

**METRO VANCOUVER REGIONAL DISTRICT
CLIMATE ACTION COMMITTEE**

REGULAR MEETING

Friday, September 20, 2019

1:00 p.m.

28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia

A G E N D A¹

1. ADOPTION OF THE AGENDA

1.1 September 20, 2019 Regular Meeting Agenda

That the Climate Action Committee adopt the agenda for its regular meeting scheduled for September 20, 2019 as circulated.

2. ADOPTION OF THE MINUTES

2.1 July 12, 2019 Regular Meeting Minutes

That the Climate Action Committee adopt the minutes of its regular meeting held July 12, 2019 as circulated.

3. DELEGATIONS

4. INVITED PRESENTATIONS

5. REPORTS FROM COMMITTEE OR STAFF

5.1 Integrated Public Engagement Process for the Metro Vancouver *Clean Air Plan* and *Climate 2050*

Designated Speakers:

John Lindner, Air Quality Planner

Jason Emmert, Senior Planner

Laura Taylor, Public Engagement Coordinator

Derek Jennejohn, Lead Senior Engineer

Planning and Environment Department

That the MVRD Board, based on the report dated August 27, 2019, titled “Integrated Public Engagement Process for the Metro Vancouver *Clean Air Plan* and *Climate 2050*”:

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

- a) approve the scope of the proposed *Clean Air Plan* as presented in the *Clean Air Plan Background*;
- b) authorize staff to proceed with the engagement process on the *Clean Air Plan*; and
- c) direct staff to integrate the *Clean Air Plan* engagement process with the *Climate 2050* engagement process.

5.2 Forth's Roadmap 12 Electric Vehicle and Smart Mobility Conference

Designated Speakers:

David Hocking, Director, Climate Action Committee

Erik Blair, Air Quality Planner, Planning and Environment Department

That the Climate Action Committee receive for information the report dated August 19, 2019, titled "Forth's Roadmap 12 Electric Vehicle and Smart Mobility Conference".

5.3 Ecological Health – Tree Canopy Cover and Impervious Surfaces

Designated Speaker:

Josephine Clark, Regional Planner

Planning and Environment Department

That the Climate Action Committee receive for information the report titled "Ecological Health – Tree Canopy Cover and Impervious Surfaces", dated August 23, 2019.

5.4 Manager's Report

Designated Speaker:

Roger Quan, Director, Air Quality and Climate Change

Planning and Environment Department

That the Climate Action Committee receive for information the report dated September 3, 2019, titled "Manager's Report".

6. INFORMATION ITEMS

- 6.1 Correspondence dated August 15, 2019 to Chair Dhaliwal and Board Members from Green Communities Committee re Climate Action Recognition Program 2018 Reporting Year.**

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.

10. ADJOURNMENT/CONCLUSION

That the Climate Action Committee adjourn/conclude its regular meeting of September 20, 2019.

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

McIlroy, Jessica - North Vancouver City

McLaughlin, Ron - Lions Bay

Pettigrew, Steven - Surrey

Steves, Harold – Richmond

van den Broek, Val - Langley City

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 1:04 p.m. on Friday, July 12, 2019 in the 28th Floor Committee Room, 4730 Kingsway, Burnaby, British Columbia.

MEMBERS PRESENT:

Chair, Councillor Adriane Carr, Vancouver
 Vice Chair, Councillor Sav Dhaliwal, Burnaby
 Chief Ken Baird, Tsawwassen
 Councillor Petrina Arnason, Langley Township
 Councillor Laura Dupont, Port Coquitlam
 Councillor David Hocking, Bowen Island
 Councillor Dylan Kruger, Delta
 Councillor Jessica McIlroy, North Vancouver City
 Mayor Ron McLaughlin, Lions Bay
 Councillor Steven Pettigrew, Surrey
 Councillor Harold Steves, Richmond
 Mayor Val van den Broek, Langley City
 Councillor Ahmed Yousef, Maple Ridge

MEMBERS ABSENT:

None.

STAFF PRESENT:

Roger Quan, Director, Air Quality and Climate Change, Planning and Environment
 Carol Mason, Chief Administrative Officer
 Genevieve Lanz, Legislative Services Coordinator, Board and Information Services

1. ADOPTION OF THE AGENDA

1.1 July 12, 2019 Regular Meeting Agenda

It was MOVED and SECONDED

That the Climate Action Committee adopt the agenda for its regular meeting scheduled for July 12, 2019 as circulated.

CARRIED

2. ADOPTION OF THE MINUTES

2.1 June 14, 2019 Regular Meeting Minutes

It was MOVED and SECONDED

That the Climate Action Committee adopt the minutes of its regular meeting held June 14, 2019 as circulated.

CARRIED

3. DELEGATIONS

No items presented.

4. INVITED PRESENTATIONS

No items presented.

5. REPORTS FROM COMMITTEE OR STAFF

5.1 Board Strategic Plan 2019 - 2022

Report dated June 25, 2019 from Ann Rowan, Manager, Collaboration and Engagement, External Relations and Megan Gerrys, Corporate Projects Coordinator, CAO Executive Office, presenting the Air Quality and Climate Change Strategic Directions for the 2019-2022 Board Strategic Plan.

Members were provided with a presentation on the Air Quality and Climate Change strategic directions for the 2019-2022 Board Strategic Plan, highlighting vision statement, regional context, and next steps.

Discussion ensued on:

- potential collaboration with utility entities
- building retrofits to increase energy efficiency
- farming techniques to sequester carbon dioxide and increase food security
- supporting collaboration with member jurisdictions to maximize policy development and minimize duplication of efforts

Members commented on the benefits of maintaining high-level strategic directions within the *2019-2022 Board Strategic Plan*.

Presentation material titled “2019-2022 Board Strategic Plan Air Quality & Climate Change” is retained with the July 12, 2019 Climate Action Committee agenda.

The Committee considered the recommendation in the report with the addition of comments and proposed amendments to the Air Quality and Climate Change Strategic Directions for consideration by the Finance and Intergovernment Committee.

It was MOVED and SECONDED

That the Climate Action Committee endorse the Air Quality and Climate Change Strategic Directions as presented in the attachment dated June 25, 2019, titled “Strategic Directions: Air Quality and Climate Change”; and including comments and proposed amendments from the Climate Action Committee at its meeting of July 12, 2019 for consideration by the Finance and Intergovernment Committee at its meeting of July 17, 2019.

CARRIED

- 5.2 Aligning *Climate 2050* with the IPCC Special Report on Global Warming of 1.5°C**
Report dated June 17, 2019 from Roger Quan, Director, Jason Emmert, Senior Planner and Conor Reynolds, Division Manager, Air Quality and Climate Change Policy, Planning and Environment, providing members with information on proposed measures to align Metro Vancouver’s greenhouse gas (GHG) emissions reductions targets and actions with the latest science in the Intergovernmental Panel on Climate Change (IPCC) Special Report on Global Warming of 1.5°C.

Members were provided with a presentation on the IPCC Special Report on Global Warming of 1.5°C, highlighting GHG emissions by sector, carbon removal through ecosystem restoration and carbon capture and storage, and 2050 emission levels to achieve carbon neutrality and negative emissions.

Discussion ensued on annual reporting, funding challenges, and regional alignment of best management practices.

Presentation material titled “A Carbon Neutral Region by 2050” is retained with the July 12, 2019 Climate Action Committee agenda.

It was MOVED and SECONDED

That the MVRD Board:

- a) endorse the proposed amendments to the *Climate 2050 Strategic Framework* to reflect a commitment to a carbon neutral region by 2050, and an interim target of reducing greenhouse gas emissions by 45% from 2010 levels by 2030;
- b) direct staff to bring forward a proposed amendment to *Metro 2040*, the regional growth strategy, to the Metro Vancouver Board for consideration, to incorporate revised greenhouse gas reduction targets (including interim targets).

CARRIED

- 5.3 Metro Vancouver’s Climate Actions and Carbon Neutral Progress in 2018**
Report dated June 14, 2019 from Ali Ergudenler, Lead Senior Engineer and Amy Thai, Environmental Technician II, Planning and Environment, providing members with the Climate Actions 2018 report submitted to the Province under the Climate Action Revenue Incentive Program (CARIP) on May 31, 2019.

Members were provided with a presentation on CARIP, highlighting corporate and community climate projects, corporate GHG emissions, and carbon credit projects completed and underway.

The Committee was informed of an administrative correction in the report.

Request of Staff

Staff was requested to correct a typographical error on page two of the report prior to the report being forwarded to the MVRD Board.

Presentation material titled "Metro Vancouver's Climate Actions in 2018 Climate Action Revenue Incentive Program (CARIP)" is retained with the July 12, 2019 Climate Action Committee agenda.

It was MOVED and SECONDED

That the Climate Action Committee receive for information the report dated June 14, 2019, titled "Metro Vancouver's Climate Actions and Carbon Neutral Progress in 2018".

CARRIED

5.4 Strata Energy Advisor Pilot Program Update

Report dated June 18, 2019 from Jason Emmert, Senior Planner and Erik Blair, Air Quality Planner, Planning and Environment, providing members with an update on the Strata Energy Advisor pilot program.

Members were shown a video on the Strata Energy Advisor Pilot Program which is not retained with the July 12, 2019 Climate Action Committee agenda.

It was MOVED and SECONDED

That the Climate Action Committee receive for information the report dated June 18, 2019, titled, "Strata Energy Advisor Pilot Program Update".

CARRIED

5.5 Update on Metro Vancouver's Grow Green Website

Report dated June 7, 2019 from Larina Lopez, Division Manager, Corporate Communications, External Relations, providing members with an update on Metro Vancouver Grow Green website.

Members were provided with a demonstration of the Grow Green website which is not retained with the July 12, 2019 Climate Action Committee agenda.

It was MOVED and SECONDED

That the Climate Action Committee receive for information the report dated June 7, 2019, titled "Update on Metro Vancouver's Grow Green Website".

CARRIED

Councillor Dupont absent at the vote.

5.6 Manager's Report

Report dated June 27, 2019 from Roger Quan, Director, Air Quality and Climate Change, Planning and Environment, providing members with an update on the 2019 Climate Action Work Plan, highlighting the BC Lung Association State of the Air 2019 report, air quality advisory program, odour complaints update, and changes to cannabis production, processing and distribution licensing process.

It was MOVED and SECONDED

That the Climate Action Committee receive for information the report dated June 27, 2019, titled "Manager's Report".

CARRIED

6. INFORMATION ITEMS

No items presented.

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 July 12, 2019.

CARRIED

(Time: 3:56 p.m.)

Genevieve Lanz,
Legislative Services Coordinator

Adriane Carr, Chair

To: Climate Action Committee

From: John Lindner, Air Quality Planner
Jason Emmert, Senior Planner
Laura Taylor, Public Engagement Coordinator
Planning and Environment Department

Date: August 27, 2019 Meeting Date: September 20, 2019

Subject: **Integrated Public Engagement Process for the Metro Vancouver *Clean Air Plan* and *Climate 2050***

RECOMMENDATION

That the MVRD Board, based on the report dated August 27, 2019, titled “Integrated Public Engagement Process for the Metro Vancouver *Clean Air Plan* and *Climate 2050*”:

- a) approve the scope of the proposed *Clean Air Plan* as presented in the *Clean Air Plan Background*;
 - b) authorize staff to proceed with the engagement process on the *Clean Air Plan*; and
 - c) direct staff to integrate the *Clean Air Plan* engagement process with the *Climate 2050* engagement process.
-

PURPOSE

To seek Metro Vancouver Regional District (MVRD) Board approval of the scope of the *Clean Air Plan* and seek authorization to begin the engagement process on the *Clean Air Plan* and integrate that process with *Climate 2050* engagement.

BACKGROUND

Metro Vancouver has developed three previous air quality and greenhouse gas management plans, in 1994, 2005 and, most recently, the *Integrated Air Quality and Greenhouse Gas Management Plan* (IAQGGMP) in 2011. The Climate Action Committee 2019 work plan includes development of a discussion paper for the next regional air quality and greenhouse gas management plan. A new plan, the *Clean Air Plan*, will build on the 2011 plan and identify opportunities for accelerated emissions reductions, including greenhouse gas emission reduction actions. These actions will help protect human health and the environment and avoid dangerous levels of climate change. The *Clean Air Plan* will be the near-term implementation plan to achieve Metro Vancouver’s 2030 greenhouse gas reduction and air quality targets.

On April 26, 2019, the MVRD Board received a report describing the proposed development and engagement process for the *Clean Air Plan*. At its meeting on June 14, 2019, the Climate Action Committee received a report seeking feedback on an initial draft discussion paper for the *Clean Air Plan*, and resolved to:

- a) endorse the draft *Clean Air Plan Discussion Paper*, as amended, in the report dated June 5, 2019, titled “Metro Vancouver Draft *Clean Air Plan Discussion Paper*”; and

- b) *direct staff to report back with a finalized Clean Air Plan Discussion Paper and associated engagement plan, for endorsement by the MVRD Board.*

Additionally, at its July 26, 2019 meeting, the MVRD Board amended the *Climate 2050 Strategic Framework* to incorporate revised greenhouse gas reduction targets, including an interim 2030 target within the timeframe of the *Clean Air Plan*.

This report responds to the Committee direction in June, and the revised greenhouse gas reduction targets adopted by the Board in July. The report presents engagement materials, including a backgrounder on the *Clean Air Plan* framework (Attachment 1), an engagement plan (Attachment 2), the first of a series of associated discussion papers (Attachment 3, pertaining to the buildings issue area), and a summary of Committee feedback from the June meeting and how it was addressed (Attachment 4).

Staff are seeking authorization from the MVRD Board to proceed with engagement on the *Clean Air Plan* and integrate the *Clean Air Plan* process with *Climate 2050* engagement.

CLEAN AIR PLAN AND CLIMATE 2050

The *Clean Air Plan* and *Climate 2050* will be the key air quality and greenhouse gas planning documents for Metro Vancouver.

Climate 2050 is an 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. Metro Vancouver is implementing *Climate 2050* through ten issue area *Roadmaps*, which will describe long-term goals, targets, strategies and actions to reduce regional greenhouse gas emissions and ensure that this region is resilient to climate change impacts. Implementation of the *Roadmaps* will be driven by Metro Vancouver's management plans and other policies, including the *Clean Air Plan*.

The *Clean Air Plan* is the **near-term action plan** that will set Metro Vancouver's direction for air quality and greenhouse gas management in the region for the next ten years. The Plan will outline actions for all regional emission sources, identifying actions that can reduce emissions of air contaminants, including greenhouse gases. Where possible, these actions will seek to use the same policy or program and achieve co-benefit reductions in common air contaminants and greenhouse gases. The Plan will be organized around seven issue areas, which provide logical groupings of goals, targets and actions. Six issue areas in the *Clean Air Plan* match six of the *Climate 2050 Roadmaps* since the sources in these issue areas generate regional greenhouse gases and can also impact regional air quality.

Issue Area Discussion Papers

To address feedback received from the Committee in June, staff propose to separate the content from the draft *Clean Air Plan* discussion paper presented in June into a *Clean Air Plan Backgrounder* and seven *Climate 2050-Clean Air Plan* issue area discussion papers, as described below.

- *Clean Air Plan Backgrounder* – the backgrounder summarizes air quality issues, challenges and opportunities, and provides the proposed vision, proposed regional air quality targets, and Board-adopted greenhouse gas targets for the Plan:

- vision: Metro Vancouver has healthy, clean and clear air, and is a carbon neutral region;
- regional targets for 2030:
 - reduce regional greenhouse gas emissions by 45% from 2010 levels (as adopted by the Board in the *Climate 2050 Strategic Framework*);
 - ambient air quality in the region meets or is better than ambient air quality objectives and standards set by Metro Vancouver, and the BC and federal governments; and
 - increase the amount of time that visual air quality is classified as excellent.
- *Climate 2050-Clean Air Plan* issue area discussion papers, which will include:
 - emissions reductions:
 - proposed long-term goal(s);
 - big Ideas: proposed actions or groups of actions that could lead to significant emission reductions within specific issue areas;
 - example targets and actions;
 - climate adaptation:
 - expected climate hazards;
 - proposed long-term goal(s); and
 - example metrics, targets and actions.

These materials will support engagement to develop both the draft *Climate 2050 Roadmaps* and draft *Clean Air Plan*. The structure and content of the engagement materials respond to Committee feedback, including comments about integrating adaptation into the engagement process (Attachment 4). Staff will also work with a consultant to characterize and quantify the expected air contaminant and greenhouse gas emission reductions of the actions identified during the engagement, which will address Committee feedback that the targets included in the draft *Clean Air Plan* and draft *Climate 2050 Roadmaps* should be informed by realistic pathways.

The joint discussion paper format is intended to facilitate a more closely coordinated engagement process for the *Clean Air Plan* and *Climate 2050*, and provide interested parties with an opportunity to provide feedback on both initiatives through a single, more efficient process.

This report presents draft versions of the *Clean Air Plan Background* (Attachment 1) and the Buildings discussion paper (Attachment 3). Feedback from the Committee is sought on any of the engagement materials presented.

Discussion papers for the remaining six issue areas are under development, following the same format as the Buildings discussion paper. These will be provided to the Committee for information as they are completed. Additional issue area discussion papers may be written to support the development of the other *Climate 2050 Roadmaps* that are not within the scope of the *Clean Air Plan*; these would be presented as part of a separate process.

ENGAGEMENT PROCESS

Metro Vancouver is committed to engaging with the public, stakeholders and other orders of government, including First Nations, that have the potential to be impacted by the *Clean Air Plan* and *Climate 2050*, and will incorporate feedback into the two initiatives.

The engagement plan (Attachment 2) provides details about the activities, participants, and timelines for the engagement process. The engagement process would be conducted in accordance with the *Board Policy on Public Engagement* and would include targeted engagement methods to ensure that the *Clean Air Plan* and *Climate 2050 Roadmaps* reflect the varied needs and demands of the region. Engagement materials will be made available online and in hard copy. A website will be created for the engagement process, linked to the existing *Climate 2050* website, and relevant events and informational videos will be advertised on Metro Vancouver social media channels.

Metro Vancouver intends to seek input on the *Clean Air Plan* and *Climate 2050 Roadmaps* in two phases, beginning with the first phase between October 2019 and March 2020. After the first phase, staff will incorporate feedback into the development of a draft *Clean Air Plan*, and then seek authorization to engage on the draft Plan. This second phase will occur later in 2020. Feedback would be reported to the Committee following both phases. Following the second phase, staff will incorporate feedback into the development of a final *Clean Air Plan*, and then seek adoption by the Board.

ALTERNATIVES

- 1) That the MVRD Board, based on the report dated August 27, 2019, titled “Integrated Public Engagement Process for the Metro Vancouver *Clean Air Plan* and *Climate 2050*”:
 - a) approve the scope of the proposed *Clean Air Plan* as presented in the *Clean Air Plan Background*;
 - b) authorize staff to proceed with the engagement process on the *Clean Air Plan*; and
 - c) direct staff to integrate the *Clean Air Plan* engagement process with the *Climate 2050* engagement process.
- 2) That the MVRD Board receive for information the report dated August 27, 2019, titled “Integrated Public Engagement Process for the Metro Vancouver *Clean Air Plan* and *Climate 2050*”, and provide alternate direction to staff.

FINANCIAL IMPLICATIONS

Under Alternative 1, the resources required to develop and engage on the *Clean Air Plan* and *Climate 2050 Roadmaps* have been approved in program budgets for 2019, including staff time, and consulting amounts of \$160,000 to support the engagement process and evaluation of the air quality and climate impacts of actions. Integration of engagement activities for the *Clean Air Plan* with the development of the *Climate 2050 Roadmaps* is intended to make the best use of resources available, as well as minimize time commitments for interested parties providing feedback.

Under Alternative 2, the Committee and Board may wish to amend the scope of the proposed approach or provide alternate direction. While some amendments could likely be covered under the

approved program budgets, significant increases in scope may be more resource-intensive and require additional budget.

SUMMARY / CONCLUSION

Metro Vancouver is developing a *Clean Air Plan* to identify actions to reduce emissions of air contaminants, including greenhouse gases, in our region over the next 10 years. Metro Vancouver is also implementing *Climate 2050*, a long-term strategy to achieve a carbon neutral and resilient region over the next 30 years. The *Clean Air Plan* is the near-term implementation plan to achieve *Climate 2050* interim greenhouse gas reduction targets (for 2030), as well as 2030 air quality targets.

If approved by the Board, Metro Vancouver intends to seek feedback on the *Clean Air Plan* and *Climate 2050 Roadmaps* in two phases during 2019 and 2020. A backgrounder and an initial discussion paper on the buildings issue area has been prepared that identify goals, targets and example actions for major sources of air contaminants and greenhouse gases in our region, as well as hazards, metrics and example actions for climate adaptation. Additional discussion papers on another six issue areas are under development. Feedback from the public, stakeholders and other orders of government, including First Nations, will support the development of the *Clean Air Plan* and the *Climate 2050 Roadmaps*.

Staff recommend Alternative 1, for the Board to approve the scope of the *Clean Air Plan*, and authorize staff to proceed with the public engagement process, integrating with the *Climate 2050* engagement process that is already underway. Engagement is intended to provide sufficient opportunity to interested parties to learn about the *Clean Air Plan* and *Climate 2050 Roadmaps* and provide feedback.

Attachments (32638850)

1. *Clean Air Plan Backgrounder*, draft dated September 2019
2. Engagement Plan for the Metro Vancouver *Clean Air Plan* and *Climate 2050 Roadmaps*
3. Buildings Discussion Paper, draft dated September 2019
4. Summary of changes to discussion materials, following feedback at June 14, 2019 Climate Action Committee meeting

32199017



Clean Air Plan Backgrounder

Metro Vancouver's 10-year Action Plan for
Air Quality and Greenhouse Gases

September 2019

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.

Member jurisdictions of Metro Vancouver include:

- Village of Anmore
- Village of Belcarra
- Bowen Island Municipality
- City of Burnaby
- City of Coquitlam
- City of Delta
- Electoral Area A
- City of Langley
- Township of Langley
- Village of Lions Bay
- City of Maple Ridge
- City of New Westminster
- City of North Vancouver
- District of North Vancouver
- City of Pitt Meadows
- City of Port Coquitlam
- City of Port Moody
- City of Richmond
- City of Surrey
- Tsawwassen First Nation
- City of Vancouver
- District of West Vancouver
- City of White Rock

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www.metrovancouver.org

September 2019

Introduction

Metro Vancouver is responsible for managing and regulating air contaminants in the Metro Vancouver region. As the next in its series of Air Quality Management Plans, Metro Vancouver is now developing the *Clean Air Plan* to further reduce regional air contaminant emissions, including greenhouse gases, over the next 10 years. The *Clean Air Plan* is an **action plan** that directly supports the vision of *Climate 2050*, Metro Vancouver's long-term climate strategy, and protects public health and the environment.

Metro Vancouver, together with its member jurisdictions, has taken action on air quality and climate change for decades. As a result, residents in our region generally experience good air quality, and there have been reductions in regional greenhouse gas emissions over the past 15 to 20 years. The *Clean Air Plan* seeks to accelerate actions on regional air quality and greenhouse gas emissions to further address our local contribution to global climate change, and protect public health and the environment.



Purpose

This *Clean Air Plan* Backgrounder outlines a framework for the *Clean Air Plan* and describes seven prioritized areas for action to be included in the Plan. It also identifies a proposed vision and targets for air quality and greenhouse gases in this region. The backgrounder is intended for the following audiences:

- the public;
- member jurisdictions;
- local First Nations, and BC and federal governments and agencies;
- other regional authorities (e.g., TransLink, Fraser Valley Regional District);
- health authorities;
- energy utilities (e.g., BC Hydro, FortisBC);
- industry and business associations;
- professional organizations and academic institutions;
- youth;
- community, environmental and other non-profit groups; and
- other interested parties.

In addition to this backgrounder, Metro Vancouver is developing discussion papers on the seven prioritized issue areas for action to support engagement on the *Clean Air Plan*.



Defining the Problem

Air Contaminants

The air we breathe is mostly made up of gases, with some suspended liquids and solids. By weight, air is 78% nitrogen, 21% oxygen, 1% argon, along with small amounts of other compounds, including air contaminants. While air contaminants account for only a tiny fraction of the air we breathe, their impacts can be significant.

Air contaminants can have a variety of impacts (see Glossary for complete list). Metro Vancouver's air quality and greenhouse gas management programs focus on regional air contaminants with direct public health impacts and air contaminants with impacts on climate change. Reducing the levels of these air contaminants can have other benefits, including improving visual air quality and reduced impacts on the environment, property and businesses.

The air contaminants with the most impact in Metro Vancouver are shown below.

- **Common air contaminants:** These air contaminants can harm public health and reduce residents' quality of life and life expectancy by causing heart and lung diseases, cancer, asthma, and other impacts. Some air contaminants have odorous characteristics. Common air contaminants include **fine and coarse particulate matter, diesel particulate matter, ground-level ozone, nitrogen dioxide, sulphur dioxide and volatile organic compounds**.
- **Greenhouse gases:** These air contaminants trap heat and are the cause of climate change. Greenhouse gases include **carbon dioxide and nitrous oxide**, as well as short-lived climate forcers such as **methane, fluorinated gases, black carbon and ozone**.

Air Quality Trends, Impacts and Challenges

Air quality monitoring over the last decade indicates that most common air contaminant levels have been improving, even while the region's population has grown. These improvements are due in part to policies, programs and regulations that have led businesses and residents to adopt emission control technologies and change practices. But more effort is still needed.

Every five years, Metro Vancouver develops an emissions inventory, which describes the types and amounts of common air contaminants and greenhouse gases emitted in the region, and also forecasts how emissions could change in the future¹. According to the most recent inventory, completed in 2017, without additional action:

- fine particulate matter emissions are expected to remain fairly constant through 2035; and
- emissions of nitrogen oxides and volatile organic compounds (which lead to the formation of ground-level ozone) are projected to start increasing after 2030.

Health Canada estimates that 1,600 British Columbians die prematurely every year due to exposure to fine particulate matter, ground-level ozone and nitrogen dioxide². These same contaminants cause 170,000 asthma symptom days in Metro Vancouver every year³, as well as other health effects.

Monitored levels of fine particulate matter and ground-level ozone in the region exceeded ambient air quality objectives during several periods in recent years, in part due to air contaminants transported from outside this region, for example from wildfires. Health researchers from Canada and around the world have indicated there are continued benefits from reducing ambient concentrations of common

1 <http://www.metrovancouver.org/services/air-quality/emissions-monitoring/emissions/emission-inventories>

2 Health Canada, 2019. Health Impacts of Air Pollution in Canada. <http://publications.gc.ca/site/eng/9.874080/publication.html>

3 Health Canada, 2019. Data from Air Quality Benefits Assessment Tool. http://science.gc.ca/eic/site/063.nsf/eng/h_97170.html

air contaminants, even when those concentrations are already low. There are no known safe levels for some common air contaminants, including fine particulate matter, ground-level ozone and nitrogen dioxide. **Additional emission reduction actions are needed to continue protecting human health and the environment.** (See the Glossary for more information on these air contaminants.)

Emissions, Ambient Air Quality and Health Exposure

- Emissions are the air contaminants we release into the air; they are most concentrated near the emission source and are diluted over time and distance.
- Ambient air quality is the concentration of air contaminants in the outdoor air, measured in parts per billion or micrograms per cubic metre.
- Exposure is the air contaminants you breathe where you live, study, play and work.

Climate Change and Air Quality

Climate change projections for this region for 2050 include longer, hotter and drier summers, warmer and wetter fall and winter seasons with decreased snowpack, and more extreme weather events. Wildfires are expected to become more intense and more frequent, impacting this region with harmful smoke.

Climate change is directly associated with greenhouse gas emissions, primarily carbon dioxide. While emissions are global, we all have a shared responsibility to take local action. The major sources of greenhouse gas emissions in this region are transportation, buildings and industry, with smaller contributions from waste and agriculture.

To align with global emissions targets and *Climate 2050*, Metro Vancouver's long-term climate strategy, we need to decrease regional emissions by nearly 100% in the next 30 years. However, the emissions inventory for the region suggests that, with population growth and without additional actions, regional greenhouse gas emissions are not expected to decrease significantly in the next 15 years.

We need to accelerate our regional climate actions to avoid dangerous levels of climate change. The *Clean Air Plan* is the action plan that will directly address greenhouse gas emissions from sources in this region, supporting the vision of *Climate 2050*. More information on climate change and greenhouse gases is available on the *Climate 2050* website⁴.

⁴ *Climate 2050* website www.metrovancouver.org/climate2050



Roles and Responsibilities

Metro Vancouver's Board Strategic Plan

Metro Vancouver's *Board Strategic Plan 2019 to 2022*⁵ identifies five themes to guide the development of Metro Vancouver's long-term plans, including environmental sustainability, system stewardship, and regulatory and legislative environment. The strategic directions for air quality and climate change for 2019 to 2022 are:

1. guide climate change policy and action for the Metro Vancouver region for the next 30 years with Metro Vancouver's *Climate 2050* strategy; and
2. improve air quality by mitigating threats to public health and the environment.

