lock-downs, and travel restrictions suspended work in 2020 and into 2021.

Testing has been deferred to 2022.

Genomics Approach to Anaerobic Digestion Optimization: In Progress
The goal of this project is to identify a means to increase biomethane generation from existing anaerobic digestion processes used at Metro Vancouver wastewater treatment plants. There are two academic teams on this project: i) environmental genomic experts at UBC's Department of Microbiology and Immunology, and ii) anaerobic digestion experts from UBC's School of Engineering, within the Bioreactor Technology Group.

Outcomes to Date:
- Secured federal academic grants totaling over $700,000.
- Genomic sequencing of the microbiome provided insights to the invention of a compact add-on reactor to boost renewable natural gas production from existing digesters.
- An intellectual property application has been filed to the U.S. and international patent offices.

The UBC team is designing various prototypes for testing at laboratory scale.

Intelligent Water Systems – Making Use of Sensors and Big Data Analytics: In Progress
Metro Vancouver and its member jurisdictions monitor and collect large amounts of data and as less expensive sensors are deployed, the volume of data is expected to increase exponentially. The purpose of this project is to identify and evaluate innovative tools and techniques to help regional and municipal liquid waste utilities create information from the wave of "Big Data" that is transforming the industry. The project partner is the Water Research Foundation (WRF).

Outcomes to Date:
- In partnership with the WRF, a consultant has been retained to explore how Big Data techniques can be unified, leveraged with Artificial Intelligence, enable predictions, adapt operational rules, schedule maintenance and the like. Other considerations include integration of databases for precipitation, land use, population, and environmental monitoring.

Next steps involve working with the consultant using Metro Vancouver as a case study.

Hydrothermal Processing Demonstration: In Progress
The goal of this project is to design, fabricate, and operationalize a hydrothermal processing demonstration facility at the Annacis Island wastewater facility. In comparison to the current anaerobic digestion process, this technology promises a smaller footprint, reduced net costs, production of biocrude having real market value, and the decarbonization of the long-haul transportation sector.

Outcomes to Date:
- Preliminary design completed in 2020.
- Additional Sustainability Innovation funding approved in February 2021.

Next steps involve detailed design and fabrication of the hydrothermal processing units.

Pump Station Optimization: In Progress
The goal of this project is to investigate opportunities to improve wet weather system performance and save energy by adjusting operating strategies at sanitary pump stations. Metro Vancouver's 33 pump stations consume electricity valued at approximately $2.4 million per year. This project is a partnership with the UBC Sauder School of Business involved in the field of Operations Research.

Outcomes to Date:
- Advanced modelling and new operational controls for Metro Vancouver's Lynn Pump Station in the North Vancouver indicate a 25% reduction in energy use.
- COVID-related priorities, facility lock-downs, and operational restrictions suspended work in 2020 and into 2021.

A trial of the control strategy for the Lynn Pump Station is now scheduled for 2022.

Advanced Resource Recovery from Sludge: In Progress
The three main goals of this 5-year project are: i) develop a prototype and pilot-scale bioreactor that can augment biomethane production, ii) assess capacity of hydrothermal processing to destroy a range of micropollutants to yield higher quality treatment plant effluent, and iii) explore the recovery of low-carbon nutrients such as nitrogen and phosphorus. Advancing the recovery of resources from wastewater to produce value-added output for use by other industries can help build a stronger circular economy. The project partners are UBC School of Engineering and the Natural Sciences and Engineering Research Council.

Outcomes to Date:
- COVID-related priorities, research laboratory lock-downs, and operational restrictions delayed start of work until Q3 2020.
- Evaluation of integrating of hydrothermal processing with bioreactors is being set-up at UBC laboratories.

Next steps include laboratory evaluation of different process configurations and prototyping.

Handheld Wastewater Microbial DNA Monitor: In Progress

The goal of this project is to adapt an off-the-shelf molecular sequencer for use with wastewater samples taken from treatment processes to support visual assessment methods with quantified results. Combined with the development of artificial intelligence, this system could provide early warning of treatment process upsets, allowing greater time to take corrective actions and prevent process failure.

Outcomes to Date:

- Terms of Collaborative Research Agreement with UBC reached.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Amy Thai, Senior Policy Analyst
Parks and Environment Department

Date: May 10, 2021 Meeting Date: June 11, 2021

Subject: **Air Quality and Climate Action Initiatives in *Caring for the Air* 2021**

RECOMMENDATION

That the MVRD Board receive for information the report dated May 10, 2021, titled "Air Quality and Climate Action Initiatives in *Caring for the Air* 2021".

EXECUTIVE SUMMARY

Caring for the Air is Metro Vancouver's annual plain language publication on regional climate action and air quality projects. The 2021 edition marks 10 years of *Caring for the Air* and features both a look back and a look forward. Over the past decade, Metro Vancouver improved and protected regional air quality and climate, with proactive management plans, progressive regulations, comprehensive monitoring, and outreach and engagement. Over the next several years, upcoming plans and programs will respond to emerging challenges such as wildfires and climate change.

In 2021, staff refreshed the online format of *Caring for the Air* to be more interactive and accessible, and created a 10th anniversary promotional video. The COVID-19 pandemic has necessitated a number of modifications to promotion and distribution of *Caring for the Air*.

PURPOSE

To present the 2021 edition of the annual *Caring for the Air* publication and provide information about outreach conducted for the 2020 edition to raise awareness about climate change and air quality initiatives in the Lower Fraser Valley airshed.

BACKGROUND

The Board Strategic Plan strongly emphasizes taking leadership on climate action through *Climate 2050*, and improving air quality by mitigating threats to public health and the environment. *Caring for the Air* has been published annually since 2012, and is Metro Vancouver's key branding document that promotes awareness of climate action and air quality initiatives. Written in plain language, it describes actions being taken by Metro Vancouver and partner agencies as well as activities that individuals can carry out to reduce greenhouse gas emissions, protect against the effects of climate change, and improve air quality. Each edition of *Caring for the Air* also summarizes the previous year's air quality measurements and compares the data to applicable guidelines.

The Climate Action Committee 2021 Work Plan identifies the development of the 10th annual *Caring for the Air* as a priority for the second quarter of the year.

INSIDE *CARING FOR THE AIR* 2021

2021 is the 10th anniversary of *Caring for the Air*. For this milestone, the theme is a look back at accomplishments over the past 10 years and a look ahead at upcoming plans and programs.

The main feature article summarizes progress made since the first edition of *Caring for the Air* in 2012, including adopting the *Climate 2050 Strategic Framework*, achieving corporate carbon neutrality, installing four new air monitoring stations, and adopting new emission regulations on non-road diesel engines and residential indoor wood burning. It also acknowledges emerging challenges due to changes in our region and climate, such as wildfire smoke impacts, and emphasizes Metro Vancouver's commitment to taking bold actions to tackle them. These actions are outlined in additional feature articles on the *Clean Air Plan* and carbon neutral modelling carried out to support the *Climate 2050 Roadmaps*.

The 2021 edition of *Caring for the Air* was prepared entirely during the COVID-19 pandemic, allowing for a large set of air quality data to be collected since public health protection measures were implemented in the Metro Vancouver region in March 2020, such as physical distancing. This edition includes an analysis of how the pandemic response affected regional air quality.

Other topics in *Caring for the Air* 2021 include:

- Results of the Strata Energy Advisor program, which provided professional energy advisor services to multi-unit homes;
- Resources on heat pumps;
- How to interpret the Air Quality Health Index;
- A summary of air quality data for 2020 and trends in key air contaminant levels since 2008;
- Improvements to Metro Vancouver's air monitoring network;
- Upcoming requirements for the residential indoor wood burning regulation adopted in 2020, and how Metro Vancouver promotes compliance; and
- New tools Metro Vancouver is using to estimate regional emissions.

Staff typically promote *Caring for the Air* through traditional media, social media, at relevant events and through other agencies and organizations. A report presented at the May 15, 2020 Climate Action Committee outlined how engagement will be modified while public health protection measures remain in place due to the evolving COVID-19 situation. Until public facilities, such as libraries and municipal halls, reopen and community events resume, staff will promote *Caring for the Air* 2021 with an increased emphasis on online promotions.

NEW FOR 2021

A combination of adapting promotional strategies during the COVID-19 pandemic and marking the 10-year anniversary of Caring for the Air led to a 'refresh' of the digital format. *Caring for the Air* was previously published online as a static report, identical to the print version. For the 2021 edition, the online version is now in a more interactive format to facilitate browsing, navigating, and sharing articles, and tracking readership.

Staff also developed a promotional video to highlight *Caring for the Air*. The video features interviews with Metro Vancouver representatives and testimonials from air quality and health professionals on how *Caring for the Air* supports and encourages residents to protect our air quality and climate.

DISTRIBUTION AND PROMOTION OF *CARING FOR THE AIR* 2020

For last year's edition (*Caring for the Air* 2020), a social media promotion, including promoted posts via Metro Vancouver's Facebook channel and organic posts via Twitter, was used to reach out to potential audiences between October and December 2020. Posts highlighted the range of topics covered by articles in the publication and provided links to the online version of *Caring for the Air* 2020. Analytics indicate that *Caring for the Air* social media posts reached over 11,500 people, resulting in over 200 engagements through likes, shares, and comments.

A link to the online version was also sent to a *Caring for the Air* email list, with over 400 subscribers, and to the Northwest Air Quality Communicators mailing list, which includes representatives from air quality organizations in western Canada and the United States.

Copies of *Caring for the Air* 2020 were circulated to municipal offices and libraries in the region, and additional copies were provided on request. A rack card was developed and highlighted the purpose and content of *Caring for the Air* 2020, but was not distributed due to public facility closures during the COVID-19 pandemic. Copies of Caring for the Air 2020 were also made available at the Metro Vancouver Information Centre and library.

At the time of writing, there have been over 330 views of the electronic version of *Caring for the Air* 2020.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Caring for the Air 2021 describes projects and programs that were undertaken within approved budgets and work plans or funded through the Regional District Sustainability Innovation Fund. The report also provides information about work relevant to Metro Vancouver's air quality and climate action interests that were conducted by and entirely the responsibility of external organizations, supported by their own resources.

CONCLUSION

Caring for the Air makes information about Metro Vancouver's climate change and air quality initiatives accessible to a wide range of readers. It helps to increase public understanding of air quality and climate change issues and encourage public engagement and personal action. This 10th anniversary edition provides a retrospective of key accomplishments over the past decade and looks ahead at upcoming initiatives such as the *Clean Air Plan* and *Climate 2050*.

Caring for the Air complements other outreach activities and publications, such as the State of the Air report produced by the BC Lung Association, which describes air quality programs throughout

British Columbia, and Metro Vancouver's annual technical air quality monitoring report, the Lower Fraser Valley Air Quality Monitoring Report.

Attachment
Caring for the Air 2021 - print version *(45511110)*

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ATTACHMENT

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Caring for the Air 2021

In this issue

- *Climate 2050 Roadmaps* to a carbon neutral region
- *Clean Air Plan* actions
- COVID-19 and air quality

Contents

The Lower Fraser Valley airshed

Air pollutants can travel between Metro Vancouver and surrounding areas. Managing air quality successfully requires effective collaboration with our neighbours and other levels of government, and participation from businesses, public institutions, non-government organizations and residents. Articles in this publication reflect this cooperation.

Message from the Chair

In this landmark edition of *Caring for the Air*, Metro Vancouver celebrates many of the key milestones we've achieved over the last decade while underscoring the important work underway and the challenging road ahead.

In recent years, we have endured unprecedented wildfire seasons with smoke from distant forest fires settling into our region for days or weeks at a time. These periods of deteriorated air quality make us all acutely aware of the damaging health effects of wood smoke pollution and the role of climate change in exacerbating wildfire activity.

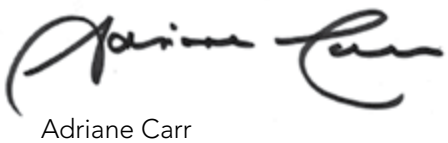
Indeed, climate action has emerged as our top priority — in this issue, you will read about how Metro Vancouver achieved carbon neutrality as an organization and how we are stepping up plans, based on scientific evidence, towards carbon neutrality in the entire region.

Back in October 2011, Metro Vancouver adopted the *Integrated Air Quality and Greenhouse Gas Management Plan*, as a 10-year vision for air quality and GHG management in the region. Fast forward ten years, and Metro Vancouver is developing the next iteration — the *Clean Air Plan*.

Air quality and climate change are inextricably linked, and the *Clean Air Plan* includes actions to significantly reduce air contaminant emissions over the next decade. These actions support *Climate 2050*, Metro Vancouver's regional climate action strategy, and include bold steps to reduce GHG emissions and accelerate climate change mitigation as well as adaptation measures.

This edition of *Caring of the Air* also examines some of the climate change and air quality implications of the COVID-19 global pandemic. As we look toward a robust economic and social recovery, many of the environmental improvements we saw over the past year give us hope that an environmentally-sound and socially-just recovery is feasible.

Clean air is one of the things that makes our region such a desirable place to live, work and play, and we thank all the regional, municipal, First Nation, and provincial staff and partners who work tirelessly to help keep our air clean.



Adriane Carr
Chair, Metro Vancouver Climate Action Committee

A Decade of *Caring for the Air*

This year marks the 10th anniversary of *Caring for the Air*. A lot has happened in the 10 years since the first edition in 2012, and there's a lot more planned for the next 10 years and beyond.

Metro Vancouver's air quality has steadily improved thanks to new programs and policies, and our response to new threats to air quality and climate change.

Let's take a look back at some of the changes in the past decade, and a look forward at what the next 10 years can bring.

Continues on next page

From page 1

A Decade of *Caring for the Air*

Air Monitoring

Since 2012, Metro Vancouver has:

- added four air monitoring stations to increase the network to 31 stations;
- built a new mobile air monitoring unit (MAMU) and deployed it to nine locations;
- upgraded particulate matter monitors to measure a portion of particulate matter not previously measured; and
- completed an in-depth review of the network, which included recommendations for improvement (see page 14).

Metro Vancouver's air monitoring network will continue to evolve to meet the region's air monitoring needs, whether it's for new pollutants, locations, or technology.

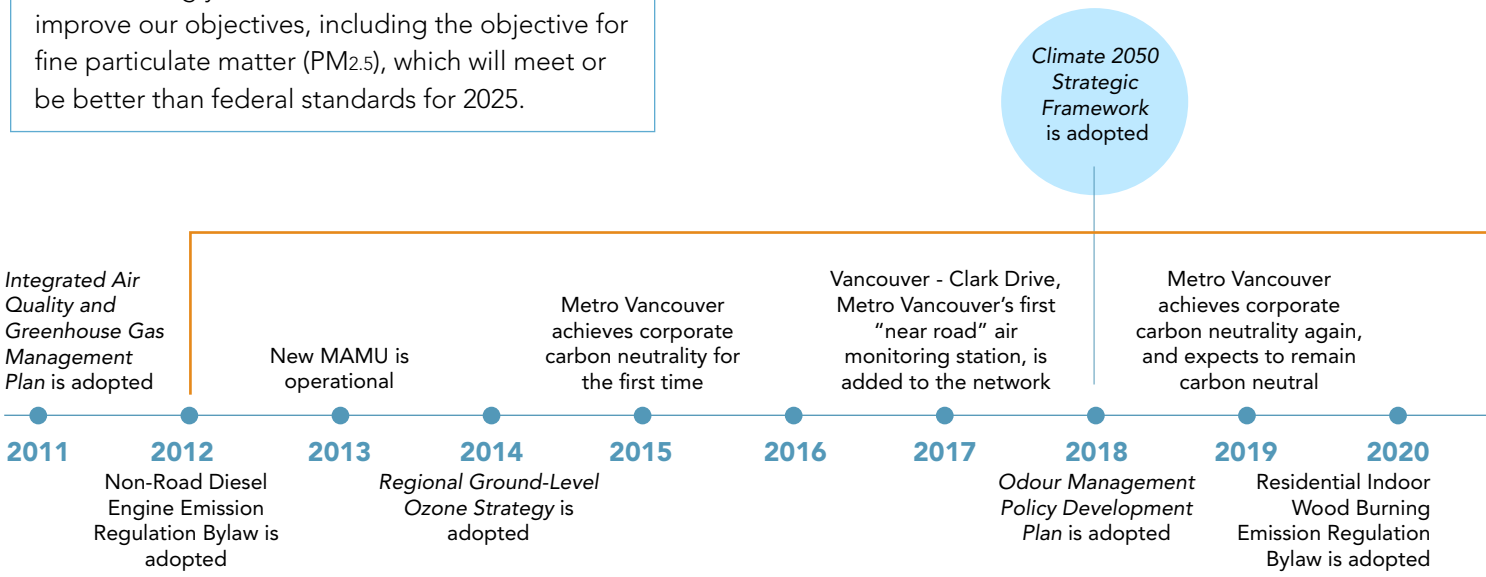
Air Quality Objectives

Air quality objectives are health-based targets for acceptable outdoor air pollutant concentrations. Over the last ten years, we've tightened our objectives to help drive air quality improvements. In the coming years, Metro Vancouver will further improve our objectives, including the objective for fine particulate matter ($PM_{2.5}$), which will meet or be better than federal standards for 2025.

Past, Present, and Future Air Quality and Climate Actions

Looking back over the past decade, Metro Vancouver has collaborated with other organizations to protect our air quality and climate by developing educational programs, policies, and regulations, including:

- programs to reduce energy use and emissions from buildings (see page 6 to learn more about the Strata Energy Advisor program for multi-unit homes);
- a wood stove exchange program to provide rebates for replacing old, inefficient wood-burning appliances with new, cleaner burning ones;
- an electric vehicle outreach program;
- bylaws to reduce emissions from non-road diesel engines and residential indoor wood burning appliances (learn more about new residential wood burning requirements on page 18 and regulation updates on page 20); and
- public services on air quality, such as providing real-time air quality data on www.AirMap.ca and www.ClearAirBC.ca, or issuing air quality advisories when air quality is poor.



What comes next?

As our region and climate changes, so can sources of air pollution. Emerging threats include:

- **Wildfires**: Four of the last six years (2015, 2017, 2018, 2020) have had significant air quality impacts from wildfire smoke. The Metro Vancouver region generally has good air quality, so short-term poor air quality events are especially noticeable. Climate projections for our region include warmer, drier and longer summers, which could lead to more intense and more frequent wildfire smoke impacts.
- **Ground-level ozone**: Ground-level ozone is formed by a chemical reaction between nitrogen oxides (NOx) and volatile organic compounds (VOC) during hot and sunny days. While ozone formation is not new in Metro Vancouver, new regional sources of these 'precursors' are leading to increased ozone in areas and at times of the year that typically don't experience high ozone concentrations. For example, wildfire smoke can transport a mix of chemicals that increases ozone formation.

Unexpected challenges, such as the **COVID-19 pandemic**, can also influence air quality: see page16 to learn more.

As new challenges emerge, Metro Vancouver is committed to taking bold actions to tackle them. Looking ahead, Metro Vancouver's new *Clean Air Plan* (page 8) lays out actions to protect our air quality for the next 10 years, and the *Climate 2050 Roadmaps* (page 4) outline how Metro Vancouver will reduce emissions by 45% from 2010 levels by 2030, and become a carbon neutral region by 2050. Furthermore, the *Regional Ground-Level Ozone Strategy* (RGLOS) will be refreshed to address new sources of ozone precursors.

Even with the progress made in the past decade, we can all do more for our air quality and climate. Evolving challenges require innovative responses, and Metro Vancouver will continue to adapt its strategies to protect our health and the environment for the next 10 years and beyond.

AIR POLLUTANT	AVERAGING PERIOD	METRO VANCOUVER AMBIENT AIR QUALITY OBJECTIVE		CANADIAN AMBIENT AIR QUALITY STANDARD
		2012 (ppb)*	**2021** (ppb)*	**2025** (ppb)*
Nitrogen dioxide (NO_2)	1-hour	107	60	42
Sulphur dioxide (SO_2)	1-hour	174	70	65
Ozone (O_3)	8-hour	65	62	60
Carbon monoxide (CO)	1-hour	26,500	13,000	n/a

*parts per billion

Climate Action Committee

Mapping a Path to a Carbon Neutral Region

Climate change continues to be one of the foremost challenges facing the Metro Vancouver region and the world. Everyone can look at the recent experiences with the COVID-19 pandemic and see that both responsive and adaptive local actions are necessary to persist and thrive when faced with these global issues.

Metro Vancouver has committed to becoming a carbon neutral region by 2050 and has established a near-term target of a 45% greenhouse gas (GHG) emissions reduction by 2030. Through its overarching climate action strategy, *Climate 2050*, Metro Vancouver is developing *Climate 2050 Roadmaps* that will identify ways to guide the region's transition towards carbon neutrality and resiliency to climate change.

To inform the *Climate 2050* work, Metro Vancouver is modelling the impacts of different policies and potential actions on GHG emissions. Results confirm that collaboration between different levels of government, businesses, residents and communities, and other key partners will be essential to reduce GHG emissions to as close to zero as possible, with a small amount of emissions balanced out by projects that store carbon over long timeframes. Taking strong and urgent action now is critical in order for the region to avoid the worst impacts of climate change.

This modelling supports the *Climate 2050 Roadmaps* to identify the critical actions needed by the region on a pathway to carbon neutrality by 2050, as well as the development of Metro Vancouver's *Clean Air Plan*, which focuses on the air quality benefits of climate actions.

Achieving Corporate Carbon Neutrality

In 2019, Metro Vancouver achieved corporate carbon neutrality under the provincial Climate Action Revenue Incentive Program (CARIP). Metro Vancouver reduced its emissions and balanced its remaining carbon footprint with carbon credits from projects that avoid greenhouse gas (GHG) emissions, or increase carbon storage in natural ecosystems, including:

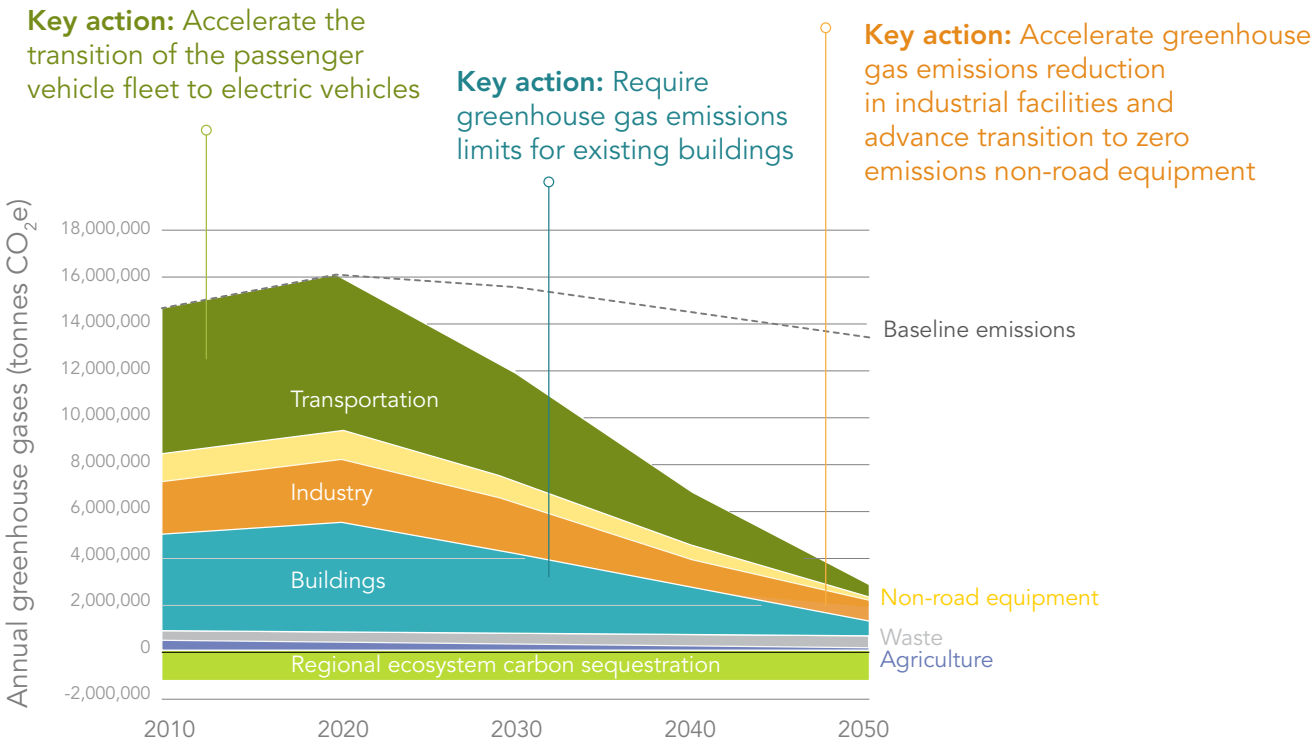
- Ecological restoration of Burns Bog (a joint effort with the City of Delta)
- Acquisition and conservation of forested land to expand regional parks
- Use of trenchless technology for sewer pipe installation

Achieving corporate carbon neutrality is an important milestone

Have a say on the development of the *Climate 2050 Roadmaps*

Visit: www.metrovancouver.org/climate2050 | Email Climate2050@metrovancouver.org

Estimated Greenhouse Gas Emissions Reductions



To learn more about the *Clean Air Plan* and actions to protect our air quality and climate, see page 8.

for Metro Vancouver. Leadership on climate action serves as a 'call to action' for other organizations, businesses and residents alike to contribute to our target of regional carbon neutrality by 2050. As Metro Vancouver's corporate GHG emissions account for less than 1% of regional emissions, region-wide action is essential to meet this target. The *Climate 2050 Roadmaps* (see above), will focus on these actions as well as those that address adaptation to climate change.

Protecting Carbon Stored in Regional Park Lands

Conserving forest within a park can prevent the release of stored carbon that could be released if the land were developed. Acquiring and stewarding new park land will enable Metro Vancouver to ensure the carbon stored in the trees, plants and soils remains stored for decades to come, contributing to Metro Vancouver's corporate carbon neutrality.

Climate Action Committee

Opening the Door to Greener Condos and Townhouses

Chances are that you or someone you know is reading this while perched in their condo or nestled in their townhouse. About one third of Metro Vancouver households live in multi-unit or 'strata' housing. Stratas account for about 20% of our regional greenhouse gas (GHG) emissions from buildings. This is about the same amount as heavy-duty vehicle emissions!

Yet, historically, strata buildings have been underserviced by energy efficiency programs because of the challenges with making collective decisions. But instead of seeing stratas as a barrier to GHG reductions, Metro Vancouver saw them as an opportunity.

Strata Energy Advisor Program

Metro Vancouver's Strata Energy Advisor pilot program provided professional energy advisory services to condo and townhouse stratas to assist with evaluating and developing energy efficiency projects. The program also helped Metro Vancouver understand barriers and opportunities for GHG reductions in strata buildings and learn how to support them to take on energy saving projects.

Strata Energy Advisor Program in numbers

- **20**-month pilot project
- **82** energy assessments and project business cases
- **38** completed energy saving projects
- **2265** tonnes of lifetime GHG reductions
- Over **$320,000** per year in utility cost savings to owners

How can my strata building get involved?

The pilot project wrapped up in 2019, and the lessons learned are informing the *Climate 2050 Buildings Roadmap*, which will include actions needed to reduce regional GHG emissions.

Metro Vancouver is investigating how to scale up the pilot project so more stratas can benefit from the assistance of professional energy advisors.

Learn more at www.strataenergyadvisor.ca.

Warming Up to Heat Pumps

The largest source of greenhouse gas emissions in the buildings sector comes from existing residential buildings. Roughly two-thirds of the buildings that are here today will still be here in 2050, when the Metro Vancouver region is aiming to reach carbon neutrality. Most of these homes burn natural gas for space or water heating, contributing to greenhouse gas emissions that are putting our planet in peril.

One climate-friendly solution that's becoming more popular among BC residents is installing an electric heat pump. Heat pumps can heat and cool your home using a fraction of the energy of other systems.

How does a heat pump work?

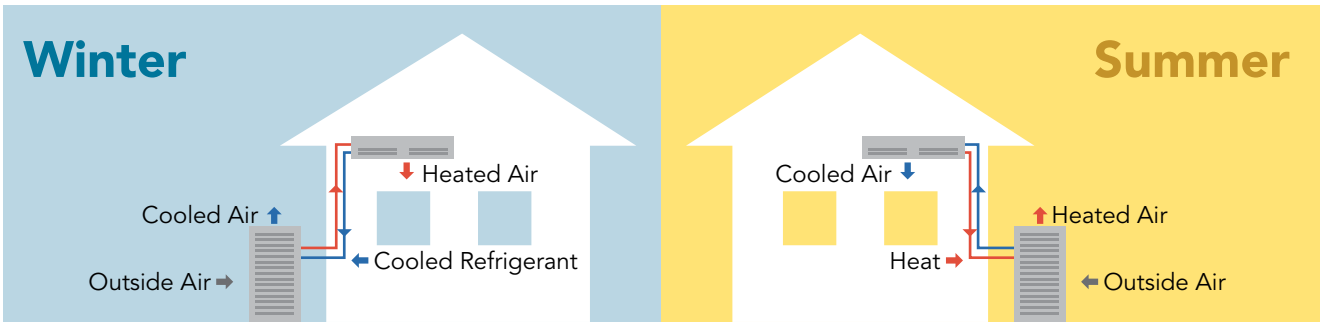
A heat pump works similarly to a refrigerator or air conditioner. In the winter, a heat pump extracts heat from the outside air or ground and brings it into your home. In the summer, it pulls heat from inside your home and moves it outside. By using refrigerants to help move the heat, heat pumps are by far the most energy efficient technology available for space heating and cooling and hot water heating. Depending on outdoor air temperatures, heat pumps can be up to 300-500% efficient. In contrast, electric baseboard heaters are typically 100% efficient, and a high performance natural gas furnace is about 95% efficient.

There are many different types of heat pump systems (for example, ducted vs. ductless systems), so there is bound to be one that is suitable for your home and local climate. Consult a professional contractor who has experience with different heat pump installations, and they will help you design the best system for you.

ADVANTAGES	DISADVANTAGES
Can both cool and heat a home	Higher upfront cost than a gas furnace
Highly energy-efficient	Efficiency reduced when it is below freezing outside
Low greenhouse gas emissions	Needs suitable space outside your home for the condenser unit

Learn more:

- Visit bchydro.com and search 'heat pump'
- BetterHomesBC.ca provides incentives, including heat pump rebates, for residents doing home renovations



Turning a Plan Into Action: How the *Clean Air Plan* Will Improve Air Quality and Reduce Greenhouse Gases

Metro Vancouver's residents generally experience good air quality. Climate change projections for the region for 2050 include longer, hotter and drier summers, warmer and wetter fall and winter seasons with decreased snowpack, and more extreme weather events, which can compromise public health and the environment, including our region's good air quality.

What is the *Clean Air Plan*?

Metro Vancouver, together with its member jurisdictions, has been taking action on air quality and greenhouse gas (GHG) emissions for decades. The *Clean Air Plan* was born out of a need to accelerate these actions to reduce our impacts on global climate change and to protect our health and the environment. Developed over the past two years with

Summary of Actions

Equity

Metro Vancouver will develop a strategic approach to introducing equity in air quality and climate change programs. This will include community input, health impact assessments and other equity evaluation tools so that all residents benefit from air quality and climate change programs.

Transportation

The transition to zero emission passenger and commercial vehicles will be supported by sales targets, improved emission standards, more renewable fuels and a charging and refueling strategy. Personal transportation choices will be supported by increased funding for transit and active transportation and improved parking policies. Longer-term clean fuel strategies and engine technologies will reduce rail, marine and aviation emissions.

input from residents, governments and stakeholders, the *Clean Air Plan* is Metro Vancouver's latest air quality and GHG management plan. It identifies how the Metro Vancouver region can improve air quality and reduce GHG emissions within the region over the next 10 years.

The *Clean Air Plan* complements *Climate 2050*, Metro Vancouver's overarching long-term strategy that will guide our region's policies and collective actions to transition to a carbon neutral and resilient region over the next 30 years. *Climate 2050* and the *Clean Air Plan* are tightly integrated, as GHGs and air contaminants can come from the same sources. The *Clean Air Plan* focuses on actions that reduce both GHGs and air pollutants.

If all the actions in the *Clean Air Plan* are successfully implemented:

- Social health benefits of up to $1 billion
- GHG emissions reduced by approximately 2 million tonnes by 2030

Next steps

The *Clean Air Plan* will be reviewed by the Metro Vancouver Board in 2021. Once adopted, it will drive new bold actions to improve air quality and reduce GHG emissions.

Industry & Business

Industry will benefit from cleaner fuels and better emission controls, supported by stronger emissions standards and regional collaboration. Replacement of older non-road equipment models will be accelerated with more stringent regulations as well as incentives.

Buildings

New and existing buildings will meet more stringent greenhouse gas standards and report on energy use and emissions. More households can benefit from retrofit programs by enhancing financial tools. Residential wood burning rules will reduce health impacts from fine particulate matter.

Agriculture

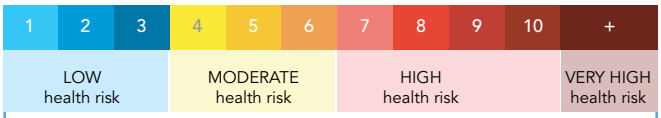
Agricultural equipment and greenhouses will reduce emissions through improved energy efficiency and shifting to renewable energy. Air quality impacts from burning vegetative waste will be reduced through alternative practices.