Air Quality and Climate Change

Metro Vancouver is responsible for managing and regulating air contaminants in the region under authority delegated by the BC government in the *Environmental Management Act*. Metro Vancouver uses this authority to:

- develop **plans** and **strategies** to guide management of air contaminants;
- establish **ambient air quality objectives** to protect public health and the environment;
- **measure** and **report** on ambient air quality, air contaminant emissions and visual air quality using one of the most comprehensive air quality monitoring networks in Canada;
- issue **air quality permits** to control emissions from industrial facilities;
- adopt and enforce **air emission regulations** to control air contaminants from key emission sources; and
- develop and operate **outreach** and **incentive programs** to reduce regional emissions of common air contaminants and greenhouse gases.

Metro Vancouver has other roles in the region that impact air contaminant emissions, outlined below.

- *Metro Vancouver 2040: Shaping our Future*, the regional growth strategy, includes a goal to develop compact, complete communities that promote walking, cycling, transit and reduced trip distances, reducing emissions from transportation and buildings.
- The Regional Parks system protects and advocates for enhanced conservation of forests and green spaces, which absorb and store (i.e., sequester) carbon dioxide.
- Metro Vancouver's utilities (Water Services, Solid Waste and Liquid Waste), Regional Parks and Metro Vancouver Housing are working to reduce emissions from operations.

Air quality and greenhouse gas management requires close coordination with other orders of government, utilities, and others. The roles of key partners are described below.

- The **Federal Government** regulates new vehicle performance and fuels as well as emissions from marine vessels, rail locomotives, non-road vehicles and engines, home heating appliances, some industrial sources and toxic substances. The federal government coordinates the national Air Quality Management System to improve air quality in Canada, and regulates emissions for federal undertakings, including rail corridors, shipping lanes, the **Vancouver Fraser Port Authority**, and the **Vancouver International Airport Authority**.
- The **BC government** manages air quality in the province for areas outside of Metro Vancouver, including adjacent regional districts. The BC government sets emission standards for vehicles, fuels and other emission sources. Provincial legislation requires regional districts and municipalities in BC to set community greenhouse gas emission targets and identify reduction actions.

⁵ <http://www.metrovancouver.org/about/aboutuspublications/BoardStrategicPlan2019-2022.pdf>

- **First Nations** in the Metro Vancouver region provide services to their communities and a number of First Nations in the region have adopted sustainability and/or land use plans. The Tsawwassen First Nation is a Metro Vancouver member jurisdiction and has similar authority and powers as other member jurisdictions with respect to climate change.
- **Municipalities** are responsible for land-use policy and enforcing the BC Building Code. Many municipalities have adopted climate action and environmental plans and are taking actions to reduce their emissions. All of Metro Vancouver's municipalities have shown leadership by signing the *BC Climate Action Charter*.
- **TransLink** plans, manages and finances public transit in this region, and shares responsibility for the major road network and regional cycling network with municipalities and the BC government. The federal and BC governments also provide funding for transit and transportation network projects.
- The **Fraser Valley Regional District** shares the Canadian Lower Fraser Valley airshed with Metro Vancouver. The District has air quality planning authority and is currently developing an updated air quality management plan.
- **Health authorities** provide information on the health impacts of air contaminants to support air quality management actions.
- **Energy utilities** such as BC Hydro and FortisBC supply energy for residents and businesses, as well as provide incentives to owners to reduce emissions and energy consumption.

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Clean Air Plan

The *Clean Air Plan* will be Metro Vancouver's fourth air quality and greenhouse gas management plan. It will build on existing Metro Vancouver air quality and greenhouse gas management programs and policies, as well as the *Board Strategic Plan* and initiatives by member jurisdictions, partner agencies and local First Nations (e.g., the provincial *CleanBC* plan and member jurisdictions' sustainability, environment, climate and energy plans).

The *Clean Air Plan* will focus on actions that Metro Vancouver can implement under its delegated authority, and will also identify actions for implementation by others. The Plan will identify actions to reduce air contaminant emissions and impacts, including greenhouse gases, in our region over the next 10 years. Actions include incentives, educational outreach campaigns and regulations. Where possible, the Plan will target common air contaminants and greenhouse gases together because many emission sources in this region emit both types of air contaminants (e.g., gasoline engines, natural gas furnaces, industrial manufacturing processes).

The *Clean Air Plan* will be organized around seven issue areas.

1. Buildings
2. Transportation
3. Industry and Commerce
4. Waste
5. Agriculture
6. Nature and Ecosystems
7. Measurement, Monitoring and Regulation

The first five issue areas focus on the largest regional sources of air contaminant emissions. The sixth issue area relates to the impacts of nature and ecosystems on air contaminants, and the final issue area describes the tools and approaches that Metro Vancouver and our partners use to reduce emissions and manage air quality in our region.

Each issue area will include:

- **long-term goal(s)** identify the desired end state for the issue area, in support of the regional vision, with expected achievement in 2050 and beyond;
- **2030 targets** as milestones to measure progress toward achieving the long-term goal(s); and
- **strategies and actions** to achieve the targets.

Climate 2050

Climate 2050 is an 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. Metro Vancouver is implementing *Climate 2050* through ten issue area *Roadmaps*, which will describe how to reduce greenhouse gas emissions and adapt to climate change impacts. *Climate 2050* includes the following greenhouse gas targets for this region.

- **Become a carbon neutral region by 2050**
- **Reduce regional greenhouse gas emissions by 45% from 2010 levels by 2030**

Metro Vancouver and its regional partners are developing the first iterations of the *Climate 2050 Roadmaps* in 2019 and 2020. Implementation of the *Roadmaps* will be driven by Metro Vancouver's management plans and other policies, including the *Clean Air Plan*.

Links between *Clean Air Plan* and *Climate 2050*

Actions in the *Clean Air Plan* will directly support the *Climate 2050* greenhouse gas targets by addressing greenhouse gas emissions from key regional sources. *Climate 2050* broadens the discussion to address how these sources will adapt to a changing climate, and also examines additional issue areas (e.g. Infrastructure, Land-use and Growth Management, Human Health and Well-being).

Climate 2050 will set the direction for addressing climate change in the region over the next 30 years. Any greenhouse gas targets adopted as part of *Climate 2050* will be reflected in the *Clean Air Plan*. The *Clean Air Plan* will identify the suite of actions needed to achieve 2030 greenhouse gas reduction targets, while also including 2030 air quality targets and actions.

The first six issue areas in the *Clean Air Plan* (see previous page) match six of the *Climate 2050* issue areas since many of the sources in these issue areas generate both common air contaminants and greenhouse gases (e.g., gasoline engines, natural gas furnaces, industrial manufacturing processes).

The content of *Climate 2050* and the *Clean Air Plan* is summarized in the following table.

TOPIC	CLEAN AIR PLAN	CLIMATE 2050 ROADMAPS
Greenhouse gases	Included - focuses on near-term actions under Metro Vancouver's delegated authority	Included - considers actions to achieve 2050 carbon neutral region target
Common air contaminants		Not included
Climate change adaptation	Not included	Included - considers actions to achieve a resilient region

Discussion Papers

Metro Vancouver is developing a series of discussion papers for the issue areas in the *Clean Air Plan* (e.g., transportation, industry and commerce, buildings). The discussion papers are an engagement tool, and will support discussions with the public, stakeholders and other orders of government, including First Nations.

Each issue area discussion paper will include content on:

- 1. common air contaminants and related air quality issues;
- 2. greenhouse gas emission reductions; and
- 3. climate change adaptation.

Including climate change adaptation in the discussion papers will streamline the engagement processes for the *Clean Air Plan* and the *Climate 2050* Roadmaps.

Action Evaluation Framework

To support development of the *Clean Air Plan*, Metro Vancouver is creating an evaluation framework to rank the actions included in the Plan. Actions will be ranked based on expected emissions reductions, impacts on visual air quality and equity, corporate leadership, and other criteria based on the Plan's proposed guiding principles.

More detailed impact analyses for some actions included in the final *Clean Air Plan*, such as new or amended air emission regulations with a significant scope, would be conducted following adoption of the Plan.

Proposed Vision and Regional Targets

In alignment with Metro Vancouver's *Board Strategic Plan*, and the carbon neutral vision in *Climate 2050*, the **proposed vision** for the *Clean Air Plan* is:

Metro Vancouver has healthy, clean and clear air, and is a carbon neutral region.

Residents, businesses and government will all need to work together to achieve this vision, so that we have a thriving region with healthy communities and a clean environment.

The *Clean Air Plan* will identify actions for the next 10 years that advance toward this vision. To track progress, Metro Vancouver proposes the following as **2030 regional targets**:

1. reduce regional greenhouse gas emissions by 45% from 2010 levels;
2. ambient air quality in the region meets or is better than ambient air quality objectives and standards set by Metro Vancouver, and the BC and federal governments; and
3. increase the amount of time that visual air quality is classified as excellent.

The greenhouse gas target matches the 2030 greenhouse gas target adopted by the Metro Vancouver Board in July 2019 as part of the *Climate 2050* process. (See the Glossary for more information on ambient air quality objectives and visual air quality.)

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Proposed Guiding Principles

The *Clean Air Plan* will identify actions for Metro Vancouver and its partners that can reduce the emissions and impacts of common air contaminants and greenhouse gases in this region. Decisions about which actions to include in the *Clean Air Plan* will be informed by a set of **guiding principles** which represent our regional values.

Building on the guiding principles for *Climate 2050*, the following guiding principles are proposed for the *Clean Air Plan*.

1. **Ambitious** – Demonstrate global and local leadership by ambitiously tackling our local climate and air quality challenges.
2. **Dynamic** – Evolve our approach to respond to new information, support innovation, and take advantage of emerging opportunities, with an objective of continuous improvement.
3. **Evidence-based** – Inform decision-making with the most current scientific information, traditional knowledge, and local understanding of air contaminant emissions and impacts.
4. **Relevant** – Design actions to respond to Metro Vancouver's unique role, opportunities and challenges and deliver regional benefits.
5. **Comprehensive** – Undertake or support emission and impact reduction actions across sectors and communities that prioritize co-benefits, consider trade-offs and avoid negative consequences to the degree possible.
6. **Integrated** – Ensure actions are integrated with, and enhance, other municipal and regional policy priorities and are coordinated with local First Nations, provincial and federal initiatives.
7. **Fair** – Seek solutions that equitably address the risks from climate change and air contaminants, fairly share the costs and benefits of action, and support a livable, thriving, and affordable region, including responsibility to future generations.
8. **Actionable** – Propose actions that can realistically be implemented given Metro Vancouver's mandate, finances and capacities; if necessary consider changes to mandate.
9. **Inclusive & Collaborative** – Involve Metro Vancouver's member jurisdictions, local First Nations, strategic partners, residents, and businesses in the planning and implementation of the *Clean Air Plan*.
10. **Transparent & Verifiable** – Follow an open decision-making process, and set goals and targets that can be measured, reported, verified, and evaluated.
11. **Preventative** – Encourage the use of processes, practices, materials and energy in ways that avoid or minimize the creation of air contaminants at the source, rather than remedial efforts after air contaminants have been released.

Trade-offs and Co-benefits

Assessing co-benefits and trade-offs are a key consideration when developing air quality and climate actions. There is a significant overlap between the sources of greenhouse gases and common air contaminants, so actions that target emissions reductions to protect public health can often (but not always) reduce greenhouse gases, and vice versa. For example, expanded use of electric vehicles will reduce greenhouse gases. As a co-benefit, it will also reduce fine particulate matter and nitrogen oxides.

In some cases, deciding on the most appropriate action will require trade-offs and balancing the health and climate benefits of reducing emissions against costs and other impacts. Approaches for reducing one air contaminant can increase the emissions of another. For example, encouraging the use of biomass or wood (over other fuels) as a renewable fuel source to reduce greenhouse gas emissions could increase emissions of fine particulate matter and nitrogen oxides.

Developing a Fair and Equitable Plan

Climate change and degraded air quality impact some neighbourhoods, households and individuals more than others. Also, some households are better able to prepare for and protect themselves from climate impacts.

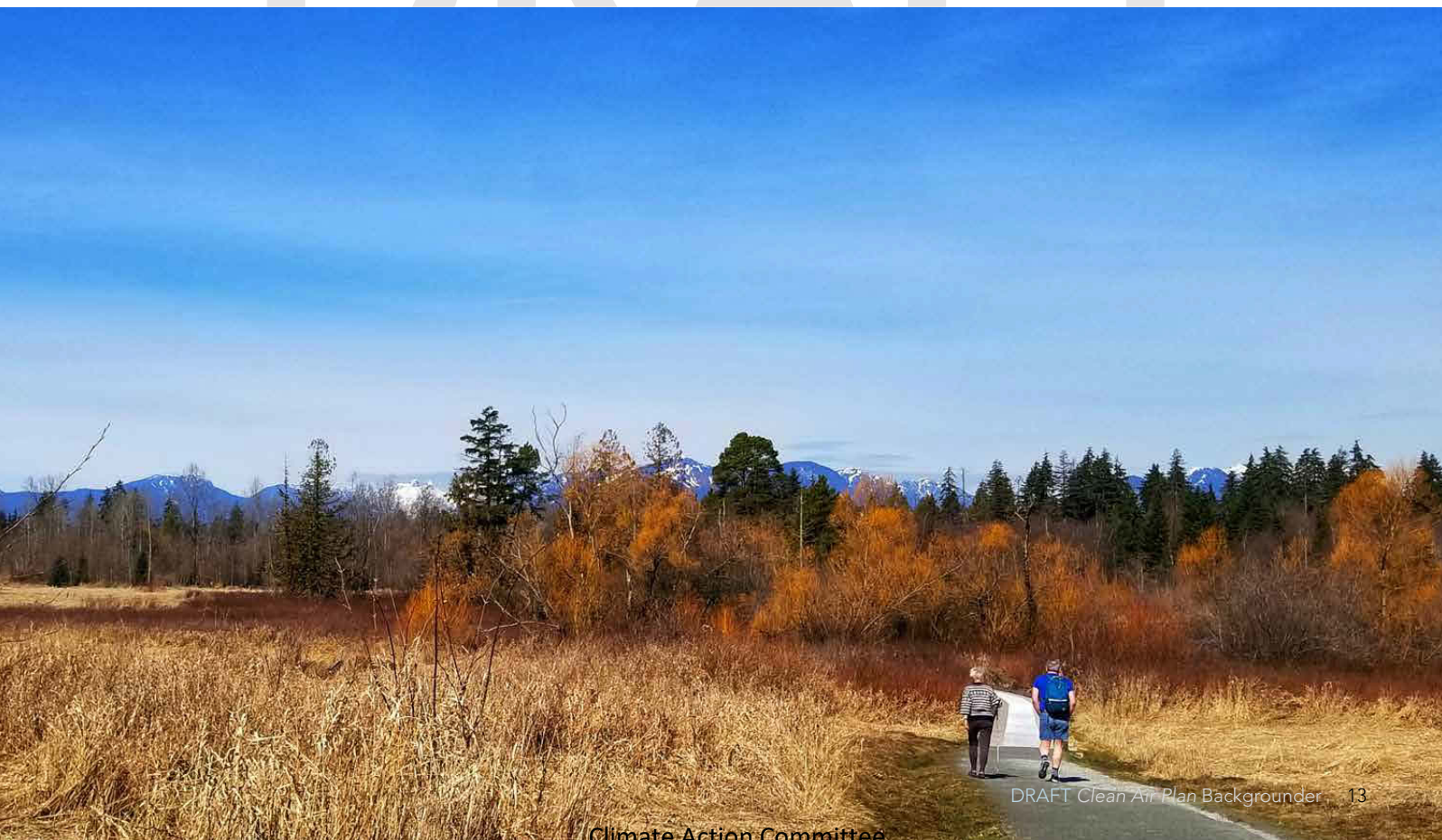
A priority of the *Clean Air Plan* is to incorporate the voices and needs of a range of views and experiences into program and policy design to ensure that fairness and equity are reflected in the *Clean Air Plan's* guiding principles, goals, targets, strategies and actions. Equity can include a range of parameters: intergenerational, gender, heritage, disability, income, location, access to information and more. Policies and programs that reduce emissions should support an

equitable distribution of benefits and costs, such as increased opportunities in a low emissions economy, affordable housing and more diverse transportation options.

Metro Vancouver will also seek opportunities to obtain perspectives and input from First Nations communities in the region.

We are seeking this feedback from diverse communities to help identify the needs, priorities, actions and opportunities for change that will lead to more fair and equitable air quality and climate policies. Diverse feedback will enhance the effectiveness of the *Clean Air Plan* to reduce emissions and improve the livelihoods of all communities.

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Feedback and Engagement Process

Help shape the *Clean Air Plan*

Metro Vancouver invites feedback from diverse viewpoints to help shape the *Clean Air Plan*, and will carefully consider all input. Feedback is welcome by email at CleanAirPlan@metrovancover.org or by telephone at 604-432-6200.

Participation Opportunities

Metro Vancouver will provide a variety of engagement opportunities to hear input on this backgrounder. The public, stakeholders and other order of government, including First Nations, can participate through the following:

- online public survey;
- open comments to a dedicated email account;
- public dialogue or forum;
- public webinars; and
- direct feedback to Metro Vancouver staff.

Details about events will be posted on the *Clean Air Plan* webpage.

Feedback on any part of the discussion materials is welcome anytime throughout the engagement. Initial events will focus on the proposed regional vision and targets, and initial identification of potential actions. The next area of focus will be specific to each issue area including potential emissions pathways.

To ensure your comments are considered **please provide feedback by March 31, 2020**. Comments and suggestions will be compiled into a summary report for consideration by the Metro Vancouver Board, and will be made publicly available in 2020.

With revisions from the initial engagement, the discussion materials will form the basis of the draft *Clean Air Plan*. The draft Plan will be made available for comment before it is finalized.

Metro Vancouver staff will treat personal information with confidentiality; please note that comments you submit may be provided to a third party 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.

Thank you for taking the time to provide your valuable feedback. For more information, visit www.metrovancover.org and search “Clean Air Plan”, or call 604-432-6200.



Glossary

Air contaminant is any substance that is emitted into the air that does or could a) harm public health (including material physical discomfort) and property, b) damage the environment, including the climate, c) impede normal business operations, or d) impair visual air quality.

Ambient air quality objectives and standards are health-based targets which define the acceptable outdoor concentration of key air contaminants. Metro Vancouver and the BC and federal governments adopt objectives and standards that become more stringent over time, to drive continuous improvement in air quality.

Climate change adaptation means anticipating, planning for and responding to the adverse effects of climate change and taking appropriate action to prevent or minimise the damage it can cause, or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation action saves money and lives later.

Common air contaminants are air contaminants that can harm public health and reduce residents' quality of life and life expectancy by causing heart and lung diseases, cancer, asthma, and other impacts. Some air contaminants have odorous characteristics. Common air contaminants include fine and coarse particulate matter, diesel particulate matter, ground-level ozone, nitrogen dioxide, sulphur dioxide and volatile organic compounds.

Fine particulate matter (PM_{2.5}) is made up of tiny solid or liquid particles that float in the air and can penetrate deep into the lungs and even the bloodstream. Particulate matter can damage health by aggravating existing lung and heart diseases, increasing the risk of cancer and reducing life expectancy. **Diesel particulate matter** is a form of particulate matter from diesel engines that is classified as carcinogenic.

Greenhouse gases are air contaminants that trap heat and are the cause of climate change. Greenhouse gases include carbon dioxide and nitrous oxide, as well as short-lived climate forcers such as methane,

fluorinated gases, black carbon and ozone. Limiting or preventing greenhouse gas emissions and removing these gases from the atmosphere is critical to avoiding catastrophic climate change (sometimes referred to as climate change mitigation).

Ground-level ozone (O₃) can have harmful impacts on everyone, especially children, seniors, and people with lung and heart conditions. It is primarily formed when nitrogen oxides and volatile organic compounds react in the air on hot and sunny days.

Nitrogen dioxide (NO₂) can damage health by aggravating existing lung diseases like asthma and bronchitis, and reducing immunity to lung infections. It is formed during high-temperature fuel combustion, and can contribute to the formation of ground-level ozone and fine particulate matter.

Sulphur dioxide (SO₂) is emitted during the combustion of sulphur-containing fuels. Exposure to high levels of sulphur dioxide can damage health by aggravating asthma and increasing respiratory symptoms. It can also react with other substances in the air to form fine particulate matter.

Visual air quality is how clear the air looks to the average observer. Metro Vancouver and its partners measure visual air quality on a scale from "very poor" to "excellent" at five sites in the Lower Fraser Valley.

Volatile organic compounds (VOC) are compounds that easily become vapours or gases; they are emitted during fuel combustion and from many consumer products. They have direct and indirect impacts on human health and contribute to the formation of ground-level ozone.



Engagement Plan for the Metro Vancouver *Clean Air Plan* and *Climate 2050 Roadmaps*

1. Background / Context

Metro Vancouver is developing the *Clean Air Plan*, which will identify how Metro Vancouver will address existing and new opportunities to reduce air contaminant and greenhouse gas emissions over the next 10 years, to protect human health and the environment, minimize the region's contribution to climate change and improve visual air quality. Metro Vancouver is also implementing the *Climate 2050 Roadmaps*, long-term strategies to achieve a carbon neutral and resilient region over the next 30 years. As a key input into the development of the *Clean Air Plan* and *Climate 2050 Roadmaps*, Metro Vancouver is seeking feedback from stakeholders and other orders of government on goals, hazards, targets, metrics and actions.

2. Accessible and Inclusive Engagement

Metro Vancouver aims to implement an accessible and inclusive engagement process to ensure that fairness and equity considerations are examined while developing the *Clean Air Plan* and *Climate 2050 Roadmaps*. Metro Vancouver researches best practices and successes in other jurisdictions and will consider how to apply these to the engagement process. To support engagement, Metro Vancouver is working with a consultant to map all stakeholders and interested parties against equity criteria to focus attention on populations who may be disproportionately impacted by degraded air quality and climate change or are seldom heard in public participation and decision-making processes. A key consideration for this engagement will be on building strong, collaborative relationships so that diverse needs and perspectives are reflected in the *Clean Air Plan* and *Climate 2050 Roadmaps*.

3. Desired Outcomes

The desired outcomes of this engagement process are:

- to increase understanding of the issues and trade-offs related to air quality and climate change issues in stakeholders and other orders of government;
- to include diverse and historically under-represented voices; and
- to earn buy-in from the public, stakeholders and other orders of government, including First Nations, on the *Clean Air Plan* and *Climate 2050 Roadmaps*.

4. Stakeholders and Other Orders of Government

The following audiences will be engaged to provide feedback:

- the public;
- local First Nations, and provincial and federal governments and agencies;
- member jurisdictions;
- neighbouring regional districts;
- partner agencies or organizations with statutory responsibilities in air quality (e.g., TransLink);
- health authorities;
- energy utilities;
- industry and business associations;
- professional associations and academic institutions;
- youth; and

- community, environmental and non-profit groups.

A list of participants within these categories will be developed in further detail.

5. Engagement Plan

Engagement for the *Clean Air Plan* and the *Climate 2050 Roadmaps* is planned to be a two-phase approach.

Phase 1 will seek feedback from stakeholders and other orders of government on the *Clean Air Plan Backgrounder for Discussion* and the seven issue area discussion papers being developed as part of this engagement process. The discussion papers and the engagement activities for Phase 1 will be informed by the ideas generated during the *Climate 2050* engagement process that occurred in May to July 2018. During Phase 1, staff will seek general feedback on vision and values from the public, stakeholders and other orders of government, including First Nations, as well as more detailed feedback on specific goals, targets, and actions about emission reductions specific to the issue areas (e.g., Transportation, Buildings and Industry). Staff are also seeking feedback about adaptation issues, including potential hazards, metrics and actions. The sectoral feedback for each issue area will also be used in developing the longer term strategies in the *Climate 2050 Roadmaps*. The engagement for both the *Clean Air Plan* and *Climate 2050 Roadmaps* will happen simultaneously to ease the burden on the public, stakeholders and other orders of government, including First Nations.

Phase 1 feedback will be considered and incorporated into a draft *Clean Air Plan* and the draft *Climate 2050 Roadmaps*.

Phase 2, in 2020, will seek feedback on the draft *Clean Air Plan* and draft *Climate 2050 Roadmaps* that incorporated feedback from Phase 1. There may be additional engagement about some of the *Climate 2050 Roadmaps* outside of the Phase 1 and 2 engagement process identified below.

As with all Metro Vancouver outreach, the *Clean Air Plan* and *Climate 2050 Roadmaps* engagement 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.

The preliminary timeline for the engagement process is described below.

PHASE 1: *Clean Air Plan* and *Climate 2050 Roadmaps* Engagement

October 2019 – March 2020

- **Workshops** (2-6) structured as information presentations and feedback sessions with:
 - Public and stakeholders
 - Staff from First Nations, other orders of government, member jurisdictions and neighbouring jurisdictions
 - Key sector representatives (transportation, buildings, industry, agriculture and waste)
- **Webinars** (1-4)
- **Community event information booths** (2-4)

- Sustainability Community Breakfast (1-2)
- Online feedback form

PHASE 2: Draft *Clean Air Plan* and *Climate 2050 Roadmap* Engagement

June – September 2020

(Note: most activities from Phase 1 are repeated in Phase 2 to ensure that all interested parties receive the draft Clean Air Plan and a summary of how Phase 1 feedback was considered)

- **Workshops** (2-6) with a draft *Clean Air Plan* overview presentation and feedback session with:
 - Public and stakeholders
 - Staff from First Nations, other orders of government, member jurisdictions and neighbouring jurisdictions
 - Key sector representatives (transportation, buildings, industry, agriculture and waste)
- **Webinars** (1-3)
- **Community event information booths** (2-4)
- **Sustainability Community Breakfast** (1-2)
- **Focus Group**
- **Online survey**

Buildings

Draft Discussion Paper to support
Climate 2050 and Clean Air Plan

Reducing emissions and increasing climate resilience for buildings
in the Metro Vancouver region over the next 10 to 30 years

September 2019

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.

Member jurisdictions of Metro Vancouver include:

- Village of Anmore
- Village of Belcarra
- Bowen Island Municipality
- City of Burnaby
- City of Coquitlam
- City of Delta
- Electoral Area A
- City of Langley
- Township of Langley
- Village of Lions Bay
- City of Maple Ridge
- City of New Westminster
- City of North Vancouver
- District of North Vancouver
- City of Pitt Meadows
- City of Port Coquitlam
- City of Port Moody
- City of Richmond
- City of Surrey
- Tsawwassen First Nation
- City of Vancouver
- District of West Vancouver
- City of White Rock

4730 Kingsway, Burnaby, BC, V5H 0C6
www.metrovancouver.org

September 2019



Introduction

Metro Vancouver is developing the *Clean Air Plan* and implementing *Climate 2050*, two major initiatives for improving regional air quality and addressing climate change. *Climate 2050* is a long-term strategy to support achieving a carbon neutral and resilient region over the next 30 years. The *Clean Air Plan* is the near-term action plan to achieve regional air quality targets and reduce regional greenhouse gas emissions by 45% by 2030. The *Clean Air Plan* and *Climate 2050* are organized around a series of **issue areas**.

This discussion paper is about the *buildings* issue area, a major regional source of air contaminant emissions, including greenhouse gases. Important changes are also needed to make commercial and residential buildings more resilient to a changing climate.

Purpose

The purpose of the buildings discussion paper is to seek feedback on the key air quality and climate change issues facing buildings in the region, as well as the potential directions to reduce emissions and adapt this region's building sector to a changing climate. Goals, hazards, targets and actions are identified to support a discussion around potential directions for this region's buildings sector. Metro Vancouver is also looking for opportunities to demonstrate climate leadership in its corporate operations.

This discussion paper is intended for the following audiences:

- the public;
- member jurisdictions;
- local First Nations, provincial and federal governments and agencies;
- other regional authorities (e.g., Fraser Valley Regional District);
- energy utilities (e.g., FortisBC, BC Hydro);
- health authorities;
- industry and business associations;
- professional organizations and academic institutions;
- youth;
- community, environmental and other non-profit groups; and
- other interested parties.

This discussion paper will also inform the development of Metro Vancouver's other management plans and policies, including *Metro 2050*, the update to the regional growth strategy.

Global Climate Change and Regional Air Quality

Metro Vancouver, together with its member jurisdictions, has been taking action on air quality and climate change for decades. But actions must be accelerated to reduce our impact on global climate change, and to protect public health and the environment.

Climate change is directly associated with **greenhouse gas emissions**, primarily carbon dioxide. While emissions are global, we all have a shared responsibility to take local action. The major sources of greenhouse gases in this region are transportation, buildings and industry, with smaller contributions from waste and agriculture. Climate change projections for this region for 2050 include longer, hotter and drier summers, warmer and wetter fall and winter seasons with decreased snowpack, and more extreme weather.

Metro Vancouver has set climate targets for our region:

1. reduce regional greenhouse gas emissions by 45% from 2010 levels by 2030;
2. become a carbon neutral region by 2050; and
3. ensure our infrastructure, ecosystems, and communities are resilient to the impacts of climate change.

Although the region has made progress in the past 15 to 20 years, **we need to accelerate our climate actions to meet these targets and avoid dangerous impacts of climate change.**

Health researchers have found that there are no known safe levels for some **common air contaminants**, including fine particulate matter, ground-level ozone and nitrogen dioxide. Health Canada estimates that at least 1,600 British Columbians die prematurely every year due to common air contaminants and many more live with the associated health effects¹.