How the Air Quality Health Index Can Protect You

Metro Vancouver issues air quality advisories to inform residents about degraded air quality and what they can do to protect their health. An air quality advisory may be in effect for an entire day or longer, but conditions can change hour by hour. Here's how you can use the Air Quality Health Index (AQHI) to understand the health risk at any time.

The AQHI is a Canadian health index designed to help people understand how air quality can affect their health, and how they can protect themselves when air quality is poor. It uses a scale of 1-10+ to indicate potential health risk and to recommend actions for reducing risk.

During wildfire events, smoke conditions can change quickly. The AQHI is available for six different areas in our airshed and is updated every hour to reflect current air quality conditions. For example, the graph below shows AQHI data from an air quality advisory in Metro Vancouver in September 2020. Although the advisory was in effect from September 8 to 18, the AQHI fluctuated during that time and there were short windows of cleaner air.



Air Quality Health Index (AQHI)

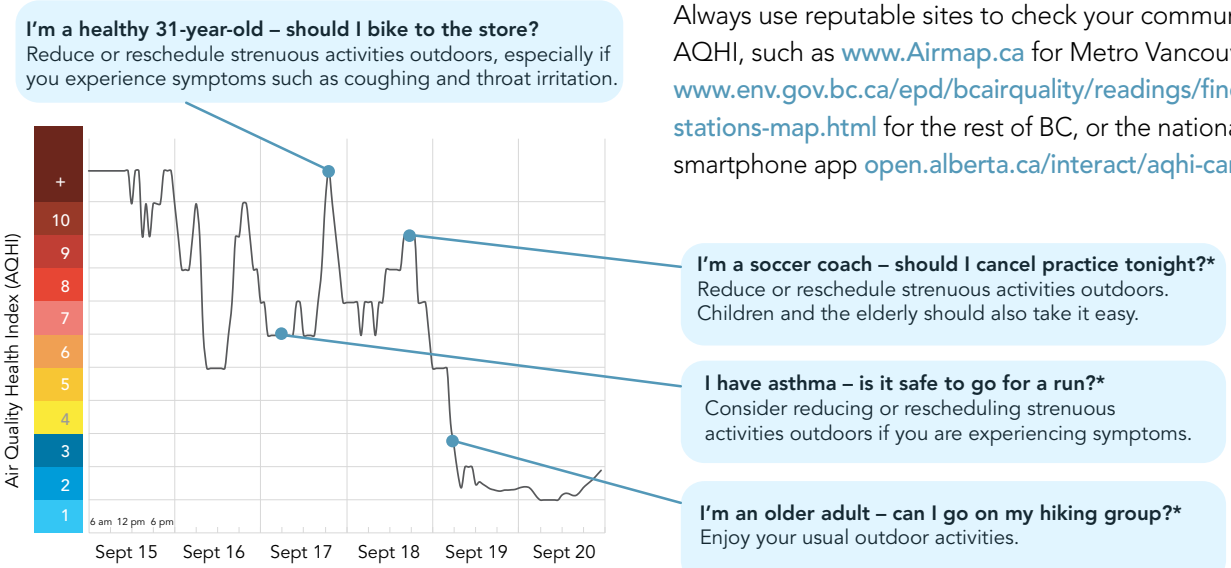
- It is the recommended tool for Metro Vancouver residents to understand health risk in the region.
- In BC it categorizes health risk based on the higher of:
  - The combined levels of ground-level ozone (O_3), nitrogen dioxide (NO_2) and fine particulate matter ($PM_{2.5}$).
  - $PM_{2.5}$ level during smoky conditions.
- An AQHI forecast is also available.

Where you find your index matters

Some websites or apps run by private companies display a health index, but these indices might not be based on the best scientific evidence and might not reflect typical air contaminant concentrations. For example, they could be based on someone's private air monitor inside their home beside their smoky stove. You certainly wouldn't want to use this data to inform your trip to the park with the kids.

Always use reputable sites to check your community's AQHI, such as www.Airmap.ca for Metro Vancouver, www.env.gov.bc.ca/epd/bcairquality/readings/find-stations-map.html for the rest of BC, or the national AQHI smartphone app open.alberta.ca/interact/aqhi-canada.

Hourly changes to the AQHI during an air quality advisory



* People with heart or breathing problems are at greater risk.
Follow your doctor's usual advice about exercising and managing your condition.

Air Quality in 2020

In 2020, the BC Centre for Disease Control noted that degraded air quality can increase susceptibility to COVID-19, as well as the severity of the infection, leading to further concerns for the health of Metro Vancouver residents during the summer wildfire season.

Metro Vancouver generally has good air quality, and air pollutant concentrations remained at levels that were better than air quality objectives for most of the summer. However, in September 2020, the region was under an air quality advisory for eleven days due to wildfire smoke from the west coast of the United States. A rare weather pattern with high winds and dry conditions rapidly increased the number and size of wildfires, leading to rapid smoke production which blanketed the Metro Vancouver region.

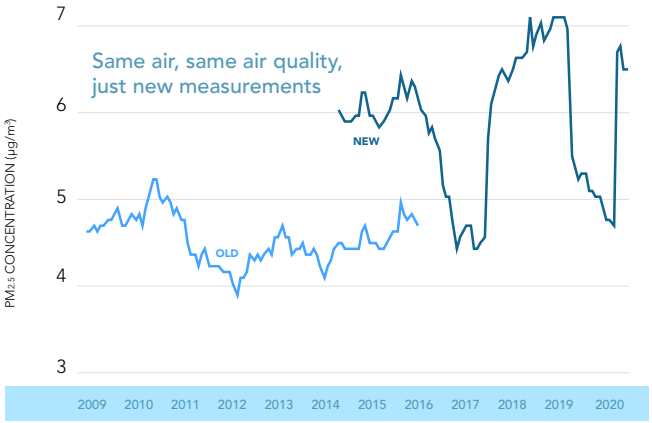
During two hot periods in 2020, the weather patterns and urban emissions increased the formation of ground-level ozone, leading to two ozone air quality advisories, one in late July and one in mid-August.

Air Quality Trends

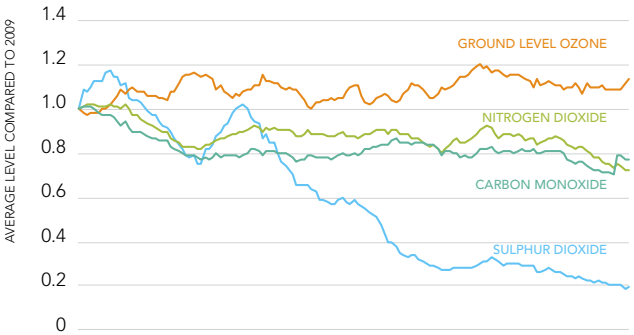
Trends charts (right) illustrate the change in average air quality across the region over time. Measurements from monitoring stations from Horseshoe Bay to Hope are averaged to represent the outdoor air quality typically experienced in the region.

Trends show that most air pollutant levels have been improving over the last decade, even while the region's population has grown. High concentrations of fine particulate matter in 2020 reflect the impacts of wildfire smoke in the region in September. Most gas phase air pollutants generally continued to decrease. Improvement of sulphur dioxide levels have been dramatic mainly due to strict lower sulphur requirements for marine fuels. Average levels of ground-level ozone have increased slightly despite reductions in some pollutants that create it. This is partly due to an increase in ozone formed outside Canada coming into our region. Peak ground-level ozone levels (not shown), which occur during hot and sunny summer afternoons, are better now than in the 1980s and early 1990s.

Trend in fine particulate matter

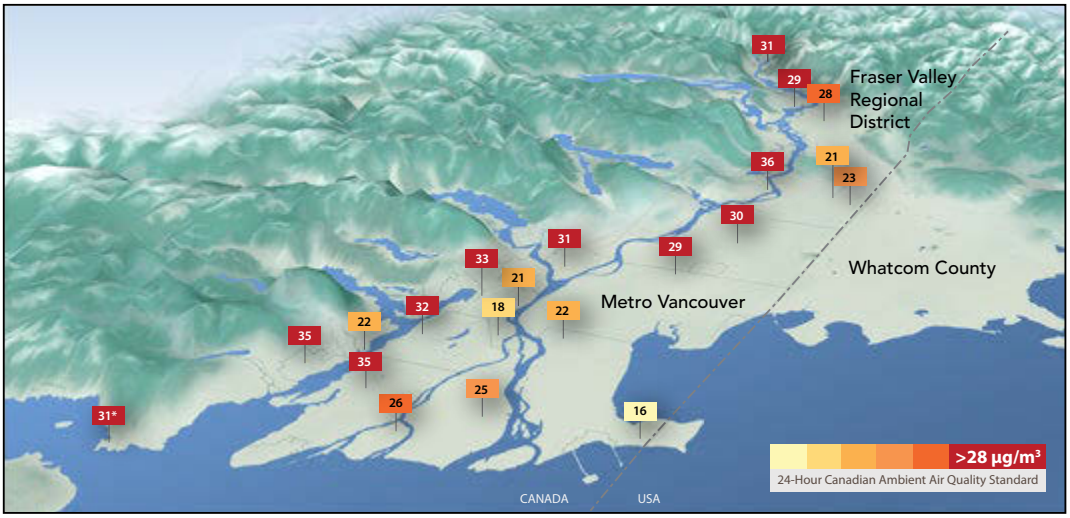


Trends in gas phase air pollutants



Air Quality in 2020 - Data Summary

FINE PARTICULATE MATTER IN 2020



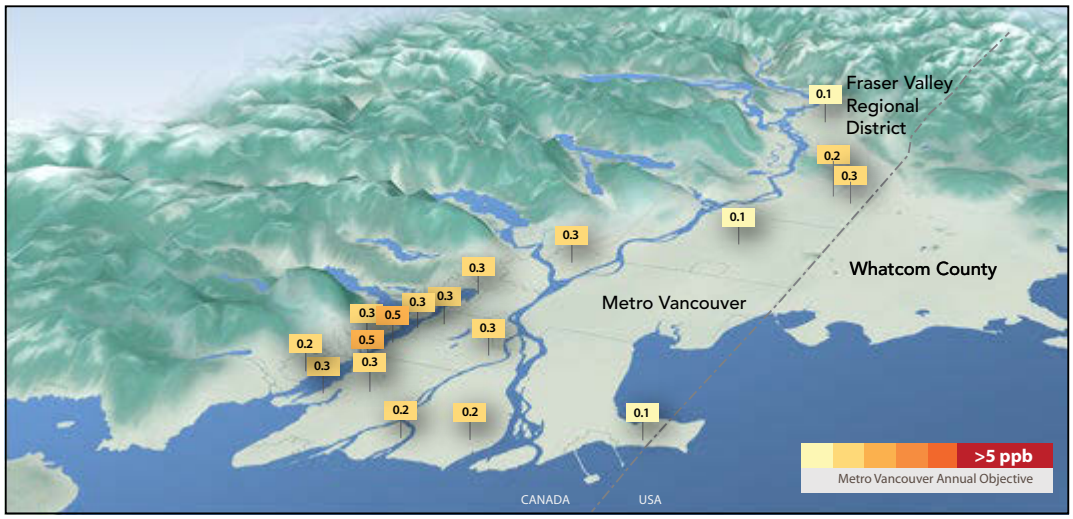
*Based on incomplete data

In 2020, fine particulate matter ($PM_{2.5}$) levels throughout the region were worse than the Canadian Ambient Air Quality Standard (calculated using data from 2018, 2019, and 2020) at more than half of monitoring stations, as shown on the map. This was a result of short term high concentrations in 2018 and 2020 largely due to smoke from out-of-region wildfires. Measurements averaged over 2020 were within Metro Vancouver's annual objective. Peak levels based on the highest 24-hour average were worse than the short-term objective (25 µg/m³) at all stations in 2020. Widespread exceedances occurred in September when the region was under an air quality advisory due to wildfire smoke. Exceedances of the short term objective also occurred in March, April, October and November, likely when the region was under an air quality advisory due to open-air burning and residential wood burning.

GROUND-LEVEL OZONE IN 2020

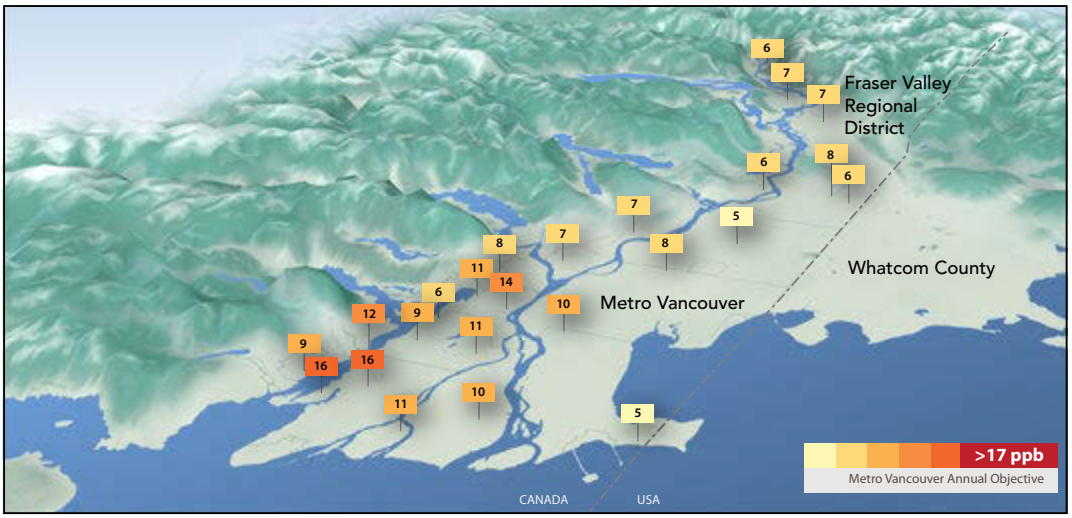
Ground-level ozone (O_3) forms when nitrogen oxides and volatile organic compounds react in the air in the presence of sunlight. The map above shows how measurements for 2020 compared to Metro Vancouver's 1-hour air quality objective. In 2020, elevated levels of O_3 were experienced in July and August with Chilliwack, Pitt Meadows, Mission and Abbotsford-Airport exceeding Metro Vancouver's 1-hour O_3 objective. These exceedances occurred briefly during hot, sunny weather.

SULPHUR DIOXIDE IN 2020



Average concentrations of sulphur dioxide for 2020 are shown on the map with all stations well below Metro Vancouver's annual objective of 5 ppb. Peak levels were better than Metro Vancouver's 1-hour objective of 70 ppb at all stations in 2020.

NITROGEN DIOXIDE IN 2020



Nitrogen dioxide (NO_2) concentrations were better than Metro Vancouver's long-term objective (17 ppb) at all monitoring stations, as shown on the map. The highest average NO_2 concentrations were measured in highly urbanized areas near busy roads. More than half of the regional emissions of nitrogen oxides (which includes NO_2) come from transportation sources. In 2020, NO_2 concentrations were better than Metro Vancouver's short-term objective (60 ppb) at all monitoring stations except for North Vancouver-Second Narrows which met the objective. Short-term measurements of NO_2 at North Vancouver-Second Narrows were influenced by local construction activity in 2020.

Improving Metro Vancouver's Air Monitoring Network


Metro Vancouver's Port Moody air monitoring station

Metro Vancouver regularly conducts an in-depth review of its ambient air quality monitoring network to ensure that the network continues to meet the needs of the region and to plan for future enhancement. One major outcome of the review is identifying emerging air quality technology and trends in the region.

Over the last few years, residents, researchers, and government agencies are becoming more interested in the use of small sensors, which have been the subject of Metro Vancouver's Air Aware project (see box). One part of the network review completed in 2021 examined the possible integration of these sensors into Metro Vancouver's regulatory monitoring network and how these inexpensive yet potentially less accurate sensors could supplement our understanding of local and regional air quality.

The 2021 network review also looked at the previous review's recommendations and found that most of the recommendations from the previous review were accomplished, which included more ground level ozone monitoring and developing 'Super Sites'. Super Sites measure more air contaminants than other stations. They monitor all the criteria air contaminants including sulphur oxides, nitrogen oxides, particulate matter, carbon monoxide, ammonia, ground level ozone, and volatile organic compounds; the chemical composition of particulate matter; black carbon; and visual air quality. This review has also demonstrated that Metro Vancouver's network is one of the more comprehensive regional monitoring networks in the world.

The 2021 network review made 13 recommendations, including:

- **Improve the spatial coverage of the current network**, specifically for areas south of the Fraser River, agricultural land in the Fraser Valley Regional District and areas that are not populated or have a very small population to better understand the impacts of urban emissions on the environment.
- **Integrate small air sensors into the monitoring network.** The current permanent network is comprised of sophisticated monitoring equipment to accurately measure air pollutants. With the increase in inexpensive yet less accurate small sensors, there is value in using these to supplement the spatial coverage of the permanent network. Small sensors can also support community-level monitoring and serve as educational and engagement tools. Other jurisdictions such as the US Environmental Protection Agency are exploring how to integrate measurements from sensors into their broader monitoring networks. For example, a pilot project demonstrated that during a wildfire event, sensors can show localized air quality data that is not captured by some existing air monitoring networks.

- **Begin continuous monitoring of carbon dioxide** (CO_2) at an existing air monitoring station. This will provide valuable information on local CO_2 concentrations and will be helpful in tracking changes as Metro Vancouver and other organizations in the region continue to implement policies to drive down greenhouse gas emissions.

Understanding air sensors

Find out how to choose and use the right sensor for your air monitoring needs, how sensors differ from the equipment used at government air monitoring stations, how to interpret the data, and more on Metro Vancouver's Air Aware website.

Visit metrovancouver.org and search 'Air Aware'.

Network News

An in-depth network review is completed regularly, but Metro Vancouver's air monitoring network evolves outside of these formal reviews, and is regularly upgraded to respond to new needs and technologies.

Air monitoring at Vancouver's MacLean Park: Metro Vancouver, supported by the Vancouver Fraser Port Authority, will be installing a new air monitor at MacLean Park in Vancouver's Strathcona neighbourhood. This compact pole-mounted station will allow air to be monitored in a location that didn't have enough space for a typical monitoring station, and will measure some of the same air pollutants as its larger counterparts, such as fine particulate matter ($PM_{2.5}$), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2).

Equipment upgrades: Tiny particles in the air, known as particulate matter (PM), can have different health impacts depending on their size and composition. In 2013, Metro Vancouver upgraded its PM monitoring equipment to measure some PM that the previous equipment could not. Nearly 10 years later, Metro Vancouver is evaluating the latest technology for another upgrade within three years to further improve PM measurements.

Equipment wasn't the only change to the network: in 2020, the COVID-19 pandemic also required air quality technicians to change how they work. Deemed an essential service, the technicians followed provincial health guidance and comprehensive safety protocols, such as physical distancing and proper sanitization, when maintaining air monitoring stations to ensure the network continued to operate as usual. See page 16 for how the pandemic response affected regional air quality.

Where's MAMU?

MAMU, Metro Vancouver's Mobile Air Monitoring Unit, is used for specialized studies in locations that are not served by a permanent monitoring station, or to measure a specific pollutant. In April 2021, MAMU completed its 1-year deployment on Musqueam's Indian Reserve No. 2 lands in Vancouver. This monitoring will provide information on air quality in the Musqueam community and support Metro Vancouver's Iona Island Wastewater Treatment Plant Biosolids Dewatering Facility project.

COVID-19 & Air Quality: Learnings from an Involuntary Experiment

When the COVID-19 pandemic hit Metro Vancouver in March 2020, life in the region and around the world changed significantly. Many businesses either closed or shifted to work from home models. This drastic change in lifestyle was reflected in the region's air quality.

Air quality impacts

During March and April 2020, Metro Vancouver's near-road air quality monitoring station at Clark Drive and 11th Avenue in Vancouver recorded more than a 30% drop in traffic when compared to the same months in 2019. Other major traffic routes across the region saw similar reductions. Less traffic and fewer businesses operating meant less transportation-related emissions, such as nitrogen dioxide (NO_2), especially in dense urban areas.

However, not all air contaminants decreased in Metro Vancouver. Other contaminants associated with combustion, such as carbon monoxide (CO), saw some reductions but not as strongly as NO_2. Fine particulate matter even appeared to increase early on in the pandemic in residential and rural areas, especially in the evening hours. This was likely because of increased residential wood burning since more people were home. Fine particulate matter levels in these areas returned closer to previous years' concentrations once the weather warmed up and less wood burning occurred.

Some pandemic restrictions were relaxed by the Provincial Health Officer in late spring and early summer. Traffic data collected at Clark Drive also reflected these changes: after the significant reduction in traffic in March, April and May, a modest increase has been observed, but total traffic is still almost 15% below the same time period in 2019.

COVID-19 or the weather?

Determining the specific impact of COVID-19 on Metro Vancouver's regional air quality is very difficult even though the overwhelming evidence shows it improved. Air quality is influenced by many factors, such as emissions and the weather. For example, during the first week of major restrictions in BC, abnormal weather conditions trapped pollution close to the ground. Even with significantly less emissions in the region, these weather conditions led to higher than normal air contaminant concentrations. Over time, these 'blips' were smoothed out and a general trend of lower than usual air contaminant concentrations emerged. This illustrates how short-term weather patterns can temporarily influence air quality.

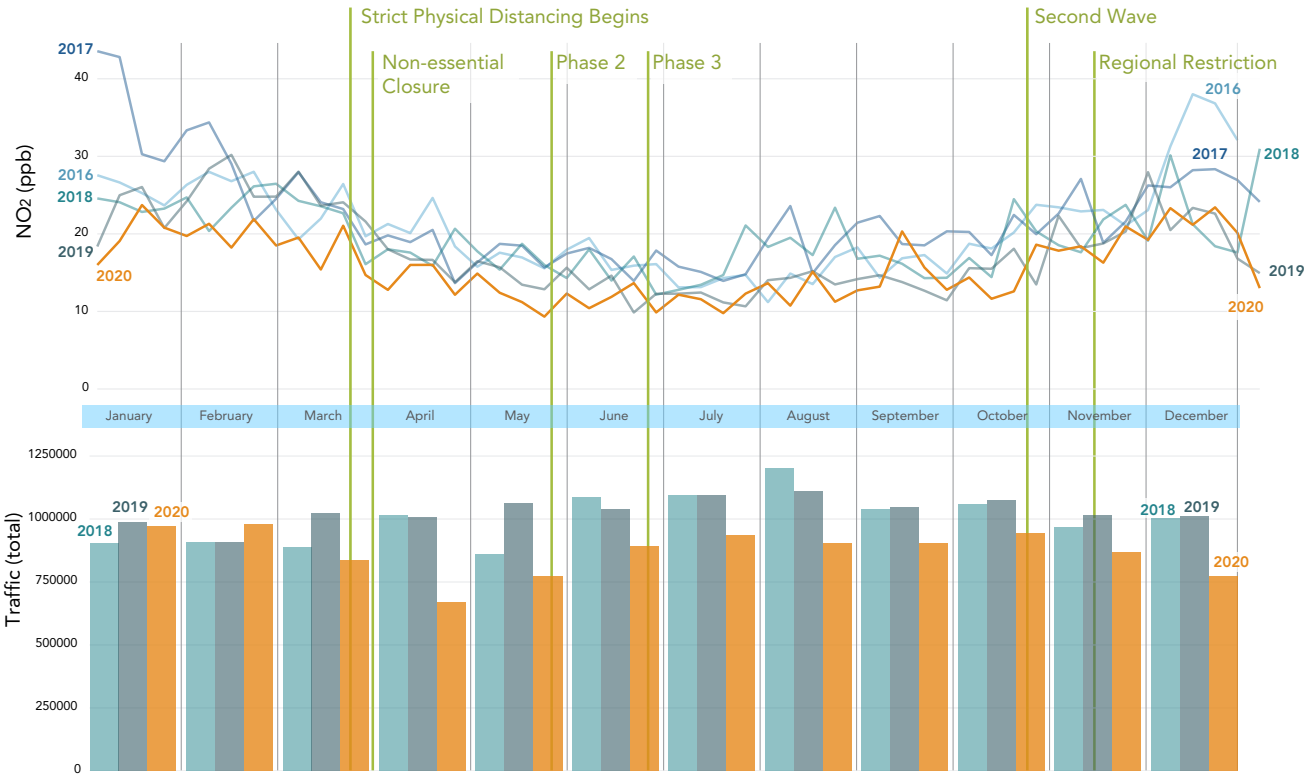
Protecting air quality, health, and the economy

A study[1] showed that in Europe, improvements in air quality may have averted over 2000 premature deaths in the short term and possibly over 20,000 deaths in the longer term. This study focused on reductions in fine particulate matter, which were more pronounced than what was experienced in the Metro Vancouver region, given our comparatively clean baseline. Nevertheless, the European study highlights how even small reductions in air quality concentrations can translate to significant improvements in health outcomes.

Metro Vancouver's air quality is typically very good but COVID-19 has provided us with an involuntary experiment which demonstrates how large reductions in emissions across the region could help to improve air quality. Transportation related activities accounted for nearly 30% of all NO_2 and greenhouse gas (GHG) emissions in Metro Vancouver in 2015. Work on Metro Vancouver's *Clean Air Plan* and *Climate 2050* strategy seeks to match or exceed the level of reductions observed during the pandemic, and are critical to setting a path for clean air and a carbon neutral region.

However, it is important to acknowledge the significant impact COVID-19 has had on the economy. Future policy development can use lessons from this pandemic but should balance improving air quality with maintaining a healthy economy.

Monthly average nitrogen dioxide (NO_2) concentrations by year at Vancouver's Clark Drive air monitoring station.



Monthly traffic counts by year at Vancouver's Clark Drive station.

1 Giani, P., Castruccio, S., Anav, A., Howard, D., Hu, W., & Crippa, P. (2020). Short-term and long-term health impacts of air pollution reductions from COVID-19 lockdowns in China and Europe: a modelling study. The Lancet Planetary Health, 4(10), e474-e482. doi:10.1016/S2542-5196(20)30224-2

Reducing Smoke from Residential Indoor Wood Burning

In 2020, Metro Vancouver introduced a new bylaw on residential indoor wood burning that aims to reduce the impacts of residential wood smoke on people's health and the environment. Wood smoke contains tiny particles that can penetrate deep into our lungs. The use of wood burning appliances, such as fireplaces and wood stoves in homes, is the main source of emissions of these particles in the region.

Under the bylaw, anyone using a residential indoor wood burning appliance must use best burning practices to minimize wood smoke emissions.

Use only clean, seasoned wood

Don't let your fire smoulder

Don't burn garbage, plastic or treated wood

Inspect and maintain your appliance

Burn small + hot fires

Additional requirements come into effect in stages.

From May 2021, residential indoor wood burning is prohibited from May 15 to September 15 each year, unless it is a home's sole source of heat, is in an off-grid home located outside the Urban Containment Boundary, or there is an emergency such as a power outage.

Starting in September 2022, users of residential indoor wood burning appliances must submit a declaration of compliance with best burning practices. Appliances inside the Urban Containment Boundary must also be registered. Only appliances that can meet emissions criteria, provide the sole source of heat, or use only manufactured firelogs can be registered.

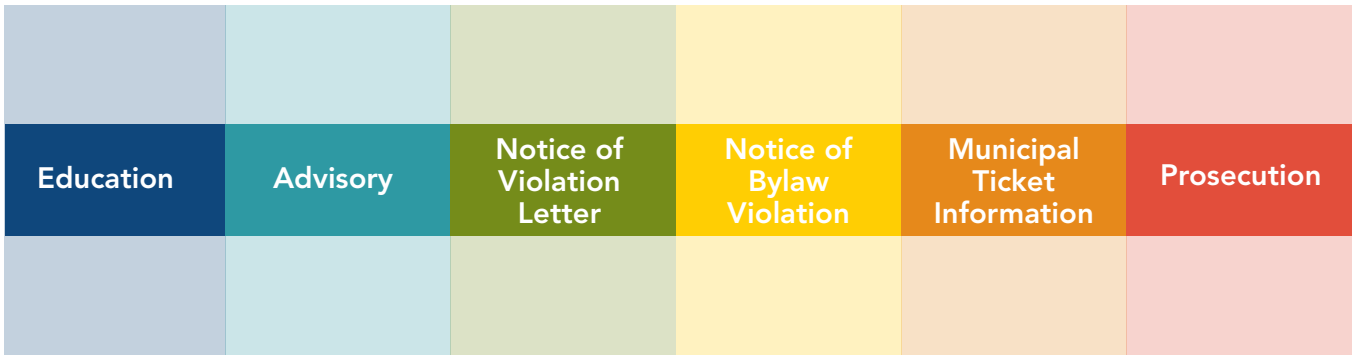
After September 2025, the use of unregistered appliances inside the Urban Containment Boundary will be prohibited unless they are used in low-income households, with the exception of in Lions Bay, where the prohibition will take effect in 2032.

The new bylaw does not prohibit residential indoor wood burning during an emergency, such as a power outage, and does not require the removal of wood burning appliances.

For more information about the bylaw, or to watch the video about the bylaw, go to metrovancouver.org and search 'residential wood burning'.

Starting with Education:

Metro Vancouver's Bylaw Compliance Continuum



Officers in Metro Vancouver's Environmental Regulation and Enforcement Division assess and promote compliance with Metro Vancouver permits and bylaws. Officers have a variety of compliance tools. For each situation, officers consider the public interest when deciding which tool will be the most effective, efficient, timely, and fair.

These tools fall under a 'compliance continuum' with proactive education at one end, and punitive ticketing or prosecution at the other.

The implementation of new bylaws, or changes to bylaws, begins with education. Bylaws are often phased in so outreach can occur before bylaw requirements take effect. In these early stages, education is the most effective and efficient means of achieving compliance.

As an example, Metro Vancouver developed an outreach program for the new Residential Indoor Wood Burning Bylaw, adopted in 2020, so that residents would receive advanced notice of bylaw requirements coming into effect in May 2021.

Even when bylaw requirements are in effect, and unless a non-compliance is serious, officers may issue a warning instead of a ticket. A warning could be a verbal advisory or a notice of violation letter, with guidance on how to comply. Warnings can be highly effective, efficient and timely. They are also fair because a resident, up to this point, might truly not have been aware of or understood bylaw requirements.

If non-compliances continue and the resident has had enough time to address them, officers may issue a Notice of Bylaw Violation. If the non-compliance is significantly impacting others, officers may issue tickets or recommend prosecution not only to achieve compliance, but to also deter others from breaking the law.

Metro Vancouver Officers use professional judgement to choose the most appropriate compliance tool that fits the seriousness of the non-compliance, results in the desired outcome, and is in the public interest.

New Requirements for Automotive Refinishing Facilities

Air contaminants from automotive refinishing facilities (autobody shops) can affect employee and public health. Using coatings and surface cleaners can release volatile organic compounds (VOCs), hazardous air pollutants, and particulate matter. Metro Vancouver's Automotive Refinishing Emission Regulation limits the release of air contaminants from these facilities.

In 2019, after consulting with the public, Metro Vancouver amended this regulation to further reduce emissions. Changes included:

- updating paint standards to meet national standards, and
- expanding the bylaw to include mobile refinishing operations and activities such as paint mixing, grinding, abrasive blasting and grease and oil removal.

In addition, starting in 2021, operators and technicians need to complete an environmental training course every two years. This new re-certification helps ensure anyone working in these facilities is aware of the regulatory requirements. Visit the British Columbia Institute of Technology (BCIT) Automotive Program website to learn more about their 'VOC – Clearing the Air' course.

For more information about the regulation, visit metrovancouver.org and search 'automotive refinishing facilities'.

Proposed Expansion of the Non-Road Diesel Engine Emission Regulation

Metro Vancouver's Non-Road Diesel Engine Emission Regulation aims to protect air quality and public health by reducing emissions from non-road diesel engines, such as construction and industrial equipment. The regulation encourages retiring or retrofitting older, higher-emitting engines.

Since the regulation was adopted in 2012:

296 higher-emitting engines were retired

88 retrofits were approved

Retirements have reduced diesel particulate matter emissions by more than 11 tonnes per year.

Metro Vancouver is looking to expand this regulation to further protect human health and the environment. Proposed changes include:

- Expanding current requirements to engines of other sizes and ages
- Restricting the use of older, higher-emitting engines around hospitals and care facilities
- Adding fees for other harmful emissions, such as nitrogen oxides

Learn more at metrovancouver.org and search 'non-road diesel engine proposed expansion'.

Reinventing the Emissions Inventory

Metro Vancouver is expanding its emissions inventory (EI) toolbox to build a more complete picture of the region's emissions. Every five years, Metro Vancouver compiles an inventory of air pollutant and greenhouse gas (GHG) emissions in the Lower Fraser Valley airshed. The last inventory was completed for 2015, and the 2020 EI is underway with some planned enhancements.

Annual Reporting of GHG Emissions

Metro Vancouver is speeding up its reporting of GHG emissions from a five-year schedule to annual GHG emissions reports, starting with 2019. Annual reporting will allow for more timely tracking of progress towards the region's emission reduction target of 45% below 2010 levels by 2030 and becoming carbon neutral by 2050. The annual report will include GHG emissions for the region and each of its member jurisdictions.

The first annual report will focus on transportation, buildings, and industry, which contribute more than 90% of the region's GHG emissions. These areas are also the subject of the first three *Climate 2050 Roadmaps* (see page 4 to learn more).