As part of the *Clean Air Plan*, Metro Vancouver has proposed new regional air quality targets for 2030:

1. ambient air quality in the region meets or is better than ambient air quality objectives and standards set by Metro Vancouver, the BC government and the Government of Canada; and
2. increase the amount of time that visual air quality is classified as excellent.

Residents in the region generally experience good air quality, **but additional emission reduction actions are needed to continue protecting human health and the environment.**

More information on the health and environmental impacts of air contaminants are listed in the Glossary and on the *Clean Air Plan* website². More information on climate change in our region is available on the *Climate 2050* website³.

A note on format: bold words are key concepts and are generally defined in the Glossary at the back of the discussion paper.

1 Health Canada, 2019. *Health Impacts of Air Pollution in Canada*. <http://publications.gc.ca/site/eng/9.874080/publication.html>

2 *Clean Air Plan* website. <http://www.metrovancouver.org/services/air-quality/consultation>

3 *Climate 2050* website. <http://www.metrovancouver.org/climate2050>

Climate 2050 and Clean Air Plan

The *Clean Air Plan* and *Climate 2050* will be the key air quality and climate change planning documents for Metro Vancouver.

Climate 2050 is an 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. Metro Vancouver is implementing *Climate 2050* through ten issue area *Roadmaps*, which will describe how the region can reduce greenhouse gas emissions and adapt to climate change impacts. Implementation of the *Roadmaps* will be driven by Metro Vancouver’s management plans and other policies, including the *Clean Air Plan*.

The *Clean Air Plan* is the **near-term action plan** that will set Metro Vancouver’s direction for air quality and greenhouse gas management for the next ten years. The Plan will outline actions to reduce emissions of air contaminants, including greenhouse gases, from all regional sources. The *Clean Air Plan* will be organized around seven issue areas.

A series of **issue area discussion papers** are planned for development, to support engagement with the public, stakeholders and other orders of government, including First Nations, about the types of actions that Metro Vancouver should pursue to achieve regional climate and air quality targets. Six of these discussion papers, including this one on buildings, are joint *Climate 2050-Clean Air Plan* discussion papers focused on the key sources of emissions in the region, as well as climate change adaptation (see graphic below). Four discussion papers focus on the other four *Climate 2050* issue areas, which deal with climate change adaptation and can also enable emission reductions. The last discussion paper, specific to the *Clean Air Plan*, describes goals and actions for improving the tools and approaches Metro Vancouver and its partners use to reduce emissions and manage air quality in the region.

The issue area discussion papers build on the *Climate 2050 Strategic Framework* and the *Clean Air Plan Background*. The discussion papers will also inform the development of Metro Vancouver’s other management plans and policies, including *Metro 2050*, the update to the regional growth strategy (see *Climate 2050* and *Clean Air Plan* websites).





There is significant overlap between the sources of greenhouse gases and common air contaminants, so actions that target emissions reductions to protect public health can often (but not always) reduce greenhouse gases, and vice versa. Metro Vancouver aims to maximize co-benefits by focusing on policies and programs that reduce both common air contaminants and greenhouse gases.

Climate change and degraded air quality impact some neighbourhoods, households and individuals more than others. Also, some households are better able to prepare for and protect themselves from climate change and air quality impacts. A priority of the *Clean Air Plan* and *Climate 2050* is to incorporate the voices and needs of a full range of communities into program and policy design to ensure that fairness and equity are reflected in the actions that Metro Vancouver pursues. Policies and programs that reduce emissions should support an equitable distribution of benefits and costs, such as increased opportunities in a low-emissions economy, affordable housing and more diverse transportation options. Issues of intergenerational equity will also be considered. Metro Vancouver will also seek opportunities to obtain perspectives and input from First Nations communities in the region.

Linkages to Other Issue Areas

There are many linkages between buildings and other issue areas. Metro Vancouver is exploring which linkages must be considered when developing policies and actions. Some of the related issue areas for buildings include:

- waste – consideration of **embodied emissions** and final disposal of building materials;
- land-use and growth management – policies that determine the form and location of buildings in the region influence emissions and resilience of buildings;
- energy – availability of clean, renewable energy for use by buildings; and
- industry and commerce – emissions produced in the construction and demolition of buildings.

Buildings Emissions

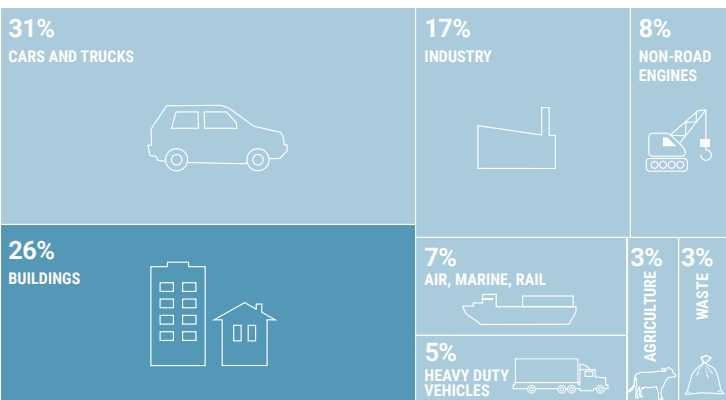
Sources and Trends

The energy we use to heat and cool our buildings is the source of roughly one quarter of the greenhouse gas (see graphic on right) and fine particulate matter emissions and 9% of the nitrogen oxides emissions in this region⁴. Emissions from buildings occur when space and water heating appliances burn fuels such as natural gas, wood and fuel oil. Emissions are generally higher from older equipment, and from buildings with less insulation, older windows and no draft protection.

The main source of greenhouse gas and nitrogen oxides emissions from buildings in the region is natural gas heating (see graphic below), which is projected to increase in the future. Fine particulate matter emissions are from wood burning in homes. There are also greenhouse gas emissions associated with the generation of electricity used in buildings, which are not currently captured in Metro Vancouver's regional emissions estimates.

Our Emissions Reduction Opportunity

Buildings can last a long time – 50 years or more – so decisions that we make now about design, construction, retrofit and operation will determine the amount of emissions they create for decades. At

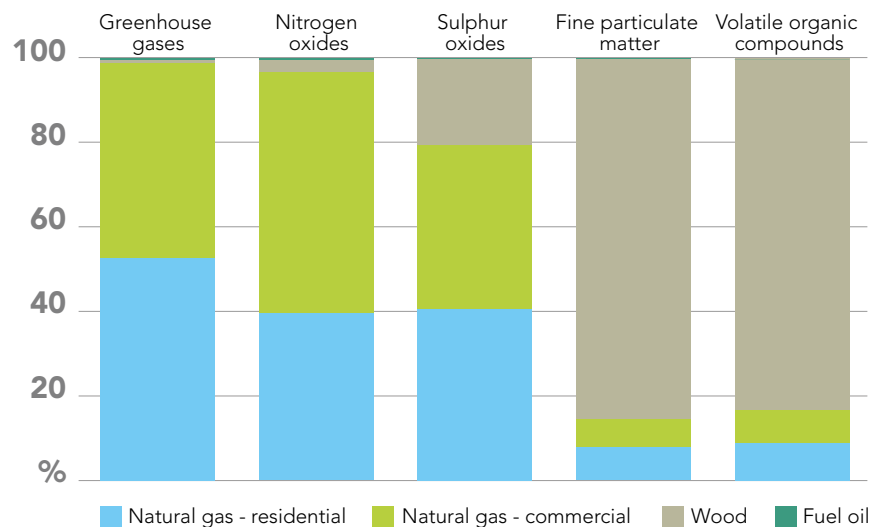


the community scale, zoning and land-use decisions that increase density can reduce buildings emissions since multi-unit buildings usually require less energy per occupant to heat and cool. However, increasing building density will occur over decades.

New building construction techniques lead to better insulated and sealed buildings, which improve comfort and health while also reducing emissions. These buildings can also provide better protection against the effects of wildfire smoke and heat waves.

Ultimately, improving energy efficiency and transitioning to clean, renewable energy sources to heat our new and existing buildings are the most effective ways to reduce our emissions and achieve regional greenhouse gas and air quality targets.

Contribution of building and fuel types to different air contaminants



⁴ Emission estimates are from Metro Vancouver's 2015 regional emissions inventory, completed in 2017, which describes the types and amounts of key air contaminants, including greenhouse gases, emitted in the region.
<http://www.metrovancouver.org/services/air-quality/emissions-monitoring/emissions/emission-inventories>

Roles and Responsibilities

Metro Vancouver is responsible for managing and regulating air contaminants in the region under authority delegated by the BC government in the *Environmental Management Act*. Under its delegated authority, Metro Vancouver manages air quality and greenhouse gases in the region, including emissions from buildings.

Metro Vancouver has additional roles in the region that impact emissions from buildings.

- *Metro Vancouver 2040: Shaping our Future*, the regional growth strategy, includes a goal to create compact, complete communities that include building types (e.g., townhouses and apartments) that typically emit less greenhouse gases and common air contaminants per dwelling unit.
- Metro Vancouver Housing provides more than 3,400 safe and affordable housing units to individuals and families across the region.
- Metro Vancouver's utilities (Water Services, Solid Waste and Liquid Waste), Regional Parks and Metro Vancouver Housing work to continue reducing emissions from their buildings.

Air quality management and climate action requires close coordination between all orders of government, businesses, utilities, institutions and residents. The roles of key partners in reducing buildings emissions are outlined below.

- **Government of Canada** and **BC government** set building codes, including energy performance requirements, and emission standards for home heating appliances.
- **Local First Nations** operating under a Treaty or Land Code can set land use and buildings policies that influence the type and location of homes and buildings constructed in their communities.
- **Municipalities** set zoning requirements that influence the type and location of homes and buildings constructed in their communities, and enforce building codes.

- **Energy utilities** and **all orders of government** provide incentives to owners to reduce emissions and energy consumption, and training to industry to improve construction, installation and building operation practices.
- **Academic institutions, non-profits** and other organizations provide education, training and advocacy to individuals, trades and others.
- **Local businesses** develop and deliver many of the services and solutions to reduce emissions from the buildings sector.
- **Metro Vancouver residents** heat and cool their homes, and make decisions about energy upgrades and where to live, all of which impacts emissions.

Current Actions in Our Region

Metro Vancouver, together with its member jurisdictions, has been taking action to reduce emissions from buildings for more than a decade. Some key current actions on buildings in our region are outlined below (additional information on the actions are listed in the web links shown).

- The **BC Energy Step Code** allows local governments to set increasingly stringent energy efficiency requirements for new construction, leading to "net-zero energy" ready buildings by 2032 ([BC government](#), adopted by over half of Metro Vancouver's municipalities).
- **CleanBC Better Homes** provides information and energy coaching for residents and businesses to access available incentives and rebates for energy efficient, low-emissions products and services like heat pumps, windows, insulation and home energy evaluations ([BC government](#)).
- **Boilers and Process Heaters Emission Regulation** regulates common air contaminant emissions from larger boilers used for space and water heating ([Metro Vancouver](#)).
- [RateOurHome.ca](#) and [Strata Energy Advisor](#) provide education, outreach and information to residents, realtors and builders on the value of home energy labelling and building retrofits, which reduce emissions (Metro Vancouver).

- **Wood Stove Exchange Program** offers rebates to replace older wood burning appliances with cleaner, high efficiency appliances ([Metro Vancouver](#) and partners).
- **Sustainable Infrastructure and Buildings Policy** sets stringent sustainable design and construction standards to make Metro Vancouver's infrastructure and buildings among the most sustainable in the region ([Metro Vancouver](#)).
- **Disclosure of home energy labels** to local governments is required for new home construction in some local municipalities to help ensure that buildings are performing at or above minimum requirements (Burnaby, Richmond, [Surrey](#), New Westminster, Vancouver).
- **Passive House and BC Energy Step Code training and outreach** to the construction and renovation industries through effective partnerships with the local and BC governments, utilities, non-profits and interest-groups (local governments, industry associations, academic institutions and non-profits).
- **Restrictions on emissions from wood burning appliances** prohibit open masonry fireplaces in new construction and set emissions limits for new residential wood burning appliances, to reduce wood smoke ([Vancouver](#)).
- **Solid Fuel Burning Domestic Appliance Regulation** specifies the type of wood burning appliances that can be sold in BC, to reduce wood smoke ([BC government](#)).
- **Large scale retrofits** or retro-commissioning and optimization of building controls of major facilities ([District of North Vancouver](#), Vancouver, Surrey).
- **Energy and emissions retrofits for affordable housing** including the installation of 32 high efficiency heating and cooling systems in Metro Vancouver Housing properties since 2016, to reduce fossil fuel consumption and energy costs ([Metro Vancouver](#)).

Key Topics for Discussion

The following sections outline the key air quality and greenhouse gas topics for buildings that Metro Vancouver would like to discuss with the public, stakeholders and other orders of government, including First Nations: proposed goals, example targets, example actions and Big Ideas.

Proposed Long-Term Goal for Buildings

This proposed long-term goal describes a desired future state for low emission and carbon neutral buildings.

- All buildings are zero emissions from heating and cooling.

This proposed goal will help identify and prioritize new actions to achieve the deep emissions reductions required from buildings.

Example Targets for Buildings from Other Jurisdictions

Near-term targets are milestones to support achievement of the long-term goal, and will be included in the *Climate 2050 Buildings Roadmap* and the *Clean Air Plan*. The timeline on the following page shows **example targets** from other jurisdictions that will support discussions to identify buildings targets for *this* region.

Example Actions for Buildings from Other Jurisdictions

Actions are the policies and programs, including regulations, incentives and educational outreach campaigns, that will lead to emissions reductions. They will be included in the *Clean Air Plan* and the *Climate 2050 Buildings Roadmap*. The following list of example actions from other jurisdictions will support discussions to identify the buildings actions for *this* region (additional information on the actions are listed in the web links shown).

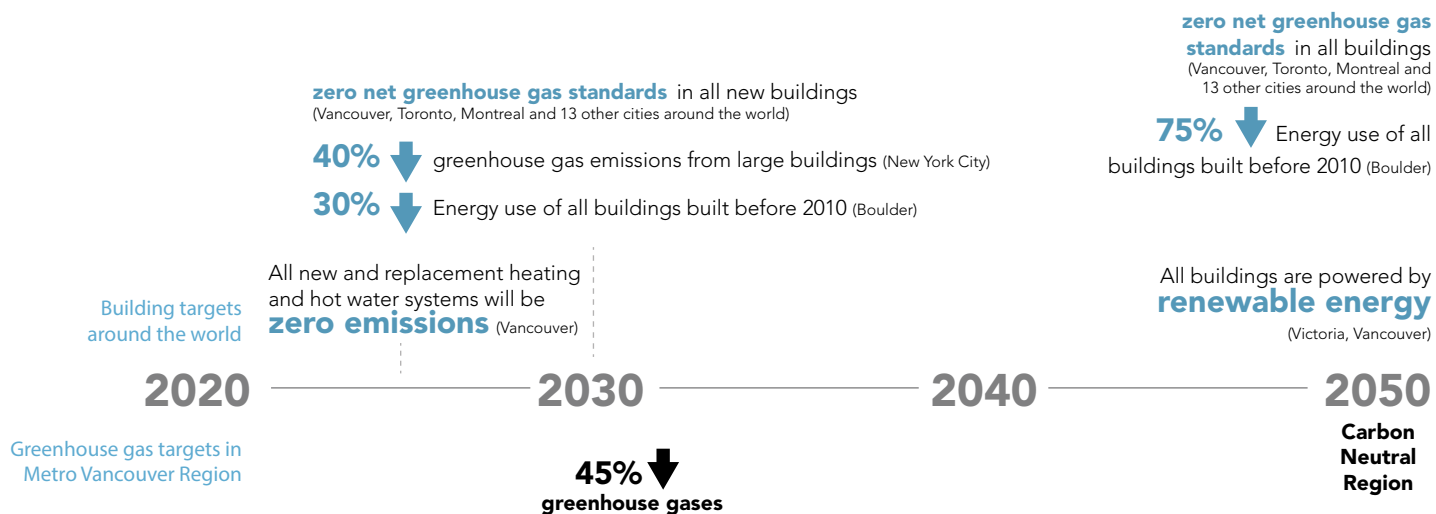
- **Performance requirements** for ultra-low nitrogen oxide emissions from boilers ([Texas](#), New Jersey)

- **Winter Spare the Air Program** restricts wood burning during degraded air quality periods ([San Francisco area](#))
- **Incentives for replacing wood burning appliances** for low-income households (Washington, [Montana](#))
- **Mandatory building energy operation and maintenance “tune-ups”** to reduce energy and emissions (Seattle, New York)
- **Mandatory home energy labelling** and disclosure at point of listing or sale to protect homebuyers and drive energy retrofits ([Portland](#), [Austin](#))
- **Solar panel bulk buy** reduces renewable energy installation costs for community members ([Sunshine Coast](#))
- **Strategic financing tools** for building energy and emission retrofits accessible to households and building owners, including rental properties ([Alberta](#), California)
- **Warm Homes on Prescription** provides energy upgrades to homeowners to improve health conditions and reduce hospital and doctor visits, funded by health care providers and government ([United Kingdom](#))

- **Tokyo Cap-and-Trade Program** requires large buildings and some industrial facilities to meet greenhouse gas emission reduction targets or purchase credits from others ([Tokyo](#))

Potential Big Ideas

Big Ideas are actions or groups of actions that could lead to significant reductions of air contaminant emissions from buildings. To achieve a cleaner, healthier, more equitable future, we need to think big and act quickly. In most cases, the Big Ideas are examples from other leading jurisdictions around the world. For buildings, three potential Big Ideas are included, to support a discussion with the public, stakeholders and other orders of government, including First Nations, on accelerating solutions for this region.



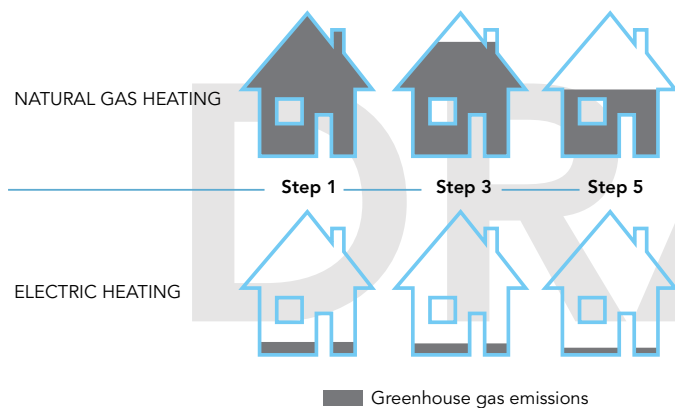
Big Idea 1:

Electrify buildings to achieve zero emissions

The BC Energy Step Code and municipal requirements could be utilized to further limit greenhouse gas and common air contaminant emissions from heating systems by requiring electric heat instead of natural gas. BC's clean hydroelectric power produces significantly less greenhouse gases than natural gas, as shown in the graphic below.

For example, a single family home constructed to Step 5 – using natural gas for heating – would achieve a 50% reduction in greenhouse gas emissions. By using electricity for heating, even a Step 1 home would achieve at least a 90% reduction greenhouse gas emissions and completely eliminate common air contaminant emissions⁵.

Greenhouse Gas Emissions by Heating Type



Some local governments have taken steps to provide builders with optional low-carbon Step Code pathways, but zero emission new buildings must become business as usual for this region to become carbon neutral. Together with the BC government, member jurisdictions and other interested parties, Metro Vancouver will explore the best approaches to accelerate the transition to electric heating in new buildings in the region.

Big Idea 2: Restricting residential wood burning to protect human health

Wood burning in a fireplace may feel cozy and romantic, but indoor residential wood burning is responsible for more emissions of fine particulate matter than any other single source in the region.

Following extensive public consultation, Metro Vancouver is developing a regulation to minimize the contribution of residential wood smoke to regional fine particulate matter emissions and reduce localized exposure risks.

Big Idea 3: Reducing emissions from buildings through benchmarking and performance requirements

Building benchmarking and performance requirements are effective approaches to reduce emissions and are used in more than 30 jurisdictions across North America.

Through these programs, building owners report energy use and emissions information at a building level. Publicly available information on buildings allows owners, residents and businesses to make more informed decisions around buying, renting, and managing buildings based on the energy and emission costs and impacts.

Performance requirements go a step further than just reporting energy use – buildings must meet energy performance targets, which can be tightened over time. In April 2019, New York City adopted requirements for buildings over 25,000 square feet to cut greenhouse gas emissions by 40% by 2030 and more than 80% by 2050. This is the most ambitious carbon reduction requirement for buildings in North America.

Metro Vancouver will study these world-class initiatives further. With a clear market signal about benchmarking and performance objectives in this region, Metro Vancouver could work constructively with the public, stakeholders and other orders of government, including First Nations, to make our large buildings low carbon and resilient.

⁵ BC Housing, 2018. 2018 Metrics Research. http://energystepcode.ca/app/uploads/sites/257/2018/09/2018-Metrics_Research_Report_Update_2018-09-18.pdf. Greenhouse gas emissions derived assuming medium single-family dwelling in Metro Vancouver, comparing natural gas against electric resistance heating.

Adapting Buildings to Climate Change

Expected Climate Hazards for Buildings

Buildings provide spaces for shelter, comfort, productivity and recreation. They are where we spend most of our time. The location and design of new homes, businesses and institutions influences exposure to the hazards associated with climate change. In 2050, low carbon and resilient buildings will be standard practice. Today, many of our buildings will require changes to adapt to the following climate hazards:

- **severe wildfire seasons** are expected to increase, leading to elevated levels of fine particulate matter (and other air contaminants) and periods of degraded air quality that contribute to negative health impacts;
- **heat waves** are expected to increase in frequency, duration and intensity that will disproportionately impact the region's most vulnerable populations, in addition to increasing cooling energy demands for buildings;
- **severe weather** such as more intense rainfall and storms, which can lead to localized flooding, power failures, and service disruption;
- **seasonal water shortages** are expected to increase in frequency due to rising temperatures and changes in precipitation and snowfall; and
- other hazards include **flooding, sea level rise** and **storm surges**.

Our Adaptation Opportunity

By proactively adapting our buildings to climate change and incorporating climate risk into land use planning, we can significantly reduce the health and safety risks, as well as severe financial losses. When planned effectively, certain adaptation actions can also reduce greenhouse gas emissions thereby reducing the amount of future adaptation needed. Greenhouse gas reduction and adaptation can and should be planned simultaneously to fully realize co-benefits and create efficiencies. Several examples are outlined below.

- As temperatures rise, adopting passive design standards that maximize orientation and natural ventilation can help maintain thermally comfortable homes while also reducing energy costs – ultimately making residents more resilient to utility grid disruptions and rising energy prices.
- By facilitating access to local and clean, renewable energy, buildings will be less vulnerable to power disruptions from severe weather. Decentralized energy systems can also ensure that, following severe weather, essential services are not disrupted and communities receive the support they need to recover.
- By retrofitting a range of public buildings to be clean air refuge areas in neighbourhoods across the region, residents will have access to safe and healthy indoor spaces during periods of degraded air quality due to wildfires. This will be particularly important for residents who face barriers to retrofitting their own homes.

Roles and responsibilities

Across the region, many different organizations are taking early action to understand and act upon key areas of vulnerability, but everyone has a role to play in preparing for a changing climate. Regional adaptation initiatives will require the cooperation and support of all orders of government, including First Nations, as well as residents, landlords, property managers and related businesses. As the regional government, Metro Vancouver can act as a regional forum in facilitating collaboration with local municipalities and other organizations to create efficiencies and improve alignment of adaptation strategies and actions.

Metro Vancouver owns and operates a wide variety of buildings, including administration buildings at wastewater and water treatment plants, rental housing units, nature centres and heritage buildings at regional parks, and our head office building. Metro Vancouver is actively undertaking climate adaptation projects within our utilities to ensure we maintain critical services during severe weather and other significant disruptions.

Current Adaptation Actions in Our Region

Metro Vancouver and its member jurisdictions have been working toward reducing the region's vulnerability to climate change hazards through adaptation actions. Some current actions planned or underway for buildings in our region include:

- **extreme weather response shelters** to reduce safety and health risks of vulnerable populations due to severe weather ([Vancouver](#));
- **accounting for climate vulnerabilities and risks in capital planning and asset management** to ensure all new and retrofitted infrastructure is adapted to future climate conditions to the end of its expected lifespan ([City of North Vancouver](#), [Vancouver](#), [Metro Vancouver](#));
- **establish respite areas** equipped with portable high-efficiency particulate air (HEPA) filters for the public to access during periods of degraded air quality due to wildfires ([Vancouver](#));

- **expand district energy systems** in order to advance energy self-sufficiency within the community ([Surrey](#), [Richmond](#), [Burnaby](#), [City of North Vancouver](#));
- **education and incentive programs** to encourage more resilient choices for the design, maintenance, and renewal of buildings ([District of North Vancouver](#));
- **advocate that the BC government** ensure the BC Building Code adequately accounts for current and projected climate conditions ([Surrey](#));
- **reduce per capita water use in buildings** through water efficient fixtures, water metering, rain barrels, and other greywater use ([City of North Vancouver](#));
- **update design standards to include passive design strategies** to maintain occupant comfort and minimize energy use ([Vancouver](#));
- **update flood level standards** for buildings to reflect increasing risk in flood-prone areas (various local municipalities); and
- **support the development of the Lower Mainland Flood Management Strategy** led by the Fraser Basin Council (various local municipalities).

Proposed adaptation goal for buildings

This proposed **long-term goal** describes a desired future state for resilient buildings.

- All buildings are resilient to high temperatures, harmful outdoor air quality, flood and drought conditions.

This proposed goal will help identify and prioritize the actions that make the region's buildings resilient to the impacts of climate change.

Example metrics/targets

It will be important to measure progress towards a climate resilient buildings sector to support achievement of the long-term adaptation goal. Measurement of climate resiliency is an emerging field of research and our region will be learning alongside other local jurisdictions. **Adaptation metrics** will be included in the *Climate 2050 Buildings Roadmap*. The below list of example metrics from other jurisdictions will support discussion to identify the metrics used in *this* region:

- number of buildings implementing Core Flood Resiliency Measures (New York City);
- square feet of residential and non-residential buildings implementing building-level adaptation measures (New York City);
- enable the delivery of 100,000 m² of new green roofs by 2012 (from 2008/09 baseline) (London, UK);
- average distance to cooling centres from known hot spots/vulnerable population location (Vancouver); and
- proportion of buildings with green or cool roofs (Vancouver).

Example Actions

Actions are the policies and programs, including regulations, incentives and educational outreach campaigns, that will lead to more climate resilient buildings. Actions will be included in the *Climate 2050 Buildings Roadmap*. The following list of example actions from other jurisdictions will support discussions to identify the actions that should be implemented in *this* region:

- **establish air quality refuge areas** in public buildings using advanced filtration systems to serve large populations during periods of degraded air quality due to wildfires ([Seattle](#));
- **mandatory cool roofs** on new and existing buildings use materials and coatings to reflect sunlight away from cities, decreasing building cooling requirements and urban heat island effect ([California](#));
- **launch a resilient housing design competition** to encourage development of new, cost-effective housing types to replace vulnerable stock ([New York City](#));
- **evaluate mobile power plants** for low-income housing properties ([Calgary](#));
- **offer subsidies for the installation of green roofs** to improve rainwater retention, increase biodiversity, and reduce extreme temperatures and urban heat island effect ([Hamburg](#));
- **mandatory wet flood-proofing** for any residential building in high risk flood areas. This technique is designed to allow floodwaters to enter and leave a structure through flood openings or vents preventing structural damage to the building ([New York City](#)); and
- **sales tax abatement program** for climate resiliency costs in buildings ([New York City](#)).

Potential Big Ideas

Big Ideas are actions or groups of actions that can make a significant advancement in the climate resiliency of the building sector. To respond to the accelerating impacts of climate change, we need to think big and act quickly. Two potential Big Ideas have been identified, to support a discussion with the public, stakeholders and other orders of government, including First Nations, on accelerating solutions for this region.

Big Idea 1: Develop a regional vulnerability assessment and adaptation action inventory for public buildings

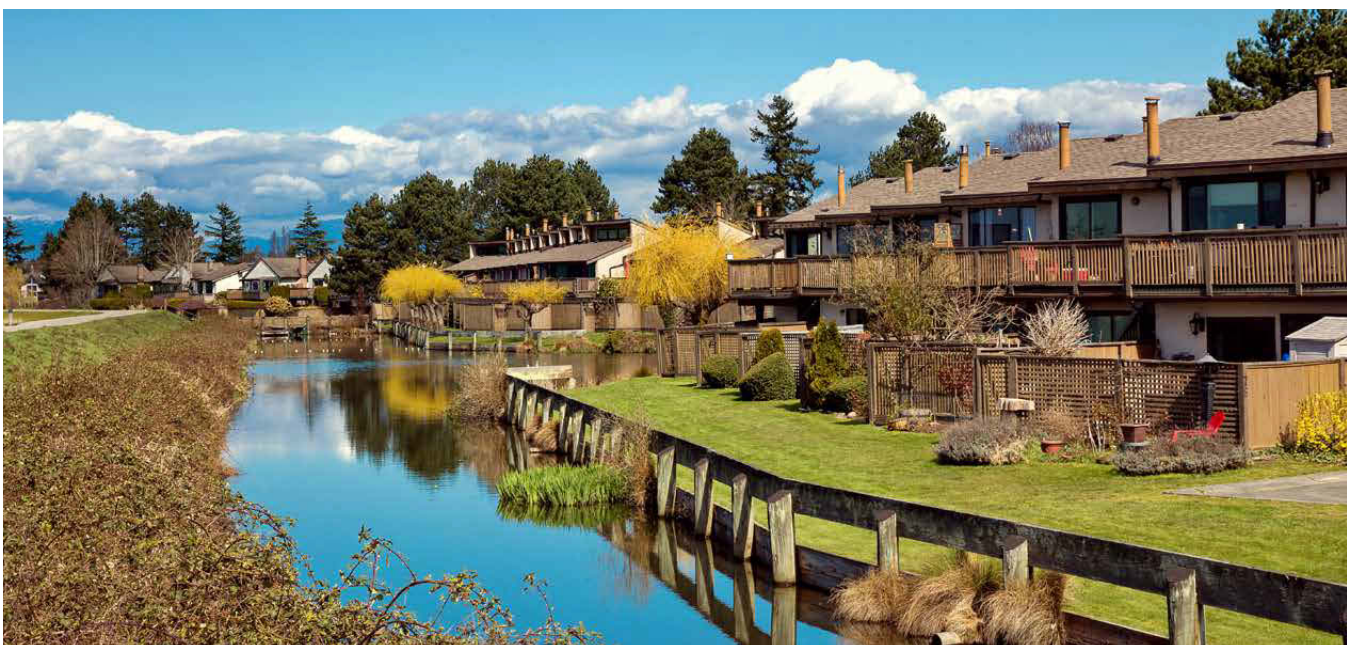
Metro Vancouver and other public organizations have completed vulnerability assessments of specific buildings and infrastructure, which provide a wealth of information so property owners can take actions to reduce risks from specific hazards. However, these assessments and recommendations may not be shared across agencies. An inventory of existing vulnerability assessments for public buildings could significantly reduce the duplication of efforts across similar building types. This could save many building owners time and money and allow them to take action much faster to adapt their buildings, thereby reducing the risks posed to both the buildings and their occupants.

As a regional government, Metro Vancouver is well-positioned to coordinate and collaborate with various organizations to develop an inventory of building-level vulnerability assessments. Metro Vancouver and interested partners could map key assessment methodologies and outcomes across a broad range of building types and geographical areas, cataloguing hazard-specific adaptation actions and making them available to through accessible online search tools and guidance documents.

Big Idea 2: Establish a building adaptation design and retrofit support centre for common building types and connect building owners to solutions

Property owners in vulnerable neighbourhoods are increasingly concerned with understanding how to retrofit their buildings to be prepared for future extreme weather, but it is difficult to know where to start, and how to plan for investment.

Metro Vancouver could work with the building centres of excellence, academic institutions and other expert organizations to create a program that assists property owners and the building industry in determining the right adaptation design solutions for new construction and retrofit projects, and connect them to available resources, programs and funding.



Feedback and Engagement Process

Help shape *Climate 2050* and the *Clean Air Plan*

Metro Vancouver invites feedback from diverse viewpoints to help shape *Climate 2050* and the *Clean Air Plan*, and will carefully consider all input. Feedback is welcome by email at CleanAirPlan@metrovancover.org, Climate2050@metrovancover.org, or by telephone at 604-432-6200.

Participation Opportunities

Metro Vancouver will provide a variety of engagement opportunities to hear input on this discussion paper. The public, stakeholders and other orders of government, including First Nations, can participate through the following:

- online public survey;
- open comments to a dedicated email account;
- public dialogue or forum;
- public webinars; and
- direct feedback to Metro Vancouver staff.

Details about events will be posted on the *Clean Air Plan* and *Climate 2050* webpages (see below).

Feedback on any part of this discussion paper is welcome anytime through the engagement. Initial events will focus on proposed goals and example targets, and initial identification of potential actions. Later events will include consideration of the potential emissions pathways needed to reach the greenhouse gas and air quality targets.

To ensure your comments are considered **please provide feedback by March 31, 2020**. Comments and suggestions will be compiled into a summary report for consideration by the Metro Vancouver Board, and will be made publicly available in 2020.

With revisions, this discussion paper will form the basis of the buildings section of the *Clean Air Plan* and the *Climate 2050 Buildings Roadmap*, both of which will be available for comment and feedback before they are finalized.

Metro Vancouver staff will treat personal information with confidentiality; please note that comments you submit may be provided to a third party 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.

Thank you for taking the time to provide your valuable feedback. For more information, visit the *Clean Air Plan* and the *Climate 2050* websites (insert CAP website, www.metrovancover.org/climate2050), or call 604-432-6200.

Note that actions identified in the final *Clean Air Plan* and any of the *Climate 2050 Roadmaps* that could result in significant changes to existing air emissions regulations or new regulations may require an independent public engagement process before any regulations or amendments are adopted.

Glossary

Air contaminant is any substance that is emitted into the air that does or could a) harm public health (including material physical discomfort) and property, b) damage the environment, including the climate, c) impede normal business operations, or d) impair visual air quality.

Ambient air quality objectives and standards are health-based targets which define the acceptable outdoor concentration of key air contaminants. Metro Vancouver and the BC and federal governments adopt objectives and standards that become more stringent over time, to drive continuous improvement in air quality.

Climate change adaptation means anticipating, planning for and responding to the adverse effects of climate change and taking appropriate action to prevent or minimise the damage it can cause, or taking advantage of opportunities that may arise. It has been shown that well planned, early adaptation action saves money and lives later.

Climate resilience is the ability of ecosystems, infrastructure, and communities to absorb the impacts of climate change while retaining the same basic characteristics and capacity for self-renewal while providing the services and functions important to the sustainability, health and well-being of its human and non-human residents.

Common air contaminants are air contaminants that can harm public health and reduce residents' quality of life and life expectancy by causing heart and lung diseases, cancer, asthma, and other impacts. Some air contaminants have odorous characteristics. Common air contaminants include fine and coarse particulate matter, diesel particulate matter, ground-level ozone, nitrogen dioxide, sulphur dioxide and volatile organic compounds.

Embodied emissions are the greenhouse gas emissions associated with the construction of a building, such as building materials and the transport of building products to the work site.

Fine particulate matter (PM_{2.5}) is made up of tiny solid or liquid particles that float in the air and can penetrate deep into the lungs and even into the bloodstream. Particulate matter can damage your health by aggravating existing lung and heart diseases, increasing the risk of cancer and reducing life expectancy. **Diesel particulate matter** is a form of particulate matter from diesel engines that is classified as carcinogenic.

Greenhouse gases are air contaminants that trap heat and are the cause of climate change. Greenhouse gases include carbon dioxide and nitrous oxide, as well as short-lived climate forcers such as methane, fluorinated gases, black carbon and ozone. Limiting or preventing greenhouse gas emissions and removing these gases from the atmosphere is critical to avoiding catastrophic climate change (sometimes referred to as climate change mitigation).

Ground-level ozone (O₃) can have harmful impacts on everyone, especially children, seniors, and people with lung and heart conditions. It is primarily formed when nitrogen oxides and volatile organic compounds react in the air on hot and sunny days.

Net-zero energy ready buildings are designed and built to achieve net-zero energy performance, by producing as much energy (e.g., from renewable energy technologies such as solar panels) as they consume.

Nitrogen dioxide (NO₂) can damage your health by aggravating existing lung diseases like asthma and bronchitis, and reducing immunity to lung infections. It is formed during high-temperature fuel combustion, and can contribute to the formation of ground-level ozone and fine particulate matter.

Sulphur dioxide (SO₂) is emitted during the combustion of sulphur-containing fuels. Exposure to high levels of sulphur dioxide can damage your health by aggravating asthma and increasing respiratory symptoms. It can also react with other substances in the air to form particulate matter.

Urban heat island effect describes urban areas that are hotter than nearby rural areas, driven by changes in the land surface by urban development. Urban heat islands can affect communities by increasing air conditioning costs, air quality impacts and greenhouse gas emissions, heat-related illness and mortality, and water pollution.

Visual air quality is how clear the air looks to the average observer. Metro Vancouver and its partners measure visual air quality on a scale from “very poor” to “excellent” at five sites in the Lower Fraser Valley.

Volatile organic compounds (VOC) are compounds that easily become vapors or gases; they are emitted during fuel combustion and from many consumer products. They have direct and indirect impacts on human health and contribute to the formation of ground-level ozone.

Vulnerability assessments identify areas most likely to be impacted by projected changes in climate and builds an understanding of why these areas are vulnerable, including the interaction between climate change, non-climatic stressors, and cumulative impacts. Assessments evaluate the effectiveness of previous coping strategies and targets potential adaptation measures.





Summary of changes to discussion materials, following feedback at June 14, 2019 Climate Action Committee meeting

Feedback number	Feedback	Metro Vancouver Staff Response
1	Clarify how both greenhouse gas reductions and climate adaptation will be addressed in the <i>Clean Air Plan</i> .	<p>The <i>Clean Air Plan</i> is focused on emission reductions under Metro Vancouver's delegated authority under the <i>Environmental Management Act</i>. The <i>Climate 2050 Roadmaps</i> will include both greenhouse gas reduction actions as well as climate adaptation actions. Climate adaptation actions will also be included as part of other Metro Vancouver management plans.</p> <p>Changes to discussion materials: The relationship between the <i>Clean Air Plan</i> and <i>Climate 2050</i> is further explained in the <i>Clean Air Plan Background</i>. The Committee will be presented with issue area discussion papers that support both the <i>Clean Air Plan</i> and <i>Climate 2050 Roadmaps</i> engagement processes. These joint <i>Clean Air Plan-Climate 2050</i> discussion papers are 1) Buildings, 2) Transportation, 3) Industry and Commerce, 4) Agriculture, 5) Waste, and 6) Nature and Ecosystems. A seventh discussion paper, specific to the <i>Clean Air Plan</i>, will also be developed for the issue area "Measurement, Monitoring, and Regulation". Each of these discussion papers will include content in three core areas: 1) common air contaminant emissions, 2) greenhouse gas emissions, and 3) climate adaptation.</p> <p>Early in 2020, discussion papers will be presented to the Committee on the other four <i>Climate 2050 Roadmaps</i>: 1) Infrastructure, 2) Land-Use and Growth Management, 3) Human Health and Well-Being, and 4) Energy. These discussion papers will support additional engagement processes on the <i>Climate 2050 Roadmaps</i> and could also support development of other management plans, such as <i>Metro 2050</i>.</p>
2	Ensure the actions in the <i>Clean Air Plan</i> are fair and equitable for emitters, and consider all key sources.	<p>An important guiding principle in <i>Climate 2050</i> is "Fairness", which states that Metro Vancouver "seeks solutions that equitably address the risks from climate change, fairly share the costs and benefits of action, and support a livable, thriving, and affordable region, including responsibility to future generations." The <i>Clean Air Plan Background</i> proposes the same principle, modified to suit the air quality context.</p>

Feedback number	Feedback	Metro Vancouver Staff Response
		<p>During the development and implementation of the <i>Clean Air Plan</i> and the <i>Climate 2050 Roadmaps</i>, Metro Vancouver will evaluate actions based on expected health and climate benefits, impacts on visual air quality and equity, corporate leadership, and other criteria based on the proposed guiding principles.</p> <p>Changes to discussion materials: The engagement plan for the <i>Clean Air Plan</i> aims to implement an accessible and inclusive engagement process. The Measurement, Monitoring, and Regulation discussion paper under development will cover cross-cutting issues, including how fairness and equity will be considered in the development and implementation of the <i>Clean Air Plan</i>, <i>Climate 2050 Roadmaps</i>, and subsequent policies and programs implemented based on these two initiatives.</p>
3	<p>Consider that natural areas do more than enable carbon sequestration, they have many benefits, including protection of biodiversity.</p>	<p>Metro Vancouver’s <i>Ecological Health Framework</i>, <i>Metro 2040</i>, <i>Climate 2050</i> and other policies consider the multiple benefits of natural areas, including their role in climate adaptation and carbon sequestration. The <i>Clean Air Plan</i> is focused on air emissions reductions, although it may include some near-term actions on Metro Vancouver’s role in minimizing loss of natural carbon sinks. The <i>Climate 2050 Nature and Ecosystems Roadmap</i> will present longer term strategies for protecting and possibly expanding carbon sinks in the region.</p> <p>Changes to discussion materials: The Nature and Ecosystems discussion paper (under development) will include example actions on carbon sequestration, as well as content on the important role ecosystem services play in climate adaptation.</p>
4	<p>Change proposed regional air quality target from “achieve” to “achieve or exceed” for ambient air quality objectives.</p>	<p>In air quality management, “exceed” typically indicates that ambient concentrations are above an objective (i.e., the objective is not being achieved).</p> <p>Changes to discussion materials: Changed regional target in <i>Clean Air Plan Background</i> to: “Ambient air quality in Metro Vancouver meets or is better than ambient air quality objectives and standards set by Metro Vancouver, and by the BC and federal governments.”</p>

Feedback number	Feedback	Metro Vancouver Staff Response
5	Visual air quality targets need to take into account that increased wildfire activity is out of Metro Vancouver's control.	<p>A baseline for assessing improvements to visual air quality will consider the emission sources that Metro Vancouver has the ability to influence or manage. As part of the <i>Clean Air Plan</i> engagement, Metro Vancouver will seek feedback from the public, stakeholders and other orders of government, including First Nations, on potential methods for defining the baseline for visual air quality in the region, accounting for wildfire impacts and seasonal targets.</p> <p>Changes to discussion materials: The <i>Clean Air Plan Background</i> includes a proposed regional visual air quality target of "Increase the amount of time visual air quality is classified as excellent" by 2030.</p> <p>The Nature and Ecosystems discussion paper under development will describe Metro Vancouver's role in wildfire prevention, detection and suppression in our managed natural areas.</p>
6	Add clarity on the timing associated with proposed goals. Are goals to be reached by 2030?	<p>The proposed goals in the issue area discussion papers are long term goals for approximately 2050 and beyond. They describe what achieving the regional visions in <i>Climate 2050</i> and the <i>Clean Air Plan</i> means for each issue area.</p> <p>The <i>Clean Air Plan Background</i> includes proposed regional air quality targets for 2030, which apply to the region as a whole and not any specific issue area. The <i>Climate 2050 Roadmaps</i> may incorporate longer term targets, which are beyond the scope of the <i>Clean Air Plan</i>.</p> <p>Changes to discussion materials: A section was included in the <i>Clean Air Plan Background</i> to clarify the relationship between the goals, targets and the expected timelines for their achievement.</p>
7	The meaning of "minimize" in draft Goal 2 under industry and commerce is not clear.	<p>Changes to discussion materials: The proposed Goal 2 in the Industry and Commerce discussion paper under development will be changed to: "The industrial and commercial sector employs lowest achievable emissions rate technology to minimize air contaminant emissions to protect public health and the environment."</p>

Feedback number	Feedback	Metro Vancouver Staff Response
8	<p>How will targets be aligned with IPCC Special Report on Global Warming of 1.5°C? How will the targets in the <i>Clean Air Plan</i> and <i>Climate 2050</i> be aligned? Targets need to be informed by realistic paths, and include targets by issue areas.</p>	<p>In July 2019, the MVRD Board approved amendments to the <i>Climate 2050 Strategic Framework</i> to reflect a commitment to pursuing a carbon neutral region by 2050 and an interim greenhouse gas reduction target of 45% from 2010 levels by 2030. These amendments align the regional greenhouse gas reduction targets with the findings in the IPCC Special Report on Global Warming of 1.5°C.</p> <p>Greenhouse gas targets will be adopted as part of the <i>Climate 2050</i> process and will be reflected in the <i>Clean Air Plan</i>. Air quality targets in the <i>Clean Air Plan</i> will not be reflected in any of the <i>Climate 2050 Roadmaps</i> since air quality is outside of <i>Climate 2050</i>'s scope.</p> <p>The example targets in the issue area discussion papers will support discussions during engagement to identify the actual near-term targets that will be included for each issue area in the <i>Clean Air Plan</i> and the <i>Climate 2050 Roadmaps</i>. Metro Vancouver staff will characterize the expected impacts of various actions included in the <i>Clean Air Plan</i>, so that the final issue area targets included in the draft <i>Clean Air Plan</i> and draft <i>Climate 2050 Roadmaps</i> are informed by realistic pathways.</p> <p>Changes to discussion materials: The <i>Clean Air Plan Backgrounder</i> includes the climate targets noted above, and describes the alignment of the targets.</p>
9	<p>Replace “low emissions” with “zero emissions” in Goal 1 and Goal 2 for transportation, recognizing that this includes ensuring upstream emissions are also decreased to zero.</p>	<p>Upstream emissions are generally outside Metro Vancouver’s jurisdiction, unless they occur within the region. However, as part of implementing <i>Climate 2050</i>, Metro Vancouver staff will explore options for developing a consumption-based emissions inventory which can help evaluate how actions in the region could influence upstream (or downstream) emissions. An example action on consumption-based inventories will be included in the Waste discussion paper under development.</p> <p>Changes to discussion materials: The proposed transportation goals will be updated in the Transportation discussion paper under development to reflect that zero emission technologies are available or in development for light and heavy-duty cars and trucks, rail locomotives and marine</p>

Feedback number	Feedback	Metro Vancouver Staff Response
		vessels. For airplanes, a “low emissions technologies” goal will be included instead, because Metro Vancouver staff are currently unaware of a clear pathway to reach zero emissions for this source. Renewable jet fuel could be substituted for jet fuel refined from fossil fuels though it would still produce common air contaminants with direct health impacts.
11	Change Goal 1 in waste to “The waste sector has minimized air contaminant emissions and eliminated greenhouse gas emissions to protect public health and the environment and maximize the upgrading of organic waste into fuels and/or products that support further regional GHG emissions reductions and local economic development.”	<p>Metro Vancouver staff are working to revise the waste goals considering this feedback.</p> <p>Final waste goals will be included in the Waste discussion paper under development.</p>
12	Change Goal 1 in Measurement, Monitoring, and Regulation to “Metro Vancouver residents have a high awareness and accurate understanding of climate change and air quality issues, and can identify opportunities to take action through behavior change, purchasing decisions and citizen advocacy.”	<p>Metro Vancouver staff are working to revise the goals for this issue area considering this feedback.</p> <p>Final goals will be included in the Measurement, Monitoring, and Regulation discussion paper under development.</p>
13	Add a goal to Buildings issue area: “All buildings are designed to ensure the long-term health and safety of occupants because they have been designed and constructed to be resilient to future temperature increases and harmful air quality events.”	<p>A proposed goal was included in the adaptation section of the Buildings discussion paper. It is anticipated that adaptation goals would eventually be developed for all ten <i>Climate 2050 Roadmaps</i>, though proposed adaptation goals may not be included in the issue area discussion papers or in the first iterations of the <i>Roadmaps</i>. For some issue areas, more research and engagement may be needed to identify appropriate regionally-specific adaptation goals.</p> <p>Changes to discussion materials:</p> <p>A proposed adaptation goal was included in the Buildings discussion paper:</p>

Feedback number	Feedback	Metro Vancouver Staff Response
		<ol style="list-style-type: none"> 1. All buildings are resilient to high temperatures, harmful outdoor air quality, flood and drought conditions.
14	Consider clean air zones for marine shipping.	Canada is a signatory to the International Maritime Organization emission control area for marine shipping, requiring lower sulphur fuel and cleaner marine engines within Canadian waters. These requirements have reduced sulphur dioxide emissions significantly. Metro Vancouver will engage the Vancouver Fraser Port Authority, the public, stakeholders and other orders of government, including First Nations, in the development of the <i>Clean Air Plan</i> and <i>Climate 2050</i> , on potential future actions to reduce emissions from the marine sector.
15	Consider adopting sector-specific industry emission standards, for example, for cement.	<p>The federal government has set emission standards for some industrial sectors and Metro Vancouver sets limits through permits and regulations. Metro Vancouver will engage the public, stakeholders and other orders of government, including First Nations, about future actions to further reduce industrial emissions.</p> <p>Changes to discussion materials: The proposed goals in the Industry and Commerce discussion paper under development will be revised to reference Lowest Achievable Emission Rate (LAER), the most stringent current technology standard:</p> <ol style="list-style-type: none"> 1. All industrial and commercial operations are carbon neutral. 2. The industrial and commercial sector employs lowest achievable emissions rate technology to minimize air contaminant emissions to protect public health and the environment.
16	Consider designating certain areas in the region as “clean air zones”.	<p>Changes to discussion materials: Big Idea 1 in the Transportation discussion paper under development will include examples of “low emission zones” from other jurisdictions.</p>
17	In response to climate risks, consider building new reservoirs to store additional rainwater to use for drinking water and wildfire prevention.	<p>Wildfire prevention will be considered as part of the <i>Climate 2050 Roadmaps</i>.</p> <p>Changes to discussion materials: References to Metro Vancouver’s role in wildfire prevention, detection, and suppression for its managed natural areas will be added to the Nature and Ecosystems discussion paper under development.</p>

Feedback number	Feedback	Metro Vancouver Staff Response
18	Consider organic regenerative agriculture as a big idea for agriculture, as it would sequester more carbon.	<p>Changes to discussion materials: Advancing regenerative agriculture as a strategy for carbon sequestration in agriculture soils will be included in the Agriculture discussion paper under development.</p> <p>The Agriculture discussion paper will also include a reference to the various research farms in the region that are showcasing diversified, sustainable, regenerative, and organic production practices.</p>
19	Enhance enforcement of industrial and transportation emission sources.	<p>Metro Vancouver enforces air emission permits and emissions bylaws enacted by the Board.</p> <p>Changes to discussion materials: Additional explanation of Metro Vancouver's role in enforcement and compliance for emission sources in the region will be included in the Measurement, Monitoring and Regulation discussion paper under development.</p>
21	Add more clear language on the difference between technologies used to control emissions.	<p>Changes to discussion materials: Definitions of Lowest Achievable Emissions Rate and other common technology standards will be added to the Industry and Commerce discussion paper under development.</p>
22	Should consider chemical tracking, including baseline information on pollutants.	<p>Metro Vancouver's air quality monitoring network continuously monitors ambient (i.e., outdoor) air quality across the region. The network monitors a broad range of air contaminants to compare air quality to regional objectives. In some cases, specialized monitoring studies seek to identify air contaminants from specific types of sources (e.g., wood smoke, diesel engines). However, there are limits to these types of studies, and it can be difficult to attribute emissions to specific emission sources. Metro Vancouver will be conducting a review of its monitoring network to review best practices and consider potential improvements.</p>
23	Require monitoring of pollution using new software and monitoring technologies, putting greater responsibility on the facility operator.	<p>Metro Vancouver requires continuous emissions monitoring at some permitted facilities, through authorization requirements in an air emissions permit.</p> <p>Changes to discussion materials:</p>

Feedback number	Feedback	Metro Vancouver Staff Response
		Additional text describing air permitting processes will be included in the Measurement, Monitoring and Regulation discussion paper under development.
24	In sensitive ecosystems, mandatory environmental assessments should be done for air permits, and bioaccumulation should be considered.	Metro Vancouver does not have the authority to require an environmental assessment, but the District Director does consider the impact of air contaminants when issuing air permits.
25	Ensure Metro Vancouver is integrated with national air zone management framework.	<p>Metro Vancouver participates in the air zone management framework through the Air Quality Management System coordinated by the Canadian Council of Ministers of the Environment.</p> <p>Changes to discussion materials: A reference was added to the <i>Clean Air Plan Backgrounder</i> about the Air Quality Management System.</p>
26	Do our objectives for fine particulate matter account for existing sources of air contaminants?	The regional ambient air quality monitoring network measures concentrations of common air contaminants in the air. The measured concentrations of these contaminants depend on emissions from existing regional sources, as well as air contaminants transported from other jurisdictions. Achievement of ambient air quality objectives relies on reducing emissions from multiple sources.
27	How can Metro Vancouver support member jurisdictions in adopting higher steps of the BC Energy Step Code?	<p>As Metro Vancouver engages member jurisdictions, the public and other interested parties on the <i>Clean Air Plan</i> and <i>Climate 2050 Roadmaps</i>, staff will seek feedback on Metro Vancouver's role and actions to advance the BC Energy Step Code in the region.</p> <p>Changes to discussion materials: Big Idea 1 in the Buildings discussion paper proposes including a greenhouse gas intensity requirement for new buildings. This enhancement to the BC Energy Step Code would help ensure a path to zero emission buildings.</p>
28	Building retrofits are a huge issue, many of these buildings will still be around in 2050.	<p>Metro Vancouver staff recognize this as a big challenge, and have included example actions and targets in the Buildings discussion paper to stimulate discussion on the best policies to accelerate retrofits.</p> <p>Changes to discussion materials:</p>

Feedback number	Feedback	Metro Vancouver Staff Response
		The Buildings discussion paper includes example targets and actions from other jurisdictions on policies and programs to accelerate retrofits.
29	Air source heat pumps can be combined with solar panels to reduce operating costs. Some regional districts have coordinated bulk purchases solar panels.	Changes to discussion materials: The Buildings discussion paper includes an example of a bulk buy program that supported residents to retrofit their homes with solar panels and heat pumps.
31	Consider examples of banning internal combustion or diesel engines.	Changes to discussion materials: The Transportation discussion paper under development will include an example of recent policy directions to ban diesel engines.
32	Does an AirCare-style program have any potential application to heavy trucks?	Changes to discussion materials: The Transportation discussion paper under development will include examples of vehicle inspection programs in other jurisdictions, including specific programs for heavy-duty vehicles.
33	Potential Big Idea: Ecosystem protection and restoration can do a lot to reduce pollution and sequester greenhouse gases.	The Regional Carbon Storage Dataset was presented at the Climate Action Committee meeting in June 2019. This tool estimates the stored carbon in the forest and agricultural soils in the region and can be used to understand the climate impact of ecosystem protection and restoration in the region. Changes to discussion materials: The Nature and Ecosystems and Agriculture discussion papers under development will include goals and example actions for protecting and restoring natural carbon sinks in the region.

To: Climate Action Committee

From: David Hocking, Director, Climate Action Committee
Erik Blair, Air Quality Planner, Planning and Environment Department

Date: August 19, 2019 Meeting Date: September 20, 2019

Subject: **Forth's Roadmap 12 Electric Vehicle and Smart Mobility Conference**

RECOMMENDATION

That the Climate Action Committee receive for information the report dated August 19, 2019, titled "Forth's Roadmap 12 Electric Vehicle and Smart Mobility Conference".

PURPOSE

To provide the Climate Action Committee with a report on Forth's Roadmap 12 Electric Vehicle and Smart Mobility Conference, which was attended by one Metro Vancouver Director and one staff member.

BACKGROUND

The Roadmap 12 Electric Vehicle and Smart Mobility Conference (the Conference), now in its twelfth year, is held annually in the Pacific Northwest of the United States. The conference is hosted by Forth, a Portland, Oregon based non-profit focused on promoting electric, smart and shared transportation options. The Conference is an international meeting place for experts from government, utilities and industry. While Metro Vancouver staff have previously attended this conference, this is the first time a Director and staff member have attended.

At its meeting on January 11, 2019, the Climate Action Committee was advised that funds were allocated in the 2019 budget for one elected official to attend the Conference in Portland, Oregon. Director David Hocking represented Metro Vancouver, and was accompanied by Erik Blair, Air Quality Planner.

This report summarizes learnings from attendance at the Conference, to inform the development of goals, targets and actions for the *Climate 2050 Transportation Roadmap* and *Clean Air Plan*.

ROADMAP 12: TEST DRIVE THE FUTURE

The Conference theme this year was "test drive the future", recognizing the rapid growth in electric, smart and shared transportation technologies in the last 10 years. In a very short time, cities and regions across the globe have experienced a wave of new electric transportation options and models, including many new light and heavy duty electric vehicle models, electric bikes and electric scooters. While these cities and regions are paving the path, others are still seeking to learn from the leaders about the opportunities and challenges posed by these new technologies.

The Conference program included more than 120 speakers, discussion panels, dozens of exhibitors, and technical tours of direct relevance to the Climate Action Committee's mandate and work plan.

The event was attended by over 1,100 delegates from government, utilities, industry, academia and non-profit organizations.

The rapid increase in public demand for clean transportation options has created pressure on governments, utilities and other organizations to take immediate action. This was evident at the Conference, as sessions had high attendance across a wide range of topics. Conference speakers from governments, non-profits, academic institutions and utilities spoke to issues concerning vehicle technology, charging infrastructure, awareness campaigning, and equity in access to transportation options.