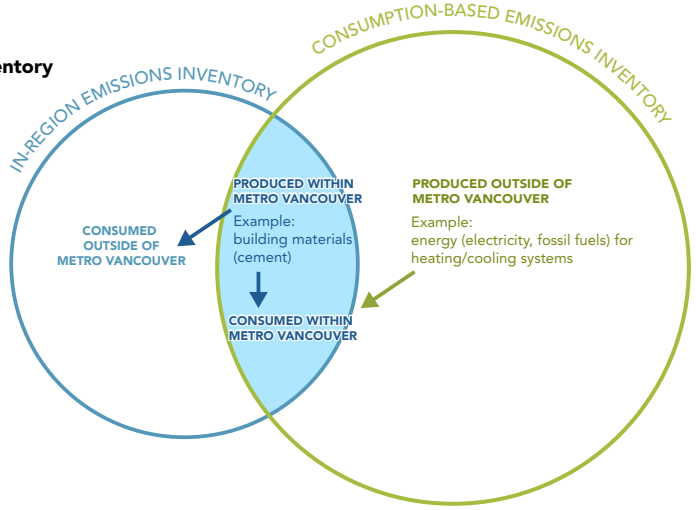
Consumption-Based Emissions Inventory

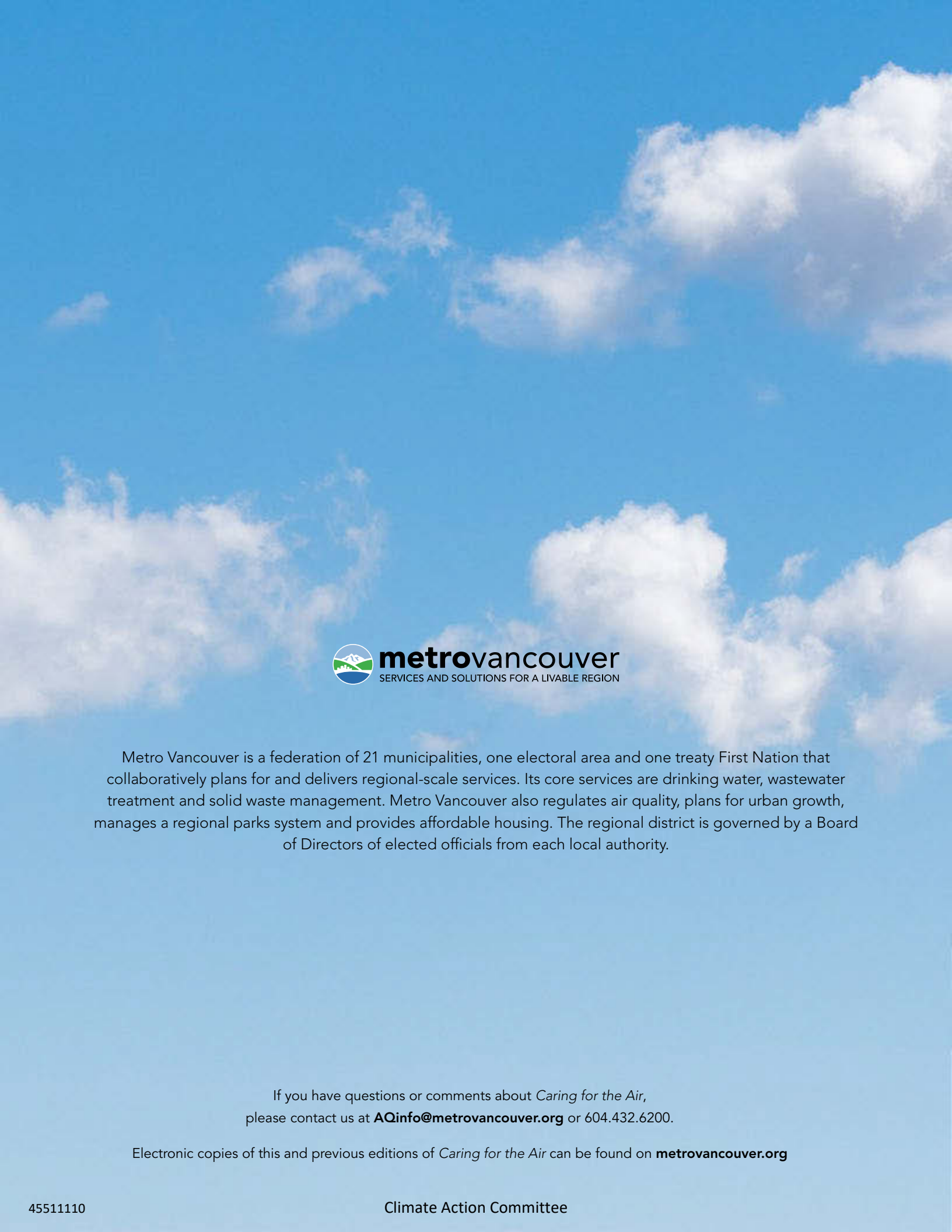
While our day-to-day activities, like driving and using a gas furnace, create GHG emissions in the region, we also create GHG emissions elsewhere when the products and services we use are created, shipped, or disposed. A consumption-based emissions inventory (CBEI) includes the GHG emissions generated from the production, transport, use and disposal of goods or services that we consume in the region, even if those emissions occur outside of the region.

Metro Vancouver is developing a CBEI to complement our five-year 'in-region' EI, which includes only GHG emissions that occur within the region. The CBEI will help us understand the global emissions resulting from our local consumption habits, and inform policies and processes that will support implementation of *Climate 2050* and the *Clean Air Plan*.

GHG emissions included in an in-region emissions inventory vs. a consumption-based emissions inventory

Example: GHG emissions from goods and services for a building





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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

Metro Vancouver is a federation of 21 municipalities, one electoral area and one treaty First Nation that collaboratively plans for and delivers regional-scale services. Its core services are drinking water, wastewater treatment and solid waste management. Metro Vancouver also regulates air quality, plans for urban growth, manages a regional parks system and provides affordable housing. The regional district is governed by a Board of Directors of elected officials from each local authority.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Morgan Braglewicz, Senior Policy and Planning Analyst
Parks and Environment Department

Date: May 25, 2021 Meeting Date: June 11, 2021

Subject: **Sectoral GHG Reduction Targets Update and Comparison**

RECOMMENDATION

That the Climate Action Committee receive for information the report dated May 25, 2021, titled "Sectoral GHG Reduction Targets Update and Comparison".

EXECUTIVE SUMMARY

Metro Vancouver, the BC government, and the federal government have developed emissions reductions targets for 2030, 2050, and sector specific targets for 2030. This report provides an update on recent changes to climate targets established by senior orders of government, and compares them to Metro Vancouver targets. While there is relatively good alignment in overall targets, there is some variation between sector targets – notably for buildings and transportation at the provincial level. Some, but not all, of the difference is caused by different sector categories and emissions sources. In order to meet its emissions targets, Metro Vancouver has proposed a number of actions in the *Clean Air Plan* and *Climate 2050 Roadmaps* that require leadership from or strong collaboration with the BC government. An analysis of sectoral targets will be helpful for Metro Vancouver to work closely with the BC government on key actions in order to meet our respective targets.

PURPOSE

This report provides an update on recent changes to provincial and federal climate targets, and provides a comparison to Metro Vancouver's proposed regional targets.

BACKGROUND

On March 26, 2021, as part of *CleanBC*, the BC government announced sector-specific targets to identify the relative contribution of different sectors to the 2030 emissions reductions target. The Climate Action Committee received a brief update from staff in April when the targets were first released. Staff subsequently undertook additional analysis, comparing sectoral targets at the federal, provincial, and Metro Vancouver levels; this report summarizes the results of that analysis.

***CLIMATE 2050* GHG REDUCTION TARGETS**

The MVRD Board has formally adopted targets to reduce regional greenhouse emissions by 45% by 2030 (relative to 2010) and to reach carbon neutrality by 2050. These targets are science-informed and were adopted to align with the recommendations from the Intergovernmental Panel on Climate Change (IPCC) to limit global warming to 1.5 degrees Celsius. The targets were formalized in both the *Climate 2050 Strategic Framework* and the *Regional Growth Strategy* in 2019.

Metro Vancouver's Proposed Sectoral Targets

Through the development of the *Clean Air Plan*, Metro Vancouver has proposed 2030 sectoral targets. 2050 sectoral targets have been proposed in the *Buildings Roadmap* and *Transportation Roadmap*, and will be developed for other sectors in future *Climate 2050 Roadmaps.* Sectoral targets signal the expected relative contribution of each sector to the overall emissions reductions target of 45% by 2030. It is expected that different sectors will reduce emissions at different rates due to sector specific characteristics such as technology readiness, cost, existing policy, and time needed for fossil fuel technologies to reach the end of their lifecycles and be replaced. The development of sectoral targets was informed by modelling and analysis that takes these factors into account.

Metro Vancouver's 2030 sectoral GHG reduction targets proposed in the *Clean Air Plan* are: 65% reduction for personal transportation, and; 35% reduction for all other sectors: buildings, industry, non-road equipment, medium/heavy trucks, agriculture, air, marine, and rail. When added together, the effect of these sectoral targets is to reduce overall regional emissions by 45% by 2030.

Provincial Sectoral Targets

In 2018, BC released the provincial climate action plan *CleanBC*. The plan outlines actions that the BC government will take to reach the Province's climate target of reducing greenhouse gas emissions by 40% by 2030 (relative to 2007). As part of *CleanBC*, in March 2021 the BC government announced sector-specific targets to identify the relative contribution of different sectors to the 2030 emissions reductions target. As shown in Table 1, these are expressed as a five percentage-point range for the following sectors: transportation; industry; oil and gas; and buildings and communities. The BC government has indicated that when added together, the mid-points of the sectoral target ranges meet the overall provincial target of a 40% reduction in emissions by 2030.

While staff analysis has confirmed that there is relatively good alignment in overall targets, there are a number of important differences in the activities included in the sector categories used by the BC government and those used by Metro Vancouver. Notably, while Metro Vancouver has a separate buildings issue area, the Province has combined buildings with communities, adding in waste and afforestation/deforestation. Also the Province has included non-road equipment with transportation, whereas Metro Vancouver has included non-road engines with industry. Additionally, there are no emissions from upstream oil and gas extraction and production in the Metro Vancouver region. Within sectors, emissions sources also differ; heavy trucks account for more emissions in the transportation sector at the provincial level than the regional level. There are different sector characteristics at the provincial level, with an example being the higher proportion of buildings that are single family detached homes in BC compared to Metro Vancouver.

Federal Climate Targets

The Federal government has set an emissions reduction target of 30% by 2030 from 2005 in its commitment to the Paris Agreement. In April 2021, it announced its intent to increase the ambition of this target to a 40 to 45% reduction in emissions by 2030. The Federal government has also outlined targets for sectoral reductions in absolute terms (tonnes reduction). The percentage reductions shown in Table 1 can be extrapolated using emissions from the baseline year of 2005. These sectoral targets add up to the 30% target that the Federal government is currently committed to.

Similar to BC, federal emissions categories differ from those used regionally. Oil and gas is the largest emissions sector at the national level, and emissions from electricity production in other provinces are significant. The sources of emissions within sectors also differ. For instance, freight transportation makes up a larger proportion of transportation emissions nationally, and types of heavy industries vary significantly across Provinces and Territories.

Climate Target Comparison Across Three Levels of Government

Table 1 summarizes Regional, Provincial, and Federal targets. With the Federal government's recently announced intention to increase their 2030 target, the overall 2030 targets across the three levels of government now align more closely, though Metro Vancouver's is still the most aggressive.

Table 1: Summary of targets at the Regional, Provincial, and Federal levels

	2030 Target	**2050 Target**	**2030 Sectoral Targets**
Metro Vancouver (2010 baseline)	-45%	Carbon neutrality	Personal Transportation: -65%
			All other sectors: -35%
BC Government (2007 baseline)	-40%	-80%: *committed* Net-zero: *announced*	Transportation: -27% to -32%
			Industry: -38% to -43%;
			Oil and Gas: -33% to -38%;
			Buildings and communities: -59% to -64%
Federal Government (2005 baseline)	-30%: *committed* -40% to -45%: *announced*	Net-zero: *announced*	Transportation: -7%
			Heavy industry: -53%
			Oil and gas: -66%
			Buildings: -51%
			Waste and others: -61%
			Agriculture: -3%
			Electricity: -39%
			Land use & nature based: -27 Mt CO_2e (absolute)

There are notable differences between sector targets. A coarse analysis using available information suggests that even after accounting for differences in sector categories, the Provincial sector targets are less stringent for transportation than those proposed in the *Clean Air Plan*, and more stringent for buildings. Provincial targets are relatively close to those that Metro Vancouver has proposed for industry and non-road equipment, though they are slightly more stringent for industry and less for non-road equipment. Provincial sector targets suggest that emissions reductions in the oil and gas sector will be an important pathway to meeting overall provincial emission reduction targets, lessening the overall burden on other sectors.

While these provincial targets do not include subsector targets that align with Metro Vancouver's targets, it is likely that the provincial pathways to meeting targets for transportation and buildings and communities will involve uneven emissions reductions within sectors. For instance, reductions in the personal transportation subsector will occur sooner and more drastically than emissions reductions for medium and heavy duty vehicles.

Federal sectoral targets vary substantially from those proposed by Metro Vancouver. However, due to the significant variation in sector categories and emissions sources across the country, direct comparison to regional targets at the sector level is challenging. Additionally, the 2030 federal

sectoral targets are designed to add up to the 30% reduction target Canada has committed to, which is less ambitious than Metro Vancouver's 2030 target.

Implications for Metro Vancouver's *Climate 2050 Roadmaps* and *Clean Air Plan*

Provincial policy leadership will strongly influence Metro Vancouver's ability to reach regional emissions reductions targets. This is reflected in the actions proposed in the draft *Clean Air Plan* and *Climate 2050 Transportation* and *Buildings* roadmaps, many of which rely on leadership or collaboration with the BC government. However, due to differences in emissions sources, the pathways to reach climate targets (driven by policies and regulations) will likely differ between the regional and provincial levels. In cases where the Province's sector targets are less stringent than Metro Vancouver's proposed targets, such as transportation, Metro Vancouver will need to ensure that local emissions reductions exceed Provincial targets.

The BC government has indicated that through CleanBC, it will soon be engaging with key stakeholders on the development of sector pathways to emissions reductions that are in line with its sector targets. While there will not be an opportunity to comment further on the sector targets, this may provide an opportunity to shape emissions reductions pathways at the subsector level that align with the actions and subsector targets proposed in the *Clean Air Plan* and *Climate 2050 Roadmaps*.

Federal sector targets are mostly likely to impact Metro Vancouver for sources that are strongly influenced by Federal regulations such as air, marine, and rail. Given the relatively loose federal sector targets for transportation, there does not appear to be strong alignment in this subsector. Bold leadership by the Federal government is needed to significantly reduce emissions from these sources.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

There are no financial implications associated with this report.

CONCLUSION

There have been a number of recent updates to provincial and federal climate targets. Metro Vancouver has also developed proposed sectoral emission reduction targets through the *Clean Air Plan* and *Climate 2050 Roadmaps*. While there is now better alignment across all three levels of government in 2030 emission reduction targets, there are some notable differences between the sector level targets. These differences are due in part to different sector categorization, emissions sources, and sectoral characteristics at the regional, provincial, and federal levels. As part of the sector pathways to reduce regional greenhouse gas emissions, Metro Vancouver has identified a number of actions that rely on leadership from or collaboration with the BC government, and some that rely on the Federal government. As other levels of government develop and refine their own climate strategies, it is imperative that Metro Vancouver leverages opportunities to pursue alignment and collaboration with the Province on critical actions that impact regional emissions.

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SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Climate Action Committee

From: Roger Quan, Director, Air Quality and Climate Change
Parks and Environment Department

Date: May 25, 2021 Meeting Date: June 11, 2021

Subject: **Manager's Report**

RECOMMENDATION
That the Climate Action Committee receive for information the report dated May 25, 2021, titled "Manager's Report".

CLIMATE ACTION COMMITTEE 2021 WORK PLAN
The attachment to this report sets out the Committee's Work Plan for 2021. The status of work program elements is indicated as pending, in progress, or complete. The listing is updated as needed to include new issues that arise, items requested by the Committee, and changes to the schedule.

CLIMATE ACTION UPDATES
BC Building Electrification Road Map
Buildings generate greenhouse gas emissions from burning natural gas – a fossil fuel – for space and water heating. Emissions from buildings are significant, accounting for approximately one quarter of all regional greenhouse gas emissions. In BC, due to the low-carbon grid electricity, electrification of space and water heating will dramatically reduce greenhouse gases from buildings. In addition, the buildings sector is mostly regulated by provincial and local governments, which presents an opportunity for a rapid transition to low-carbon solutions in the Metro Vancouver region.