Important knowledge gained at the conference included the following insights:

- **“Equitable access” to clean transportation must be defined and addressed in planning initiatives, outreach messaging and incentive programs:** Equity emerged as a core theme in the Roadmap 12 Conference. Experts impressed upon participants that electric vehicle (EV) programs should be designed so that a diverse range of communities have access to charging and clean, safe, fair and affordable mobility options. Presenters highlighted health-based incentives for EV charging, electric car-sharing, income-qualified purchase incentives, location-planning for fast charging, and free transit zones as successful solutions already being implemented.
- **Public outreach is critical to EV uptake, and Metro Vancouver is demonstrating best practices:** Potential EV owners still face critical barriers to ownership including knowledge of vehicle models, cost of ownership, and access to charging at home, at work and in public spaces. Emerging best practices from the US in designing and implementing outreach programs are centered around test drive events and showcasing EVs at community events. Metro Vancouver’s Emotive and EV Workplace programs use this outreach model and operate at a fraction of the cost of some of the programs described at the conference. Ideas for program updates include increasing language and cultural diversity in messaging, and developing online tools that appeal to different types of potential EV buyers.
- **Electric-assist bikes and scooters are connecting people to public transit in urban and rural communities:** Even advocates for zero emission cars and trucks recognize that the most climate-friendly options are self-propelled modes such as cycling and scootering. However, many people are still too far from bus and rapid transit stations to be convinced to leave their car behind. This is called the “first mile/last mile” problem. In both urban and rural contexts, e-bikes, e-scooters and other electric-assist vehicles are solving the first mile/last mile problem by connecting a more diverse group of people from their homes and workplaces to public transit.
- **Ride hailing services should be zero emissions:** While ride hailing services are new to BC, the United States has extensive experience with Transportation Network Companies (TNCs) such as Uber and Lyft. Presenters shared experiences with TNCs and cautioned that they represent a significant potential to increase transportation options, but may also significantly increase the number of vehicle kilometers travelled in a service area. Without a mix of policies such as

public transit incentives and clear fleet electrification requirements, TNCs may steal would-be transit users and increase greenhouse gas emissions. There are currently no low-carbon targets for fleets in BC's new ride hailing legislation.

- **Smart charging supports better utility planning:** By 2050, there will be millions of EVs charging at homes, workplaces, highway rest-stops, shopping centers and many other locations in North America. It is clear that the future of effective EV charging infrastructure relies on communications and information sharing. Smart and networked charging should be the standard wherever possible. This will allow utilities to use real data to plan for, and manage, infrastructure needs in a cost-effective manner.
- **Medium and heavy duty EV options are already here:** Many solutions already exist for cleaner medium and heavy duty vehicles, and more are coming quickly. Experts shared research and guidance on planning for medium and heavy duty vehicle charging, costs, and future model availability. The transferability of EV technology across multiple heavy duty vehicle categories will fast-track research and design periods, and governments, utilities and other agencies should be prepared for these technologies. Examples of available medium and heavy duty vehicles are transit, tour and school buses, urban delivery vehicles, and tractor-trailers. Electric ferries are also being introduced in Norway and Washington State.
- **Fast charging is critical for EV uptake, but still needs government and utility support in the short term:** Investments in fast charging will need to be made to expand service to many urban and rural EV users. Fast Charging, with approximately a 30-minute charge time, is already paving the way for "ultra-fast" charging, which fully charges the largest EV batteries in 15 minutes. The capital cost and power requirements of these chargers are significant, but provide a broader menu of charging options based on the location and intent of the charger. Utilities and governments in many jurisdictions are investing in critical fast charging infrastructure to improve the business case and encourage further investment from private companies.

The Conference also provided tours for participants to experience e-buses, e-bikes and e-scooters on the streets of Portland. Participants were also invited to explore Forth's Electric Showcase, a public space located in downtown Portland dedicated to educating the public about clean transportation. The Showcase provides EV test drives in a similar way to Metro Vancouver's Emotive program.

The amended *Climate 2050* target will drive action now

In July 2019, the Board amended the greenhouse gas (GHG) reduction target in the *Climate 2050 Strategic Framework* thereby committing to a carbon neutral region by 2050 and a 45% reduction from 2010 levels by 2030. The Board also adopted the *Board Strategic Plan 2019-2022*, which highlights the need to take strong leadership and guide climate action in the region in pursuit of a carbon neutral region by 2050. These are important steps because they align Metro Vancouver with the most recent scientific evidence on targets that can avoid catastrophic climate change and help to drive early zero emissions actions. The learnings from the Conference reinforce the understanding that achieving deep emissions reductions are possible, but that big changes take time. If Metro

Vancouver is going to achieve a carbon neutral region within 30 years, significant action needs to start today.

The ideas and best practices presented at the Roadmap 12 Conference can inform the long-term strategies and the early actions for the transportation sector for the *Climate 2050 Transportation Roadmap* and the *Clean Air Plan*.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Attendance at events, seminars and technical conferences are important means by which Metro Vancouver's staff and committee representatives share knowledge and build expertise on key issues relating to Metro Vancouver's services. The Remuneration Bylaw authorizes Committees to recommend to the Board Chair the attendance by members at relevant events. Operating budgets include funds for staff attendance, within the Corporate Training and Development Policy. Costs associated with attendance at this event by elected officials and staff were approved as part of the 2019 budget.

SUMMARY / CONCLUSION

The Roadmap 12 Electric Vehicle and Smart Mobility Conference was an opportunity to learn about key challenges, solutions and current and future actions to increase the uptake of electric transportation options in North America. Delegates discussed topics such as electric options for "first mile/last mile" travel, the role of government and utilities in laying the foundation for broader private investment in EV infrastructure, and designing policies and programs for disadvantaged communities. There was broad agreement that solutions for convenient and accessible charging for a range of location types and vehicle modes is critical to electrifying the transportation sector, and that, without clear low-carbon requirements, ride-hailing services may significantly increase transportation emissions. Knowledge gained at the Roadmap conference will help to guide the development of goals, targets and actions for the *Climate 2050 Transportation Roadmap* and *Clean Air Plan*.

Reference

[Roadmap 12 Conference Program](#)

31632803

To: Climate Action Committee

From: Josephine Clark, Regional Planner
Planning and Environment Department

Date: August 23, 2019 Meeting Date: September 20, 2019

Subject: **Ecological Health – Tree Canopy Cover and Impervious Surfaces**

RECOMMENDATION

That the Climate Action Committee receive for information the report titled “Ecological Health – Tree Canopy Cover and Impervious Surfaces”, dated August 23, 2019.

PURPOSE

To provide the Climate Action Committee with reporting and analysis of the newly developed regional ecological health indicators – tree canopy cover and impervious surfaces.

BACKGROUND

The Climate Action Committee’s 2019 Work Plan includes “Ecological Health – tree canopy cover and landscape imperviousness monitoring” in the third quarter.

The Ecological Health Framework was adopted by the MVRD Board in October 2018 and proposes a series of regional ecological health indicators that together, when repeated over time, provide a ‘state of the environment’ assessment for the Metro Vancouver region. This report provides the results of analysis for two key regional ecological health indicators – tree canopy cover and impervious surfaces.

REGIONAL TREE CANOPY COVER AND IMPERVIOUS SURFACES REPORT

Tree canopy cover refers to the leaves and branches that form a visible layer if one is viewing the region from the air, and the extent to which they cover the ground. Impervious surfaces, such as paved roads and buildings, are surfaces that allow very little or no water to pass through them. In 2019, staff undertook an analysis of tree canopy cover and impervious surfaces in Metro Vancouver. Findings are provided in the attached report *Regional Tree Canopy Cover and Impervious Surfaces*.

Tree canopy cover and impervious surfaces were both measured using the Metro Vancouver high-resolution land cover classification, which was created in 2017. In addition to providing measures for each indicator at multiple scales, the report explores the relationship between the indicators and land use type and residential density, and future projections of tree canopy cover within the Urban Containment Boundary. A number of recommendations are provided relating to maintaining tree canopy cover and reducing imperviousness.

Why Measure Tree Canopy Cover and Impervious Surfaces?

Trees provide a range of important ecosystem services to people including shading, carbon storage, and stormwater management. Measuring tree canopy cover is a relatively simple way to determine the extent of the urban forest and the magnitude of services it provides. Impervious surfaces are associated with many of the negative effects of urbanization such as increased temperatures (the 'Urban Heat Island' effect) and flood risk, along with impacts to stream health through disrupted hydrological cycles and poor water quality. Measuring the level of landscape imperviousness gives an indication of the extents of these negative effects.

Tree canopy cover and imperviousness are ecological health indicators, but because of their connection to factors such as urban temperatures and stormwater management, they are also indicators of how resilient communities may be to climate-related impacts. Looking at whether these indicators are distributed equitably across cities or regions helps us to identify communities or populations more vulnerable to risks and receiving fewer ecosystem service benefits.

Levels and Trends of Tree Canopy Cover and Impervious Surfaces in the Region

In this region, tree canopy cover measures 54% for the entire Metro Vancouver land base, and 32% for the portion of the land within the Urban Containment Boundary. It should be noted that these measurements are averaged, and there is great variation among neighbourhoods and land use types. Impervious surfaces total 20% of Metro Vancouver's land base and 50% of the land base within the Urban Containment Boundary. Again, there is much variation in how impervious surfaces are distributed.

Perhaps surprisingly, high density housing (e.g. condos and towers) has accommodated increasingly more trees in recent decades, with a corresponding decrease in impervious surfaces. These trends seem to have leveled off in recent years, and it is uncertain what will happen in the future. Lower density housing (especially single-family detached housing) appears to have shifted from a housing model that accommodated many trees to one that accommodates increasingly fewer trees and more impervious surface due to expanding home sizes and lot-splitting. These trends are likely to continue into the future.

Projected growth in the region over the next 20-30 years is expected to impact tree canopy cover within the Urban Containment Boundary as lands planned for future urban growth are developed, and single-family detached housing stock is redeveloped. Tree canopy cover in the Urban Containment Boundary is projected to decrease from 32% to 28% from these sources of loss.

The report presents benchmark data analysis, and comparable historic data is not available to allow the estimation of change. However, a review of other data sources (including member jurisdiction tree canopy assessments) suggest tree canopy cover levels are in decline and levels of impervious surfaces are increasing in urbanizing watersheds. In the coming years, measurement of tree canopy cover and impervious surfaces will be repeated with updated land cover data to enable tracking of change over time and identification of trends.

Offsetting Losses through Tree Planting

Municipalities, including several Metro Vancouver member jurisdictions, often use tree planting programs as a way to maintain or expand their canopy, and actions such as these could help to offset anticipated future losses. To offset the projected decline in Urban Containment Boundary tree canopy cover from 32% to 28% would require 1,100 to 3,000 hectares of lands within the Urban Containment Boundary to be dedicated to tree planting.

Analysis indicates that about 30,000 hectares of land within the Urban Containment Boundary is potentially available for tree planting. Site-level analysis would be required to determine what area is actually available, but it does suggest that the 3,000 hectares required to offset projected losses is attainable. Potential planting availability was calculated using the 'Potential Planting Area' dataset which is detailed in Appendix 2 of the attached report and is available to member jurisdictions to assist with urban forest planning.

NEXT STEPS

The attached *Regional Tree Canopy Cover and Impervious Surfaces* report will be shared with member jurisdiction staff and staff advisory committees, such as the Regional Planning Advisory Committee – Environment Sub-Committee. In addition, staff will provide support for users of Metro Vancouver's Potential Planting Area dataset, which can be used to help members develop planting plans and targets. Metro Vancouver, member jurisdictions and other land owners and managers all have a role to play in maintaining tree canopy cover and reducing imperviousness. The report also provides a set of high level recommendations for consideration to support improved tree canopy cover and limiting impervious surfaces.

As noted earlier, because the attached report presents benchmark data analysis, in the coming years, measurement of tree canopy cover and impervious surfaces will be repeated with updated land cover data to enable tracking of change over time and identification of trends. Once complete, updated levels and trends in tree canopy cover and impervious surfaces will be presented to the Climate Action Committee.

In addition, through the 2020 budget process, a project is being proposed to: develop best practices to support urban forest managers, provide tree ratio guidance, recommend tree canopy cover targets, highlight tree bylaw and tree management best practices. Staff will report out to the Climate Action Committee subject to budget approval.

ALTERNATIVES

This is an information report. No alternatives are presented.

FINANCIAL IMPLICATIONS

Work associated with measuring these indicators was completed by staff as part of the Regional Planning annual work program.

SUMMARY / CONCLUSION

Tree canopy cover and landscape imperviousness are measures of the region's ecological health and have been analyzed in the recently completed *Regional Tree Canopy Cover and Impervious Surfaces*.

Tree canopy cover refers to the leaves and branches that form a visible layer if one is viewing the region from the air, and the extent to which they cover the ground. Impervious surfaces, such as paved roads and buildings, are surfaces that allow very little or no water to pass through them.

In the Metro Vancouver region, tree canopy cover measures 54% for the entire Metro Vancouver land base, and 32% for the portion of the land within the Urban Containment Boundary, with great variation among neighbourhoods and land use types. Impervious surfaces total 20% regionally and 50% of the land base within the Urban Containment Boundary.

High density housing development has accommodated increasingly more trees in recent decades, with a corresponding decrease in impervious surfaces. On the other hand, lower density housing appears to have shifted from a housing model that accommodated many trees to one that accommodates increasingly fewer trees and more impervious surface due to expanding home sizes and lot-splitting.

Overall, the report shows that regional tree canopy cover is in decline and impervious surfaces are most likely increasing as parts of the region urbanize. There are opportunities to turn these trends around, and this report includes a number of recommendations to help do so, including continued monitoring to inform actions, adopting and enforcing tree protection bylaws, and implementing green infrastructure approaches.

Attachment

Regional Tree Canopy Cover and Impervious Surfaces (32352331)

32360338

August 2019

Regional Tree Canopy Cover and Impervious Surfaces

Analysis of Tree Canopy Cover and Impervious Surfaces in Metro Vancouver



Prepared by:
Leonardo Nicoletti
Josephine Clark



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Executive Summary

Tree canopy cover refers to the leaves and branches that form a visible layer if one is viewing the region from the air, and the extent to which they cover the ground. Impervious surfaces, such as paved roads and buildings, are surfaces that allow very little or no water to pass through them.

Trees provide a range of important ecosystem services to people including shading, carbon storage, and stormwater management. Measuring tree canopy cover is a relatively simple way to determine the extent of the urban forest and the magnitude of services it provides. Impervious surfaces are associated with many of the negative effects of urbanization such as increased temperatures (the 'Urban Heat Island' effect) and flood risk, along with impacts to stream health through disrupted hydrological cycles and poor water quality. Measuring the level of landscape imperviousness gives an indication of the extents of these negative effects. Tree canopy cover and imperviousness are ecological health indicators but because of their connection to factors such as urban temperatures and stormwater management, they are also indicators of how resilient communities may be to climate-related impacts. Looking at whether these indicators are distributed equitably across cities or regions helps us to identify communities or populations more vulnerable to risks and receiving fewer ecosystem service benefits.

In this region, tree canopy cover measures 54% for the entire Metro Vancouver land base, and 32% for the portion of that land within the Urban Containment Boundary (UCB). These measurements are averaged, and there is great variation among neighbourhoods and land use types. Impervious surfaces total 20% of Metro Vancouver's land base and 50% of the UCB. Again, there is much variation in how impervious surfaces are distributed.

Against conventional wisdom, high density housing (e.g. condos and towers) has accommodated increasingly more trees in recent decades, with a corresponding decrease in impervious surfaces. These trends seem to have leveled off in recent years and it is uncertain what will happen in the future. Low density housing (especially single-family detached) appears to have shifted from a housing model that accommodated many trees to one that accommodates increasingly fewer trees and more impervious surface due to expanding home sizes and lot-splitting. These trends are likely to continue into the future.

Projected growth in the region over the next 20-30 years is expected to impact tree canopy cover within the UCB as lands planned for future urban growth are developed, and single-family detached housing stock is redeveloped. Tree canopy cover in the UCB is projected to decrease from 32% to 28% from these sources of loss.

Potential exists to 'offset' losses or increase canopy through tree planting in the UCB. The Metro Vancouver Potential Planting Area dataset summarizes how much area is potentially available for tree planting and can be used by member jurisdictions to assist with planning of the urban forest.

The report includes data and analysis for the entire Metro Vancouver region and was created using 5m resolution land cover data. This is a benchmark data analysis initiative and comparable historic data is not available to allow the estimation of change. However, several member jurisdictions of Metro Vancouver have measured tree canopy locally over time and report losses. In addition, Metro Vancouver's own Sensitive Ecosystem Inventory indicates a loss of about 240 hectares of young and mature forests between 2009 and 2014 in the UCB, and almost 1,000 hectares regionally. Fewer data

sources are available to help identify potential regional trends in impervious surfaces but it is likely increasing in urbanizing watersheds.

Measurement of tree canopy cover and impervious surfaces will be repeated with updated land cover data to enable tracking of change over time and identification of trends.

In conclusion, the regional tree canopy cover is in decline, measurably. Impervious surfaces are most likely increasing as parts of the region urbanize. There are opportunities to turn these trends around, and this report includes a number of recommendations to help do so, including continued monitoring to inform actions, adopting and enforcing tree protection bylaws, and implementing green infrastructure approaches.

Background

Key Terms

High Density Housing Stock: Apartment oriented parcels of type “Low-Rise Apartment” and “Mid/High-Rise Apartment”.

Impervious Surfaces: Surfaces that allow very little to no water to pass through them. Paved roads and asphalt are examples of impervious surfaces.

Land Cover: Biophysical features on the earth’s surface mapped using multispectral satellite imagery and LiDAR (where available). Classes include coniferous tree, deciduous tree, grass/herb, buildings, paved, and water.

Land Use: The way in which land is used by humans for specific purposes. Examples of land use include residential land use and industrial land use.

Low Density Housing Stock: Ground oriented parcels of type “Single-family detached”, “Multi Detached”, and “Townhouse”.

Metrics: Statistical information summarized categorically (e.g. zoning class) or spatially (e.g. Census blocks).

Potential Planting Area: Land that could theoretically be used to increase Tree Canopy Cover. % Potential Planting Area includes areas currently occupied by non-tree vegetation (grass, shrubs etc.), soil patches, barren surfaces, pavement that does not fall on roads, and that under the right circumstances, could be modified to increase tree canopy cover.

Tree Canopy Cover: The area occupied by all deciduous and coniferous tree crowns (i.e. area occupied by leaves as viewed from the top) in an urban area, as measured from aboveground.

Urban Containment Boundary (UCB): Identified by *Metro 2040* as the area where 98% of future urban growth is to be contained.

Data and Methodology

The 2014 Metro Vancouver Land Cover Classification dataset was used to map and measure tree canopy cover and impervious surface across the Metro Vancouver region. The Land Cover is a 5m resolution GIS mapping dataset and was created using RapidEye satellite imagery and where available, LiDAR data.

The Metro Vancouver Generalized Land Use layer was used in order to assess tree canopy cover and impervious surface in relation to different land use types. The 2016 Generalized Land Use is a non-official ‘regional reference map’ that depicts land activities existing across Metro Vancouver.

Analysis Area

The Urban Containment Boundary, or UCB, is the area within Metro Vancouver where urban development and future urban growth are focused (see Figure 1). The UCB is used as the primary analysis area in this report because it is where most people in the region live and work. It is therefore an

important area for the provision of ecosystem services by trees, and where most of the negative impacts from impervious surfaces will be experienced. It is also where losses in tree canopy cover and increases in impervious surfaces are most likely to occur through development and redevelopment.



Figure 1: Metro Vancouver's Urban Containment Boundary

In this report, tree canopy cover and imperviousness are reported as a percentage of an area, for example, % Tree Canopy Cover by city block, or % Impervious Surface of the UCB.

Section 1 – Tree Canopy Cover

Why Measure Tree Canopy Cover?

Trees provide a range of ‘ecosystem services’ – the benefits people obtain from ecosystems – including shading and cooling (which helps to mitigate the Urban Heat Island effect¹), carbon storage, stormwater management, and wildlife habitat. There is also a growing body of evidence demonstrating that trees and other greenspace have significant human health and well-being benefits through disease prevention and promotion of health². Measuring tree canopy cover is a relatively simple way to determine the extent of the urban forest and the magnitude of services it provides³. Healthy forests in both urban and natural areas are an important component of regional livability and resilience to climate change.

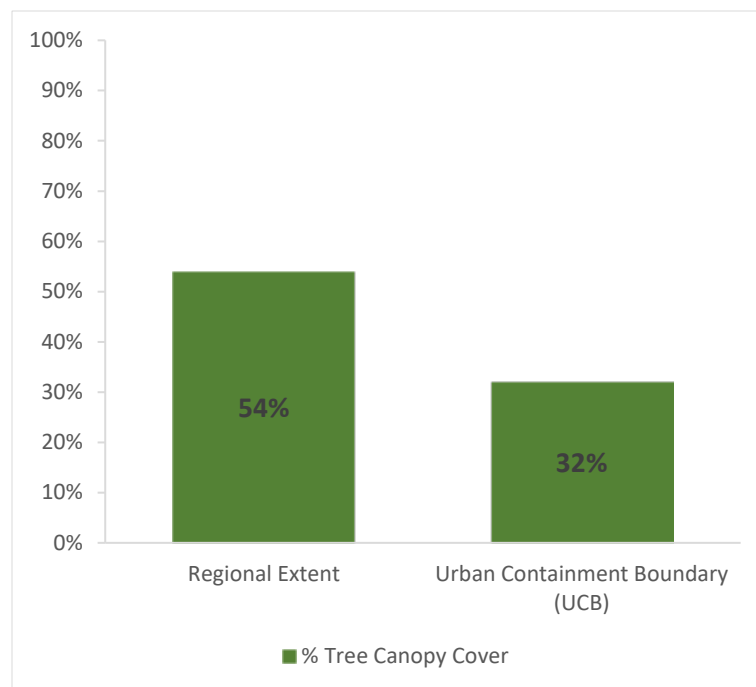


Figure 2: % Tree Canopy Cover for the Metro Vancouver region and within the Urban Containment Boundary.

¹ The term "Urban Heat Island" describes built up areas that are hotter than nearby rural areas

² Van den Bosch, M. & Ode Sang, A. (2017). Urban natural environments as nature-based solutions for improved public health - A systematic review of reviews. *Environmental Research*. 158: 373-384

³ [Leff \(2016\) The Sustainable Urban Forest – A Step-by-Step Approach](#)

Tree Canopy Cover Levels – General Results

The analysis found that 160,400 ha of Metro Vancouver, and 29,000 ha of lands within the UCB are covered by tree canopy. This represents 54% of Metro Vancouver's land base and 32% of lands within the UCB (Figure 2).

Figure 3 shows % Tree Canopy Cover summarized by city block⁴ within the UCB and illustrates the distribution of tree canopy cover within the UCB. Grey indicates very low tree canopy cover (less than 5%) and dark green indicates very high tree canopy cover (more than 60%). Concentrated areas of low tree canopy cover generally correspond to dense urban areas and industrial lands. Areas of high tree canopy cover within the UCB tend to be parks and currently undeveloped areas that are slated to accommodate planned future urban growth.

Maps of the spatial distribution of tree canopy cover (such as Figure 3) can be used by local governments in urban forest planning including determining priority planting locations and identifying underserved communities.

⁴ A dissemination block (DB) is an area "equivalent to a city block" bounded on all sides by roads and/or boundaries of standard geographic areas. The dissemination block is the smallest geographic area for which population and dwelling counts are disseminated. Dissemination blocks cover all the territory of Canada (Statistics Canada. (2018). [Dissemination Block](#). *Dictionary, Census of Population, 2016*.).

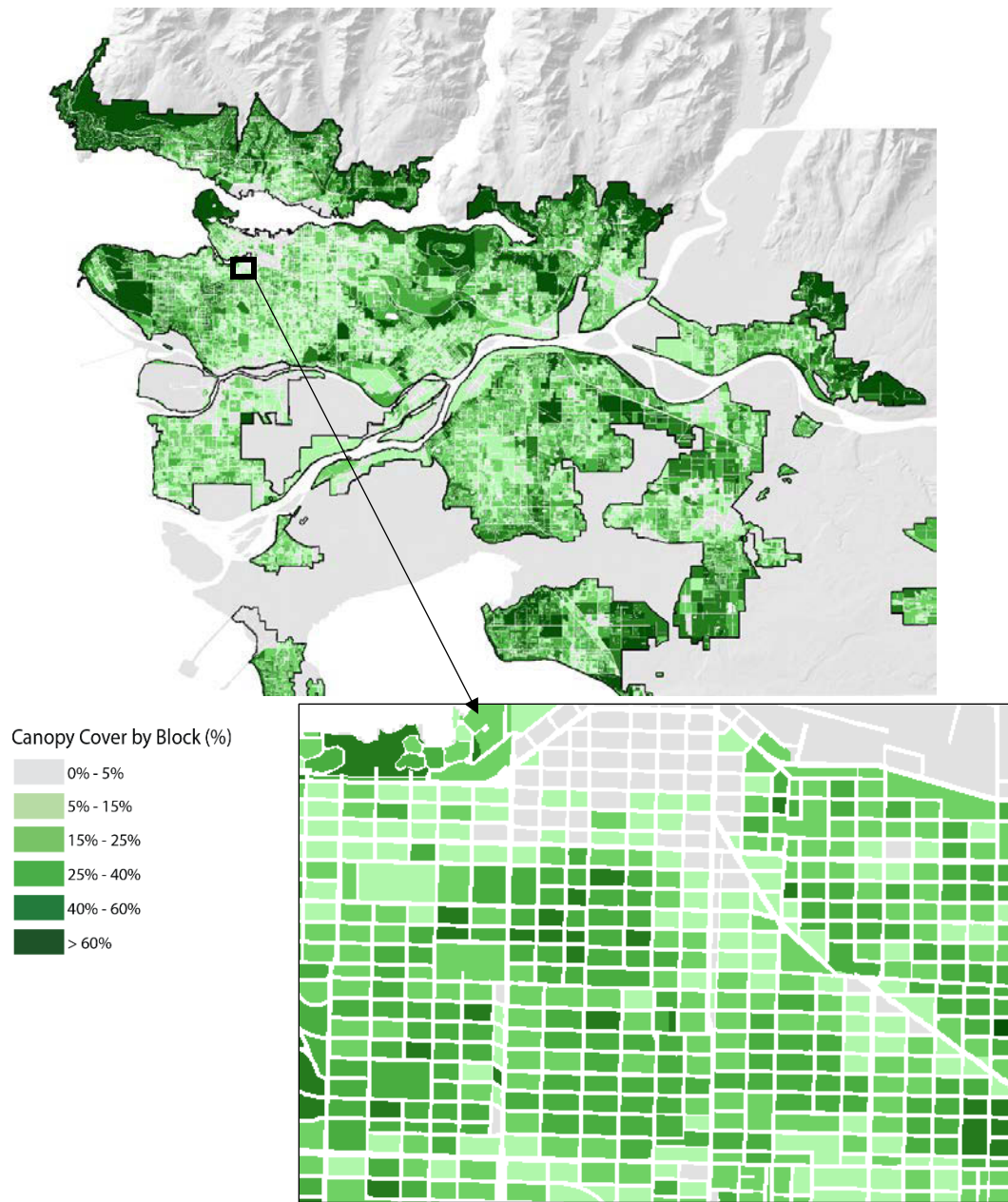


Figure 3: % Tree Canopy Cover summarized by city block within the Urban Containment Boundary.

Trends in % Tree Canopy Cover

It is not yet possible to assess trends in regional tree canopy cover because comparable historical data is unavailable. The regional Land Cover Classification dataset used to measure tree canopy cover will be updated in 2021 and at that point, regional trends will be assessed and reported.

However, other sources of information are available that provide an indication of how the region's tree canopy has changed over time. The Metro Vancouver Sensitive Ecosystem Inventory reported losses of 240 ha of young and mature forests between 2009 and 2014 within the Urban Containment Boundary (UCB) and almost 1,000 ha for the region. In addition, several member jurisdictions have measured their tree canopy cover over time and all have reported losses (Figure 4).

Available data therefore indicates that regional canopy cover is declining but the magnitude of this decline is not clear.

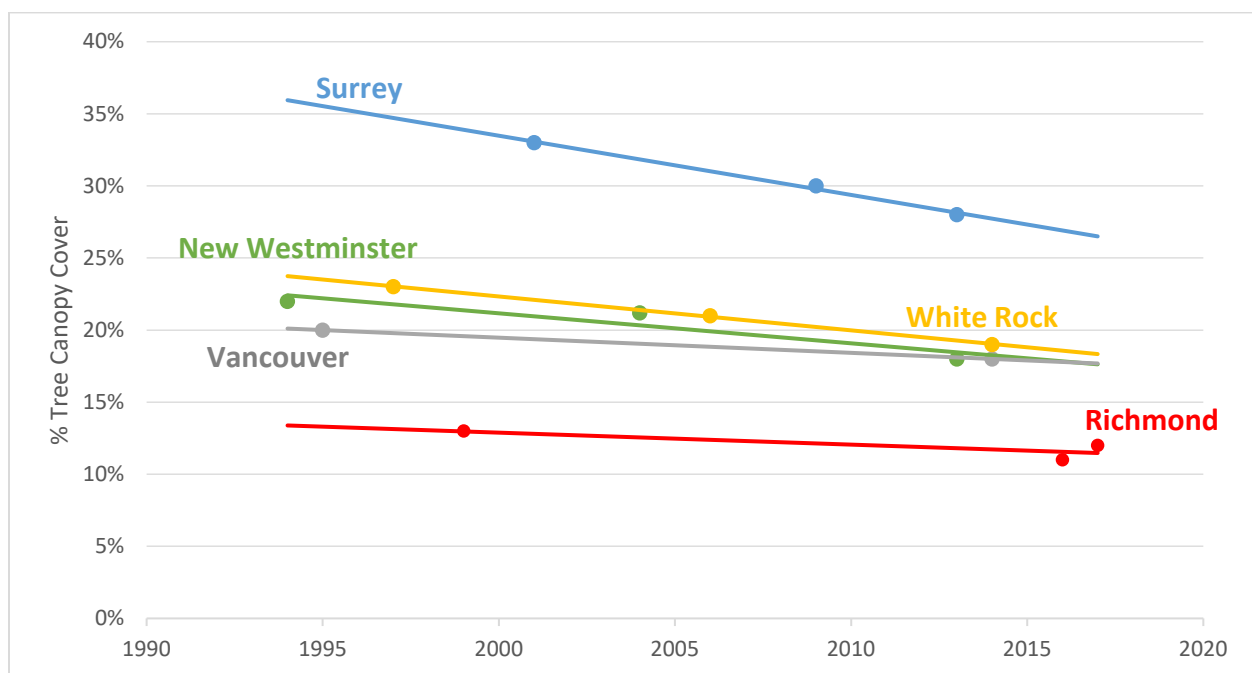


Figure 4: Reported change in % Tree Canopy Cover in Surrey⁵, New Westminster⁶, Vancouver⁷, White Rock⁸, and Richmond⁹

⁵ [City of Surrey Open Data website](#) (visited August 2019)

⁶ [City of New Westminster Urban Forest Management Strategy](#)

⁷ [Vancouver Board of Parks and Recreation, Urban Forest Strategy, 2018 Update](#)

⁸ [City of White Rock Urban Forest Management Plan Workshop, 2015](#)

⁹ Email communication with City of Richmond (A. Kurnicki), 2019

% Tree Canopy Cover by Member Jurisdiction

Figure 5 shows % Tree Canopy Cover within the UCB for each member jurisdiction in 2014. Overall, nine member jurisdictions meet or exceed the UCB average of 32% tree canopy cover for lands within their boundaries and inside the UCB.

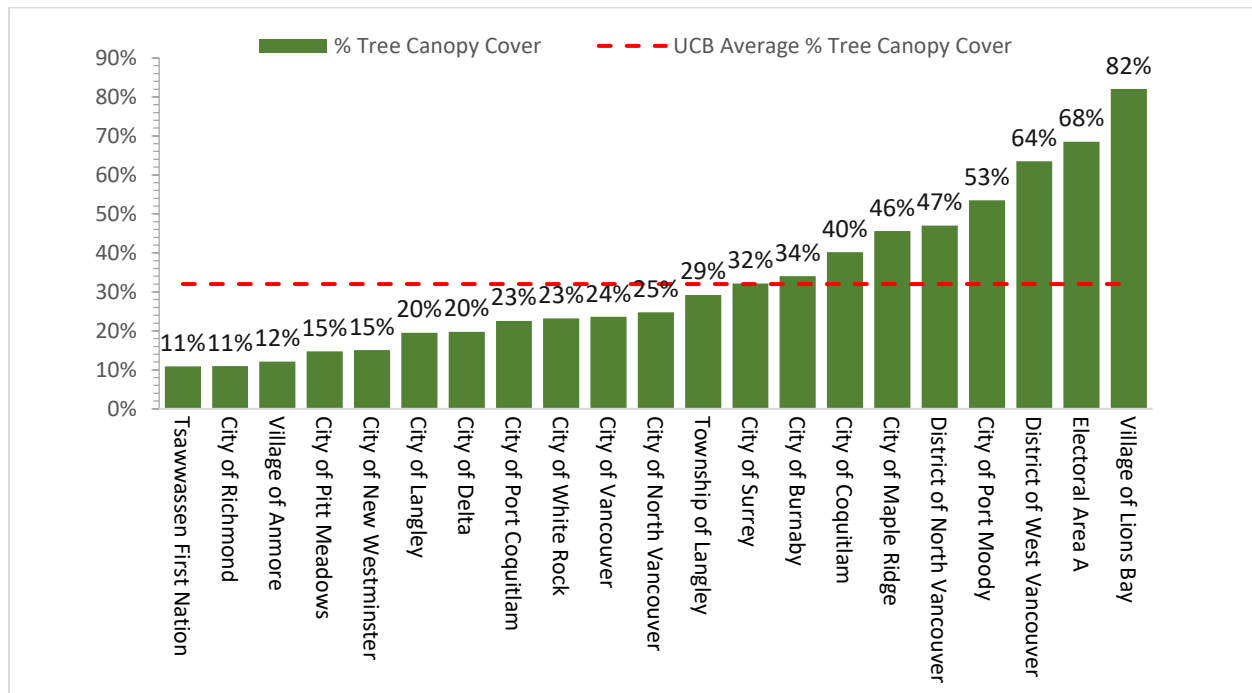


Figure 5: % Tree Canopy Cover within the Urban Containment Boundary by Metro Vancouver member jurisdiction (2014)¹⁰

Table 1 below provides a summary of each member jurisdiction's total tree canopy cover, and tree canopy cover within the UCB¹¹.

¹⁰ Please note that Belcarra and Bowen Island are not included on Figure 5 because they fall outside the UCB - these results show % Tree Canopy Cover within the UCB only.

¹¹ Additional tables with tree canopy cover information are provided in Appendix 1

Member Jurisdiction	% Tree Canopy Cover	
	Within the member jurisdiction's boundary ¹²	Within the UCB
Bowen Island Municipality	94%	Not in UCB
City of Burnaby	34%	34%
City of Coquitlam	62%	40%
City of Delta	15%	20%
City of Langley	20%	20%
City of Maple Ridge	72%	46%
City of New Westminster	16%	15%
City of North Vancouver	25%	25%
City of Pitt Meadows	19%	15%
City of Port Coquitlam	26%	23%
City of Port Moody	67%	53%
City of Richmond	15%	11%
City of Surrey	28%	32%
City of Vancouver	23%	24%
City of White Rock	23%	23%
District of North Vancouver	81%	47%
District of West Vancouver	78%	64%
Electoral Area A	80%	68%
Township of Langley	35%	29%
Tsawwassen First Nation	7%	11%
Village of Anmore	87%	12%
Village of Belcarra	94%	Not in UCB
Village of Lions Bay	83%	82%

Table 1: % Tree Canopy Cover for Metro Vancouver member jurisdictions (2014)

Differences between Regional and Member Jurisdiction Tree Canopy Cover Estimates

Regional and member jurisdiction tree canopy cover estimates will often differ by a few percentage points due to the different methodologies employed to generate the estimates. Available member jurisdiction estimates are provided alongside estimates generated from regional data in Table 2. Where estimates generated by member jurisdictions are available, they should be relied upon instead of the estimate created using regional data.

¹² Excluding ocean and the Fraser River

Member Jurisdiction	Member Jurisdiction Canopy Estimate (Year)	Regional Canopy Estimate (2014)
New Westminster	18% (2013)	16%
Richmond	12% (2017)	15%
Surrey	28% (2013) (excludes ALR)	28%
Vancouver	18% (2014)	23%
White Rock	19% (2014)	23%

Table 2: Comparison between Regional and Member Jurisdiction % Tree Canopy Cover Estimates

How Much Tree Canopy Cover is Enough?

In response to declines in tree canopy, many cities in Metro Vancouver and across North America have begun monitoring canopy cover and establishing targets. Targets set are highly variable, ranging between 20% and 60%¹³. This reflects the many factors that influence target-setting including climate and geography, the pre-development land cover (e.g. grassland vs forest) along with constraints such as existing development densities and land use patterns.

Tree canopy cover targets set in the Metro Vancouver region and Pacific Northwest include:

- City of Surrey – maintain canopy at 30% (excluding the ALR)¹⁴
- City of Vancouver – increase canopy from 18% to 22% by 2050¹⁵
- City of New Westminster – increase canopy to 27% by 2035 and an aspirational long-term goal of 40%¹⁶
- City of Victoria – increase canopy from 18% to 40%¹⁷
- Portland, Oregon – increase canopy from 26% to 33%¹⁸
- Seattle, Washington – increase canopy from 23% to 30% by 2037¹⁹

The North American average for urban tree canopy is 27%²⁰ (and declining²¹) so referring to Figure 5, about half of Metro Vancouver member jurisdictions are above this average.

It should be noted that although much of the Metro Vancouver region was historically forested, some areas (such as Richmond and Delta) would have been less treed, with large areas of grassland and

¹³ [Leff, M \(2016\) The Sustainable Urban Forest – A Step-by-Step Approach](#). See p.17 - Tree canopy cover levels and goals for selected cities

¹⁴ [City of Surrey Open Data website](#) (visited August 2019)

¹⁵ [Vancouver Board of Parks and Recreation, Urban Forest Strategy, 2018 Update](#)

¹⁶ [City of New Westminster Urban Forest Management Strategy](#)

¹⁷ [City of Victoria Urban Forest Master Plan \(2013\)](#)

¹⁸ [Portland Plan \(2012\)](#)

¹⁹ [City of Seattle Urban Forest Stewardship Plan \(2013\)](#)

²⁰ Dwyer, J., Nowak, D.(2000) *A national assessment of the urban forest: an overview*. Proceedings of Society of 1999 American Foresters National Convention, Portland, OR.

²¹ Nowak, D.J., and E.J. Greenfield (2012) "Tree and impervious cover change in U.S. cities." *Urban Forestry & Urban Greening*, Vol. 11, 2012; pp 21-30

wetlands²². As a result of this historic context, the communities and urban centres now found in these areas often have lower levels of tree canopy cover.

Urban tree canopy extent is the focus of this report but not the only criteria to consider when assessing the health of the urban forest. A sustainable urban forest contains trees in good condition, with a diversity of ages and species, and considers climate resilience in tree selection. And an equitable distribution of trees across neighborhoods and income levels will ensure all residents receive the benefits provided by the urban forest.

% Tree Canopy Cover Distribution within the Urban Containment Boundary

Figure 6 shows the proportion of regional tree canopy cover by member jurisdiction (within the UCB). This chart reveals each jurisdiction's current contribution to regional canopy cover levels. Around half (54%) of Metro Vancouver's tree canopy cover within the UCB is located within four member jurisdictions; Surrey contributes 24% of all canopy cover within the UCB, followed by Burnaby (11%), West Vancouver (10%), and Vancouver (9%).

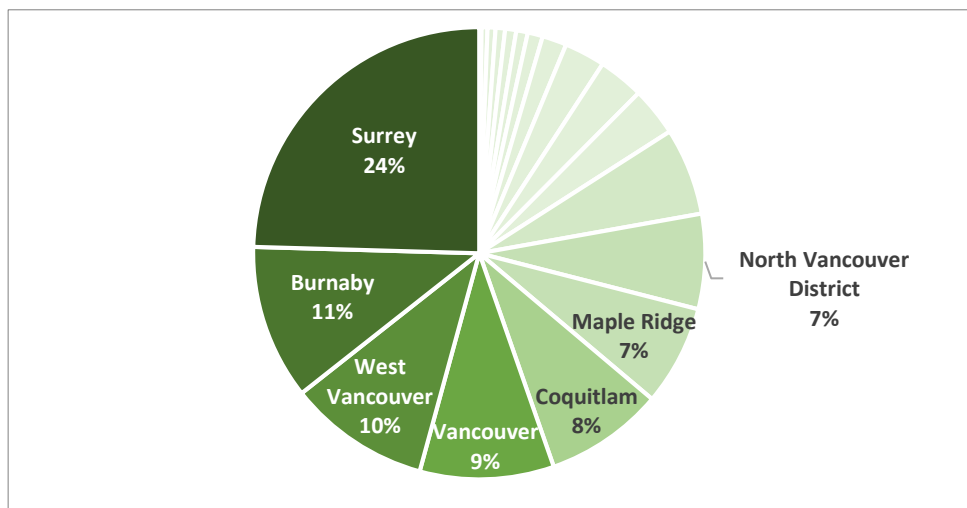


Figure 6: Proportion of tree canopy cover within the Urban Containment Boundary by member jurisdiction.

²² North M.E.A. & Teversham, J.M. (1983) The vegetation of the floodplains of the Lower Fraser, Serpentine and Nicomekl Rivers, 1859 to 1890. Syesis 17: 47-66 + loose map

% Tree Canopy Cover within the Urban Containment Boundary: Land Use Patterns

To further understand the spatial distribution of tree canopy cover within the UCB, canopy was measured in relation to land use. Using the regional Generalized Land Use (2016) layer, % Tree Canopy Cover was calculated for different types of land use and the results are shown in Figure 7.

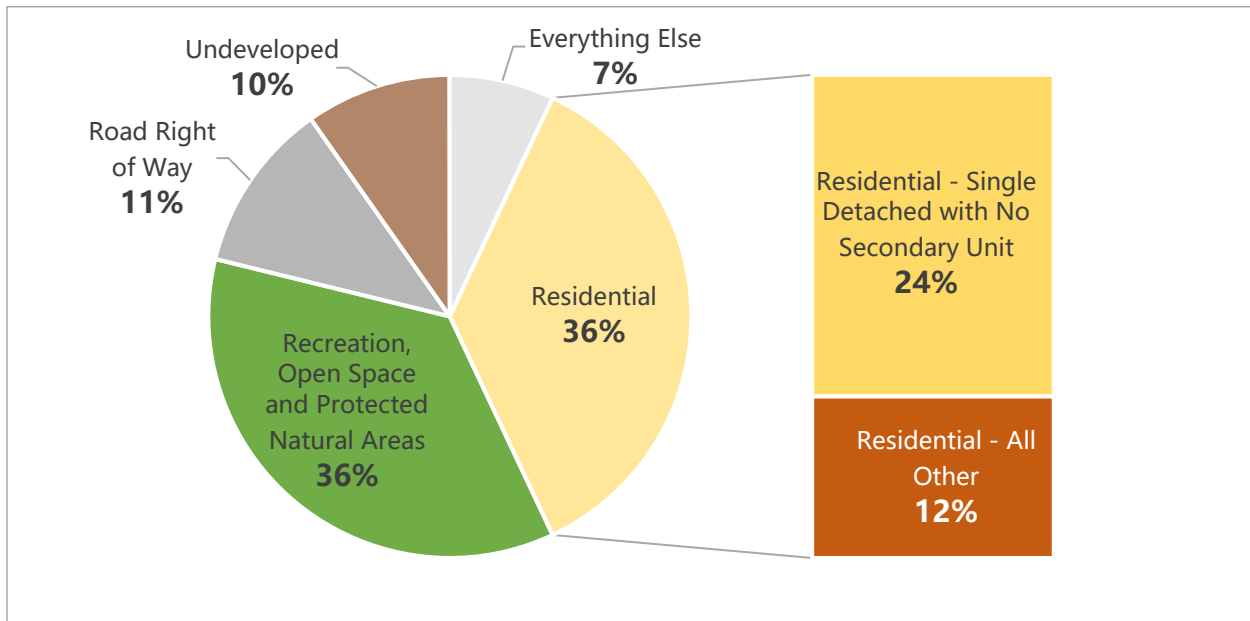


Figure 7: Distribution of tree canopy cover among land use types within the Urban Containment Boundary.

Points to note:

- Most of Metro Vancouver's tree canopy within the UCB is located within recreation and protected natural areas (36%) and residential areas (36%).
- 24% of tree canopy cover within the UCB is found within one particular type of residential area - "Residential – Single-family detached with No Secondary Unit". This residential type covers 30% of land within the UCB, so it is not surprising that most tree canopy is found here.

Some land use types have notably low tree canopy cover. For example, areas designated for 'Parking' have an average of 3% tree canopy cover; 'Retail and Other Commercial' areas have an average of 5% tree canopy cover²³ (see Table 6 in Appendix 1 for a detailed breakdown of tree canopy cover for all land use types).

²³ These land use types are small in overall area so are included within 'Everything Else' in Figure 7

Section 2 – Impervious Surface

Why Measure Levels of Impervious Surface?

The amount of impervious surface is a general measure of urbanization. It is also an ecological health indicator because increasing levels of imperviousness result in disrupted hydrological cycles and increased amounts of polluted runoff entering streams.

Increased imperviousness also results in increased temperatures compared to surrounding rural areas because there is less vegetation, which results in less shade and moisture (from plant evapotranspiration). This is known as the 'Urban Heat Island' effect and identifying areas with high imperviousness is a way of identifying communities at higher risk of potential impacts from heat – an issue of increasing concern as climate change results in increasing temperatures. Areas with high imperviousness may also be at greater risk of localized flooding as water is less able to infiltrate into the ground. This issue will also be exacerbated by climate change which is expected to bring more frequent extreme rain events.

Imperviousness is an indicator of ecological health, vulnerability to climate impacts, and human health and well-being.

Impervious Surface Levels – General Results

The analysis found that 58,000 ha of the Metro Vancouver region, and 45,000 ha of the UCB are covered by impervious surface. This corresponds to 20% of the Metro Vancouver region and 50% of the UCB (Figure 8).

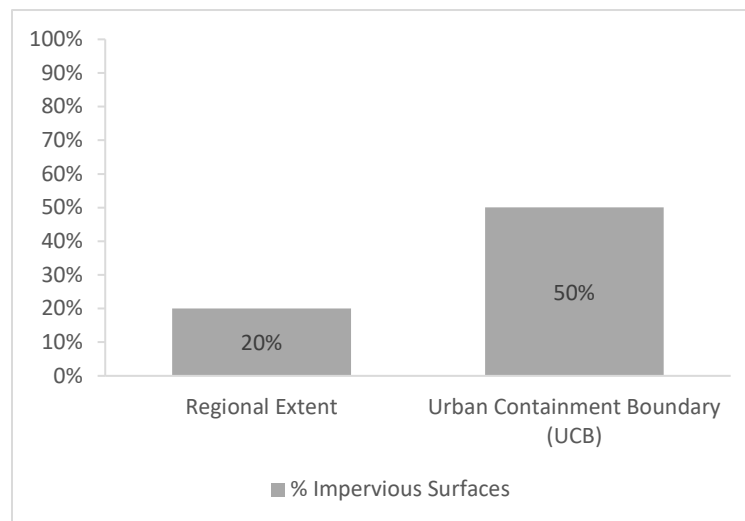


Figure 8: % Impervious Surface for the Metro Vancouver region and the UCB.

Figure 9 is a map of % Impervious Surface summarized by city block²⁴ within the UCB and illustrates the distribution of impervious surfaces within the UCB. Grey indicates very high levels of impervious surface

²⁴ A dissemination block (DB) is an area "equivalent to a city block" bounded on all sides by roads and/or boundaries of standard geographic areas. The dissemination block is the smallest geographic area for which population and dwelling counts are disseminated. Dissemination blocks cover all the territory of Canada (Statistics Canada. (2018). [Dissemination Block](#). *Dictionary, Census of Population, 2016.*).

(more than 80%) and turquoise indicates very low levels of impervious surface (less than 20%). Concentrated areas of high imperviousness generally correspond to urban centers. Areas of low imperviousness within the UCB tend to be parks or greenfield sites that are yet to have been developed.

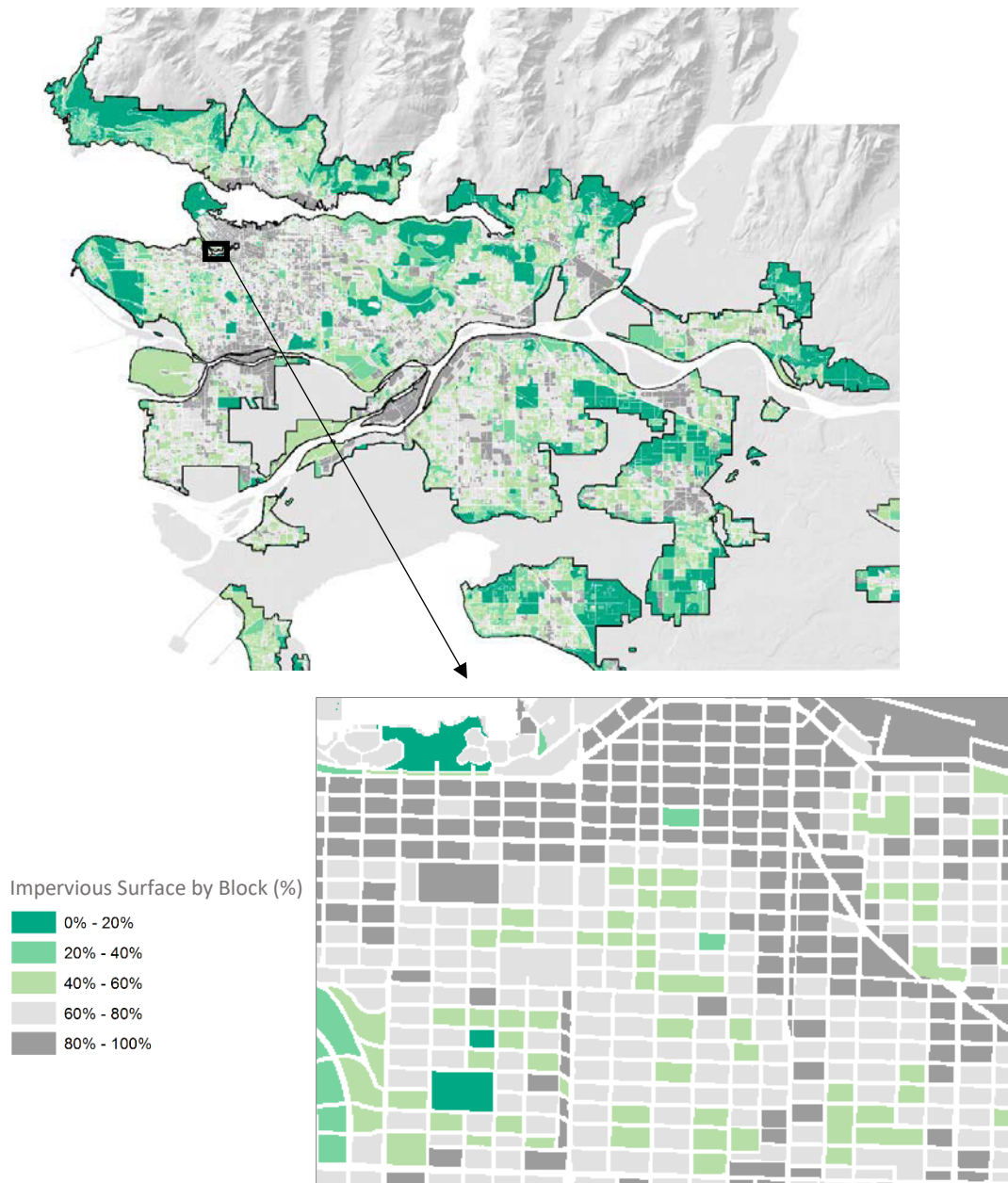


Figure 9: % Impervious Surface summarized by city block within the Urban Containment Boundary

General Trends in % Impervious Surface

It is not yet possible to assess trends in regional impervious surface coverage because comparable historic data is unavailable. However, increasing imperviousness is typically associated with

urbanization and has been recorded by stream health monitoring studies within the region²⁵. It is likely therefore that the trend within Metro Vancouver and particularly the UCB is towards increasing imperviousness. The regional Land Cover Classification dataset used to measure imperviousness will be updated in 2021 and at that point, regional trends will be assessed and reported.

% Impervious Surface by Member Jurisdiction

Figure 10 shows % Impervious Surface within the UCB for each member jurisdiction in 2014. Overall, twelve member jurisdictions are below the UCB average of 50% impervious surface for lands within their boundaries and inside the UCB.

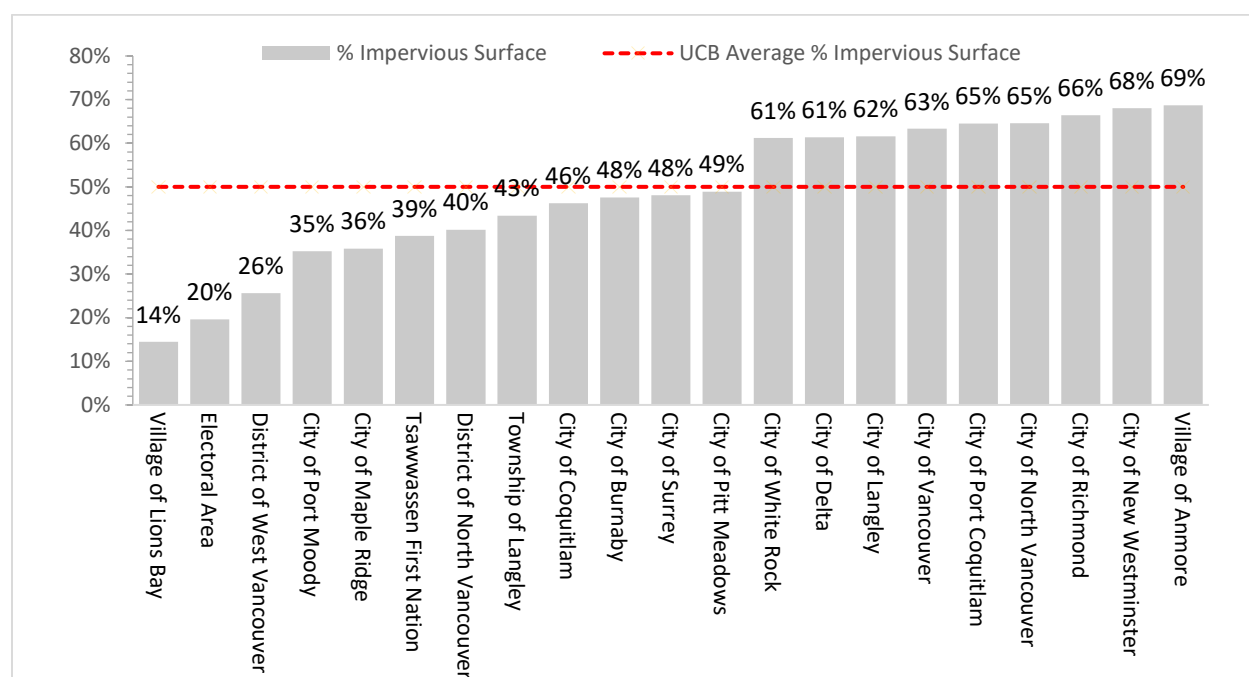


Figure 10: % Impervious Surface within the Urban Containment Boundary by member jurisdiction (2014)²⁶

Table 3 below provides a summary of each member jurisdiction's total amount of impervious surface, and amount of impervious surface within the UCB²⁷.

²⁵ Raincoast Applied Ecology (2013) Stream health monitoring in Metro Vancouver. Report to Metro Vancouver.

²⁶ Please note that Belcarra and Bowen Island are not included on Figure 4 because they fall outside the UCB - these results show % Impervious Surface within the UCB only.

²⁷ Additional tables with impervious surface information are provided in Appendix 1

Member Jurisdiction	% Impervious Surface	
	Within the member jurisdiction's boundary ²⁸	Within the UCB
Bowen Island Municipality	4%	Not in UCB
City of Burnaby	48%	48%
City of Coquitlam	24%	46%
City of Delta	27%	61%
City of Langley	59%	62%
City of Maple Ridge	9%	36%
City of New Westminster	67%	68%
City of North Vancouver	65%	65%
City of Pitt Meadows	13%	49%
City of Port Coquitlam	49%	65%
City of Port Moody	23%	35%
City of Richmond	47%	66%
City of Surrey	35%	48%
City of Vancouver	61%	63%
City of White Rock	61%	61%
District of North Vancouver	11%	40%
District of West Vancouver	14%	26%
Electoral Area A	6%	20%
Township of Langley	16%	43%
Tsawwassen First Nation	29%	39%
Village of Anmore	3%	69%
Village of Belcarra	5%	Not in UCB
Village of Lions Bay	15%	14%

Table 3: % Impervious Surface for Metro Vancouver member jurisdictions (2014)

How Much Impervious Surface is Too Much?

Research has shown there to be 'an empirical correlation between a watershed's total impervious area and its health, where the health of a watershed decreases as its unmitigated imperviousness increases'²⁹.

Many thresholds of biological degradation (e.g. invertebrate and fish diversity) and physical degradation (e.g. hydrology and geomorphology) in streams are associated with 10-20% impervious surface within the watershed³⁰.

²⁸ Excluding ocean and the Fraser River

²⁹ [Metro Vancouver \(2017\) Region-wide Baseline for On-site Stormwater Management](#)

³⁰ Paul, M.J. and Meyer, J.L. (2001) Streams in the Urban Landscape. Annual Review of Ecology and the Systematics. 32:333-65

This report has provided impervious surface measures with respect to administrative boundaries (member jurisdiction boundary, urban containment boundary, etc.) rather than watershed boundaries, so further analysis would be required to determine where in the region has exceeded 10-20% imperviousness. However, given the high levels of impervious surface documented (Figure 10), many watersheds coinciding with the region’s urban areas likely exceed thresholds for degradation.

% Impervious Surface Distribution within the Urban Containment Boundary

Figure 11 shows the proportion of regional impervious surface by member jurisdiction (within the UCB). This chart reveals each jurisdiction’s current contribution to regional impervious surface levels. Around half (49%) of Metro Vancouver’s impervious surface within the UCB is located within three member jurisdictions; Surrey contributes 23% of all impervious surface within the UCB, followed by Vancouver (16%), Richmond (11%), and Burnaby (10%).