The BC Building Electrification Road Map was launched in April 2021 (Reference 1). It outlines a detailed set of actions needed to achieve building electrification in the province, and proposes the most effective sequence for those actions. It aims to ensure that BC's building sector benefits from a clear and coordinated approach to this market transformation, for both existing buildings as well as new construction.

The BC Building Electrification Road Map has been designed to support climate action policy making at different levels of government. It will be an important reference for staff undertaking buildings-related policy and planning work. Metro Vancouver's draft *Climate 2050 Buildings Roadmap* is closely aligned with the BC Building Electrification Road Map on many key actions.

ENGAGEMENT UPDATES
Clean Air Plan
The planned engagement period for the draft *Clean Air Plan* will close June 15, although there are a few additional meetings with key stakeholders scheduled after that date.

Staff delivered five online forums on the *Clean Air Plan,* two of which were directed to the public and three to stakeholders. Staff also presented at numerous committees and organizations representing

agriculture, business and industry. The *Clean Air Plan* was included in youth events hosted by Metro Vancouver through May, and was the focus for a youth leadership forum on policy in early June.

The draft *Clean Air Plan* was promoted through social media, corporate newsletters, and online advertising to broaden the reach of the plan.

Feedback is now being reviewed and considered towards developing a final *Clean Air Plan*, which is expected to come to this Committee and the MVRD Board at a forthcoming meeting.

Climate 2050

Two draft *Climate 2050 Roadmaps*, Buildings and Transportation, were published to the website with a comment form. Staff are considering comments received through the *Clean Air Plan* engagement as feedback on the GHG emissions mitigation content, and will be checking in again with stakeholders on the adaptation content. A draft *Climate 2050 Roadmap* for Industry is being prepared.

The Energy Roadmap discussion paper, which came to this Committee in the spring, was published and circulated to energy sector stakeholders, including the technical working group members, for comments. Staff also did a final promotion for feedback on the Agriculture Roadmap discussion paper. The feedback window on three additional published Discussion Papers (Nature & Ecosystems, Water & Wastewater Infrastructure, and Waste Management) closes July 31.

Proposed Amendments to Air Quality Permit and Regulatory Fees

The planned engagement period for potential amendments to the *Greater Vancouver Regional District Air Quality Management Fees Regulation Bylaw No. 1083, 2008* (Bylaw 1083) concluded on April 30, 2021. Feedback is being collated and considered in the development of bylaw amendments for Committee and Board consideration.

Staff held three well-attended public webinars throughout February and early March 2021 covering proposals for bylaw amendments related to fees for odorous and other air contaminants and potential elimination of the Measured Discharge Program. Staff also presented the proposals for bylaw amendments at two meetings of regional, provincial and federal air quality organizations, as well as the Municipal Environmental Managers Committee.

Staff received feedback in the form of completed feedback forms, letters, comments during webinars, and emails. Feedback on the proposals was mainly sought from businesses that are currently permitted or regulated and other interested stakeholders. Staff are responding to stakeholder requests to provide estimates of how the proposed air contaminant fees may lead to increased permit application fees and annual emission fees for specific businesses. All of the engagement materials, including the discussion paper, are available on the project website. Feedback on the proposals will be presented to the Climate Action Committee and Board later this year along with the bylaw amendments for Board consideration.

Residential Indoor Wood Burning Bylaw

Outreach is underway on the yearly May 15 to September 15 warm season restrictions on residential indoor wood burning and best burning practices required under MVRD Residential Indoor Wood Burning Emissions Regulation Bylaw No. 1303. Staff prepared and initiated a communications strategy combining both digital and traditional media tactics to reach residents throughout Metro Vancouver. The digital tactics include social media messaging through Metro Vancouver's corporate channels (Facebook, Twitter, LinkedIn & Instagram), email communications to target audiences such as municipal fire departments and Metro Vancouver 'Residential Wood Smoke' mailing list subscribers, and coordination with member municipalities to assist in amplifying the message throughout the region. Traditional media tactics include a media release, information inserted into Metro Vancouver's newsletter for residents of Electoral Area A, and a suite of advertisements in local newspapers that ran across the region prior to the official launch of warm season burning restrictions on May 15, 2021. All communications tactics refer audiences to Metro Vancouver's Residential Indoor Wood Burning webpage webpage (Reference 2), where they can access current information on Bylaw 1303 and the seasonal restrictions.

Metro Vancouver will continue outreach efforts throughout the warm season, with additional newspaper advertisements in multiple languages, continued social media presence, and distribution of educational rack cards to residents when burning is observed during the warm season.

References

1. BC's Building Electrification Road Map
2. http://www.metrovancouver.org/services/air-quality/action/residential-wood-burning/Pages/default.aspx

Attachment

Climate Action Committee 2021 Work Plan

45135211

Climate Action Committee 2021 Work Plan
Report Date: May 25, 2021

Priorities

1st Quarter	**Status**
Climate Action Committee 2021 work plan and priorities	Complete
Climate 2050 – FCM Low Carbon Cities Canada initiative	Complete
Climate 2050 – carbon neutral modelling	In progress
Climate 2050 – electric vehicle programs review and recommendations	Complete
Sustainability Innovation Fund (SIF) – 2021 proposals	Complete
2nd Quarter	
Climate 2050 – draft Roadmap: Buildings	Complete
Climate 2050 – draft Roadmap: Transportation	Complete
Climate 2050 – draft Roadmap: Industry	In progress
Climate 2050 – Energy Roadmap discussion paper	Complete
Air quality – draft Clean Air Plan	Complete
Air quality – second phase of consultation on open air burning emission regulation	In progress
Air quality – monitoring network review and upgrades	In progress
10th annual Caring for the Air report	In progress
SIF – status report on previously approved liquid waste projects	In progress
3rd Quarter	
Climate 2050 – draft roadmaps: Agriculture, Nature and Ecosystems	In progress
Climate 2050 – Land Use and Growth Management Roadmap discussion paper	Pending
Climate 2050 – Metro Vancouver's climate actions and carbon neutral progress	In progress
Climate 2050 – initiate consultation on proposed buildings regulatory initiative	Pending
Air quality – amendments to air quality permit and regulatory fees	In progress
Air quality – amendments to non-road diesel engine emission regulation	In progress
Air quality – update on regulatory initiative for cannabis processing	In progress
SIF – status report on previously approved regional district projects	In progress
SIF – status report on previously approved water projects	In progress
Ecological Health Framework – annual report	Pending
4th Quarter	
Climate 2050 – annual report and progress tracking	In progress
Climate 2050 – Human Health and Well-being Roadmap discussion paper	Pending
Climate 2050 – final roadmaps: Buildings, Industry, Transportation	Pending
Climate 2050 – managing Metro Vancouver's corporate GHG emissions and energy	Pending
Air quality – Clean Air Plan for Board approval	In progress
Air quality - initiate process to update boilers and process heaters regulation	Pending
Annual budget and 5 year financial plan	In progress

The Corporation of the District of Saanich | Mayor's Office
770 Vernon Avenue Victoria BC V8X 2W7 | T 250-475-5510 | F 250-475-5440 | www.saanich.ca

Sent via email

June 1, 2021

British Columbia Elected Officials
BC Chief Administrative Officers

Re: British Columbia Climate Action Revenue Incentive Program (CARIP) Ending

This letter will confirm that Council, at their meeting held May 17, 2021, considered a staff report on the end of the Climate Action Revenue Incentive Program (CARIP) and resolved as follows:

"*That Council:*

1. *Receive for information the report of the Director of Planning dated May 13, 2021.*
2. *Direct the Mayor to send a letter to the Premier, the Minister of Municipal Affairs; the Minister of Environment and Climate Change Strategy; the Minister of Finance, and the Union of British Columbia Municipalities (UBCM) based upon the draft provided, detailing the impact of cancelling the Climate Action Revenue Incentive Program (CARIP) and the need for a swift replacement that provides consistent, non-application funding to allow the District of Saanich and other municipalities to continue their work at a scale that can deliver on the Provincial CleanBC Plan and Municipal Climate Plans.*
3. *Direct staff to draft a resolution to UBCM on a replacement CARIP program and present this to Council for consideration prior to the June 30, 2021 submission deadline.*
4. ***Share this report and attachments with the Capital Regional District Board of Directors, other BC municipal elected officials and Chief Administrative Officers in advance of the UBCM Conference in September, 2021."***

A copy of the report and draft meeting minutes are attached for information.

Sincerely,

Fred Haynes
Mayor
Enclosures
cc: Saanich Council
Sharon Hvozdanski, Director of Planning, District of Saanich
Valla Tinney, Director of Finance, District of Saanich

1300-50 BC

The Corporation of the District of Saanich

Report

To: **Mayor and Council**

From: **Sharon Hvozdanski, Director of Planning**

Date: **May 13, 2021**

Subject: **Ending the B.C. Climate Action Revenue Incentive Program (CARIP)**
File: 1300-50 • Provincial Governments

RECOMMENDATION

1. That Council receive this report for information.

2. That Council send a letter to: Premier John Horgan; the Minister of Municipal Affairs; the Minister of Environment and Climate Change Strategy; and the Union of B.C. Municipalities (UBCM) based upon the draft provided in Attachment 2, detailing the impact of cancelling the Climate Action Revenue Incentive Program (CARIP) and the need for a swift replacement that provides consistent, non-application funding to allow the District of Saanich and other municipalities to continue their work at a scale that can deliver on the Provincial CleanBC Plan and Municipal Climate Plans.

3. That Council direct staff to draft a resolution to the Union of B.C. Municipalities on a Replacement CARIP Program and present this to Council for consideration prior to the June 30, 2021 submission deadline.

4. That Council share this report and attachments with the Capital Regional District Board of Directors, other B.C. municipal elected officials and Chief Administrative Officers in advance of the Union of B.C. Municipalities Conference in September, 2021.

PURPOSE

The purpose of this report is to provide Council with information regarding:

- The announced end to the Provincial Climate Action Revenue Incentive Program (CARIP);
- The implications this has for District of Saanich climate action; and
- Proposed next steps.

DISCUSSION

Provincial Announcement - Climate Action Revenue Incentive Program (CARIP)
In terms of background, the Climate Action Revenue Incentive Program (CARIP) is a conditional grant program that provides funding to local governments that have signed the B.C. Climate

Action Charter. This funding equals 100% of the carbon taxes a local government pays to support their operations.

The program requires local governments to report annually on their greenhouse gas (GHG) emissions and encourages investment in climate action to help the Province deliver on its commitment to carbon neutrality. Since the Climate Charter was launched in 2007, 187 of 190 municipalities, regional districts and the Islands Trust have signed up, providing the Province with a comprehensive database of municipal corporate emissions inventories and corporate and community climate actions implemented at the local level.

On May 11, 2021 the Deputy Minister, and Assistant Deputy Minister for the Local Government Division of the Ministry of Municipal Affairs called a meeting with all Municipal and Regional District Chief Administrative Officers (CAO) to announce the end of the Climate Action Revenue Incentive Program. It was indicated that this decision was a direct result of the recently introduced Provincial Budget. A follow up e-mail was then issued that includes information shared at the meeting (see Attachment 1).

The Province has outlined that 2020 will be the final year for reporting, with the final grant paid to local governments in 2021. They indicated that at this stage no replacement program with unconditional funding is planned and future programs would be application based. They aim to work with local governments through UBCM and the Green Communities Committee on further supporting the CleanBC goals.

In light of the Federal government's renewed climate commitments prior to the United Nations Climate Change Conference (COP26), the withdrawal of this consistent provincial funding source for climate action was extremely unexpected and it is clear that local governments have not been engaged in this decision.

Implications

Loss of Consistent Funding

The District of Saanich has participated in the CARIP program since signing the Climate Charter in 2007 and has benefited from more than $1.3 million over the last 10 years, with approximately $150,000 annually in recent years.

This funding has been used within the Sustainability Division of the Planning Department to support staff wages, implement community climate mitigation and adaptation projects and to leverage larger climate related grant applications, which often require a substantial contribution from the local government partner.

Examples of projects supported by CARIP funding include, but are not limited to:

- Feasibility analysis, design and installation of multiple rounds of public Electric Vehicle (EV) charging stations;
- Communications campaigns for home energy efficiency upgrades, the Oil to Heat Pump program and Better Home BC rebates;
- Municipal top-ups to provincial rebates for home energy retrofits;

- Analysis and engagement to support the introduction of the Saanich Greener Garbage program and the BC Energy Step Code;
- Funding for the B.C. Sustainable Energy Association (BCSEA) CoolIt! School climate leadership education program;
- Installation and maintenance of Bike kitchens at Saanich facilities;
- Support for engagement and analysis related to electric mobility and development of the Electric Mobility Strategy; and
- Workshops on local food production and processing.

Until approval of the 2021 Budget in May of this year, CARIP has been the main source of sustained and consistent funding for community focused climate action at the District of Saanich, with the Carbon Fund used for corporate climate action projects. While Council has committed to multiple one-time resource requests to support climate action where opportunities arose or costs exceeded CARIP funding, this approach does not provide the reliability afforded by the CARIP program. As such, CARIP has been instrumental in the development of a District of Saanich Sustainability Division and the hiring and retention of sustainability staff. Many other B.C. municipalities will have sustainability staff that are still resourced through CARIP funding.

Therefore, the clear lack of a replacement program that provides a consistent and reliable funding source for municipal climate action and the shift towards solely competitive funding streams and programs is of major concern.

Competitive funding programs and grants require significant effort, staff time and, often, financial resources to fund the analysis needed for an application with no guarantee of success. They also take substantial time and resources for evaluation by the decision making body. We regularly hear that grant programs and competitive funding streams are highly competitive and over-subscribed. In addition, they rely on match funding or financial contributions from the local government partner.

In the absence of either the CARIP program or a similar source of consistent funding, many municipalities will be limited in their ability to apply for such competitive programs or grants and it will be extremely difficult to develop work plans and implement climate programs that span multiple years based upon this competitive funding approach. This change is being implemented in a time of particular uncertainty when there is an overwhelming demand for municipal tax dollars to support core municipal services and local governments have limited ability to pivot on budget decisions. Removing dedicated climate action funding will create a shortfall that is unlikely to be met by many local governments through the municipal tax base.

<u>Loss of Coordinated Reporting & Data</u>

Saanich has recently committed to developing a comprehensive annual climate report card that aligns with the goals and actions outlined in the Climate Plan and Electric Mobility Strategy. Further, we report on community-wide GHG emissions through the Carbon Disclosure Project (CDP) using the globally recognized Global Protocol for Community Scale GHG Emissions Inventories (GPC Basic+). However, there are only a limited number of B.C. municipalities that are providing this level of climate reporting.

The CARIP program established a consistent climate reporting template for all B.C. local governments that had signed onto the Climate Charter and represents over a decade of publicly accessible data on municipal climate action. This is a true example of global best practice in coordinated climate reporting. Local government have spent significant effort building internal capacity and restructuring reporting systems to align with CARIP and the process has, in many municipalities, supported the development of strategic plans for climate action, monitoring and reporting on progress and the regular cross-departmental collaboration necessary to identify opportunities for climate related projects and programs.

Proposed Next Steps

Some amendments to the CARIP process and report template would be valuable and local governments can provide important insight moving forward. For instance, as Saanich and other municipalities move towards our corporate GHG reduction targets and increase our requirements for contractor climate responsibilities, we will pay less carbon tax as a result. While this should be addressed by an increase in the carbon tax in the short term, as we get close to our zero carbon targets, the CARIP funding will be reduced. In addition, funding based on fossil fuel consumption may be perceived as rewarding a lack of progress. As such, changes to the program could include the move from a carbon tax refund based upon fossil fuel consumption to one based on municipal population. However, there remains considerable benefit to continuing with a climate program that provides consistent funding tied to the delivery of a simple annual climate report.

A draft letter to: Premier John Horgan; the Ministry of Municipal Affairs; the Minster of Environment and Climate Change Strategy; and the Union of B.C. Municipalities (UBCM) is included as Attachment 2 for Council's consideration.

This letter outlines the value of the CARIP program and associated funding to the District of Saanich and the considerable implications for the program's end. It advocates for the Province to engage local governments in the design and implementation of a replacement program that offers consistent funding that is comparable to or greater than that is currently provided by CARIP. Program funding should be used for climate action (mitigation and adaptation), tied to a requirement for annual reporting on progress towards climate goals and should be in place for the first payments to be received by municipalities in 2022. It is recommended that Council sends this letter to the Provincial officials listed above.

In addition, there is the opportunity for Council to submit an endorsed resolution directly to UBCM prior to June 30, 2021 that would address the impact of ending the CARIP program and propose the swift development of a suitable replacement. It is recommended that Council direct staff to draft such a UBCM resolution for their consideration.