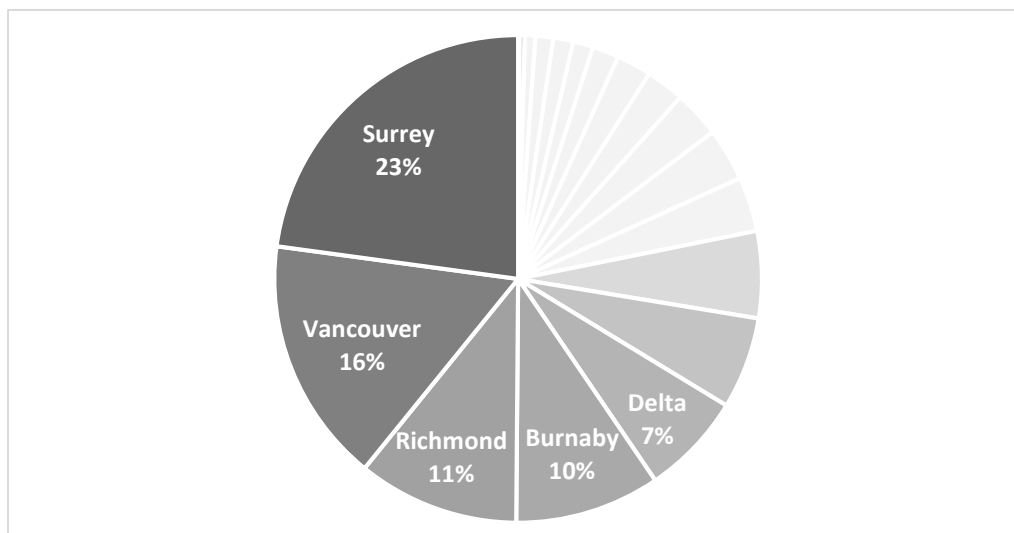


Figure 11: Proportion of impervious surface within the Urban Containment Boundary by member jurisdiction

% Impervious Surface within the Urban Containment Boundary: Land Use Patterns

To further understand the spatial distribution of impervious surface within the UCB, amount of impervious surface was measured in relation to land use. Using the regional Generalized Land Use (2016) layer, % Impervious Surface was calculated for different types of land use and the results are shown in Figure 12.

Points to notes:

- Most of Metro Vancouver’s impervious surface is located within residential areas (42%) and road right of ways (25%).
- 30% of impervious surface within the UCB is found within one particular type of residential area - “Residential – Single-family detached with No Secondary Unit”. This residential type covers 30% of land within the UCB, so it is not surprising that most tree canopy is found here.

Some land use types have notably high levels of impervious surface. For example, areas designated for 'Parking' have an average of 90% impervious surface; 'Retail and Other Commercial' land use types have an average of 92% impervious surface (see Table 6 in Appendix 1 for a detailed breakdown of impervious surface for all land use types).

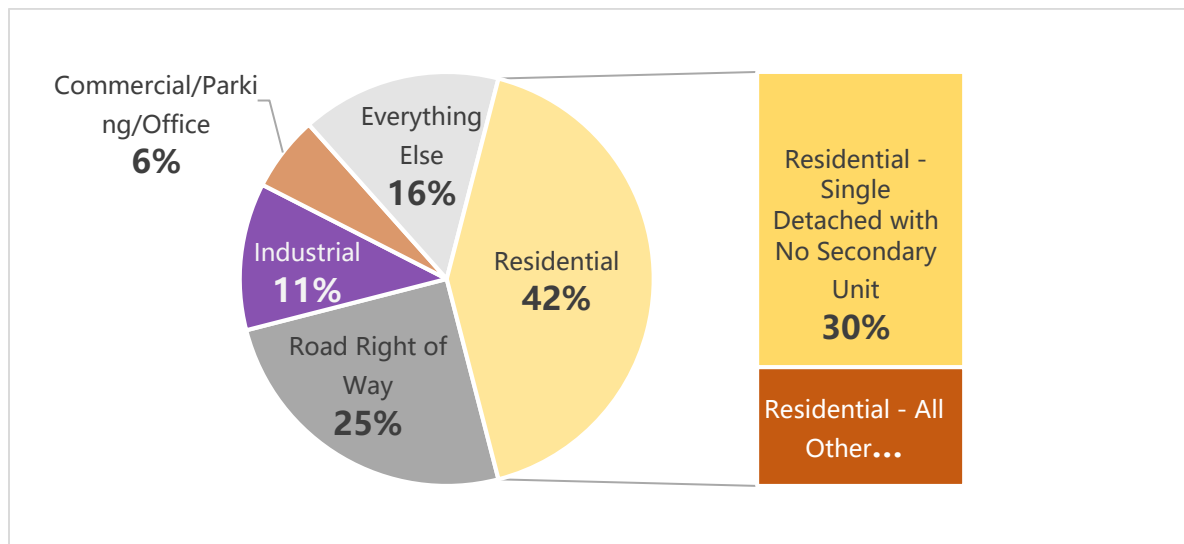


Figure 12: Distribution of impervious surface among land use types within the Urban Containment Boundary

Section 3 - The Relationship between Tree Canopy Cover, Impervious Surfaces, and Residential Density - Temporal Analysis and Future Projections

To explore how tree canopy cover and impervious surface has been influenced by trends in residential building practices, the following analysis looked at the relationship between the year of construction for residential parcels, and the amount of tree canopy cover and impervious surface currently found there.

Tree canopy cover and impervious surface levels are typically related - as the amount of one falls, there is often a corresponding rise in the other. Areas of impervious surface in urban areas include buildings, driveways, paths, and roads. This section explores the relationship between tree canopy cover and impervious surfaces in the Metro Vancouver context.

For this analysis, housing types were split into two categories:

- 'High Density Housing' is defined as apartment oriented parcels with 'Low-Rise Apartment' and 'Mid/High-Rise Apartment'.
- 'Low Density Housing' is defined as ground oriented parcels with 'Single-family detached', 'Multi Detached', and 'Townhouse'.

Average % Tree Canopy Cover by Residential Density: Temporal Trends

Figure 13 illustrates the relationship between amount of tree canopy today on parcels with low density housing and high density housing, and the year in which they were constructed. It demonstrates that for low density housing, there has been a decline in tree canopy cover for parcels constructed in more recent years.

The decline in average % Tree Canopy Cover for low density housing stock parcels has been consistent, from 36% for those built in 1970 to 18% for those built in 2000. This decline indicates that fewer, or smaller, trees are being retained or planted during construction of low density housing over time.

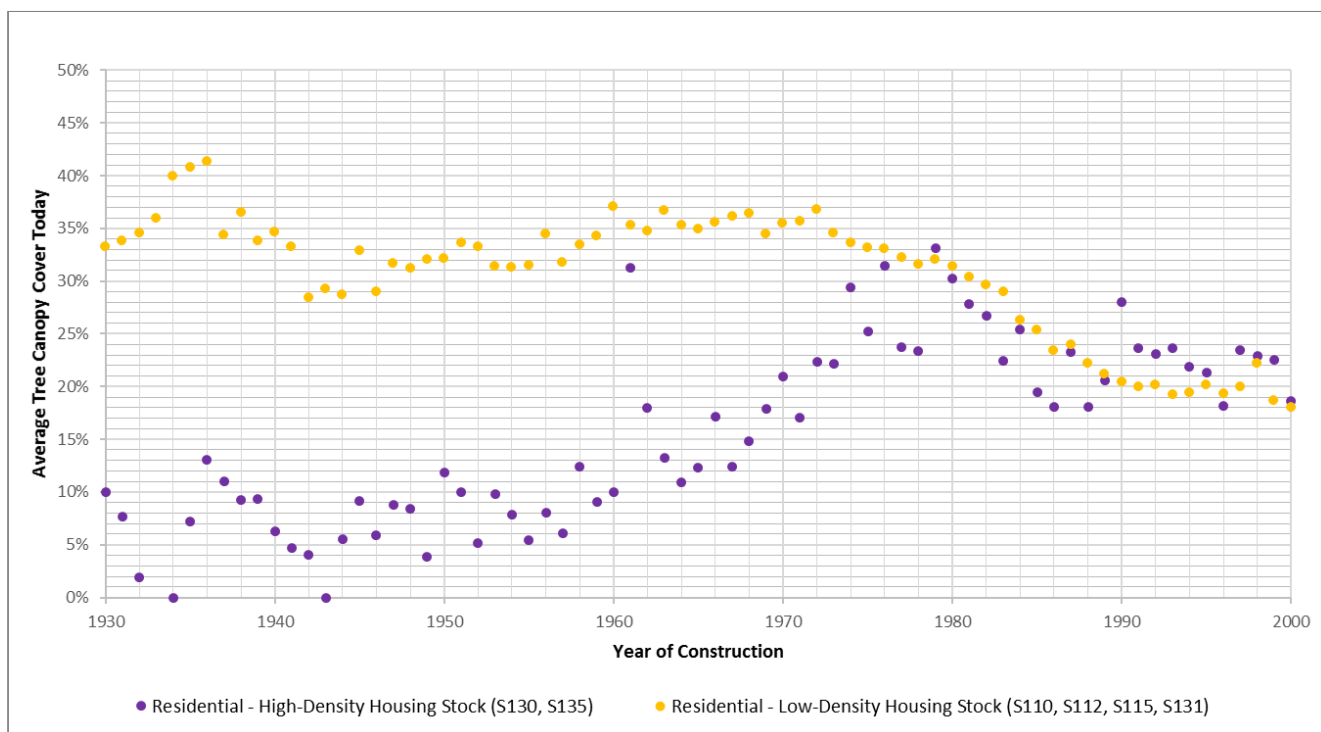


Figure 13: Average % Tree Canopy Cover for low density housing stock and high density housing stock parcels by year of construction.

In contrast, tree canopy is higher for high density housing constructed more recently. Although the relationship is less strongly linear, the data indicates that there has been an overall increase in the number of trees planted or retained for high density housing over time.

Figure 13 only displays results up to the year 2000 because more recently constructed parcels are likely to have a higher proportion of younger, newly planted trees, which have not yet grown a full canopy.

Average % Impervious Surfaces by Residential Density: Temporal Trends

Figure 14 illustrates the relationship between the amount of impervious surface within low density housing and high density housing, and the year in which they were constructed. For almost every year since 1970, the average low density housing parcel has more % Impervious Surface today than the average parcel for the previous year. The analysis shows that there has been a consistent increase in average % Impervious Surface within the low density housing stock, from 49% for parcels built in 1970 to 75% for parcels built in 2012.

In contrast, average % Impervious Surface has been decreasing over time within the high density housing stock. As with % Tree Canopy Cover, the relationship between % Impervious Surface and year of construction for high density housing stock is less linear; but overall there has been a clear trend of decline in levels of impervious surfaces since the 1950's, although this trend has levelled out in recent years.

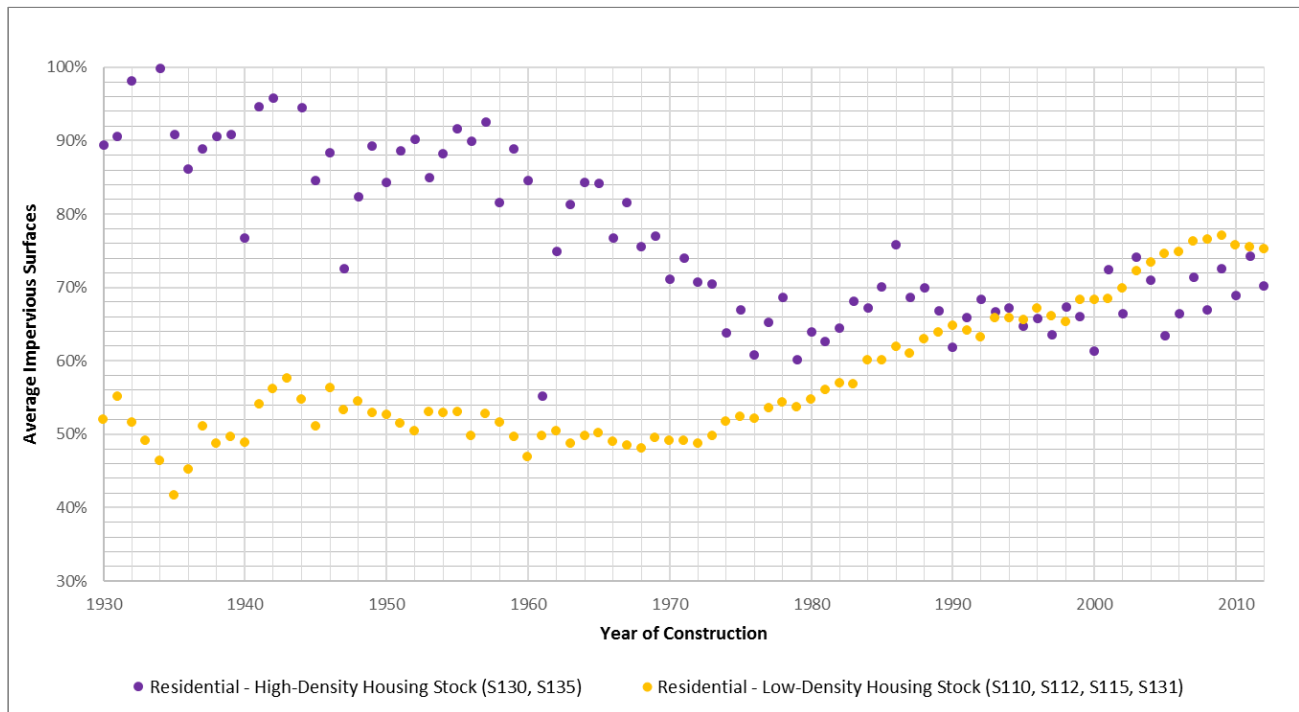


Figure 14: Average % Impervious Surface for low density housing stock and high density housing stock parcels by year of construction.

Observed Relationship Between Tree Canopy Cover and Impervious Surfaces

These results show the amount of tree canopy cover is closely connected to the amount of impervious surface. Comparing Figures 13 and 14 shows that the pattern of change for % Impervious Surface over time mirrors that of % Tree Canopy Cover for both parcels with high density housing and low density housing. As average tree canopy cover has decreased over time within low density housing there has been a corresponding increase in impervious surface. For high density housing this relationship is reversed, and as average tree canopy cover has increased, levels of impervious surface have decreased over time.

Trend Analysis – Historical Context

Low Density Housing: The region experienced rapid urban population growth starting in the 1960's, which resulted in the subdivision of parcels in urban areas to accommodate more housing growth. While lot sizes shrunk, demand for bigger homes increased, resulting in increased lot coverage. This has resulted in less space for trees and an increase in impervious surfaces on low density housing parcels. If these housing trends continue (which seems likely), they may result in ongoing declines in tree canopy and increases in impervious surface.



Figure 10: Examples of low density housing (left) with very low % Tree Canopy Cover (80 people/ha, 0% Tree Canopy Cover), and high density housing (right) with high % Tree Canopy Cover (600 people/ha, 36% Tree Canopy Cover).

High Density Housing - High density housing prior to the 1960's was composed of low-rise apartments which typically had high lot coverage and little greenspace. Economic growth and technological advancement in the region triggered a 'skyscraper' boom in 1960s, 1970s, and 1980s³¹. The new skyscrapers were characterized by tall and slender buildings with low Floor to Area Ratio (FAR), and enough space between them to preserve view corridors³². This *Vancouverism* architectural model featured residential buildings that used up little lot coverage and allowed abundant greenspace, street trees and other public space at the bottom³³. This may explain the observed increase in % Tree Canopy Cover, and decline in % Impervious Surface during the decades leading up to 1980 (Figures 13 and 14). The West End neighborhood in the City of Vancouver is a good example of this phenomenon, where the majority of its residential high rises were constructed between 1960 and 1980³⁴.

After 1980, % Tree Canopy Cover on high density housing parcels shows a slight decline (Figure 13) but this is not matched with a corresponding increase in % Impervious Surface which have remained relatively steady (Figure 14). This suggests that since 1980, trees have been replaced by other types of vegetation (e.g. grass, shrubs) rather than increased lot coverage by buildings or other impervious surface.

³¹ <https://www.theguardian.com/cities/2017/sep/27/wipe-out-era-1970s-vanish-vancouver>

³² [Walsh, R.M. \(2013\) The Origins of Vancouverism: A Historical Inquiry into the Architecture and Urban form of Vancouver, British Columbia](#)

³³ [Walsh, R.M. \(2013\) The Origins of Vancouverism: A Historical Inquiry into the Architecture and Urban form of Vancouver, British Columbia](#); [Skyrise Vancouver web article](#) (visited August 2019)

³⁴ [Walsh, R.M. \(2013\) The Origins of Vancouverism: A Historical Inquiry into the Architecture and Urban form of Vancouver, British Columbia](#)

Section 4 – Future Projections of Tree Canopy Cover within the Urban Containment Boundary

Metro Vancouver’s population is projected to increase by about 1 million people over the next 30 years and this growth will be accommodated through both new urban development and intensification of established areas within the UCB³⁵. This section considers how projected regional growth trends may impact tree canopy cover by looking at where growth is expected to occur. The following information and assumptions were included:

1. *Development on remaining General Urban land*
 - There are currently about 6,500 hectares of lands with the regional land use designation ‘General Urban’ within the UCB, that are undeveloped or rural and planned for future urban growth³⁶ (see Figure 15)
 - The remaining General Urban lands contain 3,900 hectares of tree canopy.
 - It is assumed that the remaining urban lands within the UCB will be largely developed over the next 15-20 years.
 - These areas are expected to be developed as mainly low density housing with some higher density areas but the relative proportions of housing types is unknown.
 - It is assumed that tree canopy cover levels on parcels developed over the next 20-30 years will have comparable tree canopy cover to parcels developed between 1990-2000 (see Figures 13 and 14)³⁷. The post 1990’s average % Tree Canopy Cover for all housing types (low and high density) is 20%.
 - For the purposes of this analysis, it is assumed that by 2040, the remaining General Urban lands planned for future urban growth will be developed to housing types with an average of 20% tree canopy cover.
 - This would result in a loss of over 3,000 ha of tree canopy.
2. *Redevelopment of single-family detached housing within the General Urban regional land use designation*
 - The amount of single-family detached housing (one unit, one lot) is projected to decrease significantly by 2050, mostly as a result of intensification and redevelopment³⁸. For this analysis, a conservative estimate of 25% redevelopment is applied.
 - Redevelopment is projected to focus on multi-unit ground-oriented structures (secondary units, laneway, x-plexes, row houses) and apartments (low rises, mid rises, high rises).
 - Currently, single-family detached housing contains 6,900 hectares of tree canopy within the UCB.

³⁵ Projected regional growth trends are documented in ‘[Metro Vancouver Growth Projections – A Backgrounder](#)’ (2018)

³⁶ For this analysis, 80% of District of West Vancouver’s upper lands special study area was not included within the area considered developable, given the District’s commitment to transfer much of this area to the Conservation and Recreation designation

³⁷ This is the most recent timeframe we have tree canopy cover data for residential housing types

³⁸ [Metro Vancouver Growth Projections – A Backgrounder \(2018\)](#)

- On average, housing built after 1990 has 37% less tree canopy cover than single-family detached housing built before 1990.
- If over the next 30 years, 25% of single-family detached housing is redeveloped to housing types with 37% less tree canopy cover than the current single-family detached housing, the result will be a loss of 650 ha tree canopy cover.

Taking into account only the above two sources of loss, tree canopy cover within the UCB is projected to decrease from 32% to 28% by 2040.

‘Offsetting Losses through Tree Planting

Municipalities (including several Metro Vancouver member jurisdictions) often use tree planting programs as a way to maintain or expand their canopy, and actions such as these could help to offset anticipated future losses. To offset the projected decline in UCB tree canopy cover from 32% to 28% would require 1,100 to 3,000 hectares of the UCB to be dedicated to tree planting³⁹.

Analysis indicates that about 30,000 hectares within the UCB is *potentially* available for tree planting⁴⁰. Site-level analysis would be required to determine what area is *actually* available, but it does suggest that the 3,000 hectares required to offset projected losses is attainable.

Potential planting availability was calculated using the ‘Potential Planting Area’ dataset which is detailed in Appendix 2 and is available to member jurisdictions to assist with urban forest planning.

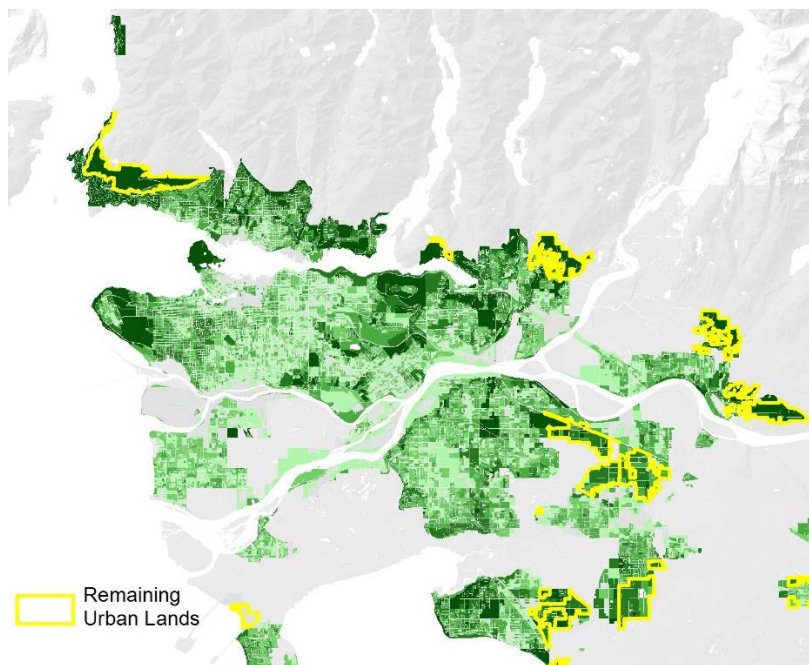


Figure 15: Remaining General Urban areas within the Urban Containment Boundary⁴¹

³⁹ The actual area required depends on the ground-to-crown ratio of trees planted so a range is provided.

⁴⁰ i.e. areas currently occupied by non-tree vegetation (grass, shrubs etc.), soil patches, barren surfaces, and pavement that does not fall on roads. Assessed using the ‘Potential Planting Area’ dataset – see Appendix 2

⁴¹ For this analysis, 80% of District of West Vancouver’s upper lands special study area was not included within the area considered developable, given the District’s commitment to transfer much of this area to the Conservation and Recreation designation

Conclusion

This report provides consistent regional measurements of tree canopy cover and impervious surfaces, which allow for cross-regional comparison and will be repeated with updated land cover data in the future to enable tracking of change over time and identification of trends.

Trees provide a range of important ecosystem services to people including shading, carbon storage, and stormwater management. Measuring tree canopy cover is a relatively simple way to determine the extent of the urban forest and the magnitude of services it provides. Impervious surfaces are associated with many of the negative effects of urbanization such as increased temperatures (the 'Urban Heat Island' effect) and flood risk, along with impacts to stream health through disrupted hydrological cycles and poor water quality. Measuring impervious surfaces gives an indication of the extents of these negative effects. Tree canopy cover and imperviousness are indicators of ecological health but because of their connection to factors such as urban temperatures and stormwater management, they are also indicators of how resilient communities may be to climate-related impacts. Looking at whether these indicators are distributed equitably across cities or regions helps us to identify communities or populations more vulnerable to risks and receiving fewer ecosystem service benefits.

Metro Vancouver's regional tree canopy cover is 54% and for the Urban Containment Boundary (UCB) it is 32%. Canopy is unevenly distributed across the UCB and land use types, with concentrations of canopy within protected natural areas and residential areas. Regional trends will be confirmed when the analysis is repeated with new data but indications from other data sources are that canopy is declining.

For impervious surfaces, 20% of Metro Vancouver and 50% of the UCB is impervious. Most of Metro Vancouver's impervious surface is located within residential areas and road right of ways. Again, regional trends will be confirmed after future updates of the analysis but imperviousness is likely increasing in urbanizing watersheds.

Analysis of the relationship between tree canopy cover, impervious surfaces and residential density showed that over the past few decades, low density housing (especially single-family detached) has shifted from a housing model that accommodated many trees to one that accommodates increasingly fewer trees due to shrinking lot sizes and increasing lot coverage from buildings. This trend is expected to continue. Decreasing tree canopy has been mirrored by increases in amount of impervious surface as higher proportions of lots are covered by buildings, driveways and other paved surfaces. Since the 1960's high density housing has accommodated increasingly more trees with a corresponding decrease in impervious surfaces. This trend seems to have leveled off in recent years, and it is uncertain whether high density housing will continue to accommodate more trees in the future.

Projected growth in the region over the next 20-30 years is expected to impact tree canopy cover within the UCB as lands planned for future urban growth are developed, and single-family detached housing stock is redeveloped. Tree canopy cover in the UCB is projected to decrease from 32% to 28% from these sources of loss.

Potential exists to 'offset' losses or increase canopy through tree planting in the UCB. The Metro Vancouver Potential Planting Area dataset can be used by member jurisdictions to assist with planning of the urban forest.

Recommendations

Metro Vancouver, member jurisdictions and other land owners and managers all have a role to play in maintaining tree canopy cover and reducing imperviousness. The following recommendations are provided for consideration, as appropriate:

1. Monitor the extent, distribution and status of the tree canopy cover and imperviousness to inform planning and management.
2. Establish urban forest management plans that consider how to reduce impacts of future development on tree canopy.
3. Consider focusing tree planting efforts in areas of low canopy cover, particularly when these coincide with areas of high density and vulnerable populations in support of regional and municipal equity.
4. Use Metro Vancouver's Potential Planting Area dataset to develop realistic and achievable planting plans and targets.
5. Adopt and enforce bylaws that protect trees wherever possible, and require trees to be replaced when development results in loss.
6. Prioritize the retention of existing mature trees wherever possible when planning new urban communities as these provide the greatest amount of canopy cover and ecosystem services.
7. Implement on-site stormwater management and green infrastructure approaches throughout urban areas as effective ways of improving water quality and reducing the amount of runoff.
8. Look for opportunities to integrate the objectives of maintaining tree canopy cover and reducing imperviousness into a broad range of departments, plans, and strategies so responsibilities become a shared goal.
9. Given how much tree canopy and impervious surfaces fall within residential areas in the UCB, engage with the public about the importance of tree canopy and its protection, along with the benefits to maintaining permeability. These efforts could be supported with programs to encourage tree planting and maintenance of existing trees on private land.

Appendix 1: Additional tables for % Tree Canopy Cover, % Impervious Surface and % Potential Planting Area

Table 4: % Tree Canopy Cover and % Impervious Surface by member jurisdictions

Member Jurisdiction	% Canopy Cover			% Impervious Surface		
	as a % of the member jurisdiction	as a % of the total regional area	as a % of the total area of existing tree canopy (Region)	as a % of the member jurisdiction	as a % of the total regional area	as a % of the total area of existing tree canopy (Region)
Bowen Island Municipality	94%	2%	3%	4%	0%	0%
City of Burnaby	34%	1%	2%	48%	1%	3%
City of Coquitlam	62%	3%	5%	24%	0%	2%
City of Delta	15%	1%	2%	27%	1%	4%
City of Langley	20%	0%	0%	59%	0%	0%
City of Maple Ridge	72%	7%	13%	9%	0%	2%
City of New Westminster	16%	0%	0%	67%	0%	1%
City of North Vancouver	25%	0%	0%	65%	0%	0%
City of Pitt Meadows	19%	1%	1%	13%	0%	1%
City of Port Coquitlam	26%	0%	0%	49%	0%	1%
City of Port Moody	67%	1%	1%	23%	0%	0%
City of Richmond	15%	1%	1%	47%	1%	5%
City of Surrey	28%	3%	5%	35%	1%	8%
City of Vancouver	23%	1%	2%	61%	1%	3%
City of White Rock	23%	0%	0%	61%	0%	0%
District of North Vancouver	81%	4%	8%	11%	0%	1%
District of West Vancouver	78%	2%	4%	14%	0%	1%
Electoral Area A	80%	23%	43%	6%	2%	8%
Township of Langley	35%	4%	7%	16%	1%	4%
Tsawwassen First Nation	7%	0%	0%	29%	0%	0%
Village of Anmore	87%	1%	2%	3%	0%	0%
Village of Belcarra	94%	0%	0%	5%	0%	0%
Village of Lions Bay	83%	0%	0%	15%	0%	0%

Table 5: % Tree Canopy Cover and % Impervious Surfaces by member jurisdiction within the Urban Containment Boundary

Member Jurisdiction	% Canopy Cover			% Impervious Surface		
	as a % of the member jurisdiction (within the UCB)	as a % of the total UCB area	as a % of the total area of existing tree canopy (within the UCB)	as a % of the member jurisdiction (within the UCB)	as a % of the total UCB area	as a % of the total area of existing tree canopy (within the UCB)
City of Burnaby	34%	3%	11%	48%	2%	3%
City of Coquitlam	40%	3%	8%	46%	1%	2%
City of Delta	20%	1%	3%	61%	1%	3%
City of Langley	20%	0%	1%	62%	0%	0%
City of Maple Ridge	46%	2%	7%	36%	1%	1%
City of New Westminster	15%	0%	1%	68%	0%	1%
City of North Vancouver	25%	0%	1%	65%	0%	1%
City of Pitt Meadows	15%	0%	1%	49%	0%	1%
City of Port Coquitlam	23%	1%	2%	65%	1%	1%
City of Port Moody	53%	1%	3%	35%	0%	1%
City of Richmond	11%	1%	3%	66%	3%	5%
City of Surrey	32%	8%	24%	48%	4%	9%
City of Vancouver	24%	3%	9%	63%	2%	4%
City of White Rock	23%	0%	0%	61%	0%	0%
District of North Vancouver	47%	2%	7%	40%	1%	1%
District of West Vancouver	64%	3%	10%	26%	1%	1%
Electoral Area A	68%	1%	3%	20%	0%	0%
Township of Langley	29%	2%	6%	43%	1%	2%

Tsawwassen First Nation	11%	0%	0%	39%	0%	0%
Village of Anmore	12%	0%	0%	69%	0%	0%
Village of Lions Bay	82%	0%	1%	14%	0%	0%

Table 6: % Tree Canopy Cover and % Impervious Surface metrics by Land use type within the Urban Containment Boundary

Land Use Type	% Potential tree canopy - Total			% Potential tree canopy - Vegetated			% Potential tree canopy - Impervious		
	as a % of land use type (within the UCB)	as a % of the total UCB area	as a % of the total existing area of potential tree canopy (within the UCB)	as a % of land use type (within UCB)	as a % of the total UCB area	as a % of the total existing area of potential tree canopy (within the UCB)	as a % of land use type (within the UCB)	as a % of the total UCB area	as a % of the total existing area of potential tree canopy (within the UCB)
Agriculture	73%	0%	1%	64%	0%	1%	9%	0%	0%
Airport/Airstrip and Ferry	89%	1%	3%	56%	1%	2%	32%	0%	1%
Cemetery	74%	0%	1%	65%	0%	1%	10%	0%	0%
Civic and Other Institutional	55%	0%	0%	10%	0%	0%	45%	0%	0%
Exhibition, Religious and Other Assembly	56%	0%	1%	13%	0%	0%	43%	0%	1%
Health and Education	48%	1%	2%	8%	0%	0%	40%	1%	2%
Hotel, Motel and Rooming House	47%	0%	0%	6%	0%	0%	40%	0%	0%
Industrial	54%	4%	11%	7%	0%	1%	48%	3%	9%
Industrial - Extractive	84%	0%	0%	33%	0%	0%	51%	0%	0%
Lakes, Large Rivers and Other Water	30%	0%	1%	28%	0%	1%	3%	0%	0%
Mixed Residential (Low-rise Apartment) Commercial	32%	0%	0%	2%	0%	0%	29%	0%	0%
Mixed Residential (Mid-Rise or High-Rise Apartment) Commercial	29%	0%	0%	3%	0%	0%	26%	0%	0%
Office	47%	0%	1%	5%	0%	0%	42%	0%	1%
Parking	75%	0%	0%	7%	0%	0%	68%	0%	0%
Protected Watershed	5%	0%	0%	3%	0%	0%	2%	0%	0%
Recreation, Open Space and Protected Natural Areas	34%	6%	17%	24%	4%	12%	9%	2%	5%
Residential - Institutional and Non-Market Housing	38%	0%	0%	12%	0%	0%	26%	0%	0%

Residential - Low-rise Apartment	32%	1%	2%	8%	0%	0%	25%	0%	1%
Residential - Mid/High-rise Apartment	37%	0%	0%	9%	0%	0%	28%	0%	0%
Residential - Mobile Homes	39%	0%	0%	8%	0%	0%	31%	0%	0%
Residential - Multi Detached	25%	0%	0%	9%	0%	0%	16%	0%	0%
Residential - Rural	38%	1%	4%	33%	1%	4%	4%	0%	0%
Residential - Single-family detached with No Secondary Unit	33%	9%	25%	15%	4%	11%	18%	5%	14%
Residential – Single-family detached with One Secondary Unit or Duplex	36%	1%	3%	15%	0%	1%	21%	1%	2%
Residential - Townhouse	35%	1%	3%	8%	0%	1%	26%	1%	3%
Retail and Other Commercial	59%	1%	4%	3%	0%	0%	55%	1%	4%
Road Right-of-Way	14%	3%	7%	10%	2%	5%	4%	1%	2%
Transit, Rail and Other Transportation	66%	1%	3%	16%	0%	1%	50%	1%	2%
Undeveloped and Unclassified	39%	2%	6%	26%	1%	4%	14%	1%	2%
Utility, Communication and Work Yards	64%	0%	1%	18%	0%	0%	45%	0%	1%
Vancouver Fraser Port	78%	1%	2%	6%	0%	0%	71%	1%	2%

Table 7: % Potential Planting Area metrics by member jurisdiction within the Urban Containment Boundary

Member Jurisdiction	% Potential tree canopy - Total			% Potential tree canopy - Vegetated			% Potential tree canopy - Impervious		
	as a % of the member jurisdiction (within the UCB)	as a % of the total UCB area	as a % of the total existing area of potential tree canopy (within the UCB)	as a % of the member jurisdiction (within the UCB)	as a % of the total UCB area	as a % of the total existing area of potential tree canopy (within the UCB)	as a % of the member jurisdiction (within the UCB)	as a % of the total UCB area	as a % of the total existing area of Potential tree canopy (within the UCB)
City of Burnaby	33%	3%	10%	16%	2%	10%	17%	2%	9%
City of Coquitlam	32%	2%	6%	13%	1%	5%	19%	1%	7%
City of Delta	43%	2%	7%	17%	1%	6%	26%	1%	8%
City of Langley	41%	0%	1%	18%	0%	1%	23%	0%	1%
City of Maple Ridge	28%	1%	4%	17%	1%	5%	11%	1%	3%
City of New Westminster	43%	1%	2%	15%	0%	2%	28%	0%	3%
City of North Vancouver	28%	0%	1%	9%	0%	1%	19%	0%	1%
City of Pitt Meadows	61%	1%	2%	35%	0%	3%	25%	0%	2%
City of Port Coquitlam	42%	1%	3%	12%	0%	2%	30%	1%	4%
City of Port Moody	23%	0%	1%	9%	0%	1%	14%	0%	1%
City of Richmond	54%	4%	13%	22%	2%	11%	32%	3%	14%
City of Surrey	36%	9%	25%	18%	4%	27%	18%	4%	23%
City of Vancouver	26%	3%	9%	11%	1%	9%	15%	2%	10%
City of White Rock	37%	0%	1%	15%	0%	1%	22%	0%	1%
District of North Vancouver	24%	1%	3%	11%	0%	3%	14%	1%	3%
District of West Vancouver	20%	1%	3%	10%	0%	3%	10%	1%	3%
Electoral Area A	18%	0%	1%	10%	0%	1%	7%	0%	1%
Township of Langley	42%	3%	8%	25%	2%	10%	17%	1%	6%
Tsawwassen First Nation	80%	0%	1%	49%	0%	1%	31%	0%	1%
Village of Anmore	76%	0%	0%	19%	0%	0%	57%	0%	0%
Village of Lions Bay	9%	0%	0%	2%	0%	0%	7%	0%	0%

Table 8: % Potential Planting Area metrics by Land use type within the Urban Containment Boundary

Land Use Type	% Canopy cover			% Impervious surfaces		
	as a % of land use type (within the UCB)	as a % of the total UCB area	as a % of the total area of existing tree canopy (within the UCB)	as a % of land use type (within the UCB)	as a % of the total UCB area	as a % of the total area of existing impervious surfaces (within the UCB)
Agriculture	21%	0%	0%	14%	0%	0%
Airport/Airstrip and Ferry	0%	0%	0%	43%	1%	1%
Cemetery	23%	0%	0%	11%	0%	0%
Civic and Other Institutional	14%	0%	0%	76%	0%	0%
Exhibition, Religious and Other Assembly	17%	0%	0%	70%	0%	1%
Health and Education	17%	0%	1%	75%	1%	2%
Hotel, Motel and Rooming House	8%	0%	0%	85%	0%	0%
Industrial	11%	1%	2%	82%	6%	11%
Industrial - Extractive	9%	0%	0%	58%	0%	0%
Lakes, Large Rivers and Other Water	16%	0%	0%	4%	0%	0%
Mixed Residential (Low-rise Apartment) Commercial	5%	0%	0%	92%	0%	0%
Mixed Residential (Mid-Rise or High-Rise Apartment) Commercial	7%	0%	0%	89%	0%	0%
Office	12%	0%	0%	82%	1%	1%
Parking	3%	0%	0%	90%	0%	0%
Protected Watershed	94%	0%	0%	3%	0%	0%
Recreation, Open Space and Protected Natural Areas	63%	11%	36%	12%	2%	4%
Residential - Institutional and Non-Market Housing	25%	0%	0%	61%	0%	0%
Residential - Low-rise Apartment	19%	0%	1%	72%	1%	2%
Residential - Mid/High-rise Apartment	22%	0%	0%	67%	0%	1%
Residential - Mobile Homes	18%	0%	0%	73%	0%	0%
Residential - Multi Detached	24%	0%	0%	65%	0%	0%
Residential - Rural	56%	2%	6%	9%	0%	1%
Residential - Single-family detached with No Secondary Unit	28%	8%	24%	55%	15%	30%
Residential – Single-family detached with One Secondary Unit or Duplex	22%	1%	2%	61%	2%	3%

Residential - Townhouse	22%	1%	2%	68%	2%	5%
Retail and Other Commercial	5%	0%	0%	92%	2%	5%
Road Right-of-Way	20%	4%	11%	69%	12%	25%
Transit, Rail and Other Transportation	17%	0%	1%	66%	1%	2%
Undeveloped and Unclassified	59%	3%	10%	15%	1%	2%
Utility, Communication and Work Yards	20%	0%	0%	60%	0%	1%
Vancouver Fraser Port	3%	0%	0%	89%	1%	2%

Appendix 2: % Potential Planting Area

As part of the analysis on Tree Canopy Cover, possible areas of opportunity for new tree canopy were considered. The additional metric, % Potential Planting Area, is the amount of land that could theoretically be used to increase % Tree Canopy Cover. % Potential Planting Area considers non-tree vegetation (grass, shrubs etc.), soil patches, barren surfaces, and pavement that does not fall on roads, that under the right circumstances, could be modified to increase % Tree Canopy Cover. It is a measure of what is **physically possible**, given the current land cover. **Physically possible** planting area does not necessarily translate into **feasible** planting area. Other factors, such as land use, also determine the feasibility of a site for tree planting. However, this tool is meant to remain general, in consideration that any conversion of land cover/land use types to tree canopy requires site specific assessments by land managers. This tool is intended to support discussions about how much and where land owners, member jurisdictions and Metro Vancouver might be able to increase canopy cover.

As with % Tree Canopy Cover and % Impervious Surfaces, % Potential Planting Area was mapped and quantified for the Metro Vancouver region, and the UCB. The analysis found that an area of 89,667 Ha (27%) of the Metro Vancouver region qualifies as % Potential Planting Area. More specifically, 19% of the Metro Vancouver region was found to be vegetated potential area and 8% is impervious potential area. In the regional core, 78,621 Ha (47%) qualifies as % Potential Planting Area. 34% of the regional core was found to be vegetated potential area and 13% is impervious potential area. Finally, 31,710 Ha (35%) of the UCB was found to be vegetated potential area and 19% is impervious potential area. For each of the three study areas, Figure 16 shows the proportion of existing % Tree Canopy Cover, % Potential Planting Area – vegetated and % Potential Planting Area – Impervious. The pink area of the chart corresponds to the proportion of land that was found to be generally unsuitable for the establishment of new tree canopy (e.g. buildings, roads, other built features).

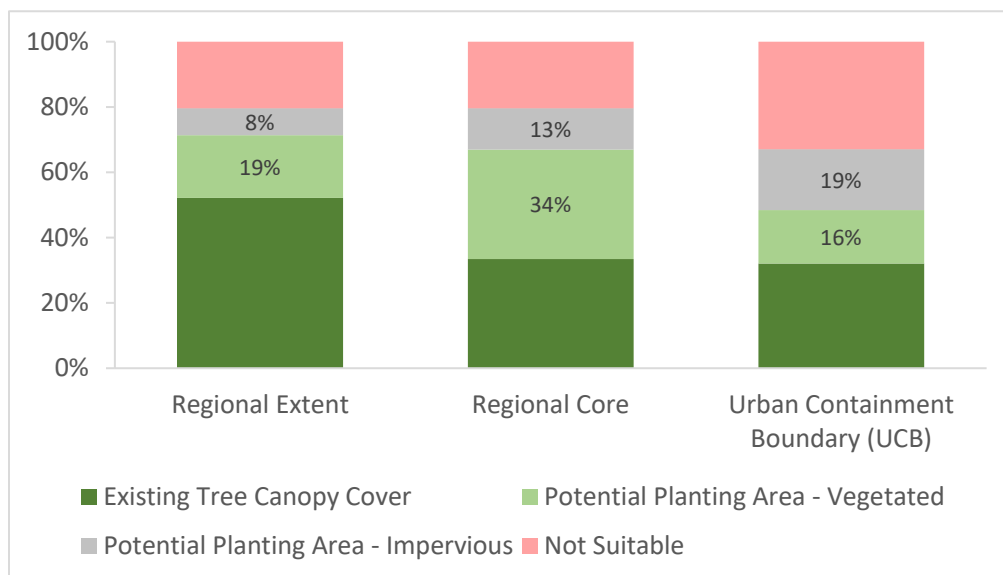


Figure 16: % Potential Planting Area for the Metro Vancouver region and the Urban Containment Boundary.

Figure 17 shows the % Potential Planting Area summarized by census block within the UCB. Beige indicates low % Potential Planting Area (less than 20%) and dark brown indicates high % Potential Planting Area (more than 40%).

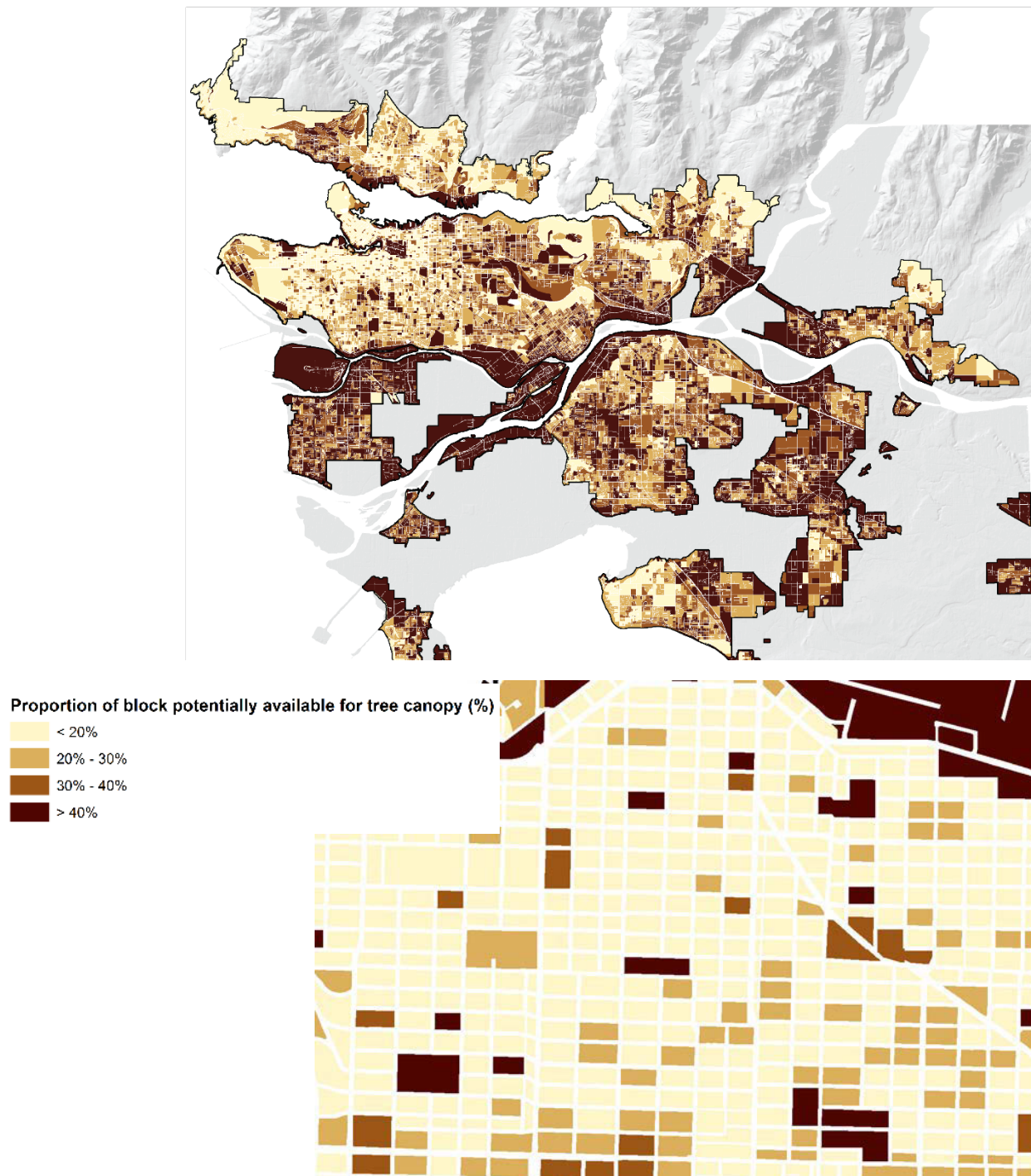


Figure 17: % Potential Planting Area summarized by city block (Urban Containment Boundary)

To: Climate Action Committee

From: Roger Quan, Director, Air Quality and Climate Change
Planning and Environment Department

Date: September 3, 2019 Meeting Date: September 20, 2019

Subject: **Manager's Report**

RECOMMENDATION

That the Climate Action Committee receive for information the report dated September 3, 2019, titled "Manager's Report".

Climate Action Committee 2019 Work Plan

Attachment 1 to this report sets out the Committee's Work Plan for 2019. 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 or Board, and changes to the schedule.

Community Outreach on Air Quality and Climate Change

As previously reported to the Committee, Metro Vancouver is engaging the public on a number of initiatives related to regulation development, new air quality objectives, the *Clean Air Plan*, and *Climate 2050*. Staff hosted an Air Quality and Climate Change informational booth at the following community events from July until the end of September:

- Maple Ridge - Pitt Meadows Country Festival;
- Tsawwassen Sun Festival;
- Electrafest in the City of Vancouver;
- Country Celebration in the Township of Langley;
- Coho Festival in the District of West Vancouver; and
- World Rivers Day in the City of Burnaby.

Holding pop-up booths at well attended public events in place of traditional open houses enabled Metro Vancouver to reach more members of a community in a cost-effective manner. Event attendance ranged from approximately 10,000 to 20,000 at each event. With this attendance, staff was able to have hundreds of one-on-one conversations about air quality initiatives and distribute informational material.

The Air Quality and Climate Change informational booth offered information on Metro Vancouver as an organization and its role in regional air quality management, general information on issues like wildfires, and focused information on specific initiatives, including proposed changes to the regional ambient air quality objectives, managing emissions from cannabis production and processing operations, odour management, and Climate 2050. Public feedback gathered at the community events will be incorporated into each project's engagement analysis and final engagement report.

Update on Consultation Related to Managing Emissions from Cannabis Production

In May 2019, the Metro Vancouver Regional District Board endorsed an expanded engagement plan and directed staff to proceed with engagement and consultation on the proposed approach to regulating air emissions from cannabis production and processing. As part of the first phase of consultation, Metro Vancouver staff hosted several meetings with representatives from the cannabis and agricultural sectors, government and health agencies, and the general public, in addition to attending municipal meetings and community events from July through September.

At these meetings, representatives from the cannabis sector requested additional information on forecasted emissions from cannabis production, as well as an extension to provide feedback on the detailed information presented. The period for providing comments on the potential approach to managing emissions from cannabis production will be extended until October 31, 2019. This extension is not expected to affect the overall timeline for the consultation. The expanded engagement plan noted that feedback received during the first phase of consultation would inform the development of a bylaw development consultation paper including refined regulatory proposals by December 2019. The engagement plan anticipates a second phase of consultation on refined proposals in early 2020.

Air Quality Advisories

At the time of writing this report, Metro Vancouver has not issued any air quality advisories during the summer of 2019. Following a warm and dry start to the summer in June, unsettled weather conditions and regular precipitation throughout July and August suppressed wildfire activity throughout British Columbia. Considerable wildfire activity in Alaska during the summer did not significantly impact air quality in the Lower Mainland, nor did wildfires in south-central British Columbia and north-central Washington State. With no protracted heat waves, ground-level ozone concentrations have also remained well below advisory levels. This is in contrast to the unprecedented number of days in the summers of 2017 and 2018 when the region was under an air quality advisory.

Throughout the summer of 2019, staff have continued to work with partner agencies on refinement of air quality advisory procedures and messaging related to wildfire smoke, and have engaged with municipalities and health authorities on planning for cleaner air shelters. Despite the good air quality this summer, the warming climate is expected to increase the risk of wildfire activity similar to that experienced in the summers of 2017 and 2018. The average area burned in BC during the past 5 years is more than 3 times greater than the 25-year average, emphasizing that a significant shift in wildfire activity has already occurred. Rising summer temperatures will also exacerbate the formation of ground-level ozone. As a result, preparedness for significant summer air quality events will remain a key focus in future years, as will further reduction of regional particulate and ozone precursor emissions.

Attachment

Climate Action Committee 2019 Work Plan

Climate Action Committee 2019 Work Plan

Report Date: September 3, 2019

Priorities

1 st Quarter	Status
Climate 2050 - work plans and engagement strategy for roadmaps	Complete
SIF (Sustainability Innovation Fund) - 2019 proposals	Complete
Electric vehicle outreach program - schedule for 2019	Complete
Air Quality - cannabis production - discussion paper for potential regulations	Complete
Air Quality - proposed amendments to ticketing bylaws	Complete
Air Quality - odour management - community outreach for enhanced management options	Complete
Metro 2040 - environment policy review scoping	Complete
Participate in environmental assessment processes as required	Complete
2 nd Quarter	
Climate 2050 - strategy and roadmap update	Complete
Air Quality Management Plan - discussion paper	In Progress
Ambient Air Quality - intentions paper on new objectives for nitrogen dioxide	Complete
Ambient Air Quality - intentions paper on new objectives for ground level ozone	Complete
Air Quality - 8 th annual Caring for the Air report	Complete
Air Quality - automotive refinishing emissions regulation - outcomes of consultation	In Progress
Air Quality - indoor residential wood burning - proposed bylaw	In Progress
Air Quality - outdoor burning - discussion paper for potential bylaw	In Progress
SIF - progress report on Strata Energy Advisor Program	Complete
Metro Vancouver's Carbon Price Policy implementation Update	Complete
SIF - status report on previously approved Sustainability Innovation Fund Projects	Complete
Air Quality - discussion paper on odour management framework	In Progress
Air Quality – outreach program on updated non-road diesel engine bylaw	Complete
Ecological Health - invasive species - best management practices	Complete
Ecological Health - Sensitive Ecosystem Inventory - update and implications	Complete
Ecological Health - regional ecosystem carbon storage	Complete
30 year financial Plan - Air Quality function	In Progress
Participate in environmental assessment processes as required	Complete
3 rd Quarter	
Climate 2050 - strategy and roadmap update	In Progress
Metro Vancouver's climate actions and carbon neutral progress for 2018	Complete
SIF - prototype design for public display of air quality monitoring data	In Progress
SIF - outcomes of National Industrial Symbiosis Program pilot	In Progress
SIF - results of DC fast charger project at Metro Tower III	In Progress
Review of user fees related to air quality permits and regulations	In Progress
Air Quality - proposed amendments to automotive refinishing emissions regulation	In Progress
Metro 2040 - environment policy forum results	In Progress

Ecological Health - tree canopy and landscape imperviousness monitoring	In Progress
Ecological Health - regional ecosystem connectivity index	In Progress
Participate in environmental assessment processes as required	In Progress
4th Quarter	
Climate 2050 - strategy and first set of draft Climate 2050 roadmaps	In Progress
Annual budget and 5 year financial plan	In Progress
Draft Air Quality Management Plan and phase 2 engagement strategy	In Progress
Ambient Air Quality - proposed objectives for nitrogen dioxide	In Progress
Ambient Air Quality - proposed objectives for ground level ozone	In Progress
SIF - Strata Energy Advisor pilot program preliminary outcomes	In Progress
SIF - results of Air Aware citizen science air quality monitoring	In Progress
Ambient Air Quality - review of monitoring network	In Progress
Electric vehicle outreach program outcomes for 2019	In Progress
Air Quality - indoor residential wood burning – public outreach plan	Pending
Metro 2040 - environment policy review - update	Pending
Ecological Health Framework - update	Pending
Participate in environmental assessment processes as required	Pending



Ref: 247227

August 15, 2019

Mr. Sav Dhaliwal and Board Members
Regional District of Metro Vancouver
4730 Kingsway
Burnaby BC V5H 0C6

Dear Chair Dhaliwal and Board Members:

On behalf of the joint Provincial-Union of British Columbia Municipalities (UBCM) Green Communities Committee (GCC), we would like to extend our congratulations for your successful efforts to undertake significant corporate or community-wide climate action to reduce greenhouse gas (GHG) emissions in the 2018 reporting year.

As a signatory to the Climate Action Charter, you have demonstrated your commitment to work with the Province of British Columbia and UBCM to take action on climate change and to reduce GHG emissions in your community and through corporate operations.

The work that local governments are undertaking to reduce their corporate emissions demonstrates significant climate leadership and sets the stage for broader climate action in the community. Your leadership and commitment continues to be essential to ensuring the achievement of our collective climate action goals.

The GCC was established under the Charter to support local governments in achieving their climate goals. In acknowledgement of the efforts of local leaders, the GCC is again recognizing the progress and achievements of local governments such as yours through the multi-level Climate Action Recognition Program. A description of this program is enclosed for your reference.

As a Charter signatory who has achieved Level 1 and Level 2 recognition, and demonstrated significant climate action (corporately or community-wide) to reduce GHG emissions for the 2018 reporting year, you have been awarded Level 3 recognition – 'Accelerating Progress on Charter Commitments'.

.../2

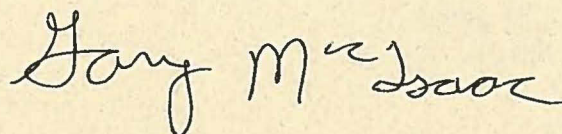
In recognition of your significant achievements, the GCC is pleased to provide you with climate action community branding for use on official websites and letterheads. An electronic file with the 2018 logo will be provided to your Chief Administrative Officer via email. Also enclosed is a *BC Climate Action Community 2018 – Climate Leader* window decal, for use on public buildings.

Congratulations again on your continually improving achievement. We applaud your leadership and wish you continued success in your ongoing commitment to the goal of corporate carbon neutrality, and your efforts to reduce emissions in the broader community.

Sincerely,



Tara Faganello
Assistant Deputy Minister
Local Government Division
Ministry of Municipal Affairs and Housing



Gary MacIsaac
Executive Director
Union of British Columbia Municipalities

Enclosures



GCC Communiqué on the Climate Action Recognition Program

B.C. local governments continue to play a critical role in reducing GHG emissions across the province. In acknowledgment of the ongoing efforts of B.C. local government leaders, the joint Provincial-UBCM Green Communities Committee (GCC) is pleased to continue the Climate Action Recognition Program (*Recognition Program*) for the 2018 reporting year. This multi-level program provides the GCC with an opportunity to review and publicly recognize, on an annual basis, the progress and achievements of each Climate Action Charter (*Charter*) signatory on their *Charter* commitments. Recognition is provided according to the following:

Level 1: Demonstrating Progress on Charter Commitments

Local governments who demonstrate progress on fulfilling one or more of their *Charter* commitments receive a letter from the GCC acknowledging their accomplishments.

Level 2: Measuring GHG Emissions

Local governments that achieve level 1, have completed a corporate carbon inventory for the reporting year and demonstrate that they are familiar with their [community's community energy and emissions inventory](#) receive a letter from the GCC and a 'BC Climate Action Community 2018' logo, for use on websites, letterhead, etc.

Level 3: Accelerating Progress on Charter Commitments

Local governments that achieve levels 1 and 2 and demonstrate significant corporate or community-wide climate action to reduce GHG emissions in the reporting year receive a letter from the GCC and a 'BC Climate Action Community 2018 – Climate Leader' logo, for use on websites, letterhead, etc.

Level 4: Achievement of Carbon Neutrality

Local governments that achieve [carbon neutrality](#) in the reporting year receive a letter from the GCC and a 'BC Climate Action Community 2018 – Climate Leader - Carbon Neutral' logo, for use on websites, letterhead, etc.

To be eligible for the *Recognition Program*, local governments must fulfill the public reporting requirements (including reporting progress to carbon neutrality) of the Climate Action Revenue Incentive Program (CARIP). Recognition levels for the *Recognition Program* are based on the information included in each local government's annual CARIP public report. For more information on CARIP and the public reporting requirements go to:

<https://www2.gov.bc.ca/gov/content/governments/local-governments/grants-transfers/climate-action-revenue-incentive-program-carip>