Finally, it is recommended that this Council report and attachments be shared with the CRD Board, other B.C. municipal elected officials and Chief Administrative Officers in support of an additional coordinated response and discussion at the UBCM Conference in September 2021.

ALTERNATIVES

1. That Council approve the recommendations as outlined in this report.
2. That Council reject the recommendations as outlined in this report.
3. That Council provide alternate direction to staff.

FINANCIAL IMPLICATIONS

The District of Saanich has participated in the CARIP program since signing the Climate Charter in 2007 and has benefited from more than $1.3 million from the program over the last 10 years. In 2020, CARIP funding amounted to $154,072. This forms a substantial portion of the Sustainability Division's budget. Should a similar Provincial program that provides consistent funding for municipal climate action not be developed to replace CARIP by 2022, then staff will need to bring forward a resource request to Council as part of the 2022 budget to ensure the required sustained funding necessary, to effectively deliver on the Climate Plan actions and goals. As always, staff will continue to apply for senior government and other sources of external funding. That said, the time spent seeking out and applying for external funding draws valuable staff resources away from work on corporate and community GHG initiatives.

STRATEGIC PLAN IMPLICATIONS

The 2021 Council Budget requests and Sustainability Division and Planning Department work plans have been developed on the understanding that the CARIP program will continue. As such, removal of this funding without a suitable and consistent replacement impacts the ability to deliver on the 2019-2023 Council Strategic Plan Goal: 'Climate Action and Environmental Leadership', most notably the initiative to implement Saanich's Climate Plan.

CONCLUSION

CARIP has been a valuable source of consistent and dedicated funding over the last decade, allowing municipalities to take action on climate change by resourcing staff, undertaking key emissions reduction projects and leveraging larger climate related grants. It is a true example of global best practice in coordinated and consistent climate reporting by local governments at the provincial level.

On May 11, 2021 the Ministry of Municipal Affairs announced the end of the CARIP program, with the final grant paid to local governments in 2021. This amounts to a loss of approximately $150,000 in consistent annual funding to the District of Saanich, which is used to address climate change.

In light of the Provincial commitment to climate action outlined in CleanBC and the Federal government's renewed climate commitments prior to COP26, the end of the CARIP program and withdrawal of this consistent provincial funding source was extremely unexpected and it is clear that local governments have not been engaged in the decision. The absence of a replacement program and shift towards competitive funding applications has considerable implications for dedicated municipal staffing and actions on climate change and jeopardises a decade's worth of work monitoring and reporting on local government GHG emissions and progress.

As such, staff are recommending that Council advocate to the Province via letter to the Premier, appropriate Ministries and UBCM, for a swift replacement of the CARIP program with consistent, non-application based funding, tied to annual climate reporting and that this be followed by a Council endorsed resolution submitted to UBCM addressing the same. This will allow municipalities to continue their work at a scale necessary to address the Climate Emergency and deliver on CleanBC and Municipal Climate Plan goals.

Prepared by:

Rebecca Newlove, Manager of Sustainability

Approved by:

Sharon Hvozdanski, Director of Planning

RN/jsp

Attachments:
1. E-mail from Province of BC, Ministry of Municipal Affairs Re: CARIP Reporting 2020, May 11, 2021
2. Draft Letter to Premier John Horgan, the Minister of Municipal Affairs, the Minster of Environment and Climate Change Strategy and the Union of B.C. Municipalities (UBCM)

cc: Valla Tinney, Director of Finance

ADMINISTRATOR'S COMMENTS:

I endorse the recommendation from the Director of Planning

Paul Thorkelsson, Chief Administrative Officer

Jon Poole

From: Rebecca Newlove
Sent: Wednesday, May 12, 2021 11:11 AM
To: Rebecca Newlove
Subject: Re: Climate Action Revenue Incentive Program (CARIP) Reporting 2020

From: INFRA MUNI:EX [redacted]
Sent: Tuesday, May 11, 2021 12:40 PM
To: INFRA MUNI:EX <redacted>
Subject: (External Email) Re: Climate Action Revenue Incentive Program (CARIP) Reporting 2020

To: All Municipal and Regional District Chief Administrative Officers and Chief Financial Officers

Re: Climate Action Revenue Incentive Program (CARIP) Reporting 2020

Many thanks to all who joined Deputy Minister Okenge Yuma Morisho and me on today's call about the Climate Action Revenue Incentive Program (CARIP), please accept our apologies for the technical difficulties on the call that some experienced. This email includes the information that was shared during the call. We want to emphasize that local governments throughout British Columbia have shown great leadership on climate action. The province is committed to working with local governments to reach our climate goals and make life better for people across British Columbia.

For those who were unable to attend or hear due to some technical difficulties on the call, I wish to inform you and your staff that the CARIP will be wrapping up in the 2021/22 fiscal year. During this final program year, local governments will be required to complete and submit the 2020 Carbon Tax Calculation Form. **This will be the only reporting requirement**.

All program information is available on the Ministry of Municipal Affairs' CARIP webpage. In particular, we encourage you to review the CARIP *Program Guide* for 2020 prior to completing the *2020 Carbon Tax Calculation Form*.

CARIP Reporting Requirement

1. **2020 Carbon Tax Calculation Form (submission deadline: August 6, 2021)**
   Complete and submit a signed electronic version of the form to [redacted]. This form requires Financial Officer certification.

The end of the CARIP program should not be interpreted as the Province pulling back from the productive relationship we have and we look forward to working with UBCM, through the Green Communities Committee, to support the goals of the Climate Action Charter.

Under CleanBC, the Province of British Columbia has put a priority on reducing pollution, boosting energy-efficient solutions and building a low-carbon economy. Local governments will continue to be a key partner in

our collective efforts to address the challenges of a changing climate, playing a specific and important role in British Columbia's climate goals.

Just as local governments' actions on climate solutions have evolved in the past decade, our government is responding to support you with tools and funding programs such as:

- Updating the BC Action Climate Toolkit and the Green Communities Committee Carbon Neutral Framework.
- Investing $110 million in combined provincial and federal funding to help local governments and Indigenous communities develop energy efficiency and clean energy projects through the Investing in Canada Infrastructure Program CleanBC Communities Fund.
- Working with the federal government to assess the climate impacts of all major infrastructure being funded under the Investing in Canada Infrastructure Program to reduce GHG emissions and increase resilience to climate change, which benefits communities and creates jobs.
- Boosting active transportation infrastructure with $18 million through the Ministry of Transportation and Infrastructure.
- Making sure commuters can get out of their cars with historic investments in public transit, such as the Broadway Subway Line, and free transit for kids 12 and under starting this September.

Budget 2021 commits $11 million in new funding to help local governments plan for compact, energy- efficient communities, directly supporting the Climate Action Charter's commitment to create complete, compact, energy-efficient rural and urban communities. We look forward to working with all local governments through UBCM and the Green Communities Committee on how to support greener and more livable communities.

Building on record investments in CleanBC, the Province will continue to strengthen our work with local governments and support the Climate Action Charter.

If you have any questions, please contact the Ministry of Municipal Affairs at [redacted] or [redacted]

Kind regards,

Tara Faganello
Assistant Deputy Minister, Local Government Division
Ministry of Municipal Affairs

District of Saanich
Legislative Services Division
770 Vernon Ave.
Victoria BC V8X 2W7

t. 250-475-5501
f. 250-475-5440
saanich.ca

May , 2021

The Honourable John Horgan, MLA
Premier of British Columbia
Office of the Premier
PO Box 9041 Stn. Prov. Govt.
Victoria BC V8W 9E1

The Honourable Josie Osborne, MLA
Minister of Municipal Affairs
PO Box 9056 Stn. Prov. Govt.
Victoria BC V8W 9E2

The Honourable George Heyman, MLA
Minister of Environment and Climate Change Strategy
PO Box 9047 Stn. Prov. Gov.
Victoria BC V8W 9E2

Councillor Brian Frenkel
President, Union of B.C. Municipalities
Local Government House
525 Government Street
Victoria BC V8V 0A8

Dear Premier John Horgan:

Re: B.C. Climate Action Revenue Incentive Program (CARIP) Ending

This letter will confirm that Council, at their meeting held May 17, 2021, considered a staff report on the end of the Climate Action Revenue Incentive Program (CARIP) (see attached) and resolved as follows:

> "*That Council send a letter to: Premier John Horgan; the Minister of Municipal Affairs; the Minister of Environment and Climate Change Strategy; and the Union of B.C. Municipalities (UBCM) based upon the draft provided in Attachment 2, detailing the impact of cancelling the Climate Action Revenue Incentive Program (CARIP) and the need for a swift replacement that provides consistent, non-application funding to allow the District of Saanich and other municipalities to continue their work at a scale that can deliver on the Provincial CleanBC Plan and Municipal Climate Plans;*
>
> *That Council direct staff to draft a resolution to the Union of B.C. Municipalities on a Replacement CARIP Program and present this to Council for consideration prior to the June 30, 2021 submission deadline; and*
>
> *That Council share this report and attachments with the Capital Regional District Board of Directors, other B.C. municipal elected officials and Chief Administrative Officers in advance of the Union of B.C. Municipalities Conference in September, 2021."*

On May 11 2021, the District of Saanich was made aware of the end to the Climate Action Revenue Incentive Program (CARIP) through an announcement made by the Ministry of Municipal Affairs.

In light of the Provincial commitment to climate action outlined in CleanBC and the Federal government's renewed climate commitments prior to the United Nations Climate Change Conference (COP26), the end of the CARIP program and withdrawal of this provincial funding source for climate action was extremely unexpected and it is clear that local governments have not been engaged in the decision.

CARIP has been a critical source of consistent and dedicated funding over the years, allowing municipalities to take action on climate change by resourcing staff, funding key emissions reduction projects and leveraging larger climate related grants. It is a true example of global best practice in coordinated and consistent climate reporting, representing over a decade of data on climate action at the municipal level.

The District of Saanich has delivered a considerable number of high impact actions using CARIP funding, ranging from multiple rounds of public electric vehicle charging stations, to the analysis and engagement required to support adoption of the BC Energy Step Code. Additional examples are provided in the attached Council Report. Further, CARIP funding has been instrumental in the development of a Sustainability Division and the hiring and retention of sustainability staff, which, until 2021, were still partly resourced via CARIP funding. Many other municipalities will have staff delivering on climate action that are still resourced through the CARIP carbon tax refund.

Given this, the clear lack of a replacement program that provides a consistent and reliable funding source for municipal climate action and the shift towards solely competitive funding streams and programs is of major concern. Such programs require significant effort, staff time and, often, financial resources to fund the analysis needed for an application with no guarantee of success. They also take substantial time and resources for evaluation by the decision making body and we regularly hear that grant programs and competitive funding streams are over-subscribed. In addition, they rely on match funding or financial contributions from the local government partner. In the absence of either the CARIP program or a similar source of consistent funding, many municipalities will be limited in their ability to apply for such competitive programs. Further, this level of uncertainty makes it extremely difficult to plan for and implement climate actions that span multiple years.

While some amendments to the CARIP process and report template would be valuable, for example, the move from a carbon tax refund based upon fossil fuel consumption to one based on municipal population, there remains considerable benefit to continuing with a program that provides consistent funding tied to the delivery of a simple annual climate report.

This change is being implemented in a time of particular uncertainty when there is an overwhelming demand for municipal tax dollars to support core municipal services and local governments have limited ability to pivot on budget decisions. Removing dedicated climate action funding will create a shortfall that is unlikely to be met by many local governments through the municipal tax base.

As such, Council requests that the Province engage local governments on the swift replacement of CARIP with a program that provides consistent, non-application based funding, tied to annual climate reporting and with first payments received by local governments in 2022. This will allow municipalities to continue their work at a scale necessary to address the Climate Emergency and deliver on CleanBC and Municipal Climate Plan goals.

Sincerely,

Angila Bains, B.A., CMC,
Manager, Legislative Services

RN/

Enclosures: Council Report:

cc. Mayor and Council
Paul Thorkelsson, Chief Administrative Officer, District of Saanich
Sharon Hvozdanski, Director of Planning, District of Saanich
Valla Tinney, Director of Finance, District of Saanich
Tara Faganello, Assistant Deputy Minister, Local Government Division, Ministry of Municipal Affairs

2560-50
Climate Action

ENDING THE BC CLIMATE ACTION REVENUE INCENTIVE PROGRAM (CARIP)

Report of the Director of Planning dated May 13, 2021. To provide Council with information regarding:

- The announced end to the Provincial Climate Action Revenue Incentive Program (CARIP);
- The implications this has for the District of Saanich Climate Action; and
- Proposed next steps.

The Manager of Sustainability provided an overiew of the termination of the BC Climate Action Revenue Incentive Program.

MOVED by Councillor Chambers and Seconded by Councillor Plant: "That Council:

1. **Receive for information the report of the Director of Planning dated May 13, 2021;**
2. **Direct the Mayor to write a letter to the Premier, the Minister of Municipal Affairs, the Minister of the Environment, Minister of Finance and Climate Change Strategy, and the Union of British Columbia Municipalities based upon the draft provided, detailing the impact of cancelling the Climate Action Revenue Incentive Program (CARIP) and the need for a swift replacement that provides consistent, non-application funding to allow the District of Saanich and other municipalities to continue their work at a scale that can deliver on the Provincial CleanBC Plan and Municipal Climate Plans;**
3. **Direct staff to draft a resolution to the Union of British Columbia Municipalities on a replacement CARIP program and present this to Council for consideration prior to the June 30, 2021 submission deadline; and**
4. **Share this report and attachments with the Capital Regional District Board of Directors, other BC municipal elected officials and the Chief Administrative Officers in advance of the Union of British Columbia Municipalities conference in September 2021."**

Council discussion ensued with the following comments:

- The cuts to funding are disappointing.

The Motion was then Put and CARRIED

metrovancouver
SERVICES AND SOLUTIONS FOR A LIVABLE REGION

To: Regional Economic Prosperity Management Board

From: Gregory Freeman, Senior Economist, Regional Economic Prosperity Service
Megan Gerryts, Senior Advisor, Regional Economic Prosperity Service

Date: May 7, 2021 Meeting Date: May 26, 2021

Subject: **Clean Transportation Sector Profile**

RECOMMENDATION

That the MVRD Board receive for information the report dated May 7, 2021, titled "Clean Transportation Sector Profile".

EXECUTIVE SUMMARY

The clean transportation sector presents an immense opportunity for the Metro Vancouver region as the world seeks solutions to the climate emergency. Driven by the specialization in hydrogen and fuel cell technology, this sector includes low and zero emission vehicles and components, renewable and low carbon fuels and charging infrastructure, and transferable systems and technologies. Supported by a strong innovation ecosystem and benefiting from the larger green economy industry cluster, the clean transportation sector would benefit from regional efforts to strengthen local competitive advantages, to fill any gaps along the clean transportation industry value chain, and to attract additional investment. The next step of this initiative is to undertake a gap analysis of the sector to understand how to strengthen the industry to be more globally competitive.

PURPOSE

To present a profile of the clean transportation sector in the region for information to the Regional Economic Prosperity Service Management Board.

BACKGROUND

One of the key functions of the Regional Economic Prosperity Service (REPS) is to conduct regional data collection and research, in particular where that research can target and drive strategic investment in the region and maximize the economic impacts of that investment. The clean transportation sector has been identified as an area of focus for REPS, as part of the "green economy" industrial cluster. The overall industry cluster is growing, export-oriented, provides quality jobs, and benefits from economic tailwinds due to the transition to a low-carbon economy in response to the global climate emergency. Most importantly, the region has productive advantages in the intensely competitive global clean transportation sector.

Attachment 1 to this report presents for the Management Board's information a profile of the clean transportation sector in the Metro Vancouver region. Attachment 2 provides a regional map profiling the various firms operating in this space.

CLEAN TRANSPORTATION SECTOR

Metro Vancouver's clean transportation sector features both emerging and mature clean transportation firms. The clean transportation sector consists of the following areas:

- **Low- and Zero-Emission Vehicles and Components,** including low and zero emission light-, medium- and heavy-duty vehicles, rail and low-carbon marine transport
- **Renewable and Low Carbon Fuels and Charging Infrastructure,** including hydrogen fuel cells, battery storage, and other renewable fuels
- **Transferable Technologies and Services,** including improvements to transportation systems through vehicle automation, intelligent grid interface, smart grid technologies and intelligent transportation systems technology

The Metro Vancouver region has several differentiators in the clean transportation sector, which make this sector a promising area for future investment.

In-region Specialization: The Metro Vancouver region has demonstrated specialization in Hydrogen and fuel cell technology, pioneering new technologies in this export-driven market.

Innovation Ecosystem: Startup accelerators, incubators, world-leading research universities and government investment in innovation create a promising landscape that supports this sector.

Green Economy Cluster Benefits: The clean transportation sector is a part of the larger green economy cluster in the region, which confers additional advantages such as:

- Accessing workers in transferrable occupations;
- Promoting cross-sector industry linkages; and,
- Facilitating access to investment opportunities.

Government Investments: The provincial and federal governments have committed to a host of investments in clean transportation from zero-emission buses, to charging infrastructure, to the development and commercialization of clean technology.

MOVING FROM LOCAL DEMAND TO GLOBAL COMPETITIVENESS

The Metro Vancouver region is collectively moving to de-carbonize transportation. The region benefits from all orders of government pursuing reductions in emissions from transportation. Emissions targets and zero emission vehicle (ZEV) mandates help create a local clean transportation consumer market, but are not sufficient to attract and grow an export-oriented industrial base locally. Clean transportation technologies, products, and services can be provided from almost anywhere globally, and many regions are vying to host firms in this industry.

While global competition makes it more challenging to develop and sustain a thriving clean transportation sector, the export-oriented nature of the industry means that increasing global competitiveness can increase market share and drive industry growth, creating high-wage jobs and regional prosperity. The entire region benefits from firms selling products and services world-wide and bringing revenue back and recycling it locally.

Next Steps
The next phase of REPS work in clean transportation will be to undertake a gap analysis of the sector. Knowing Metro Vancouver's regional strengths and weaknesses in clean transportation provides a baseline to build regional economic development strategies to further strengthen and grow the globally-facing segments of this industry.

The gap analysis will consist of convening focus groups and interviews to better understand the needs, challenges, and frustrations of entrepreneurs, investors, and firms operating the sector. The goal is to identify regional strengths and weaknesses, and to generate actionable recommendations for improving the desirability of the Metro Vancouver region as a place for firms to flourish while serving global markets.

ALTERNATIVES
This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS
There are no financial implications associated with this report.

CONCLUSION
One of the key functions of the REPS is to conduct regional data collection and research, in particular where that research can drive strategic investment in the region. The clean transportation sector represents an area of opportunity for the region. Building on the region's strengths, there is an opportunity to strengthen this industry cluster's growth in the region and attract investment into this important sector. Attachment 1 to this report presents for the Management Board's information a profile of the clean transportation sector in the Metro Vancouver region. Attachment 2 provides a regional map profiling the various firms operating in this space.

Attachments
1. Clean Transportation Sector Profile
2. Map of the Clean Transportation Sector in the Metro Vancouver Region

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METRO VANCOUVER SECTOR PROFILE

metrovancouver

Leading the Way in Clean Transportation

Prepared by the Metro Vancouver Regional Economic Prosperity Service, May 2021

Why Metro Vancouver?

Metro Vancouver is home to a vibrant network of emerging and mature clean transportation companies, with a particular specialization in hydrogen and fuel cell technology. The sector is supported by world-leading research universities, specialized academic programs, start-up accelerators, and incubators. Progressive local, regional and provincial greenhouse gas reduction policies and funding initiatives at the provincial and federal levels demonstrate an encouraging climate for the clean transportation industry. Furthermore, a receptive public has enthusiastically embraced zero-carbon transportation.

Metro Vancouver organizations are driving change in clean transportation across many specializations.

Specialization	Examples of Organizations in Metro Vancouver
Low- & Zero-Emission Vehicles and Components	Advanced Intelligence Systems, Corvus Energy, Electra Meccanica, FVT Research, Green Light, GreenPower Motor Company, Greenwit Technologies, Grin Technologies, OHM Cycles, Veemo
Renewable & Low Carbon Fuels and Charging Infrastructure	AVL Fuel Cell Canada, Ballard Power Systems, CSA Group, Delta, Q Technologies, E-One Moli Energy, Greenlight Innovation, Ionomr Innovations, Loop Energy, Mercedes-Benz Canada Fuel Cell Division, Molicel, nanoOne, PowerTech Labs, SMPC Technologies Ltd., Hydra, Hydrogen in Motion, Hydrogen Technology and Energy Corporation, Invinity Energy Systems, Parkland Refinery, Westport Fuel Systems
Transferable Technologies and Services	Alpha Technologies, Corinex, IRDI System, Plugzio, Pulse.eco, ReCharged, SandVault, SmartCity ITS, Uplight,

The Clean Energy Vehicle Sector Assessment completed for the BC Government in 2016 found this sector generates ***over $702 million in total direct economic activity*** across the province.

LOW-CARBON INNOVATION ECOSYSTEM:

Metro Vancouver benefits from a rich ecosystem of startup accelerators and incubators, world-leading research universities, and government investment in innovation. From accelerators to clean energy research centres, Metro Vancouver is aggressively advancing technological solutions to meet ambitious greenhouse gas emission reduction goals.

30+ startup accelerators and incubators Including cleantech accelerators such as **Creative Destruction Lab**, **Foresight CAC**, and **SFU VentureLabs**

Specialized academic & training programs include **UBC Clean Energy Research Centre**, **BCIT Centre for Energy Systems Applications**, **SFU School of Sustainable Energy,** and **BCIT EV Maintenance Training Program**.

Industry Associations & Collaborations such as **BC Hydrogen Fuel Cell Association**, **Vancouver Marine Centre for Climate**, **BC Cleantech**, and **Project Greenlight**

Regional Strengths: Hydrogen & Fuel Cell Technology; Data Analytics & Optimization; Robotics & Unmanned Aerial Vehicles; Low Carbon Fuels

Our regional strengths are fertile ground for a growing cleantech industry.

Metro Vancouver's value proposition for investors:

- High quality of life
- Port of Vancouver and YVR Airport provide global gateways
- World-class talent
- Competitive cost of doing business
- Resilient civil society
- Connectivity within the Cascadia Innovation Corridor

The clean transportation sector is part of a larger technology cluster that includes sectors focused on reducing the carbon footprint of buildings as well as technology in general. The strength and size of the larger cluster improves access to workers in transferable occupations, promotes cross-sector industry linkages, and facilitates greater access to early stage capital. Investments in technology and innovation in one area can improve productivity across the whole industry cluster.

Progressive municipal, regional and provincial initiatives reinforce the transition to clean transportation.

British Columbia supports the development of companies operating in the zero-emission vehicle (ZEV) sector, and encourages international investment in the local ZEV sector. The province has set **a target for 100% of all sales of new light-duty cars and trucks to be zero emission by 2040.** Rebates are provided for the adoption of EV technology, including for medium and heavy-duty vehicles, such as airport and port vehicles.

Emissions targets and ZEV mandates help create a clean transportation consumer market but are not sufficient to attract and grow an export-oriented industrial base. **In BC the alignment of municipal, regional, and provincial policies demonstrates an encouraging climate for the clean transportation industry**. Together, these policies contribute to the creation of a "sandbox" where firms can test their innovations and gauge receptiveness to their products.

The federal government and regional authorities are investing in clean transportation.

FEDERAL GOVERNMENT

$2.75 billion investment in zero-emission buses.

$280 million in funding to increase the number of charging and refueling stations.

$2.4 million in research & development funding to reduce emissions from aviation, rail and marine transportation.

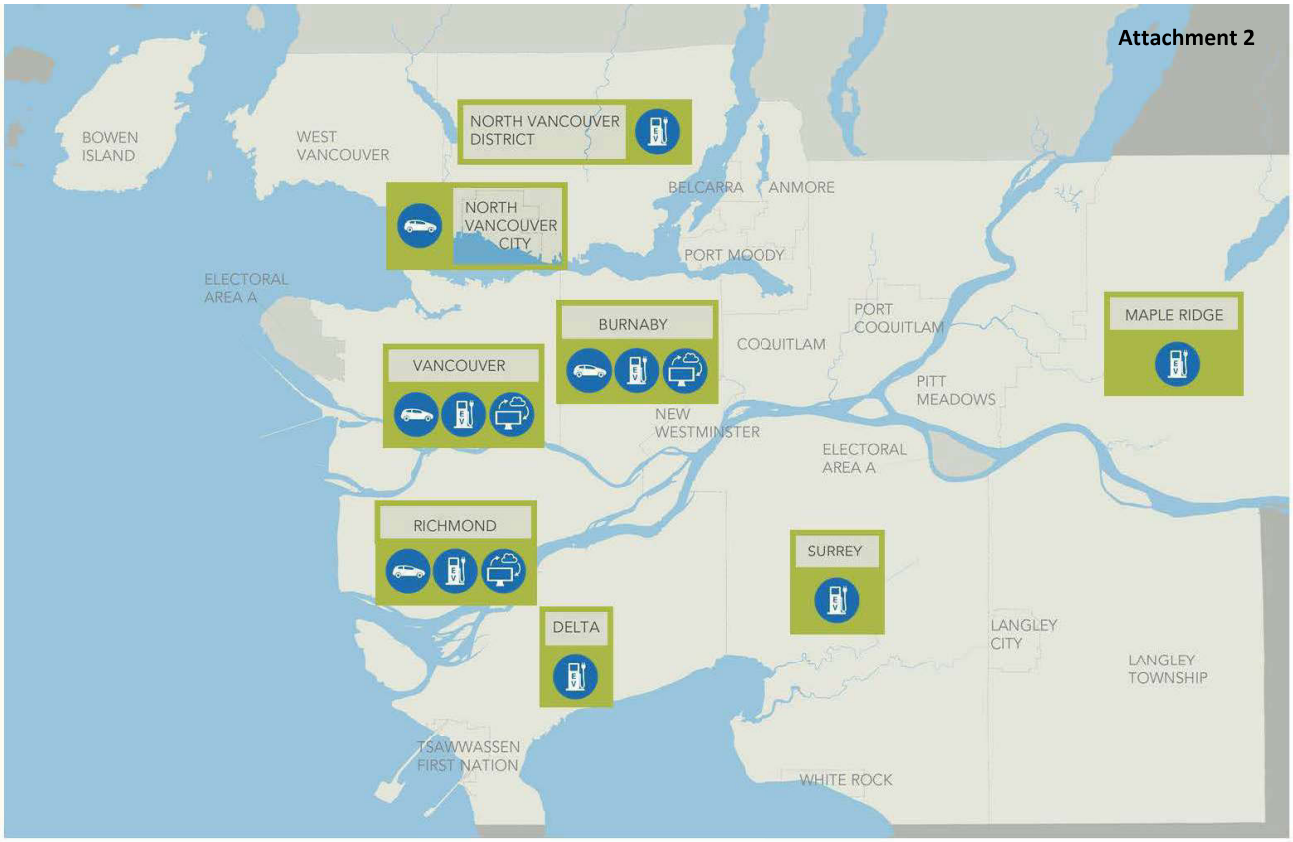
$95 million joint Federal-Provincial investment in the Centre for Innovation and Clean Energy supports the development and commercialization of clean technology in B.C.

REGIONAL AUTHORITIES

TransLink is pursuing an aggressive approach to **decarbonizing transit** through its *Low Carbon Fleet Strategy.*

The Port of Vancouver uses innovative programs such as shore power to realize their vision of becoming the **world's most sustainable port**.

Vancouver International Airport is committed to being **net zero by 2030** through strategies such as renewable fuels and fleet electrification.



Burnaby

Advanced Intelligent Systems: Custom robotics company that creates autonomous custom robotic solutions to solve industry problems.

Alpha Technologies: Providers of DC, AC, and renewable powering solutions for the Telecom, Traffic, Broadband, Renewable Energy, and Industrial markets.

AVL Fuel Cell Canada: Cutting edge proton exchange membrane fuel cell development for all applications, including automotive, heavy duty and marine.

Ballard Power Systems: Developer and manufacturer of proton exchange membrane fuel cell products for markets such as heavy-duty motive, portable power, and material handling.

Blue-O Technology: Researcher and developer of nanotechnology based supports for hydrogen based fuel cell products and applications.

Daimler (Mercedes-Benz Canada Fuel Cell Division): Production of fuel stacks and sub-assemblies, as well as to the advancement of fuel stack production technology.

Delta-Q Technologies: manufacturer of industrial battery chargers for lead acid and lithium-ion batteries.

Green Light Cycle Ltd: Designer and manufacturer of electric bicycles.

Greenlight Innovation: manufactures testing and assembly equipment for fuel cells, electrolysers and batteries.

Loop Energy: hydrogen fuel cell solutions for next-generation zero-emission vehicles and power generators.

nanoOne: Producer of low cost, high performance cathode powders used in lithium ion batteries.

Parkland Refinery: Commercial-scale co-processing tests by mixing bio-crude oils with petroleum crude in the manufacturing process.

SMPC Technologies Ltd.: Developers of a Level 2 charger that allows direct connection to the 600V distribution network, currently developing a 50kW and 100kW DC Level 3 charger.

Xantrex: Specializes in the development, manufacturing and marketing of power electronic products for the mobile power market.

Delta

Hydra: Sources green hydrogen and provides clean fuel to fleets at below-diesel prices, enabling a rapid and economical transition to cleaner trucking.

Maple Ridge

E-One Moli Energy: Lithium-ion battery research and development company.

Molicel: Manufacturer of high performance, superior quality rechargeable lithium-ion cells and battery pack products.

North Vancouver City

OHM Cycles: Designer and producer of electric bicycles.

North Vancouver District

HTEC (Hydrogen Technology and Energy Corporation): Developer and provider of hydrogen transportation and fuel supply infrastructure.

Richmond

Corvus Energy: Large-scale maritime-certified hydrogen fuel cell systems.

CSA Group: High pressure test facility that tests hydrogen industry products from suppliers.

IRDI System: manufacturer of infrared communication equipment in hydrogen enriched environments.

Plugzio: An electricity access control platform that gives any property the ability to monitor, manage and monetize access to electricity.

SandVault: Developer of CycleStation the first public use bicycle system to feature wireless installation by using GPRS communication and solar power.

Surrey

PowerTech Labs: Testing and development for fueling/charging infrastructure, vehicle systems/components, and codes/standards.

Vancouver

Corinex: Smart metering and smart grid solutions through broadband over powerline (BPL) technology.

Electra Meccanica: Developer and manufacturer of all-electric, single passenger, three-wheeled electric vehicles.

GreenPower Motor Company: Purpose built EV passenger, student and cargo transportation.

Greenwit Technologies: Design, engineering, manufacturing, importing and distribution of electric two-wheeled scooters, electric power-assisted bicycles and motorbikes.

Grin Technologies: Research and development company advancing the state of after-market electric bicycle conversion kits.

Hydrogen in Motion: hydrogen energy storage research and development company.

Invinity Energy Systems: Vanadium-based energy storage systems for commercial and industrial sites, grid network infrastructure projects and off-grid applications.

Ionomr Innovations: Developer of ion-exchange membranes & polymers for use in hydrogen fuel cells and hydrogen generation.

ReCharged: Ad funded EV charging stations integrating with autonomous vehicles.

SmartCity ITS: Intelligent Transportation Systems (ITS) supply and integration for municipalities and agencies across Canada.

Uplight: End-to-end customer-centric technology solutions dedicated solely to serving the energy ecosystem.

Veemo: Developers of an electric-assist, enclosed, smartphone-connected pedaled vehicle intended to replace automobiles in urban and sub-urban areas.

Westport Fuel Systems: Inventors, engineers, manufacturers and suppliers of advanced clean fuel systems and components.

Government of B.C.
News on Demand

April 27, 2021

$500-million investment fund paves way for a StrongerBC

A first-of-its-kind $500-million strategic investment fund will provide B.C.-based businesses with capital to position the province as a front-runner in the post-pandemic economy.

The B.C. government has introduced legislation to support the operations of InBC Investment Corp. (InBC), a new $500-million strategic investment fund. Developed in consultation with the business and investment sectors, InBC will focus on driving innovation, sustainability and inclusiveness into B.C.'s economy. InBC will be designed to attract investment, create family-supporting jobs and diversify B.C.'s economy.

"By investing in people and businesses, InBC will support startups, help promising companies scale up and attract world-class talent to B.C. This new strategic investment fund is one of the tools we are using to build the foundation for a strong recovery and a bright future," said Premier John Horgan. "The funds will be used to grow the economy and create jobs that will support British Columbians in all regions of the province."

InBC will invest in high-growth potential businesses in British Columbia and leverage investments from the private and public sectors to help businesses grow. InBC will have a "triple bottom line" investment mandate, aiming to:

- establish B.C. as a globally competitive low-carbon jurisdiction;
- promote values that make life better for people in B.C., including job creation, advancing reconciliation with Indigenous peoples, promoting diversity and inclusion; and
- achieve a financial return on investment.

"As we deal with the challenges of COVID-19, we must lay the foundation for a strong and vibrant economic recovery," said Ravi Kahlon, Minister of Jobs, Economic Recovery and Innovation. "The global economy is undergoing rapid changes, and InBC will position our province for the long term. Helping fulfil our goals of growing innovation, attracting investment and creating jobs, this strategic investment fund will ensure B.C. remains competitive as we invest in our low-carbon future."

InBC will operate independently from government, with investment decisions made by a chief investment officer and a team of investment professionals. The chief investment officer will be held accountable by a nine-member board of directors, the majority of whom